

Immigrant students' opportunities to learn mathematics

In(ex)clusion in mathematics education

Petra Svensson Källberg

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Abstract

This thesis explores immigrant students' opportunities to learn mathematics. The research is concerned with issues of social justice and adopts a socio-political approach. Immigrant students are often described as students who do poorly in school because they lack "Swedishness" and have insufficient Swedish language skills. This deficit discourse is used when explaining immigrant students' failure in mathematics, which this thesis aims to critique. Also, by adopting two theoretical frameworks, one that draws on the work of Skovsmose (1994, 2014) and one on the work of Foucault (2000, 2002), it aims at exploring possible understandings of immigrant students' opportunities to learn mathematics.

The research questions are addressed in a preamble and four articles. They address immigrant students' perceptions of their opportunities to learn mathematics and how these perceptions come into existence, and the different contributions of using the theoretical frameworks.

Data emanates from interviews, with immigrant students aged 15 to 16 years old and policy texts regarding schooling for newly arrived. Skovsmose's notion of foreground is used when analysing immigrant students' perceptions of their opportunities to learn mathematics. A Foucauldian perspective is used for exploring immigrant students' identity formations as mathematical learners in a context of a forced school transition. The notions of fabrication and abjection (Popkewitz, 2012, 2013) are used as analytical tools when exploring how the newly arrived student as a mathematical learner is fabricated in policy texts.

The findings show how conditions concerning future plans, otherness, Swedishness, perceiving their parents as deficit in relation to Swedish parents, segregation, feelings of exclusion and rowdy mathematics classrooms constitute their foregrounds, and affect their perceptions of their opportunities to learn mathematics. It was also shown how students' identity formations as learners of mathematics are dynamic and enabled by discourse. For example, discourses operating in two different school contexts enabled the transitioning students to form identities as un-engaged and respectively engaged mathematics students. It was shown how students' perceptions were influenced by public discourses, and thus how categorisations of them as immigrant students with deficiencies had looped into their lives. By exploring fabrication of the newly arrived student as a mathematical learner and the process of abjection information on how students may be ordered in relation to what degree they have come to master for example the Swedish language were provided. This may generate feelings of in(ex)clusion, which refers to the inseparability of inclusion and exclusion: any move to include brings with it potential exclusions.

A conclusion is that to be able to understand immigrant students' opportunities to learn mathematics and explain achievement in mathematics, deficiency explanations are not sufficient. Instead, it is of importance to try to understand the students' perspectives and explore the role of discourse and power since it allows for explanations that ground students' opportunities to learn mathematics in the socio-political conditions in which they emerge. This enables for learning more about what constitutes immigrant students' perceptions and how they come into existence and thus allows for addressing processes of in(ex)clusion and critique deficiency explanations.

Keywords: *mathematics education, immigrant students, narratives, learning opportunities, foregrounds, identity, policy texts, fabrication, deficit perspective, discourse, power.*

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IMMIGRANT STUDENTS' OPPORTUNITIES TO LEARN
MATHEMATICS

Petra Svensson Källberg



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To Lovisa.

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Abstract

This thesis explores immigrant students' opportunities to learn mathematics. The research is concerned with issues of social justice and adopts a socio-political approach. Immigrant students are often described as students who do poorly in school because they lack "Swedishness" and have insufficient Swedish language skills. This deficit discourse is used when explaining immigrant students' failure in mathematics, which this thesis aims to critique. Also, by adopting two theoretical frameworks, one that draws on the work of Skovsmose (1994, 2014) and one on the work of Foucault (2000, 2002), it aims at exploring possible understandings of immigrant students' opportunities to learn mathematics.

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The findings show how conditions concerning future plans, otherness, Swedishness, perceiving their parents as deficit in relation to Swedish parents, segregation, feelings of exclusion and rowdy mathematics classrooms constitute their foregrounds, and affect their perceptions of their opportunities to learn mathematics. It was also shown how students' identity formations as learners of mathematics are dynamic and enabled by discourse. For example, discourses operating in two different school contexts enabled the transitioning students to form identities as un-engaged and respectively engaged mathematics students. It was shown how students' perceptions were influenced by public discourses, and thus how

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A conclusion is that to be able to understand immigrant students' opportunities to learn mathematics and explain achievement in mathematics, deficiency explanations are not sufficient. Instead, it is of importance to try to understand the students' perspectives and explore the role of discourse and power since it allows for explanations that ground students' opportunities to learn mathematics in the socio-political conditions in which they emerge. This enables for learning more about what constitutes immigrant students' perceptions and how they come into existence and thus allows for addressing processes of in(ex)clusion and critique deficiency explanations.

Keywords: mathematics education, immigrant students, narratives, learning opportunities, foregrounds, identity, policy texts, fabrication, deficit perspective, discourse, power

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List of included papers

- I Svensson Källberg, P. (2016). Learning mathematics: hope and despair. In J. Häggström, E. Norén, J. van Bommel, J., Sayers, O. Helenius, & Y. Liljekvist, (Eds.), *ICT in mathematics education: the future and the realities. Proceedings of MADIF 10 the tenth research seminar of the Swedish Society for Research in Mathematics Education Karlstad*, January 26–27, 2016. Göteborg: SMDf p. 99–108.
- II Svensson, P., Meaney, T., & Norén, E. (2014). Immigrant Students' Perceptions of Their Possibilities to Learn Mathematics: The Case of Homework. *For the Learning of Mathematics*, 34(3), 32-37.
- III Svensson Källberg, P. (accepted for publication 2018). Identity formations as mathematical learners in the context of transition. *Nordic Studies in Mathematics Education*.
- IV Norén, E., & Svensson Källberg, P. (accepted for publication 2018). Fabrication of newly arrived students as mathematical learners. *Nordic Studies in Mathematics Education*.

All papers are re-published with permission from their respective journals and co-authors.

1 Introduction

Swedish school can be viewed as an institution of opportunities. This means that no matter where you go to school and no matter what your background, all students should be provided the same opportunities for learning (Skolverket, 2012a [The Swedish National Agency for Education]). The Swedish school system has been characterised by the phrase, *a school for all* (Tallberg Broman, 2014), building on a parliament decision from 1962 on a nine-year universal school (Richardson, 1976). According to the Swedish Education Act (SFS 2010:800) students should be provided equal access to education (SFS 2010:800, chapter 1, 8 §) and equal quality of education (SFS 2010:800, chapter 1, 9 §). Further, it is stated that education should promote the development and learning of all students and that education should take into account students' different needs and provide support for the students to develop as far as possible (SFS 2010:800, chapter. 1 § 4). It is also stated that education should strive to compensate for students' different conditions of learning (SFS 2010:800, chapter 1).

However, during the last few decades differences in achievement between different groups of students within the Swedish school system have dramatically increased, suggesting that "a school for all" may not be the case anymore (Tallberg Broman, 2014). One example is the latest PISA study (2015), in which Swedish students performed statistically significantly higher in mathematics than immigrant students born abroad as well as immigrant students born in Sweden (Skolverket, 2016a). The low achievement in mathematics of students of foreign backgrounds and/or from low socioeconomic backgrounds is documented repeatedly in (for example) PISA (Skolverket, 2013; 2016a) and TIMSS reports (Skolverket, 2012b, 2016b). Consequently, there is an *achievement gap* (Gutiérrez & Dixon-Román, 2010) between immigrant students and/or students from low socioeconomic backgrounds and native-born students in Sweden when it comes to mathematics achievement. The term *achievement gap* emerged in the USA, and has become a common phrase in the education literature there. It means that "...a gap in academic achievement persists between minority and disadvantaged students and

their white counterparts” (Ladson-Billings, 2006, p. 3). An existing achievement gap in Sweden indicates that the Swedish school system has failed when it comes to equity and providing the same learning opportunities for all students. It raises questions about participation and processes of inclusion and exclusion. In particular, in relation to school mathematics, since mathematics is the subject that, after Swedish as a second language, has the highest proportion of students who do not achieve a passing grade at the conclusion of compulsory schooling (Siris database, 2016). A passing grade in mathematics is needed to qualify for a national programme in upper secondary school. Further, the number of immigrant students in Swedish schools has increased significantly during the last few years. For example, in 2015, approximately 163 000 people applied for asylum in Sweden, of which 70 384 were children (SOU 2017:54). This current situation poses great challenges for the Swedish school system when it comes to providing education and equal learning opportunities for all students. To avoid marginalisation and exclusion of immigrant students in the Swedish school system their opportunities to learn mathematics need to be seriously discussed. Thus, immigrant students’ opportunities to learn mathematics are the focus of this thesis.

My experiences as a teacher, teaching mathematics and science to immigrant students in a school located in a multicultural and socioeconomically disadvantaged and stigmatised area have also had consequences for the selection of the topic of this thesis and for how the thesis has been conducted. As have my experiences of working with school development - that is, working with mathematics teachers with the aim of developing their teaching practice. During the years when I taught immigrant students and worked with mathematics teachers, I was privileged to meet students from a range of different backgrounds and teachers from many different schools. My two jobs were very rewarding but also challenging in many ways, which made me reflect. For example, I thought a lot about what learning opportunities the students actually had and how I as a teacher and school developer could contribute to provide better learning opportunities. Moreover, during these years I encountered various claims and explanations from teachers and other school staff about why immigrant students do not pass mathematics. For example: students lack prior important knowledge in mathematics, they do not receive support from their families in their school work, they do not do homework and have no one to help them with their mathematics homework, they do not master the language of instruction, in this case Swedish, and they do not know the Swedish culture. These kinds of explanations reflect *deficit thinking* about immigrant students (Nilsson & Axelsson, 2013). The

students and their parents are thought of as having deficiencies, for example lacking proper Swedish language skills. This was something I found very problematic and that I could not fully agree with in relation to the experiences that I had encountered in my work as a teacher. I found it problematic since it enables blaming of the students and their families for not learning what is expected of them. That is, if one just learns Swedish and the Swedish culture well enough the learning opportunities and achievement in mathematics will increase. For me, the solution was not that simple, pushing me to reflect on other possible issues that could influence immigrant students' achievement in mathematics. Thus, I became interested in learning more about how issues related to the social and political context may have an influence on immigrant students' opportunities to learn mathematics. But, foremost, when I started my research studies towards a licentiate degree (see Svensson, 2014) in 2010 I was interested in the perspectives of the students. I had heard several explanations about immigrant students' low achievement in mathematics from people other than the students themselves, and thus it became important for me to listen to what students themselves had to say about their opportunities to learn mathematics. It is within this context that my interest in trying to understand immigrant students' opportunities to learn mathematics started.

When I started my research studies towards the licentiate thesis, I read some work of Ole Skovsmose (for example, Skovsmose, 1994). The way he wrote about backgrounds and foregrounds in relation to opportunities to learn mathematics was something I as a teacher teaching mathematics to immigrant students in a school located in a multicultural and socioeconomically disadvantaged area could relate to. His work with foregrounds seemed to deal with several issues that I as a teacher had encountered and seemed to have the potential to explain many of the issues I had experienced. For example, using foregrounds as an analytical tool appealed to me because it considers the students' present situation and not only the backgrounds of the students when discussing their opportunities to learn. Furthermore, when using foregrounds as an analytical tool the socio-political context is acknowledged, thereby enabling explanations for students' failure in mathematics that are not directly connected to the students and their deficiencies. So, by listening to the students' narratives I, tried to make the students fairness by exploring their foregrounds and learning opportunities in mathematics (see article I and II) and in so doing trying to offer other possible explanations to immigrant students' low achievement in mathematics than explanations referring to their deficiencies.

However, when reflecting on this research about students' foregrounds (studies I and II), my conclusion was that more could be said about these students' situations and learning opportunities in mathematics by continuing the research. In particular, I got interested in trying to understand how students' perceptions of their learning opportunities come into existence and how this may lead to inclusion and/or exclusion in mathematics for these students. Also, to uncover some of the complexities of the situation, in which immigrant students in Sweden are situated when it comes to opportunities to learn mathematics, I turned to other theories. In particular, to theories that address issues of power, to try to understand how students come to perceive themselves and position themselves in certain ways - for example as the deviant in relation to Swedish students. I believed that I needed to more explicitly address issues of power and more explicitly attend to macro level issues when trying to widen my understanding about immigrant students' opportunities to learn mathematics. Thus, I chose to change theoretical perspective when continuing with the third and fourth study. Consequently, there is a theoretical displacement, from the work of *Ole Skovsmose* (studies I and II presented in articles I and II), to the work of *Michel Foucault* (studies III and IV presented in articles III and IV). Thus, this thesis contributes to knowledge about immigrant students' perceptions of their opportunities to learn mathematics and how immigrant students' perceptions of themselves as learners of mathematics may come into existence. This thesis also adds knowledge on how the two theoretical perspectives that this thesis takes on, contribute to new understandings when exploring immigrant students' opportunities to learn mathematics.

Immigrant students in Sweden – a definition

Before getting deeper into this thesis a definition of the word *immigrant* has to be made. I have chosen to use the term immigrant, referring to students with foreign backgrounds, since students with foreign backgrounds is a long expression that becomes unwieldy in a text. I have chosen to use the same definitions of students with foreign backgrounds as Skolverket (2011a, 2011b) and Statistics Sweden (2002). The term immigrant refers to a person of foreign background born abroad or born in Sweden with both parents born abroad. However, I will also use the term *newly-arrived students* when talking about students who have recently arrived in Sweden, leaning on the definition in the Education Act (SFS 2010:800, chapter 3, 12 §) that defines a newly-arrived student as a person

who has lived abroad and who now lives in Sweden or is deemed to reside in Sweden and has started their education in the country after the autumn term the year that he or she turns seven. After four years of schooling in Sweden the student will no longer be considered as a new arrival.

However, these categorisations are not as simple as they may sound. They may be problematic, since for example a student who is born abroad is categorised as an immigrant even though he or she has Swedish citizenship and might have lived in Sweden for many years. The same applies to students who are born in Sweden, with both parents born abroad. They are categorised as immigrants, although they have lived their whole life in Sweden and have a Swedish citizenship. Categorisation is always problematic, since it can lead to stigmatised roles. There is research showing that immigrant students in Sweden are often categorised as problematic (Bunar, 2009). Being Swedish and knowing the Swedish language is often perceived as normal and desirable, while social problems and a marginalised position in society is associated with immigrants (Bunar, 2009; Kallstenius, 2010). Immigrant students in Sweden are also shown to be categorised differently in relation to their performance in school. For example, a study by Gruber (2007) showed that students who are successful in their schoolwork are categorised and perceived as “less immigrant” than students who fail with their schoolwork.

I would like to emphasise that despite the use of the term immigrant and newly-arrived students in this text, I dissociate myself from using the terms within an excluding and deficit perspective. Despite good intentions, use of these categorisations can be counterproductive, reinforce stereotypes, and runs the risk of aligning with public deficit discourses about immigrant students in Sweden that regard a particular group as demanding and problematic in school (see for example, Bunar, 2009). On the other hand, pointing out a particular group of students when conducting research with them, as in this case, can also provide understandings about how, for example, deficit models regarding immigrant students with various language and socioeconomic backgrounds work. The categorisation of students is also a way to describe them, while telling stories “about the people in a group category” (Norén & Björklund Boistrup, 2013, p. 1). Furthermore, I also stress that these definitions and categorisations are general, meaning they contain a great variety. In this kind of categorisation, the backgrounds of the students are not presented - that is you do not know if the origin of the students is, for example, EU-countries, developing countries or countries affected by war. The students in this study are immigrants living in a multicultural and socioeconomically disadvantaged

and stigmatised area. The students are further presented in the chapter *Methodological perspectives*.

The Swedish context and immigrants in Sweden

The Swedish context, and its cultural configuration has been changing over the years as the “immigration pattern” has changed. This, needs to be explored when trying to understand immigrant students’ opportunities to learn mathematics today and the socio-political context their opportunities to learn are emerged in. For example, a change in the cultural configuration also entails a change in who “the other” or “the deviant” is in Sweden today which need to be addressed to understand imposed categorizations on groups of immigrant students.

In this section, I explore the Swedish context - in particular who the immigrant students in Sweden are today and their backgrounds - are presented and discussed. Furthermore, the context is described, including for example residential segregation and school segregation which many immigrant students are subjected to and thus are of importance for their learning opportunities.

Sweden

Sweden has a population of just above 10 million people (Statistics Sweden, 2017b). However, it is a fairly large country measured in square kilometres. It means that Sweden has a low-density population - 23 people per square kilometre (OECD, 2015). However, as much as 85 % of the population live in urban areas and one third of them lives in the three largest cities of Sweden: Stockholm, Göteborg and Malmö (OECD, 2014). The economy of Sweden is stable and in growth. For example, Sweden is ranked as the sixth most competitive country when comparing competitive economies of the world (World Economic Forum, 2014). Further, employment rates are high: in September 2017, 68,1 % of all 15-74 years old in Sweden were employed (Statistics Sweden, 2017a). However, despite this large number, the Swedish labour market faces significant challenges. These challenges involve who gets to be a part of the labour force and who does not. An example to illustrate this is the unemployment rate. After the second quarter of 2017 the unemployment rate was estimated to be 7,3 % of the population aged 15 to 74 years old. However, the unemployment rate of the native- and foreign-born populations differs: 5,1 % of the native-born 15 to 74-year olds are unemployed, whereas the

percentage of foreign-born unemployed is 15,5 % (Statistics Sweden, 2017a). It means that immigrants in Sweden face great challenges when it comes to the labour market. Furthermore, asylum-seekers are not included in these statistics, which means that the unemployment rate for immigrants is higher if asylum-seekers are included.

Sweden has gone from being a country that people migrated from, in particular in the nineteenth century and early twentieth century, to a country to which, since the Second World War, people immigrate. In recent years there has been a growth in population - an increase of approximately 7% between 2005 and 2014, which is a result of several decades of immigration. In 2014, 16 % of the population in Sweden were born abroad in over 200 different countries (Statistics Sweden, 2016). However, half of immigrants born abroad are born in only eleven countries. In 2014, the most common country of birth for immigrated women in Sweden is Finland, whereas for men it is Iraq. Since 1970, approximately 1,3 million women and 1,4 million men have immigrated to Sweden. During the same time 700 000 women and 800 000 men have emigrated from Sweden (Statistics Sweden, 2016). However, who has immigrated and emigrated and for what reasons has changed over the years. Thus, who the “average” immigrant student in Swedish schools has been and is today has changed over the years.

In the following text, I will give an account of the immigration to Sweden over the years, starting with the Second World War. I retrieved this information from a report issued by Statistics Sweden, referenced as Statistics Sweden 2016. Thus, the following presentation of immigration into Sweden builds on this report, which means that I have left out many of the references to this text. However, when information has been retrieved from elsewhere it is referenced in the text. I do not attempt to make an exhaustive or complete account of it. I will pay attention to the largest groups of immigrants in Sweden over the years and the largest groups of asylum-seekers in recent years (2000 to 2016). I do so to provide an overview of who the immigrant students in Swedish schools have been over the years, and who they are today.

Immigration after the Second World War

Between 1940 and 1954, approximately 300 000 immigrants were registered in Sweden. During this time 55 % of the immigrants were women and 45 % were men, as there was a high demand for housekeepers in Sweden. Thereafter, the trend reverses as men dominate immigration to Sweden. Since Sweden did not participate in the Second World War

economic conditions in Sweden were better than in the countries which had been in the war. Whereas unemployment dominated many war-ravaged countries, demand for labour was high in Sweden. Consequently, foreign labour was employed in Sweden. This also contributed to a liberalisation of the immigration policy, and in 1954 Sweden made an agreement with the other Nordic countries on a common labor market so that people with citizenship in any Nordic country could live and work anywhere else within the region. Furthermore, it became easier for immigrants from outside the Nordic countries to get residence and work permits approved (Statistics Sweden, 2016). The refugees of the Second World War that came to Sweden came mainly from the Baltic and Nordic countries, but also from Germany and Poland.

During the period 1955 to 1969, approximately 500 000 immigrants came to Sweden. Contrary to the post-war period described above, the number of immigrant men was larger than the number of women. Most of the immigration consisted of migrant workers and almost half of the immigrants during that time came from Finland. There were also immigrants coming from the other two neighboring countries Norway and Denmark, as well as immigrant workers from countries such as Yugoslavia, Italy, Greece and Turkey. In 1969, Sweden had about eight million inhabitants, of which 6 % were born abroad. Out of the 6 %, 40 % were born in Finland. Most of the people who came to Sweden during this time started working in industry where the workforce was needed. At the end of this period, in 1968, the government decided to restrain immigration from countries outside of the Nordic region. This regulation was considered necessary so that the resources (of Sweden) would be sufficient to provide the same living conditions to all people. However, immigration into Sweden continued to increase until the beginning of the 1970s. Thereafter, it decreased as a result of the regulation but also as a result of the recession in Sweden in the 1970s. Until the mid-1980s, immigration remained at a relatively low and fairly stable level.

Until 1982, most immigrants to Sweden came from Finland. Thereafter, most immigrants were returning Swedes. From 1985, immigration to Sweden started to increase. In total, between 1985 and 2000, 825 000 immigrants came to Sweden, 49 % of whom were women and 51 % men. During this time immigration from people born in Iran and Iraq increased as a consequence of the war between these two countries in the 80s and as a consequence of the Kuwait war in the 90s. Also, in 1989 and 1990 a large number of men born in Norway came to Sweden because of the financial crisis, which hit Norway before Sweden. Norway was the most common country of birth for the immigrants who came to Sweden during those

years. In the beginning of the 90s many immigrants from the former Yugoslavia came to Sweden, as a consequence of the civil war there. In 1993 and 1994, 67 000 people, born in former Yugoslavia or one of the newly formed countries, came to Sweden.

Immigration between 2000 and 2014

Between 2000 and 2014 the largest proportion of immigrants were returning Swedes (15 %), while another large proportion were immigrants from neighboring Nordic countries (10 %). Immigrants from the rest of the European Union constitute 19 %. Immigrants from countries outside of the EU/ESS during this time were often refugees and family reunion immigrants from countries like Iraq, Syria and Somalia or work-labor immigrants from India, China and Turkey, and students from (for example) China and Pakistan. In 2014, the ten most common countries of birth for immigrants in Sweden were, in descending order: Finland, Iraq, Poland, Iran, Yugoslavia, Syria, Somalia, Bosnia-Herzegovina, Germany and Turkey. However, when looking at women and men separately, the order differs. In 2014 Finland was the most common country of birth for foreigners born in Sweden. However, these people had been living in Sweden for a long time - half of them for 45 years or longer. If we treat all countries from the former Yugoslavia as one country, then this becomes the most common country of origin for Swedish immigrants in 2014. Approximately 162 000 people born in the former Yugoslavia lived in Sweden in 2014. The countries included in the former Yugoslavia are: Yugoslavia, Bosnia-Herzegovina, Kosovo Croatia, Macedonia, Montenegro, Serbia, Serbia and Montenegro and Slovenia (Statistics Sweden, 2016). Most of these people came to Sweden in 1993 and 1994 as a consequence of the war. Over one third of them were children, which means that a large proportion of the immigrant students in Swedish schools during this time were children from the former Yugoslavia.

Another country of origin of many Swedish immigrants is Poland. Immigration from Poland has varied over the years depending on factors like the economic and political situation in Poland and the entrance of the country into the European Union. During the 2000s Poland was the most common country of birth for foreigners in Sweden. In 2014, people born in Germany were the ninth largest group of foreigners in Sweden. Today (2014) there are 42 000 German-born immigrants living in Sweden - 24 000 women and 19 000 men. These women mostly immigrated after the Second World War in the 1940s and 1950s. The reason for this was the high demand for housekeepers in Sweden, as mentioned above, and thus

immigration from Germany at that time was dominated by women. In the 1960s men came to work in Sweden and thus dominated immigration from Germany. Since then, immigration from Germany has been low, with an exceptional peak in 2007. This means that the majority of people born in Germany that live in Sweden today do not attend comprehensive school.

The tenth most common country of birth for foreigners in Sweden in 2014 is Turkey. As a consequence of an unstable political climate in Turkey over the years, people have immigrated to Sweden. Also, in the 1960s Turkish-born people started immigrating to Sweden to work. During the years 1987 to 2014, the most common reason for immigrants to come to Sweden from Turkey was for family reunion - 23 800 people. The second most common reason was to seek asylum - 5 000 people - and the third reason was to work, which was 3 000 people. Half of the women born in Turkey and living in Sweden in 2014 have been living in Sweden for more than 22 years, while the corresponding number for men is 18 years. This means that the number of people born in Turkey living in Sweden and attending comprehensive school in Sweden today is most likely reasonably few.

Immigration from outside of Europe

Immigration from countries outside of Europe to Sweden was low before 1970. People who are resident in a country outside of the EU/ESS need a residence permit to be able to settle in Sweden.

Over the years, people born in Iran have come to live in Sweden. In 2014, Iran was the fourth most common country of birth for foreign-born people in Sweden. Immigration from Iran to Sweden had its peak around 1988, at the end of the Iran-Iraq war that lasted from 1980 to 1988. During that time, approximately 25 % of the immigrants from Iran were children, with the majority being adults. However, since the mid-2000s, the distribution between women, men and children born in Iran and emigrating to Sweden has been more even. Approximately one third were women, one third men and one third children under 19 years old. Furthermore, one third of people immigrating from Iran during this time were asylum-seekers and one third immigrated to Sweden for family reunion. Many of the asylum-seekers were Afghan citizens born in Iran. The remaining third were Swedish citizens or citizens of other countries in the European Union or labor immigrants or students. Looking at the age of the Iran-born people in Sweden in 2014, two percentage peaks can be discerned: one of people around 30 years of age and the other of people around 55 years of age. The first peak has an even distribution between women and men, while men

dominate the latter. Today (2014), half of the women born in Iran have lived in Sweden for 20 years, while the corresponding number for the men born in Iran is 23 years or longer. Consequently, the number of students born in Iran attending Swedish comprehensive school today compared to the late 1980s and the 1990s is fairly low.

Immigrants in Sweden who were born in Somalia started to arrive in the beginning of the 1990s because of the unstable political situation in the country and in 2014 were the seventh most common foreign-born people in Sweden. In 2014, there were 60 000 people born in Somalia living in Sweden, almost all of whom have come to Sweden as asylum-seekers or as family reunion immigrants (Statistics Sweden, 2016). However, this number only includes those people who are registered as residents. Statistics on Somalian asylum-seekers from year 2000 to 2016 reveal that Somalians constitute 7 % of all asylum-seekers in Sweden - which is 50 959 people. (Migrationsverket, 2017)

Iraq is the second most common country of birth for foreign-born people in Sweden in 2014. However, when separating women and men, Iraq is the most common country of birth of foreign-born men in Sweden and the third most common among foreign-born women in Sweden. Over a long period of time different conflicts have persisted in Iraq: between 1980 and 1988 the war between Iran and Iraq; the Kuwait /Gulf war of 1990 and 1991; and then between 2003 and 2011, the Iraq war. In addition, there have been ongoing internal tensions and conflicts between different ethnic and religious groups within Iraq. This unstable situation has contributed to the immigration of Iraq-born people to Sweden. Today (2014) there are 70 000 men born in Iraq living in Sweden and the corresponding number for women is 60 000. These numbers include the people who are registered as residents but not asylum-seekers. Half of the them - both women and men - have lived nine years or longer in Sweden. Around year 2000, there was an increase in families with children coming from Iraq to Sweden. Almost 40 % of the immigrants from Iraq at that time were children and 45 % were married men and women. During this time, half of the immigrants from Iraq came as asylum-seekers or for family reunion. In subsequent years there was a decrease in the number of children and married people arriving, but still, between 2006 and 2008, 33 % of the immigrants from Iraq were children. It means that these children born in Iraq and coming to Sweden in the 2000s have been and are students in Swedish schools. Furthermore, statistics from 2000 to 2016 on asylum-seekers in Sweden show that Iraq is the second most common country of birth for asylum-seekers in Sweden - 13 % (90 217 people) of all asylum-seekers during this period were from Iraq (Migrationsverket, 2017). In 2015, there was a peak with 20 858 Iraq-

born asylum-seekers. This was a consequence of the acute crisis in the Middle East, and in 2016, this number dropped to 2 758 - closer to numbers in the years prior to 2015, except for 2007, in which 18 559 applied for asylum (Migrationsverket, 2017).

Introducing restrictions

The drop in the number of asylum-seekers in 2016 was a consequence of a new law regarding entrance into Sweden (SFS 2015:1073). From being a country with an open immigration policy, Swedish laws changed so that it became more difficult even for asylum-seekers to be let into Sweden. The new law regarding rules for asylum were put into action on the 20th of July 2016 - time-limited residence permits, a restriction on the right to family reunion immigration, and tightening of living requirements were introduced (SOU 2017:54). The time-limit residence permit is three years. Further, a new law (SFS 2015:1073) regulating special actions in the event of serious danger to public order or internal security in the country of Sweden was issued. The law gives the government or an authority determined by the government the right to issue temporary regulations on identity controls for transportations carried out by bus, train or passenger ships to Sweden from another state (SFS 2015:1073). The introduction of the new laws was a consequence of the large influx of refugees in 2015 - approximately 150 000 - which the government interpreted as a serious threat to public order and internal security and thus introduced temporary border and identity controls. It means that people need to show a valid identification document to be able to cross the border into Sweden. The law expires in December 2018. In May 2017, the identity checks were stopped, but the internal border checks still exist (Regeringskansliet, [The Government Offices of Sweden], 2017). It means that the identity checks that were conducted by the transporters on all people entering Sweden (for example, the identity checks that were made on all people before entering the trains that run from Denmark to Sweden) were stopped. The temporary border checks that still exist are located in the south of Sweden and are managed by the police, who check that people coming into Sweden have the right to do so.

“New” groups of immigrants in Sweden

A fairly new group of immigrants in Sweden is comprised of people born in Syria. Syria was the sixth most common country of birth of immigrants in Sweden in 2014. Since 2012 many people born in Syria have come to Sweden because of the war in Syria, but since they are mostly asylum-seekers they are not included in the statistics on how many people born in

Syria live in Sweden. According to statistics on asylum-seekers in Sweden between 2000 and 2016, people born in Syria constitute the largest percentage. 17 % of all asylum-seekers in Sweden during this time were born in Syria - in total 117 369 persons. From year 2000 to 2011, a couple of hundred Syrian-born people applied for asylum in Sweden each year. However, in 2012 the number of asylum-seekers from Syria increased to 7 814. The following year, it doubled to 16 317 and the year after, 2014, it almost doubled again to 30 583. In 2015, it peaked with 51 338 Syrian-born asylum-seekers. Then, in 2016 the number dropped to 5 459 because of the restrictions of the new law (mentioned above). Consequently, many of the immigrant students in Swedish schools today are children who came to Sweden as refugees from Syria.

Another group of immigrants fairly new to Sweden consists of people born in Afghanistan. After the Taliban took over that country in 1996, the numbers of people living in Sweden but born in Afghanistan has increased. Before 2007, the gender distribution as well as the age distribution of the people coming to Sweden from Afghanistan mirrored the distributions for refugee immigrants from other countries, meaning that it was a combination of children and adults with a dominance of unaccompanied men (Statistics Sweden, 2016). However, in 2007 the distributions changed. That year, 20 % of the immigrants born in Afghanistan were boys between 15 and 18 years old. In 2011, this number was even higher, almost 40 %. Statistics on asylum-seekers show an increase in the number of boys born in Afghanistan seeking asylum in 2015 (Statistics Sweden, 2016). In 2014, there were 28 000 people born in Afghanistan in Sweden, 17 000 were men and 11 000 women. Half of the men were between 15 and 25 years old and constituted 30 % of all people born in Afghanistan residing in Sweden. However, this number does not include the asylum-seekers. From 2000 to 2016, people born in Afghanistan seeking asylum in Sweden constitute the third largest group, making up 69 242 people or 10 % of all asylum-seekers in Sweden during this period (Migrationsverket, 2017). Furthermore, the statistics show that since 2009, several more people born in Afghanistan have applied for asylum. Between 2000 and 2009, it was a couple of hundred people each year. In 2009, 1 694 applied and thereafter a couple of thousand have applied each year, except for 2015 when 41 564 people born in Afghanistan came to Sweden as asylum-seekers (Migrationsverket, 2017).

The above overview shows how, at different times, different groups of people born in different countries have come to live in Sweden for different reasons. Hence the immigrant students in Sweden do not constitute a homogenous group, but reflect how the “immigration pattern” has changed

over the years. For example, in the decades after the second world war, many immigrant students in Swedish schools were children born in Finland, whereas today many immigrant students in Swedish schools have non-European backgrounds, born in countries such as Syria, Afghanistan or Iraq. The reasons for the immigration have also varied over the years. After the Second World War, many of the foreign-born came to Sweden to work, whereas the immigrants who have arrived more recently are refugees and asylum-seekers coming from religious wars in Muslim countries. The introduction of the restrictions (see above) and also new policies regarding schooling for newly arrived, was a consequence of the large immigration of this group of immigrants (refugees from Muslim countries) which signals that more needs to be done than has been previous. Meaning that these students may be categorized as “the very far other” in relation to Swedish students since they are needed to be acted on more than immigrant students in the past.

The situation “today”

As was noted above, immigration to Sweden has been high during the 2000’s and in particular during the last ten years (SOU 2017:54). As a consequence, the number of immigrant students in Swedish schools has increased significantly over the last few years. Between 1994 to 2016, the proportion of immigrant students in Sweden increased from approximately 12 percent to 24 percent, the largest increase occurring between 2006 and 2016 (SOU 2017:54). In the beginning of this period, the increase consisted mostly of immigrant students born in Sweden (both parents born abroad), whereas in the end of the period the increase consisted of mainly foreign-born students. In the last few years, a substantial number of asylum-seekers have come to Sweden, in particular in 2015 when approximately 163 000 applied for asylum, 70 384 of whom were children (SOU 2017:54). This is a consequence of the international refugee crisis. Sweden is the country in the EU which has received the highest proportion of refugees in relation to its population: 8.5 per thousand capita (Hungary is second with 4.4) (Migrationsverket 2016). Of these newly-arrived asylum-seeking children in 2015, approximately 40 000 were aged 13-18 years and just under 31 000 were aged 1-12 years (Skolverket, 2016a). In the school year 2011/12, 183 676 (20.7 percent of all) students in Swedish compulsory school were entitled to study a mother tongue different from Swedish; in 2015/16 the number had increased to 250 399 (25.4 percent of all). In recent years, Arabic has become the most common mother tongue after Swedish spoken in school (Skolverket, 2015/16).

Schooling for newly-arrived students

Asylum-seeking children in Sweden have the right – but not the obligation - to attend school, including pre-school and upper secondary school. This means that the municipality in which the children live has the responsibility to provide education for them on the same terms as for other children who live in Sweden. Even if the asylum-seeking children have turned 18 when they arrive in Sweden, they have the right to finish their education. When it comes to undocumented children they have the same right to education on the elementary and upper secondary level as children with residence permits. However, they do not have the right to pre-school, out-of-school provision or adult education (Nilsson Folke, 2017). Further, it is suggested that the children should start school no longer than a month after the arrival in Sweden or as soon as it is appropriate with respect to the child's personal situation.

The current situation, with a large increase of foreign-born students in Swedish schools, places higher demands on those responsible for their education and on how schools manage the reception, organisation and teaching of these students (SOU 2017:54) in order to be able to provide equal education and equal quality of education. Accordingly, many challenges in the school system need to be resolved, such as the increasing need for teachers, in particular teachers who can teach Swedish as a second language, mother tongue language teachers, and mother tongue supervisors¹ (SOU 2017:54). Thus, in recent years several policy documents about schooling for newly-arrived students have been issued to guide and support the organisation of teaching and learning for newly-arrived students in Swedish schools. For example, in 2016 Skolverket issued *Allmänna råd för utbildning av nyanlända* (General guidelines for the schooling of newly arrived 2016c). This policy text holds general recommendations for municipalities, principals, teachers and other school staff about how they should organise and work to meet the regulations of the Swedish Education Act, the Education Ordinance and the official curriculum. It aims to affect development of the Swedish education system in a certain direction and to promote legal consistency. Adherence is mandatory. Students are regarded as newly-arrived up to four years from arrival. Within the educational system resources are tied to that time span, and offer optional teaching in mother tongue, as well as in Swedish as a second language (Utbildningsdepartementet [Ministry of Education],

¹ Students with another mother tongue than Swedish has the right to receive support in their mother tongue to be able to follow the regular teaching, which is conducted in Swedish (Skolverket, 2015). This support is provided by mother tongue supervisors.

2015). The students have to learn Swedish, and they are entitled to a special introduction to school, including knowledge about the Swedish school system and the grading system. The laws regarding newly-arrived students in Swedish schools were changed on the 1st of January 2016. Consequently, within two months of a newly-arrived student starting compulsory school in Sweden a mapping of the student's prior knowledge has to be done. The mapping is used to make decisions about which school year to place the student in, how the teaching should be planned, and how the teaching time for the subjects will be distributed. During the first year, a redistribution of teaching time for the benefit of studies in Swedish as a second language can be decided on by the school principal (Skolverket, 2016c). Moreover, the school principle has to appoint personnel to do the mapping. The mapping team must include both mother tongue teachers and subject teachers. Mathematics is one of the subjects that is mapped.

Different prerequisites

School for newly-arrived students is usually arranged in introductory classes, providing a basis in the Swedish language for later transition to mainstream classes. However, how introductory teaching is organised differs greatly between different municipalities and schools and until today, there is insufficient knowledge about what successful teaching for newly-arrived students entails (OECD, 2006; Nilsson & Axelsson, 2013). The introduction to Swedish schooling is a complex process, since newly-arrived students may have very different backgrounds in terms of, for example, language and school experiences. From 2008, there has been a change in newly-arrived students' countries of origin. In recent years, more of the newly-arrived students come from countries whose school systems are very different from the Swedish. In Swedish policy texts sometimes labelled as relatively undeveloped (SOU 2017:54).

Up to around 2005 the parents of foreign-born students were almost as highly-educated as parents of students with Swedish backgrounds. Today, 30 percent of all newly-arrived students have parents with a post-secondary education (SOU 2017:54). It is well known that the level of parents' education has an impact on school achievement (Skolverket, 2015). For example, it is more likely that a student will qualify for upper secondary school if her parents have a post-secondary education (SOU 2017:54). For students born abroad of parents with a strong post-secondary education, the likelihood of them being qualified to apply for upper secondary school is three times higher than for students with parents who do not have a substantial post-secondary education. Students with Swedish backgrounds

are four times more likely to qualify for upper secondary school (SOU 2017:54).

Further, educational backgrounds of the newly-arrived students are important when transitioning to the Swedish school system. Students may have attended school in their home country to a larger or lesser extent depending on where they come from. For example, some students from countries at war may have been fleeing danger zones and thus sporadically attended school, or perhaps did not attend school at all for long periods. For example, 44 % of all immigrated students between 7 and 19 years of age (Statistics Sweden, 2014), were born in countries outside of Europe. Several of these countries suffer from political instability and some of them are classified as developing countries. Students who come to Sweden therefore have different needs depending on their prior schooling experiences in their home countries. In addition, the newly-arrived students' mother tongue influences the transition to the Swedish school system since the way a student learns Swedish depends on how closely related the mother tongue is to Swedish (SOU 2017:54). For example, in terms of the distance between Swedish and other languages in relation to alphabet, grammatical structures and phonetic systems.

The age at which students immigrate also impacts on their achievement in Swedish school. Education prerequisites in Sweden have also changed - the immigrant student in the Swedish school of today has on average two years less in the Swedish school system to achieve the knowledge requirements than immigrant students had in the mid 2000s (SOU 2017:54).

Segregation

From the above it can be concluded that Sweden of today is a diverse country, characterized by multiculturalism and multilingualism. For example, Swedish is the official language in Sweden. Besides Sweden's five officially recognised minority languages which are: Finnish, Meänkieli (Torne Valley Finish), Sami languages, Yiddish and Romani, more than 100 different languages are spoken in schools. However, to what extent Sweden is a multicultural and multilingual society differs in different parts of Sweden, which brings in the notion of segregation.

The distribution of students with foreign backgrounds and newly-arrived students is uneven among the country's municipalities. Municipalities with large proportions of foreign-born are usually located in metropolitan areas (SOU 2017:54). But statistics on newly-arrived students in metropolitan municipalities show that the proportion of newly-arrived students compared to previous years is relatively low. But if we

look at the numbers of newly-arrived students in metropolitan areas, they still outscore smaller municipalities - for example, in the autumn of 2016 Stockholm had 4 723 newly-arrived students, whereas Göteborg had 3 738, and Malmö, 2 928 (SOU 2017:54). In the school year 2016/2017, the proportion of newly-arrived students in remote and manufacturing municipalities was 14 % of the total number of students. In the autumn of 2016, 41 % of all newly-arrived students in compulsory school attended school in 29 out of Sweden's 290 municipalities. Another example of uneven distribution is the municipality of Åsele, in which almost a quarter of the students are newly-arrived, whereas in the municipality of Danderyd, there is only one newly-arrived out of every 200 students (Lärarnas tidning, 2016 [The Teachers' newspaper]).

It has been shown that the area in which they live and the school they attend is important for students' achievement (Skolverket, 2009). Segregation is therefore important when discussing immigrant students' opportunities to learn. Students living in areas with a high proportion of immigrant children run a greater risk of failing to gain access to upper secondary school than children who live in another area, regardless of what school they attend (Skolverket, 2009). This implies that residential segregation impacts on students' school performance. Furthermore, students are placed in the public school closest to their residence, due to the attendance zone principle, so residential segregation results in schools with a predominantly foreign-born student body (Bunar, 2010). Residential segregation based on social and migration backgrounds (most notably in the suburbs of the three largest cities of Stockholm, Göteborg and Malmö), also impacts on the student compositions of elementary schools (Bunar & Ambrose, 2016). For example, there are suburban schools in these cities with up to 100 % of the students having a first language other than Swedish. These suburbs are often described as marginalised and stigmatised (Kamali, 2006). Since the 1970s these suburbs have become increasingly populated by immigrants. According to Kamali (2006), the marginalisation and stigmatisation of these suburbs most often occurs outside these areas. He states that the labor market, official politics and the media are among the most important actors for increasing the marginalisation and stigmatisation of the suburbs. In Sweden, the words 'immigrant' and 'suburb' are strongly connected (Alinia, 2006). They are two stigmatised categories that in public opinion and in public discourse are often associated with social and cultural problems. She notes that in the Swedish context, the word suburb refers to non-Swedish and immigrant-dense areas and therefore also connotes poverty, segregation and marginalisation (Alinia, 2006). She says this means that people living in

these areas are often stigmatised - positioned on the outskirts of society, positioned outside the national community. Compulsory schools located in these areas often struggle to produce students who qualify for a national programme in upper secondary school. In some areas, the proportion of students who do not receive a passing grade in mathematics when finishing compulsory school is very high, sometimes up to 80 % (Siris database, 2016). Segregation consequently becomes an issue for the educational system.

How students perform has increasingly come to depend on the school that they attend (Skolverket, 2009). Since the introduction of the *Free school choice* in 1990, parents and their children have had the freedom to choose which school to attend, subject to availability. If a student does not choose a school the so-called attendance zone principle is applied (Bunar, 2010) and the student will be placed in the school closest to where they live. Consequently, freedom to choose schools can both increase and decrease opportunities for learning, since it has been shown that students' academic achievement can depend on what school they attend (Skolverket, 2009). When it comes to choosing schools, there is a strong relationship in Sweden today between parents' socioeconomic status and their choice of school for their children. For example, there is research showing that it is predominantly parents with economic, cultural and social capital who take advantage of the free school choice and chose schools for their children (Bunar, 2009; Kallstenius, 2010; Kjellman, 2001). In a recent study conducted in Sweden by Ambrose (2016), it was shown that different actors manage school choice based mainly on how well their habitus and different forms of capital resonate with the structure of the field. Thus, it is reasonable to believe that the free school choice has contributed to school segregation in Sweden, which has also been shown by Ambrose (2016) and Bunar and Ambrose (2016). Ambrose (2016) investigated how students (13-16 years old), parents, and school professionals perceived and discussed their schools, other schools, and the neighbourhoods around them. She showed how a combination of residential segregation, negative symbolic representations, and school choice drive differentiation between schools that leads to more homogeneous schools and enables categorisations of schools as "better" or "worse". Thus, some schools become opt-in schools and others opt-out schools, creating a local school market. Opt-out schools are often schools with an overrepresentation of students with migration backgrounds and students from families with lower socioeconomic status (Bunar & Ambrose, 2016). Ambrose (2016) also found that this reinforcement of differentiation between schools that is operating as a consequence of the free school choice, is something that is largely considered "normal" and as something that is "unable to stop". She

also showed, that in a system of free school choice, the bad reputation and low achievement of the opt-out schools is almost exclusively blamed on students and parents.

Challenges for the Swedish school system

The current situation, described above, the increase in immigration from non-european populations and the large increase of refugees from countries in war poses significant challenges for a Swedish school system striving to accomplish the aims stated in the School Act (SFS 2010: 800), about providing an equal education of quality *for all* students. The Swedish school system is bound to provide equal opportunities to learn regardless of the students' backgrounds. However, equal education and opportunities are not always available, specifically not for immigrant students and students from low socioeconomic backgrounds (Wigerfelt, 2009; Hansson, 2011; Tallberg Broman, 2014). An example that relates to school mathematics, are the findings of Hansson (2011). She showed, in a quantitative study, that students in classes with a large proportion of students from low socioeconomic backgrounds, or with expected weak language skills in Swedish (the language of instruction) were largely left alone to take responsibility for their own learning of mathematics, in contrast to classes with the opposite characteristics. This was despite these disadvantaged students needing greater teacher support to learn mathematics than their more privileged peers. Hansson's (2011) study speaks directly to issues of pedagogical segregation, showing how teachers took greater responsibility for students' mathematics learning processes in classes with students from higher socioeconomic backgrounds and stronger Swedish language skills. Thus, who gets to be included in mathematics education and who does not, and the processes that enable the operations of in(ex)clusion become important issues for investigation.

Background and rationales for the thesis

Before exploring the rationales for this study in more detail, I would like to highlight that my licentiate thesis (see Svensson, 2014) is part of this PhD-study. In the licentiate thesis, immigrant students' perceptions of their opportunities to learn mathematics in Sweden were explored, which is further elaborated on in this thesis. This also means that the licentiate thesis constitutes a background and a rationale for this thesis. The other three rationales are described in the following section, at times focusing on research from a Swedish context. Thereafter, a chapter on previous

research that relates to the topic of this thesis, and which also constitutes part of the background of the thesis, is presented.

Immigrant students' achievement in mathematics

This rationale has to do with immigrant students' achievement in school and school mathematics. International studies, such as The Programme for International Student Assessment (PISA), show that immigrant students, on average, perform more poorly in mathematics than their non-immigrant peers (OECD, 2016a). While in some countries immigrant students score above PISA international standards, they still score lower than their non-immigrant peers. The National Assessment of Educational Progress (NAEP), which assesses student performance in mathematics in both public and private schools across the USA, shows similar trends. Specifically, the average mathematics scores for White students in grades 4 and 8 have been higher than the scores of their Black and Hispanic peers on all assessments since 1990 (National Center for Education Statistics, 2015).

Sweden is no different to other countries in this regard: in the latest PISA study (2015), Swedish students performed statistically significantly higher than immigrant students born abroad as well as immigrant students born in Sweden (Skolverket, 2016). In terms of overall student achievement in Sweden between 2011 to 2016, both the proportion of students who achieve the highest grades and the proportion who achieve the lowest grades have increased (SOU 2017:54). In addition, statistics on different student groups' qualification for upper secondary school in Sweden reveal telling discrepancies – in 2014, 90 % of students born in Sweden were eligible to apply for upper secondary school; approximately 86 % of students who were born abroad but who immigrated before the regular school start were eligible; but only 52% of foreign-born students who joined a Swedish school after the regular school start, and a mere 27% of students who immigrated during the last four years of school were eligible to apply for upper secondary school.

Statistics from Skolverket (Siris database, 2016) reveal that mathematics, after Swedish as a second language, is the subject with the highest proportion of students who do not achieve a passing grade at the end of compulsory schooling. In schools in some multicultural and socioeconomically disadvantaged areas in Sweden, the proportion of students who do not receive a passing grade in mathematics at the end of compulsory school is very high; sometimes up to 80 % (Siris database, 2016). In Sweden, students need to have a passing grade in mathematics

when finishing compulsory school to be able to apply for a national programme in upper secondary school. This means that students who struggle to pass mathematics will struggle to gain access to upper secondary school. Mathematics has the potential to either open or close the gate to educational opportunities, depending on students' grades (Skovsmose, 1994; Stinson 2004).

Before continuing to the next rationale for this study, two issues need to be attended. First, immigrant students' achievement in mathematics is not a simple matter since immigrant status often intersects with other background variables such as socioeconomic background, parents' level of education, and language proficiency in the language of instruction (Halai, et.al., 2016; Prediger, et.al., 2013). Immigrant status and social class may be intertwined. In Germany, Prediger, et. al. (2013) analysed data from 1495 high-stakes tests, and concluded that while family background matters for achievement in mathematics, language proficiency matters even more. When it comes to the intersection of immigrant status and socioeconomic status in relation to mathematics achievement in PISA, OECD (2016) concluded that students in schools with high concentrations of immigrant students underperform in mathematics in relation to students who attend schools with no immigrant students, but after taking socioeconomic disparities into account the number of students who underperform drops. The intersection between immigrant status, socioeconomic status, multilingualism and gender is a complex matter that cannot easily be separated from each other. For example, although it is common for immigrants in areas with a high concentration of immigrants to have low socioeconomic backgrounds, being an immigrant does not mean you have a low socioeconomic background (OECD, 2016).

Secondly, I would like to point out that quantitative research on achievement, like the large-scale assessment of PISA, may be problematic when discussing immigrant students' achievement in mathematics. This is because quantitative research may not acknowledge how PISA is "epitomized in the intersection of multilingualism, social class, gender, ethnicity, etc." (Halai, et.al., 2016, p. 288), which may contribute to reducing the students to numerical variables. Thus, the potential to reveal explanations of the inequalities they report on may not be possible. According to Halai, et.al. (2016, p. 288) measurement of achievement, like PISA, "obliterates the messiness and uncertainties through the reduction of students and learning to well-defined numerical variables for statistical manipulation".

This problem is also addressed by Gutiérrez (2008) and Gutiérrez and Dixon-Román (2010) in the context of the achievement gap in the USA.

Documenting and stating that there is a gap in mathematics achievement with statistics from, for example PISA surveys, may give information on how to locate resources and support for disadvantaged students. However, this may not lead to action. Instead, at one extreme, it may merely offer a static picture of inequities which supports deficit thinking and negative narratives about immigrant- and working-class students (Gutiérrez, 2008). According to Gutiérrez (2008) and Gutiérrez and Dixon-Román (2010), the danger in maintaining research focus on the achievement gap and how to close is that it leads to what Gutiérrez (2008) calls a “gap-gazing” fetish, in which issues of access and achievement from a dominant perspective takes precedence over concerns about how students are constructed in this process (Gutiérrez & Dixon-Román, 2010) (for a more exhaustive presentation of the dangers see for example Gutiérrez, 2008 and Gutiérrez & Dixon-Román, 2010). This excessive focus on deficit may lead to the opposite effect of what is intended, while wanting to point to a difference for claiming the necessity of equity, the research ends up strengthening the deficit discourse. Focusing on an achievement gap between immigrant and native students, which test scores in large scale assessments enable, may therefore continue to reinforce the comparison and contrasting of immigrant students to students with Swedish backgrounds. If this becomes normalised (Foucault, 1980) it has the potential to become a ‘truth’ and an acceptable way of talking about achievement in Sweden. Thus, perceptions of who is good at mathematics and who is not may become a truth.

I would like to stress that I am aware of this problem and I agree with Gutiérrez and Dixon-Román’s (2010) critique of gap-gazing. At the same time there is a need of showing that inequalities exist. However, when using immigrant students’ achievement in mathematics as a rationale for this study it is not my intention to reduce the students to a certain category of students by exploring their achievement in mathematics through deficit thinking. Instead, I would like to raise equity issues for these students by trying to understand and find explanations for their opportunities to learn mathematics discursively acknowledging the socio-political context. Pointing out a particular group of students in this case may contribute to provide understandings that do not refer to deficit thinking regarding immigrant students with various language and socioeconomic backgrounds. The statistics help to define and tell us that something needs to be done for these students. They do not show anything more than numbers and achievement in relation to, for example, immigrant status and socioeconomic status. What this study deems important to explore, are immigrant students’ perceptions of their opportunities to learn mathematics, and how these perceptions come into existence.

Deficiency explanations

The first rationale for this study leads to the second - explanations for immigrant students' low achievement in school and school mathematics. A body of research shows that not all groups of students have the same opportunities to learn due to the impact of family background on students' achievement (Sirin, 2005). Several studies have shown that students' socioeconomic status influences school achievement - students who attend schools with peers from predominantly high socioeconomic backgrounds achieve better academically (Agirdag, et.al., 2012; Sirin, 2005; Skolverket, 2009). There is consensus, according to Agirdag, et.al. (2012), that the socioeconomic composition of primary school student bodies impacts academic achievement. A meta-analytic review by Sirin (2005), which reviews literature on socioeconomic status and academic achievement, confirms these findings. In Sweden, Skolverket (2015) reported that students' socioeconomic background and their parents' educational level are important factors that determine school achievement. This kind of explanation derives from a deficit perspective which holds that poor results are a consequence of the students' deficiencies such as their own and their parents' background and socioeconomic status (Valero & Meaney, 2014).

Another deficit perspective points to the impact of a school's ethnic composition on school achievement. However, in contrast to the general agreement about the power of socioeconomic status to impact negatively on student performance, there is less agreement about the impact of ethnicity (Agirdag, et.al., 2012). However, Szulkin and Jonsson (2007) showed ethnic density to have a measurable effect on achievement in Swedish schools. They showed that in schools where less than 40 per cent of the students were born outside of Sweden, the effect of ethnic density on grades was weak. But, if the percentage exceeded 40 per cent, there was a strongly negative effect (Szulkin & Jonsson, 2007). These kinds of correlations of school achievement refer to a deficit perspective and are commonly used to explain poor school results. The assumption is that poor results are a consequence of the students' deficiencies such as their own and their parents' background and socioeconomic status. A body of research has shown that poor school results are often explained from a deficit perspective (Halai, et.al., 2016; Healey & Powell, 2013; Moschkovich, 2002; Runfors, 2003). For instance, in Sweden, Runfors (2003) found that a deficit perspective dominated the thinking of teachers in her study. Teachers described the immigrant students in comparison with "other children", "normal children" and "Swedish children". Swedish thus becomes the desirable norm; "Swedish children" or "normal children" become the ideal category; while the not desirable and the abnormal is then

defined by default (Runfors, 2003). The focus was on what the immigrant students were lacking in relation to the knowledge and social skills that the teachers and schools demanded, which assumes that immigrant students have deficiencies and, for example, lack sufficient knowledge in the Swedish language and culture (Runfors, 2003). Another Swedish study conducted by Gruber (2007) showed that immigrant students were differently categorised according to their academic achievement, and students who were successful in their school work were categorised as less immigrant than students who did not succeed academically, which also indicated the existence of a deficit perspective.

Research in mathematics education has been conducted within a deficit framework. For example, research has examined and focused on hindrances such as comprehension in the language of instruction, instead of focusing on the students' resources for learning mathematics (Langer-Osuna, Moschkovich, Norén, Powell & Vazquez, 2016; Phakeng, 2016). Past research has also described disadvantage as an individual or social condition that somehow hinders mathematics learning (Gutiérrez, 2008; Healey & Powell, 2013; Lerman & Zevenbergen, 2004). Disadvantage has come to be defined by physical, racial, ethnic, linguistic, social and gendered identities that are different from normative identities constructed by dominant social groups, which has resulted in the further marginalisation of students who are different (Healey & Powell, 2013). In so doing, the blame for these students' failure in mathematics is allocated to the students themselves, thus perpetuating a deficit model of thinking (Lerman & Zevenbergen, 2004). The deficit perspective focuses on obstacles, and has a normative starting-point, assuming, for example, the monolingual student to be the norm. Langer-Osuna, Moschkovich, Norén, Powell & Vazquez (2016) argue that this perspective is common in mathematics education research. It also implies that certain cultural groups of students are deficit in contrast to the dominant normative group - for example, immigrant students are deficit in mathematics achievement. To overcome this disadvantaged position then requires the marginalised to assume normative identities, which is highly problematic from an equity point of view.

However, research in mathematics education has more recently started to challenge a deficit perspective (Langer-Osuna, et.al., 2016) by avoiding the conflation of difference and deficiency, and attempting to understand mathematics learning from the perspective of the marginalised groups (Healey & Powell, 2013). One example of this is the research of Moschkovich (2002) who, to overcome the deficit perspective has chosen to focus on bilingual students' resources when conducting research.

Another example is research conducted by Planas, who acknowledges language-as-resource in her work (see for example Planas, 2014; Planas & Setati-Phakeng, 2014; Planas & Civil, 2013). Planas (2014) focused on the notions of mathematics learning opportunities and language-as-resource instead of concentrating on the difficulties and obstacles that arise in learning due to bilingualism, which is common in research. By doing this, she showed how certain language difficulties generated mathematics learning opportunities. Her study offers a favorable view of bilingualism from the perspective of its relationship with the creation of opportunities that may support the mathematics learning of bilingual students. Langer-Osuna et.al. (2016) challenge a deficit perspective by offering counter-narratives in diverse multilingual mathematics classrooms. In three vignettes, they show multilingual learners' agentive use of resources for both mathematical and positional functions, thereby suggesting an approach that appreciates the resources and competencies of the student.

Although more research today tries to avoid deficit perspectives, such perspectives regarding immigrant students in Sweden persist. Immigrant students are often categorised as students who lack the Swedish language skills required in school, and as not having acquired the Swedish culture (Norén, 2010; Runfors, 2003). Immigrant students in Sweden are often portrayed in society, school and media, as students who are doing poorly in school because they lack "Swedishness" and have insufficient Swedish language skills (Bunar, 2009; Dovemark, 2013; Nilsson & Bunar, 2015; Norén, 2010; Parszyk, 1999; Runfors, 2003, Svensson et.al., 2014). As a result, poor results in school are understood to be a consequence of students' deficiencies, such as their ethnic backgrounds and socioeconomic status. When immigrant students' failures in school and school mathematics are understood from a deficit perspective it follows that the student, her background, and status, are the cause of the failure. Consequently, students do not pass mathematics because they do not master the language of instruction well enough, because of their immigrant background, and because they do not fit the Swedish language norm. Following this logic, all the student needs to do to pass mathematics and become eligible to upper secondary high school, is simply learn the language of instruction well enough and become "Swedish" enough. These types of explanations are not sufficient for explaining immigrant students' achievement in mathematics. Instead, they may contribute to the interpretation that some categorises of students are predestined to fail in school (Valero & Meaney, 2014). These deficit-based explanations need to be problematised and challenged to understand immigrant students' achievement in mathematics. I agree with Valero and Meaney (2014) who

argue that “socioeconomic influences on mathematical achievement should not be considered as a taken-for-granted fact that is accepted uncritically” (Valero & Meaney, 2014, p. 977). They suggest that, since research involves practices of inclusion and exclusion, and constructs how we think about relationships, mathematics education researchers should formulate more nuanced approaches for understanding the social, political and historical constitution of the relationships between socioeconomic influence and mathematical achievement. I am thus challenged to understand opportunities to learn mathematics “...from the perspective of those whose identities contrast the construction of normal by dominant social groups” (Healy & Powell, 2013, p. 69) - in this case, immigrant students from a multicultural and socioeconomically disadvantaged area in Sweden.

In this thesis, I attempt to focus on the perspectives of the students; to displace the focus on deficiency explanations by exploring the students’ own perceptions of their opportunities to learn mathematics and how such perceptions may come into existence.

A lack of student perspectives

Another rationale for conducting this research had to do with the lack of student perspectives, in particular the perspective of immigrant students in mathematics education research. The immigrant students in this study live and go to school in multicultural and economically disadvantaged areas, which means that they are often categorised as immigrant students and poor performers in school, and consequently confronted by the status of not belonging to the norm. This study assumes that students who are confronted with not belonging to the norm or majority have, from this perspective, the potential to offer valuable information about their opportunities to learn mathematics.

However, research conducted in this area seems to be scarce. In Sweden, there has been no research on immigrant students’ perceptions of their opportunities to learn mathematics. Norén’s study (2010), framed within a socio-political perspective, focused on the role of language and discourses when investigating how discourses in the multilingual classroom effected the multilingual students’ foregrounds, agency and identity formations. While she conducted participant observations, the students’ stories or perceptions were not the focus. There have been other studies on immigrant students and learning mathematics in Sweden. Hansson (2011) quantitatively investigates teachers’ pedagogical responsibility for students’ mathematical learning in relation to students’ socioeconomic

background and language proficiency. Another (Petersson, 2016), explored the mathematics achievement of second language immigrants in compulsory school as they continued their schooling in Sweden, by analysing students' responses to test items. However, there is one relatively dated Swedish study by Parszyk (1999), that focused on a student perspective. The aim of her study was "to illustrate pedagogical and social living conditions in the compulsory school from two aspects: the experiences of the students and the treatment/assessments of the school system" (Parszyk, 1999, p. 256). In the study, school mathematics formed the frame of reference for a learning situation in that mathematics was the focus in one of three studies. When interpreting the student interviews, Parszyk (1999) took a hermeneutically-existential approach, basing her interpretations on her own knowledge and prior experiences. Her analysis was not theoretically driven. The main message of Parszyk's (1999) study was that immigrant students perceived that their school was not for them, and thus questioned the Swedish school system's slogan: *a school for all*. The immigrant students in her study felt like outsiders who belonged to a deviant group in society: namely, the immigrants. Parszyk (1999) concluded that a change was needed in the way immigrant students were treated and urged that "We must listen to the descriptions of the school life of the students in order to understand" (p. 266). Despite this conclusion, drawn many years ago, research concerning immigrant students and mathematics education from a student perspective is scarce in Sweden, as is research on mathematics education from social, political and cultural perspectives.

In a Danish context Alrø, Skovsmose, & Valero (2009) addressed social, cultural and political issues from the perspectives of students by investigating nine interrelating elements of a learning landscape. One of the elements was the notion of foreground. By interviewing immigrant students they aimed to understand how their sociocultural experience in mathematics related to their learning. Since I build the analyses in the first two studies on Alrø, Skovsmose, & Valero's (2009) work on foregrounds I will get back to this in the next chapter and expand on it. The notion of foreground will also be addressed in the third chapter *Theoretical approach*.

International research seems equally scarce. For example, in a search in the database ERIC by EBSCO with the following search criteria: (Immigrant* or multilingual* or minority students) and (math*) and (perception* or attitude* or narrative* or stor* or perspective* or view* or interview* or biograph*) and (student*) 225 hits were generated. That was 225 peer reviewed articles published between 2000-2017. Most of the

articles were excluded quickly on the basis of their abstracts which did not match the criteria for the search. For example, some of the articles researched teacher beliefs, some were quantitative survey studies, some quantitatively investigated immigrant students' achievement in relation to different variables, and some focused on school development projects. Thirteen papers were left. After more careful reading of these papers, several more were excluded - for example, papers that did not have a mathematics focus were excluded. Only 4 papers matched the three search strings.

These studies address different issues in relation to immigrant students and the learning of mathematics. For example, there was one study that focused on language-related issues conducted in New Zealand, in which ten non-English speaking immigrant students tell their lived experiences from a secondary school mathematics classroom (Jhagroo, 2015). The study is framed within a hermeneutic phenomenological framework. Data was collected by classroom observations and interviews with ten students from non-English speaking backgrounds that had lived in New Zealand for a period of two years or less. The students were asked questions about what was observed in the classroom, indicative comparative questions about mathematics learning in New Zealand and in their home countries, and questions on what they felt their teachers' and parents' ratings of their mathematics ability would be. Language-related challenges faced by the students were the focus and discussed in the light of the language barriers that they faced and the coping strategies they employed to make sense of their learning - in line with previous research on multilingual students' learning of mathematics (see Chapter 2). Jhagroo (2015) also investigated students' perceptions of their mathematics ability in New Zealand compared to their ability in their home country. The author concluded that language barriers may affect the students' perceptions of their mathematics abilities in an environment where the language of instruction is different to their mother tongue (Jhagroo, 2015). This 2015 article by Jhagroo came out of her PhD study (Jhagroo, 2011), in which she also used a hermeneutic phenomenological framework to investigate how the perceived past and present lived experiences of ten immigrant students influenced their transition in mathematics classrooms in New Zealand.

A study from the USA that also dealt with language issues and conducted as part of a PhD thesis (Zavala, 2012), was Zavala (2014). In contrast to Jhagroo (2015), Zavala did not focus on language. Instead she applied critical race theory in an intersectional analysis approach that examined how mathematics identities are co-constructed in relation to racial, linguistic, and gendered narratives of Latina/o youth. The data

consisted of individual interviews and focus groups with seven students, collected in the context of a multi-racial and multi-lingual school in an urban setting in the Pacific Northwest. Zavala (2014) showed how race and language are complex factors that influenced how the students became mathematical people. For example, she showed how racial stereotypes and students' linguistic identities in relation to the language of instruction impacted on students' negotiation of their identities as mathematical learners.

Students' identities as mathematical learners was a topic indirectly touched upon in a study by Barajas-López (2014). This study investigated four Mexican immigrant students' experiences with schooling and mathematics in a southwestern high school in the USA through an ethnographic and narrative inquiry approach. However, Barajas-López (2014) did not explicitly approach race or ethnicity as Zavala did. Barajas-López (2014) found that the Mexican immigrant students in school, and in mathematics classrooms, experienced unique and conflicting conditions of success and disadvantage (both socially and structurally) from an early age. The students experienced deficit thinking and low expectations from teachers in mathematics learning contexts. They perceived that teachers identified their skills deficits in both mathematics and English, but did little to help them. They felt excluded from programmes for the gifted and other programmes because of their levels of language proficiency and related labels. Their status as English learners and immigrant students played an important role in the way they experienced schooling and mathematics learning. Inequity in everyday school situations shaped the ways these Mexican immigrant students experienced schooling and mathematics learning (Barajas-López, 2014), corroborating the findings of Zavala (2014). Barajas-López's (2014) article is also a result of his PhD work (Barajas-López, 2009) in which he employs an ethnographic and narrative inquiry method to explore the mathematics classroom experiences of seven immigrant students.

Another issue that arose from the literature review was that of high-stakes tests. In a study by Lattimore (2001) in the USA, a qualitative narrative looked at the importance of preparation for three 15-year old, African-American female students, for their high-stakes mathematics test. The narratives showed that the test was taking over the students' lives. Their perceptions revealed the test as a barrier. However, although they realised that the test was an obstacle to them as African-American high school students, they remained hopeful - the pressure that the test had imposed tended to improve the students' sense of self and inculcate a

commitment and passion for learning and passing the test (Lattimore, 2001).

The studies referred to in this section all deal with issues that have consequences for immigrant students' perceptions of their opportunities to learn. However, the number of studies that explore immigrant students' learning opportunities from their perspectives in relation to mathematics is low. This fact provides an argument for exploring immigrant students' perceptions of their opportunities to learn mathematics and how these kinds of perceptions are enabled, which will be this thesis's contribution to the literature.

The aim and the outline of the thesis

As the research continues from a licentiate thesis (Svensson, 2014) towards a PhD thesis, immigrant students' opportunities to learn mathematics is still under scrutiny, but now with a focus on how the understandings about their learning opportunities can be expanded. This means that I am not only interested in finding out what constitute the students' perceptions of their learning opportunities, but also in how their perceptions about their learning opportunities come into existence, which means that the notion of power must be addressed. During my PhD studies, I have had the opportunity to expand my knowledge about different theoretical frameworks, such as sociological perspectives drawing on Bernstein (2000), Bourdieu (1990) and Foucault (2002). This broadening of my understanding of different theoretical perspectives and deepening my understanding about immigrant students' opportunities to learn mathematics, have consequences for how the studies in this thesis are conducted. For example, it means that this thesis contains a theoretical displacement from the work of Skovsmose (1994, 2005, 2014) to the work of Foucault (for example, 1966/73, 1980, 1982, 1993, 2002). Consequently, the first two studies in this thesis are framed by one theoretical perspective and the third and fourth study in another.

The aim of the thesis

In relation to the rationales described above, the theoretical displacement and the review of the literature the aim of this thesis can be formulated. The overarching aim of this thesis is to deepen and widen understandings about immigrant students' opportunities to learn mathematics in Sweden; and in so doing to critique deficiency explanations given for immigrant

students' failure in mathematics. This includes grasping a student perspective by exploring their foregrounds (Skovsmose, 1994, 2005, 2014) (see article I and II), but it also aims to understand how the students' perceptions come into existence by exploring the role of discourse (article II), discursive identity formations (article III) and fabrications of newly-arrived students in policy texts (article IV). It also entails an exploration of the contributions of the two theoretical frameworks adopted when trying to understand immigrant students' learning opportunities.

Opportunities

The word *opportunity* is used frequently throughout the thesis since the purpose of the study is to examine immigrant students' opportunities to learn mathematics. In the licentiate study (Svensson, 2014), which was written in Swedish, the Swedish word used was *möjligheter*. The word *möjligheter* is explained in the Swedish Academy's dictionary (2009) as "being possible" and is compared with the word "eventuality". It is also described as "a possible way out" or "possible action", "possible case", "opportunity" and "chance" (Svenska Akademien, 2009). However, when writing this thesis in English, there are two words that can be used: *opportunities* or *possibilities*. I have chosen to use the word *opportunities*. According to the online Cambridge Dictionary², an opportunity is "an occasion or situation that makes it possible to do something that you want to do or have to do, or the possibility of doing something". The word *opportunities* carry a positive connotation in this thesis since it refers to something inherently positive – the opportunity to learn mathematics. However, when the students in this study describe the experiences that affect their learning in mathematics, the experiences are largely described, not as opportunities, but as something negative, something that limits or hinders opportunities to learn mathematics.

The phrase *opportunities to learn mathematics* is long and may make the reading of the text unnecessarily onerous. Therefore, I frequently use the shortened phrase *learning opportunities*. Use of the phrase *learning opportunities* may lead the readers to think of the research literature on "opportunities to learn", which is not intended. Studies on opportunities to learn mathematics often involve measures of achievement, socioeconomic factors, or teacher beliefs. However, this thesis takes a socio-political perspective (see chapter 3) in which opportunities to learn mathematics

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<https://dictionary.cambridge.org/dictionary/english/opportunity?q=opportunities>
(retrieved 2017-12-17)

concern social and political issues and not the statistical measuring of learning opportunities since it may produce deficit thinking and thus generate processes of inclusion and exclusion. Therefore, it is not important for this thesis to make use of the literature on “opportunities to learn”.

The outline of the thesis

Working with two theoretical perspectives in this thesis has influenced my choice of structure. I have chosen a *hybrid thesis* structure (see for example Palmer, 2010; Serder, 2015) - essentially, a hybrid of a monograph and a compilation thesis. It consists of a preamble and four articles (like a compilation), while it seeks to answer two overarching research questions, by combining the findings in the four articles and the theoretical displacement that occurred (similar to a monograph). The four articles each address one guiding research question (see chapter 2). The fifth chapter, *Bridging the articles*, contains summaries of the four articles, with sections in between wherein I demonstrate how I moved from one article to the next and how the articles relate to each other, and discuss the contributions and limitations of the different theoretical frameworks. These three sections address the second overarching research question (see chapter 2) The purpose of the preamble therefore, is not only to tie together what has influenced and directed the four studies, but also to address and discuss issues that may not be as visible in the single articles, such as the theoretical displacement.

The four articles are complementary and should be viewed in light of the thesis aim. The four articles are:

- I. Learning mathematics: hope and despair.
- II. Immigrant Students’ Perceptions of Their Possibilities to Learn Mathematics: The Case of Homework.
- III. Identity formations as mathematical learners in the context of transition.
- IV. Fabrication of newly-arrived students as mathematical learners.

After this introductory chapter, in which the rationales for the thesis are presented, I describe the research field in chapter 2. In the third chapter, *Theoretical approach*, I present the theoretical perspectives and analytical tools that have guided my studies. In the fourth chapter, *Methodological perspectives*, I address the construction of data, methods, ethical and

methodological considerations, and discuss the quality of the thesis. In chapter 5, *Bridging the articles*, summaries of the four articles with the bridging texts are presented. In the last chapter (6), *Concluding Discussion*, the aim of the thesis is re-visited with a discussion of the two overarching research questions, which are introduced in the next chapter.

2 Mathematics education in language diverse settings

In this chapter I provide a background for the present thesis with a discussion of research relating to *mathematics education in language-diverse settings*, to explain why it is of interest to explore immigrant students' opportunities to learn mathematics. The focus is how research in this field relates to the aim and research questions of this study. I draw mainly on research conducted in the 2000s. However, some older studies that have received significant attention over the years are included. It is not my intention to give an extensive or exhaustive account of the related research field, but an overview with some examples.

My literature searches were conducted mainly through search engines and the database ERIC, by EBSCO. I also used the "snow ball-method" where reference lists from articles identified as key studies were used to find other interesting studies, and the new reference lists generated further searches, and so on. I have also looked at recently published books (volume collections) on the topic to access relevant, recently published literature.

The students in my study are immigrant students with a mother tongue other than the language of instruction (Swedish), and are taught mathematics in multilingual classrooms in Sweden. According to Barwell, a multilingual mathematics classroom can be defined as follows:

... mathematics classrooms are considered to be multilingual if two or more languages are used overtly in the conduct of classroom business. And mathematics classrooms are *also* considered to be multilingual if students *could* use two or more languages to do mathematics, even if this does not actually occur, ... (Barwell, 2009a, p. 2)

Many mathematics classrooms in Sweden nowadays are multilingual. There are largely four different strands of existing research that deal with immigrant students and learning mathematics in multilingual settings, all with a concern for students' opportunities to learn mathematics explicitly or implicitly formulated. These strands of research are presented and discussed here.

Language diversity in multilingual mathematics classrooms

Research on mathematics education and language diversity is fairly new (Barwell, et.al., 2016; Halai & Clarkson, 2016; Phakeng, 2016), and has mostly examined the role of language in mathematics cognition; for example, examining students' understanding of mathematical concepts (Halai & Clarkson, 2016). Less research on the social, cultural, and political role of language and learning in mathematics has been conducted, although, according to Phakeng (2016), the socio-political role of language has received greater recognition in recent years, and generally, the crucial role that language plays in learning mathematics has received greater acknowledgement in the last 30 years (Barwell, et.al., 2016; Halai & Clarkson, 2016).

The research field on language diversity before 1979 focused on bilingualism and the bilingual learner, with most studies concluding that bilingualism had negative effects on learners' linguistic, cognitive and educational development (Barwell, et.al., 2016; Phakeng, 2016). Bilingual learners were viewed from a deficit perspective, bilingualism was unnatural, and such learners blamed for not learning the required mathematics.

Phakeng (2016) provides a historical overview of the research on mathematics education and language diversity by reviewing papers on the topic published in selected international mathematics education and linguistics journals between 1979 and 2012. In the review, Phakeng (2016) found 51 papers on the topic, concluding that growth of research on this topic is slow, with a small number of researchers worldwide. She believes that the challenges in the field are about both growing knowledge and building capacity. Phakeng (2016) also identified the most dominant topics during this period. Learner performance was the topic with the highest number of published papers (21), and code-switching second, with 11 (see Phakeng (2016), p. 17). In contrast to the earlier view of bilingualism as problematic, Phakeng (2016) concludes that post-1979 literature tends to encourage it. For example, code-switching to support learners of mathematics (see for example Adler 1998, 2001; Barwell, 2003; Moschkovich, 1999; Planas & Setati, 2009; Setati & Adler, 2000 and Setati, 2005), became a common practice in the 90s.

Adler (1998, 2001) and Setati³ (2005, 2008) in a South-African context, and Moschkovich (1999, 2002, 2008) in a USA context, put the multilingual mathematics classroom on the research agenda towards the end of the 90s. This contributed to a perspective that views language diversity as a resource and asset, rather than a deficiency, which was the predominant viewpoint for many years (Barwell, et.al., 2016; Halai & Clarkson, 2016; Langer-Osuna, et.al., 2016; Phakeng, 2016; Setati & Adler, 2000). A shift from bilingualism to multilingualism entails a shift from exclusion to inclusion, since bilingualism is about two languages competing, resulting in one language being silenced, whereas multilingualism embraces all languages equally (Phakeng, 2016). Most research on language diversity in mathematics education today assumes that language diversity is an asset and not a deficiency (see chapter 1 *Deficiency explanations*). Research that focuses on the use of multiple languages in mathematics learning has shown, in a variety of ways, how the use of students' home languages can be an important resource for mathematics students (see for example Adler, 1998, 2001; Barwell, 2005; Domínguez, 2011; Halai, 2009; Khisty, 1995; Moschkovich, 1999, 2002, 2007; Norén, 2010; Planas & Gorgorió, 2004; Planas & Civil, 2013; Planas, 2014; Setati & Adler, 2002; Setati, 2005, Setati, 2008).

In the following sections I present a variety of the work that has significantly contributed to the field, including research conducted in a Swedish context.

Multilingualism – the 90s and forward

This shift to multilingualism was due to the work of Adler (see for example 1998; 2001) in multilingual South Africa (Barwell, et.al., 2016). For example, she provides a language of dilemmas as an explanatory and analytic tool for studying mathematics teaching and learning in multilingual classrooms, in which teachers and students do not share a home language, as well as in classrooms where the language of instruction is not the home language of either the teacher or the students (Adler, 1998). She found three interrelated dilemmas: code-switching, mediation and transparency, which capture the tensions and contradictions mathematics teachers deal with when teaching mathematics in multilingual classrooms (Adler, 1998; 2001). Code-switching, in general terms, is a practice that entails both teachers and students switching between the language of

³ Setati and Phakeng are the same person; Setati as un-married and Phakeng as married

instruction and the home language (Adler, 2001). However, even if code-switching and using home language when learning mathematics are viewed as a resource for learning, teachers still encounter the dilemma of code-switching, which is shown in the work of Adler (1998; 2001). One example of such a dilemma has to do with the politics of access to mathematical English (since English is a dominant and powerful language in South Africa). A teacher may believe that using languages other than English in the mathematics class will facilitate the learning of mathematics, but putting code-switching into practice may be constrained by the politics of access to mathematical English. The teacher wants to provide her students with both a good grasp of mathematics and English for their students to access further education and thus a dilemma come into existence (Adler, 1998; 2001).

Setati (2005), highlights the politics of language in South-Africa in a study which focused on a grade 4 mathematics lesson in a multilingual classroom. She analyses how mathematical and nonmathematical discourses were used and in which languages they were used. The findings showed that mainly English, accompanied by a procedural discourse, was used even if the students' home language was Setswana. English was the language of mathematics, authority and assessment, whereas the students' home language had the role of solidarity. Setati (2005) reveals how the teacher experiences what she calls an access-paradox - if the teacher encourages English in the classroom as the legitimate language for teaching and learning mathematics, she will be perpetuating the hegemony of English. But if she instead encourages the use of the home language and does not provide English, she will perpetuate the marginalisation of her students in a world in which English is important and highly valued. Setati (2005) concludes that language is not simply a tool for thinking and communicating and argues that language should be viewed as political both in research and in the practice of mathematics.

A similar situation is described in Norén and Andersson's (2016) study, in which they show how a teacher in ordinary mathematics lessons use both Swedish and Arabic regularly, promoting bilingualism as a resource, but in an assessment situation, enacts a discourse of "Swedish only", adopting the institutional value of Swedish as the language of assessment and authority. However, the students forced the teacher to switch to Arabic and embrace a discourse promoting bilingualism as a resource (Norén & Andersson, 2016). Viewing language as political puts power on the agenda - the language that receives official recognition in the classroom has this position, a result of power relations. Language choice can thus play a powerful socio-political role if it is consciously deployed to address issues

for immigrant students other than the purely cognitive (Halai & Clarkson, 2016), and the deficit model of thinking can be avoided.

Another significant influence on the field is the work in Spanish–English bilingual settings in the USA by Judith Moschkovich (see for example 1999, 2002, 2007, 2008). Moschkovich (2002) examines mathematical discussions in multilingual classrooms by using three perspectives: one that focuses on acquisition of vocabulary, another that focuses on the construction of multiple meanings across registers, and the third that focuses on participation in mathematical discourse. She concludes that the first two perspectives allow for a deficit way of thinking since they focus on students' lack in vocabulary and students' inability to use multiple meanings across registers appropriately. The third perspective however, participation in mathematical discourse, based on sociocultural and situated views of both language and mathematics learning, allows for an expanding view of what counts as competence in mathematical communication, and several other resources that students use to communicate mathematically can be described (Moschkovich, 2002). In this third suggested perspective, she views learning mathematics as participating in mathematical Discourses (in line with Gee, 2011), which also allows for non-language resources, such as gestures, mathematical artefacts, and everyday experiences, to be used when students communicate mathematically. Multilingual students can thus participate in mathematical discussions even if they do not completely master the language of instruction (in this case English) and thus can be regarded as students with resources for communicating competently (Moschkovich, 2002), instead of students with deficiencies.

Another Swedish study in line with the work of Moschkovich (2002), conducted by Norén (2010), investigates the discourses that operate in multilingual mathematics classrooms in Sweden, and how these discourses operate and impact multilingual students' identity formations. The operating discourses were a social relational discourse, school mathematical discourses, a normalising discourse, and a bilingual discourse. Norén (2010) draws on Boaler's (2002) work with traditional-oriented and reform-oriented mathematical teaching methods, identifying mathematical discourses in classrooms as a traditional-oriented school mathematical discourse, and a reform-oriented school mathematical discourse. Norén (2010) found that the official school mathematical discourse in Sweden is reform-oriented, while actual mathematics classrooms are dominated by the traditional-oriented discourse. This result is in line with results from investigations conducted by Skolinspektionen [The Swedish School Inspectorate] and Skolverket in Sweden

(Skolinspektionen, 2009; Skolverket, 2004). She concludes that immigrant students' opportunities for learning mathematics increase in a reform-oriented mathematical discourse. Norén (2010) also shows that the different discourses that operate in multilingual classrooms can enable both opportunities and limitations in multilingual students' identity formations as mathematical learners. She claims that the success or lack of success of multilingual students in mathematics can be explained in relation to discourses and social conditions in society at large, and is not only based on linguistic and cultural factors (Norén, 2010).

Some research deals with communicative resources that students use in mathematics classrooms. The work of Barwell in the UK and Canada (see for example 2005, 2009a, 2009b, 2014) on word problems and students' communicative repertoires are examples. When investigating bilingual students' work with word problems in mathematics, Barwell (2009b) found that the bilingual students were able to participate fully in the task and make sense of the word problems, and that it supported their mathematical thinking when the students jointly wrote and solved word problems of their own.

In a Catalanian context, an autonomous region in northern Spain, much work on mathematics education in language diverse settings has been conducted. Some of that research focuses on cultural diversity (for example Gorgorió, Planas & Vilella, 2002; Planas & Gorgorió, 2004), and therefore will be presented and discussed in the next section *the role of culture in language diverse settings*. However, there is also research conducted with a focus on language issues (for example Gorgorió & Planas, 2001; Planas & Setati, 2009; Planas & Civil, 2013; Planas, 2014). One example of such research, reported by Gorgorió & Planas (2001), examines language issues which concern learning processes in mathematics, by having minority language students' work in monolingual groups on problem-solving tasks that reflect students' interests and realities. Their findings showed that these problem-posing activities in monolingual groups were a powerful approach for encouraging students' mathematical thinking, but also a useful tool for identifying their language difficulties. They conclude that the conflicts minority students experience in the mathematics classroom are not always directly related to language obstacles, but also to wider communication obstacles. According to Gorgorió and Planas (2001), language is a communication tool that goes beyond the translation of words. Having sufficient language skills in the language of instruction does not mean that the conflicts automatically disappear. They conclude that language issues cannot be disentangled from cultural and social facts

(Gorgorió & Planas, 2001). This leads into a discussion on the role of culture in language diverse settings, which is presented in the next section.

The role of culture in language diverse settings

Research in mathematics education that deals with culture, cultural issues, cultural conflict and so on, often refers to the work of Bishop (1988) and his work on enculturation processes in which mathematics is viewed as a cultural product, and D'Ambrosio (for example 1995, 2010) and his work on ethnomathematics. According to D'Ambrosio (2010), a multicultural approach to mathematics is ethnomathematics, which he describes in the following way:

Ethnomathematics reveals all mathematical practices of day-to-day life, or preliterate cultures, of professional practitioners, of workers and obviously what has been called multicultural mathematics, but also includes the so-called academic or school mathematics, taking into account their historical evolution, with the recognition of all the natural social and cultural factors that shaped their development. (D'Ambrosio, 2010, p. 341)

Bishop and D'Ambrosio's concepts about knowing mathematics are both developed from a bottom up perspective, that emphasising people's competences developed within different cultural groups, and in their everyday lives. This can be contrasted with concepts about having mathematical knowledge that is deemed to be necessary or useful in people's everyday practice, like the concepts *Mathematical literacy* (OECD, 2006) and *Mathematical competencies* (Niss, 2003), which are developed from a top down perspective (Wedeg, 2010). I have understood the concept of ethnomathematics as a response to Western dominance and Eurocentrism in mathematics education. Bishop and D'Ambrosio's perspective on knowing mathematics recognising the cultures of different groups of students and understands cultural difference as a richness rather than a deficiency.

Another example of this approach to culture in mathematics education research is the work of Gorgorió & Planas (2001), who in their work with immigrant students in Catalonia, view "...the cultural contribution of the ethnic minorities and different social groups as a source of richness to be maintained and shared" (p. 10). That is, cultural differences are a potentiality, not a problem. Gorgorió, Planas & Vilella (2002) study cultural conflicts in multilingual mathematics classrooms by looking at immigrant students' transitions from their home and home school culture

to the school culture that hosts them. This entails moving from one context with particular meanings and values to another context with different meanings and values. Gorgorió, et.al. (2002) examine how the immigrant students in different classroom situations construct new meanings and values and adapt the old ones, by referring to social and sociomathematical norms and the norms of the classroom mathematics practices. The results show that the immigrant students experienced cultural conflicts in their transition processes. They concluded that the cultural conflict and disruptions in the mathematics classroom emerged from the different understandings of the meanings attached by the different participants to the classroom's normative elements. One example of this is the different expectations the immigrant students had of their mathematics teacher as a person with the mathematical knowledge whose job it was to transmit it to the students. In one classroom situation, the teacher does not want to give the students the answer to a task that the students have not finished at the end of the lesson. The teacher wants them to do more work on it. Gorgorió, et.al. (2002) show how a Pakistani boy has a hard time accepting the sociomathematical norm in this situation. His interpretation is that the teacher does not have the mathematical competencies needed for solving the task, which reflects his previous education experiences. From multiple situations, the authors conclude that the boy cannot accept a woman (whom he regards as permissive, inadequate and incapable) as a mathematics teacher (Gorgorió, et.al., 2002). The authors stress that "the different understanding of the norms within the mathematics classroom is a fact not only related to ethnic differences but also mainly to individual differences closely linked to the experience every individual has or had" (Gorgorió, et.al., 2002, p. 48).

There is research that acknowledges different cultures as a starting point for research, while other research, like Gorgorió, et.al. (2002) suggests that it is mainly individual experiences, rather than ethnic differences, that impact how students understand and attach meaning to the norms in the mathematics classroom. However, this perspective is not always present in the everyday lives of immigrant students.

Instead, a deficit perspective exists in Sweden where immigrant students are often described by society as students who do poorly in school and as "problematic" because they lack "Swedishness", and have insufficient Swedish language skills (Gruber, 2007). A study conducted in a Swedish context by Runfors (2003), shows how the teachers adopt a deficiency perspective when talking about their immigrant students. The teachers described and talked about the immigrant students in relation to "other children", "normal children" and "Swedish children", where

Swedishness became what was desirable and non-Swedishness was defined as abnormal and non-desirable. Ideal categories like “Swedish children” or “normal children” were created. This ideal category also meant that the ideal students started school with good knowledge and social skills, which, according to the teachers, many other students were lacking. The teachers in the study talked about this lack of skills, and their intention was to compensate for the lack to give the students equal access to education. This, according to Runfors (2003), contributed to a focus on what the immigrant students were lacking in relation to the knowledge and social skills the teachers requested. This kind of categorisation of immigrant students takes a deficit perspective on culture as its starting point.

Social equity - foregrounds

The notion of foreground is derived from the work on critical mathematics education of Skovsmose (1994), which is concerned with social justice and equity issues. Critical mathematics education in the work of Skovsmose (1994) recognising mathematics education as important for democracy and promotes student empowerment through critical mathematics education. He discusses students’ obstacles to learning, but instead of only relating these to the background of the students, he discusses students’ possibilities for learning mathematics in relation to their so-called foregrounds. A student’s foreground “refers to a person’s interpretation of his or her learning possibilities and ‘life’ opportunities, in relation to what the socio-political context seems to make acceptable for and available to the person” (Alrø, Skovsmose, & Valero, 2009, p. 17). This is explained further in the next chapter, *Theoretical approach*. The definition implies that Skovsmose approaches obstacles to learning from a socio-political perspective.

An example of a study on foregrounds is that by Alrø et.al. (2009), who analysed an interview with a Muslim immigrant student in Denmark by using the methodological and theoretical construction of the learning landscape. Nine elements interrelate in the learning landscape: students’ foregrounds, students’ construction of identity, teacher’s perspectives, opinions and priorities of teaching, the content of learning, tools or resources for learning, classroom interaction, parents, friends and public discourses. This framework was developed as a tool for trying to understand mathematics learning in multicultural classrooms. That is, as a way of grasping other dimensions than just the mathematical activities in the classroom that may have consequences for immigrant students’

learning of mathematics. Alrø, et.al. (2009) focused on the notion of foreground when analysing the data, trying to understand the participants' intentions for engaging in (mathematics) learning. However, since they view the dimensions of the learning landscape as interrelated and interdependent, they also paid attention to those in the analysis. The results show how the girl's foregrounds consists of strong and clear opinions about her possibilities, ambitions and hopes, and how she referred to religious and cultural views when expressing her opinions. Thus, she showed an awareness of these matters and how they may impact her opportunities and create exclusion.

Students' foregrounds have been explored in a study by Norén (2010), conducted in multilingual mathematics classrooms in Sweden. In contrast to the study by Alrø, et.al. (2009), who primarily interviewed immigrant students, Norén (2010) conducted an ethnographic study with mainly participant observations. She used the notion of foreground as an analytical tool in relation to discourses in the classroom and multilingual students' agency and identity formations. She found that discourses impact the practice and the activities going on in the mathematics classroom, which in turn had an impact on the multilingual students' foregrounds and identity formations as engaged learners of mathematics.

From these two studies, conducted in similar contexts to this thesis, I was inspired to use the notion of foreground when analysing interviews with immigrant students. The influence of discourse on students' foregrounds shown in Norén's study, made me turn to exploring the influence of public discourses (study II). However, in contrast to Norén's study, I decided to conduct student interviews since I am interested in the students' perceptions and how they may be influenced by the social and political context, and thus the influence of discourse. Also, since students' perceived opportunities to learn or participate in school mathematics are impacted by the students' interpretations of their background and foregrounds, I thought interviews were the best way to get a hold on the students' perceptions of their learning opportunities.

The categorisation of immigrant students

As described earlier, immigrant students' failure in school is often described in relation to linguistic and cultural deficiencies, which allows for a categorisation of immigrant students as less capable of succeeding in school than their native peers. For example, Gruber (2007) showed, in a study conducted in Sweden, that immigrant students who were successful

in their schoolwork were categorised as immigrants to a lesser extent than students who failed with their school work. Further, immigrant students in Sweden are often portrayed as problematic, and their multicultural schools are portrayed as poor schools with a rowdy and negative social environment and bad grades (Bunar, 2009). What is seen as Swedish or Swedishness, is often perceived as the normal and desirable, while social problems and a marginalised social position are associated with immigrant status (Kallstenius, 2010).

Immigrant students do not only have to deal with language and cultural issues when learning mathematics in the multilingual and multiethnic classroom, they may also have to deal with imposed categorisations or identities that refer to their cultural backgrounds and their linguistic competences in the language of instruction. Below I present and discuss research that shows how teachers categorise immigrant students and research on the workings of these kinds of categorisations on immigrant students, and how these factors may have consequences for their perceptions of their opportunities to learn mathematics.

Teachers

The study conducted by Runfors (2003), mentioned above, showed how teachers categorised immigrant students from a deficit perspective and in relation to “Swedish children”. However, similar findings are found in studies conducted elsewhere. For example, in Denmark Gitz-Johansen (2004) showed how a deficit approach characterised teachers’ categorisations of immigrant students. He studied how teachers conceptualise ethnic, cultural and linguistic diversity among their students.

More specifically, he discussed how teachers produced a special category which they called “the bilingual child”, how it related to competence and how ethnicity diversified this presentation. For example, when the teachers in the study talked about the students they very rarely spoke directly about ethnicity when they talked about ethnic minority children; instead they talked about bilingual children (Gitz-Johansen, 2004). When they talked about bilingual children they did use the term in the sense of mastering two languages, but to construct difference. Consequently, a difference between a Danish childhood and a non-Danish childhood, or a bilingual childhood was construed. Gitz-Johansen (2004) concluded that the bilingual child was always construed in relation to how it differs from the “Danish child” and that this difference almost always was construed in relation to incompetence. The notion of bilingualism was therefore characterised by an inferior language ability in relation to what

was expected by Danish children and the bilingual child was construed as “the linguistic other” - a person that linguistically does not fit into the Danish school system’s definition of a normal child (Gitz-Johansen, 2004). The study showed that the teachers also construed the bilingual child as less socially competent in relation to what they require of the children in school. Gitz-Johansen (2004) also shows how cultural differences contributed to how the teachers categorised minority children. He showed how the category “bilingual child” is made up from an exotic culture that is characterised in relation to its difference from how the Danish culture is perceived. For example, the schools organised multicultural activities in which the minority students and their parents showed their traditional folk costumes, food and dances, which then became constructed in relation to its difference to Danish culture. According to Gitz-Johansen (2004), good intentions to display tolerance towards ethnic minority students and their families prompted the gesture. However, this exotification contributed to a focus on difference and a hierarchy of cultural differences was entrenched. Gitz-Johansen (2004) showed how the teachers perceived the minority children as being inbetween two cultures, which constructed the minority child as potentially problematic. As a consequence, the minority child and her parents carry the blame, exonerating the majority (natural) culture and the school (Gitz-Johansen, 2004). The bilingual child was thus posited outside the natural state, from a culture other than the dominant Danish culture. This was regarded as a cause of the minority child’s incompetence and the category “the incompetent child” was construed (Gitz-Johansen, 2004).

Planas & Gorgorió (2004) have similar findings in relation to mathematics teaching and learning in multiethnic schools. They analysed interactions during the first days of school in a secondary mathematics classroom in Barcelona with a high percentage of immigrant students. Their aim was to explore how the immigrant students’ identities as mathematical learners are constructed through discursive practices in classroom interactions. They chose a discursive approach to avoid blaming students for the cause of their failures. Accordingly, they explored how discourses were constructed in the classroom by analysing the classroom norms, the personal values and the social valorisations given to the students, as well as their mathematical practices. Their findings show that some behaviours were valorised over others as a part of the discursive practices of the mathematics classroom. For example, some immigrant students were identified as less able than other students in relation to these mathematical tasks. When the students worked with problems connected to real-life situations the non-immigrant students were listened to and

expected to participate by discussing and explaining their strategies for solving the problem using academic contexts, while the immigrant students, in subtle ways, were denied collaboration in the tasks. Instead of being listened to, the immigrant students had to listen to how the other students explained and discussed their ideas. The teachers' expectations of the immigrant students' learning of classroom norms were different from their expectations of the non-immigrant students. Consequently, the immigrant and the non-immigrant students were treated differently by the teacher, and expected to behave in different ways (Planas & Gorgorió, 2004).

In summary, the teachers in the studies of Runfors (2003), Gitz-Johansen (2004), and Planas & Gorgorió (2004), construed immigrant students differently from the non-immigrant students, often in relation to deficiencies. Even though the three studies were conducted in three different countries the results point in the same direction - that teachers categorise immigrant students in relation to deficiencies. Even when teachers are motivated by good intentions, deficiency discourse seems to work its way into the classrooms. These kinds of categorisations may become internalised by the immigrant students (Gogorió & Planas, 2004), and therefore impact on their opportunities to learn mathematics. The next section deals with the power effect of categorisations on immigrant students.

The power effects of immigrant categorisations

Research conducted by Popkewitz (see for example 2013), which draw on the work of Foucault, has shown how images or categorisations of certain kinds of people are constructed and have a way of looping into their lives. Popkewitz (2012, 2013) has shown how systems of reason have a way of governing conduct. The system of reason is shaped by historical, political and social contexts, and through its ordering and dividing principles, always divide and order, shaping the behavior of people. It is about how certain kinds (images) of people are made up. For example (Popkewitz, 2013), showed how "adolescence" was constructed through historicising the notion of adolescence. In this process, as a certain kind of person is made up, for example the immigrant student or the successful mathematical learner, the opposite is defined. What constitutes that kind of person and what does not is defined. This process is what Popkewitz (2012, 2013) called abjection and "the double gesture". It becomes clear who is included and who is the deviant. These kinds of *fabrications*, like who "the adolescent" is and should be (Popkewitz, 2013), work their ways into the

lives of these people and become a way of defining oneself. This may generate feelings of in(ex)clusion, which refers to the inseparability of inclusion and exclusion: any move to include brings with it potential exclusions. In the fourth study of this thesis, the notion of fabrication is used to explore how the newly-arrived student as a mathematical learner in Sweden is thought about and acted on in policy documents issued by Skolverket and Skolinspektionen.

Categorisation of immigrant students may have negative consequences for how immigrant students perceive themselves and thus their opportunities to learn mathematics. A study in Sweden by Parszyk (1999), which investigates minority students' experiences of working and living conditions in compulsory school, shows how the students gradually internalise and accept the perceptions and label of immigrant. Categorisation contributed to many of the minority students believing they belonged to an inferior category of young people (Parszyk, 1999).

León Rosales (2010) found a similar result in his study about masculine student positions in a multiethnic school in Sweden. In contrast to this thesis that focuses on school mathematics, León Rosales' study focused on making visible central conditions, norms and values that enabled certain masculine and complicated positions. Interviews and observations were conducted in school year 6, with students about 12 years old. León Rosales (2010) found that the boys in the study understood themselves and were understood by others based on the societal discourses that identify them as deficient and problematic. He expresses it as follows:

When some children in compulsory school learn that they are not worth as much as other children, when some children at the age of 12 are already familiar with discourses that create themselves as subjects in the margins of society, as subordinate Swedes, then there is an "us and them" ordering principle that profoundly counteracts the creation of a demos. (León Rosales, 2010, s.307) (my translation)

This, according to León Rosales (2010), contributes to the boys' construction of themselves as individuals with limited opportunities for action in the present as well as in the future, since they identify themselves as belonging to a problematic category of students.

These two studies conducted in a Swedish context show how discourses about immigrant students in Sweden work their way, as an effect of power, into the lives of immigrant students. These discourses may well influence immigrant students' perceptions of their opportunities to learn mathematics in Sweden. A study conducted by Fairbanks, Crooks and Ariail (2011), in the USA, similarly shows how an immigrant student

internalised the school staffs' categorisation of her. In their research, they followed a girl of Mexican descent, with Spanish as her first language, who went to school and lived in the USA from the sixth to the eleventh grade. The results showed how the girl's way through the school years was limited by how the school positioned her and how, over the years, she continued to internalise the feeling of deficiency that the school staff projected onto her - for example, her deficiencies in the (English) language of instruction (Fairbanks, et. al., 2011). The school contributed to limiting her educational and professional opportunities by allowing her to switch to regular courses from more advanced courses, placing her in special help to read courses for students with deficiencies in the English language, interrupting teaching that she perceived as meaningful to prepare for the national tests, and by steering her into taking vocational education courses (Fairbanks et al., 2011). These methods caused harmful effects, which according to Fairbanks, et. al. (2011), were worsened by structural problems in the school which was limiting the students' access to support such as supervision.

Identity in mathematics education

In the previous section I presented research which showed how immigrant students internalise local and societal categorisations of them. In this section I discuss the potential impact of these categorisations on students' identity formations, particularly, as mathematical learners, since students form identities in relation to mathematics and the teaching and learning of mathematics. I refer to research conducted with both native and immigrant students, as well as to research conducted outside of mathematics education.

There is no one clear definition of the concept of identity (Chronaki, 2016). The definition applied in different studies depends on what discipline or tradition the study is grounded in, and is therefore differently conceptualised. Three traditions and disciplines that have been influential in educational research are the psychological (or developmental), the socio-cultural and the post-structural perspective (Grootenboer, Smith & Lowrie, 2006). When applying a psychological perspective to identity, the individual, not the social and cultural context, is in focus. Consequently, the individual is responsible for his or her own identity. Identity then is about who you are and not about what you do and identity is viewed as fixed and stable (Grootenboer, et. al., 2006).

In contrast to a psychological perspective, the socio-cultural perspective acknowledges that identity is developed through social and cultural

practices and foregrounds the social context. The focus is on the interactions between the individual, culture and society. Identities relate both to the internal and the external, and are understood to be directed by society (Grootenboer, et. al., 2006). In the socio-cultural perspective, Wenger's (1998) work on identity seemed to have been influential in mathematics education research. An example of this is the work of Boaler. For example, Boaler, Wiliam and Zevenbergen (2000), apply a socio-cultural perspective on identity when showing the importance of the role of identity in students' beliefs about themselves as mathematical learners. For example, they show that the extent to which students identify themselves as learners of mathematics is related to how much they like the subject. The students' perceptions of mathematics are strongly linked to how they identify themselves as learners of mathematics (Boaler, et.al., 2000). They argue that students who develop a sense of identity that resonates with mathematics discourse in the classroom are more likely to continue with their studies in mathematics than their classmates who do not develop this sense of identity. In another study by Boaler (2002), she shows how students participating in reform-oriented mathematics teaching, develop more positive attitudes towards mathematics than students participating in traditional mathematics teaching, and thus construct a stronger sense of mathematical identity. The work of Boaler on students' identity formations as learners of mathematics has shown how students' developing identities are an important element in succeeding at secondary school mathematics.

Another influential work on identity in mathematics education is the work of Sfard and Prusak (2006), who acknowledge identity as a discursive activity. Identities are constructed as we tell stories about our experiences in relation to wider societal discourses. They suggest "that identities may be defined as collections of stories about persons or, more specifically, as those narratives about individuals that are reifying, endorsable, and significant" (Sfard & Prusak, 2006, p. 16). The stories are told individually but are products of collective storytelling. They make distinctions between actual and designated identities, and think of learning as closing the gap between these two identities (Sfard & Prusak, 2006).

Socio-cultural and discursive perspectives on identities are brought together in some mathematics education research that aims at a better understanding of how identities are constructed (see for example Darragh, 2013; Solomon, 2007). Solomon (2007), who explored identities in relation to gender and ability grouping, views identities as constituted by both the classroom communities of practice and as a product of discourses of gender, ability and mathematics.

Transition to a new school might involve many different things; a new learning environment and culture, and maybe another understanding of what it means to be a learner of mathematics. Darragh (2013) approaches transition in relation to identity as mathematical learners in a study conducted in New Zealand. The context of her study is transitioning between primary and secondary school. Darragh (2013) examined students' perspectives on their learning experiences and identity constructions when transitioning to secondary school. In-depth, semi-structured interviews with six girls aged 13 to 14 were conducted. The results showed that the girls discursively constructed what it means to be a learner in the mathematics classroom and how they fit within it. She concludes that confidence, belonging and identity are closely linked within a mathematics learning situation and a sense of belonging can be seen as part of identifying with mathematics. She identifies the importance of attaining a sense of belonging in mathematics when transitioning.

Scandinavian research on immigrant students' identities as mathematical learners

In this section I present and discuss two studies conducted in a Scandinavian context that have influenced my work in the third study of this thesis.

In a study conducted in a multilingual classroom in Sweden, Norén (2011) explored how various discourses affect immigrant students' identity formations. In the case study, she focusses on two students, a girl and boy in grade eight and nine respectively, both with Arabic as their first language. The data, from a larger study (Norén, 2010), consist of field notes from ethnographic fieldwork, participant observations, video recordings, and formal and informal interviews with students and teachers in one bilingual mathematics classroom. I focus here on the participant observations. The students participated in bilingual (Swedish and Arabic) mathematics teaching and learning in the mathematics classroom. In her analysis Norén (2011) draws on the work of Foucault when investigating identities, recognising the role of discourse in identity formations. She shows how the students' different identity formations grew out of a variety of discourses in the multilingual mathematics classroom. Discourses available in the classroom were, for example, "Swedish only", "regulating", and "noisy immigrant student", but also discourses that enabled the identity formation of "engaged mathematics learner", like discourses of solidarity, social relations, a discourse promoting multilingualism, and a mathematical discourse. These latter discourses, reflecting positive attitudes towards, for example, social relations,

language, culture, values and habits, gave space for the students to positively build upon opportunities in the classroom and enhance their identity formations as engaged mathematics learners and multilinguals (Norén, 2011). This result challenges the findings of Runfors (2003) and Parszyk (1999), since it suggests that immigrant students do not have to be positioned as disadvantaged or deficit if discourses that promote multilingualism (e.g. the use of the mother tongue and code-switching) and social relations are available (Norén, 2011). This study by Norén (2011) that focused primarily on classroom practice, provided important information about immigrant students' opportunities for learning mathematics. However, it lacks a student perspective. So, in order to provide a more nuanced and broader understanding of immigrant students' opportunities to learn mathematics the perspectives of the students are explored in this thesis. In study II, I analyse focus group interviews with immigrant students to explore the influence of different discourses in their lives and in their learning of mathematics and draw conclusions about how these discourses may have impacted on their opportunities to learn mathematics.

The data in the second Scandinavian study consist of student interviews. It is a single case study conducted in Denmark by Lange (2009), in which a student's identity work in the area of social life constituted by school mathematics education is explored. The case study is one immigrant girl in grade 4 (10 years old) with Arabic as her mother tongue. Analysing the semi-structured life world interviews with the girl, Lange (2009) drew on the work of Sfard and Prusak (2006), in which identities are viewed as reifying, endorsable and significant narratives. The girl was struggling with learning mathematics, at the same time as she was dealing with identity positions encompassing her minority background in a Danish public discourse on Muslim immigrants (Lange, 2009). Her designated identity was to become a designer of clothes. To achieve this, she believed she had to perform well in reading and mathematics, in particular, and get a good education overall. This identity work, Lange (2009) connected to the "grand narrative" in Danish society of education as the road to a desirable future, that is, an impact of a discursive field on the girl's perceptions. Another example of the impact of discourses shown by Lange is how the girl made an effort to identify herself as normal in relation to the social practice of mathematics education. According to Lange (2009) the girl, who achieved poorly in mathematics, could uphold an identity as a normal student because of the classroom discourse, which was inclusive and free from labelling practices. As a result, she could maintain a positive attitude towards mathematics as part of her future. Summarising, Lange argued

“that school mathematics constitutes a valorising field where children’s identity construction takes place as a move between the individually and socially constructed ideas of ability and normality in the teaching of mathematics” (2009, p. 136).

Lange’s (2009) study is similar to study III in this thesis, as both analyse semi-structured student interviews with immigrant students as well as acknowledge students’ perceptions or narratives as important for trying to learn more about their learning of mathematics. Another similarity, also reflected in the study by Norén (2011), is the recognition of discourses as impacting students’ identity formations as mathematical learners. However, in contrast to Norén (2011) and Lange (2009), study III in this thesis explores immigrant students’ identity formations as mathematical learners in a context of transition between schools. Thus, instead of one mathematics classroom, mathematics teaching and learning in two different contexts are in focus. The transition is likely to prompt the students to notice things they would otherwise see as normal, which is a significant difference in relation to the studies of Norén and Lange.

Introducing the research questions

According to the literature on immigrant students and mathematics education in language diverse settings, language issues seem to dominate the research field. This may not be strange, since not knowing the language of instruction obviously creates limitations when participating in mathematical practices and learning mathematics. However, being positioned as an immigrant includes other issues that are less obvious. For example, in the review above, imposed categorisations on immigrant students, their perceptions of their foregrounds, and different discursive practices in the mathematic classroom, are shown to be important for immigrant students’ opportunities to learn mathematics. Thus, I would like to attend to these kinds of issues that are often of a cultural, social and political nature. This is done in four different studies by adopting a socio-political perspective (Valero, 2004; Gutiérrez, 2013). The findings of the four studies are presented in four articles and are assumed to contribute with different information on immigrant students’ learning opportunities. The research questions addressed in the four articles are:

Table 1. Guiding research questions in articles I-IV.

Article	Guiding research question
I. Hope and despair	How are immigrant students' foregrounds expressed, and how do they contribute to the students' interpretations of their opportunities to learn mathematics?
II. Immigrant students' perceptions of their possibilities to learn mathematics: the case of homework.	How are immigrant students' perceptions of their foregrounds and opportunities to learn mathematics influenced by wider discourses?
III. Identity formations as mathematical learners in the context of transition.	Which identity formations as mathematical learners are expressed by the students and how are these identity formations influenced by different discourses?
IV. Fabrication of newly-arrived students as mathematical learners.	How is the newly-arrived student fabricated as a mathematical learner in Swedish policy texts?

The findings of the four articles will be used to answer and discuss the two overarching and meta-reflective research questions of this thesis. This will be done in the last chapter, 6. The two research questions are a rephrasing of the aim, which is to deepen and widen the understandings about immigrant students' opportunities to learn mathematics in Sweden, and in so doing critique deficiency explanations given for immigrant students' failure in mathematics. Thus, the overarching research questions to be addressed in the thesis are:

- I. How can immigrant students' opportunities to learn mathematics and the processes that enable immigrant students' perceptions of their opportunities to learn mathematics be understood?
- II. How do the understandings of immigrant students' opportunities to learn mathematics change when making a theoretical displacement from the work of Skovsmose to the work of Foucault?

The first question is addressed in the different articles. A summarised discussion is provided in the last chapter. As mentioned earlier, a theoretical displacement occurred between the two first studies the two last studies, which generated the second research question. To attend to this second question, and discuss the consequences of the applied theoretical frameworks, texts that bridge the articles are placed between the summaries of the articles. Thus, the second research question is addressed spread out in these chapters. The second question is also addressed and discussed in the last chapter of the thesis, *Concluding discussion*.

3 Theoretical approach

In this chapter the adopted theoretical frameworks and the concepts used when analysing data are presented and described. I employ the work of Ole Skovsmose (1994, 2005, 2012, 2014) and the work of Michel Foucault (1974, 1980, 1993, 2000, 2002) when exploring immigrant students' opportunities to learn mathematics. The work of Skovsmose (1994) is related to critical theory in line with the Frankfurt school (Kolloche, 2016; Ernest, 2010) and the work of Foucault may be related to post-structural or postmodern perspectives. Hence this thesis builds on different theoretical underpinnings; different assumptions and ontological and epistemological views.

From my readings I conclude that there is no such thing as "one true understanding" of critical theory and post-structuralism/postmodernism, since there are several theorists or philosophers who have contributed to the development of the different theoretical perspectives. So, depending on whose work you interpret and use, and from what point in time, there may be conceptual differences even within the same theoretical paradigm. For example, there are differences between the early and later work of Foucault. Some scholars position his work in relation to critical theory, others to post-structuralism or postmodernism (Alvesson & Sköldbberg, 2008). This, means that it is impossible to provide one "truth" or one "correct understanding" when presenting the different theoretical approaches, and it is not my aim to do so. Instead my aim is to be as explicit as possible about my interpretations of the different theoretical perspectives to show how my thinking about them may have influenced the research process.

I start out by showing how this thesis is framed within a socio-political perspective. Thereafter, I attend to the two theoretical perspectives that the studies draw on. I present a more general picture of the two different theoretical perspectives, which then are narrowed down to the applied analytical concepts. Last, I more explicitly discuss the theoretical displacement from the work of Skovsmose to the work of Foucault, by digging deeper into the similarities and differences between the two perspectives.

Adopting a socio-political perspective

To get away from explanations for immigrant students' low achievement in mathematics that refer to their backgrounds, and to introduce a social and political aspect to this issue, this thesis is framed within a socio-political perspective (see for example Gutiérrez, 2013; Valero, 2014). The socio-political context influences students' perceptions of their learning opportunities, perhaps particularly, immigrant students in schools in multicultural and socioeconomically disadvantaged and stigmatised areas. Social and political aspects cannot be neglected, and it is assumed that they are important when exploring immigrant students' opportunities to learn mathematics. I have adopted a socio-political approach (see for example Gutiérrez, 2013; Valero, 2004) to place this research within an equity and social justice perspective (see Phakeng & Moschkovich 2010). Doing so, I draw attention to issues that relate to equity and social justice for immigrant students, because the focus on a certain group of students per se, is insufficient to locate the research in an equity and social justice perspective (see Phakeng & Moschkovich 2010). Accordingly, this thesis attends to both micro and macro contexts, and specifically, how the micro context is influenced by the macro context when conducting research from equity and social justice perspectives. In the fifth chapter this is further described, using the phrases “zooming in” and “zooming out”, drawing on a study by Stinson and Bullock (2012).

A socio-political approach in mathematics education is relatively new. Stinson and Bullock (2012) identified four historical moments in mathematics education research, in which the socio-political is the fourth moment, placed in the 2000s. The first historical moment is what they call *the process-product moment*, which they place in the 1970s. This kind of research mostly deals with quantifying effective mathematics teaching that focuses on the relationship between teaching and the students' achievement in mathematics (Stinson & Bullock, 2012). The second is *the interpretivist-constructivist moment* in the 1980s, in which research focuses on understanding, for example, how students make meaning of mathematics, by studying student-student interactions (Stinson & Bullock, 2012). The third moment is *the social-turn moment*, which Stinson and Bullock (2012) place in the mid-1980s. In this type of research the socio-cultural context is important, and mathematics teaching and learning is understood in relation to the socio-cultural context in which it occurs. The fourth and most recent moment, *the socio-political moment*, acknowledge the importance of seeing the wider social and political picture when conducting research in mathematics education (Stinson & Bullock, 2012). Stinson and Bullock (2012) point out that these timeframes should not be

interpreted as fixed starting and/or ending points. Instead, they should be seen as possibly operating at the same time, overlapping each other. In contrast to the first three moments, the socio-political moment has the potential to deal with social and political issues that relate to the micro and the macro context. For example, researching identities that have arisen from or have been constituted by social discourses, instead of identities that are fixed and stable and located solely within the student, becomes possible with a socio-political approach.

Adopting a socio-political research perspective has consequences for how mathematics is viewed. For example, within a socio-political perspective, mathematics cannot be viewed as something neutral and pure and thus practices of teaching and learning mathematics cannot be viewed as neutral (Valero, 2014). Instead, according to Valero (2014), these practices generate processes of inclusion and exclusion since "...they insert people – be it children, youth, teachers, and adults – in socially valued mathematical rationalities and forms of knowing" (p.484). This "results in differential positioning of inclusion or exclusion of learners in relation to access to socially privileged resources such as further education, labor market, and cultural goods." (p. 484-485)

Power is a key element when adopting a socio-political approach. Power relates to the term political (Valero, 2004), and thus adopting a political perspective in mathematics education enables looking at how mathematics, education, and society relate to power (Valero, 2014). Power within a socio-political approach is viewed as strongly intertwined with knowledge and identity (Gutiérrez, 2013), which arise from social discourse. According to Valero (2004) there are different ways of defining power within a socio-political approach: in line with Marxist and critical traditions and/or in line with postmodern and post-structuralist thinkers. The notion of power rooted in Marxist and critical traditions has to do with the resources or capacities of people or certain groups of people who have the ability to exclude others. That is, creating a struggle between who is included and excluded (Valero, 2004). It is within this approach, that the work of Skovsmose (1994) on critical mathematics education may be placed (Kolloosche, 2016; Ernest, 2010). To examine power in line with these traditions "requires critique as a means to offer a counterpart to naïve views about the way in which mathematics and mathematics education are implicated in the creation and maintenance of particular social structures" (Valero, 2004, p. 11). Thus, critique is an essential element of a socio-political approach (Valero, 2004), which means that when adopting a socio-political perspective, research has the potential to uncover taken-for-granted rules that privilege and exclude people (Gutiérrez, 2013). This

study relates to privilege and exclusion, since a part of the thesis aim is to question and critique the common deficiency explanations and categorisations about immigrant students and mathematics that may generate exclusion. In contrast to the critical traditions, a Foucauldian approach views the notion of power as a characteristic of social relations and of how “social actors to position themselves in different situations and through the use of various resources of power” (Valero, 2004, p. 11; see also Foucault, 2002). As an example, this view of power enables exploring how different discourses may influence students’ opportunities to learn mathematics. For example, what discourses dominate and how they enable identity formations as mathematical learners? What is valued and what is not?

Another key notion when adopting a socio-political approach is the notion of context, which relates to a Foucauldian view on power (Valero, 2004). Context from this perspective takes in both the micro and macro contexts. The micro contexts are viewed as inserted into layers of macro contexts (Valero, 2004). In other words, the micro contexts are influenced by the macro contexts. When researching mathematics classroom practice or students’ perspectives the macro contexts, not just the classroom as micro context, should be acknowledged. This enables the exploring of social and political issues, or larger structures “outside” the classroom that may influence students’ perceptions of their opportunities for learning mathematics. One example of this is the second study of this thesis, which explores how immigrant students’ perspectives on mathematics homework, and the importance of parental support, are influenced by public discourses.

In mathematics education research, socio-political studies often draw on critical perspectives, for example the work of Skovsmose (1994; 2005, 2012; 2014), and/or use theoretical thinking tools in line with the work of Foucault (see for example Andrade-Molina, 2017; Pais & Valero, 2012; Walshaw 2004, 2007, 2013). Gutierréz discusses the perspectives of critical theory, critical race theory and later theory and post-structuralism as theoretical approaches within a socio-political perspective on research in mathematics education (Gutierréz, 2013). Studies adopting critical perspectives and post-structural perspectives, all fit within a socio-political approach. However, some mathematics educators argue for one socio-political theoretical perspective over others. Kollosche (2016) argues that Skovsmose’s work, which he relates to a Marxist understanding of ideology, has limitations when it comes to socio-political research in mathematics education, and proposes instead a Foucault-based approach for conducting socio-political research. In contrast, Stinson and Bullock

(2012) suggest a theoretical hybrid between the two perspectives, which they call critical postmodern theory (CPT). Thus, there are different understandings and preferences among mathematics educators of how to make use of the two perspectives. In this thesis, I make use of both perspectives. Study I and II relate to critical theory (the Frankfurt School) with the work of Skovsmose. Study III and IV relate to post-structuralism with the work of Foucault. It means that I work with both theoretical frameworks in the thesis, but not in the same studies. The two theoretical perspectives have both similarities and differences. What they both have in common is that they are both effective for critiquing positivism, in interrogating taken-for-granted assumptions on how research is conducted (Agger, 1991). However, it is important to make explicit their differences and make the research process as transparent as possible for the reader. I present and discuss the epistemological differences between the two perspectives at the end of this chapter.

A critical perspective

Studies I and II were inspired by Skovsmose's critical mathematics education work, specifically the concept of foreground as an analytical tool (Skovsmose, 1994; 2014). His work in *Towards a philosophy of Critical Mathematics Education* (1994) relates to the critical theory of the philosophical thinkers of the Frankfurt School (Kollosche, 2016). I start out by presenting critical theory on a more general level, which then leads into the work of Skovsmose on the notion of foreground, which I present in the next section. Critical research in the social sciences may have different approaches, but according to Alvesson and Sköldberg (2008), it is a specific form of critical thinking. They state that critical research may be about a) identifying and questioning assumptions behind common ways of perceiving, understanding and acting; b) acknowledging the influence of history, culture and social position on perceptions and actions/practices; c) imagining and exploring alternatives that may disrupt routines and an established order; d) acknowledging different, not least subtle, forms of social dominance; and e) being duly sceptical about all knowledge or solutions that claim to be the only truth or alternative (see Alvesson & Sköldberg, 2008, p. 283). An influential strand of critical theory on research in social sciences is the Frankfurt school (Agger, 1991; Alvesson & Sköldberg, 2008), which has also been influential in Skovsmose's work on critical mathematics education (Ernest, 2010; Kollosche, 2016). The Frankfurt school started in the late 1920s at the university of Frankfurt in

Germany, and philosophers central to this tradition are Habermas, Marcuse, Horkheimer, Adorno, Apel and Fromm (Alvesson & Sköldbberg, 2008). These philosophers were, in turn, inspired by Marx, Weber, Hegel, Kant and Freud. According to Agger (1991), the theory of the Frankfurt School was originally developed as an attempt to explain why Marx's predicted social revolution did not occur as expected. They were committed to egalitarian social justice values, which constitute a rationale in their theoretical standpoint. A basic idea of the Frankfurt school, according to Alvesson and Sköldbberg (2008), was that the social sciences should develop knowledge that may contribute to managing and counteracting irrational and repressive social structures and processes.

An aim for critical theorists is to contribute to liberation, for example, by reconsidering oppressive ideas and identities (Alvesson & Sköldbberg, 2008). This means that research in line with critical theory has an interest in critically questioning social reality, with a focus on social change. In other words, critical theory can be said to be about critiquing domination, social practices and asymmetric power relations (Agger, 1991; Alvesson & Sköldbberg, 2008; Stinson & Bullock, 2012). As mentioned earlier in this chapter, the notion of power rooted in Marxist and critical traditions has to do with the resources of people or certain groups of people who have the ability to exclude others, that is creating a struggle between who is included and excluded (Valero, 2004). Within the critical perspective power is sovereign - the subjects or actors are at the centre as the wielders of power (Popkewitz & Brennan, 1998). Power is interpreted as something you can own or possess, and may be restructured among people or groups to challenge inequalities.

Adopting a critical approach to mathematics education entails taking up social and political issues, with the goal of providing all students with equal access to mathematics, with equal access to empowerment through mathematics (Skovsmose, 1994). Or as expressed by Ernest (2010, p 82): "CME has the overriding aim of combating these divisive, class-reproductive effects". Stinson and Bullock (2012) summarise the work of critical mathematics education researchers as: they "attempt to broaden the accessibility and purposes of school mathematics as they work against the status quo in hopes of transforming mathematics teaching and learning into more humanising experiences" (p. 47). As mentioned earlier, the notion of foreground is a notion from Skovsmose's (1994) work, which I use as an analytical tool in studies I and II. The following section in this chapter presents and discusses this notion and how it relates to learning mathematics.

The notion of foreground – critical mathematics education

To avoid explaining immigrant students' achievement in mathematics with only reference to deficiencies (such as their backgrounds), and in order to learn more about immigrant students' opportunities to learn mathematics, the notion of *foreground* is used to analyse the student interviews in article I and II. According to Skovsmose (1994) it is problematic to only explain students' mathematics achievement with reference to their backgrounds since this sanctions deficit thinking. The background, according to Skovsmose (1994), belongs to the history of a person and consists of a socially constructed network of relationships and meanings, so it is also important to consider the students' present situation (their foregrounds) when explaining school achievement.

Skovsmose came to use the notion of foreground after noticing a certain pattern during classroom observations in a mathematics classroom in Denmark. The pattern looked like this; the teacher began the lesson by explaining a new task or a new element, then the students worked in their textbooks, and when they were done with the tasks they went up to the teacher's desk. The teacher looked at the solved tasks and gave encouraging comments about the solved tasks in the textbook. When the students were lining up to have the teacher look at the tasks, Skovsmose (2005) argues that stratification occurs. For some students, it meant a race to be the first to the teacher, while others did not participate in the race, realising that they would never be number one in line to the teacher. These students occupied themselves by sharpening their pencils, selecting erasers, or similar activities to pass the time so that they did not have to participate in the race. In this way, their self-esteem did not have to be affected when they failed in their attempt to come first. It was a way of defending themselves. Or one could say that such students "know their place" or their position (Skovsmose, 2005). The students knew who would "win the race" and who would not. It was in relation to this situation that Skovsmose started to use the notion of foreground; in order to understand these students' attitudes towards mathematics and how they interpreted their possibilities he found that:

...they constructed their "foregrounds" as expressions of what they experienced as their opportunities, and that these foregrounds set the conditions for their engagement in, as well as their resistance towards, mathematics. (Skovsmose, 2005, p. 4)

Skovsmose views learning as action (Skovsmose, 1994) - the rationales for action (here: learning mathematics) are the intentions of the individual, which are grounded in a landscape of dispositions (pre-intentions) formed

by, on the one hand, a person's background and, on the other, his or her foreground. Skovsmose considered that these dispositions, especially dispositions to learn, "embody propensities that become manifest in actions, choices, priorities, perspectives, and practices" (2005, p. 7). Opportunities relate to the individuals' perceived opportunities in relation to the social, political and cultural situation. Alrø, Skovsmose, and Valero (2009) define foreground as follows:

The notion of foreground refers to a person's interpretation of his or her learning possibilities and "life" opportunities, in relation to what the socio-political context seems to make acceptable for and available to the person. (p. 7)

What a student perceives as her foreground when interpreting her opportunities, relates to the socio-political context in which she is situated. Thus, my assumption is that exploring immigrant students' foregrounds may provide valuable information on immigrant students' perceptions of their opportunities to learn mathematics. It also means that foregrounds and backgrounds are strongly connected to the individual and are interpreted by the person herself and thus cannot be viewed as objective or a truth. Based on the situation the student is in, different foregrounds can be activated, and thus be a motive for action and either intention to learn, no intentions to learn (inaction). It is also important to point out that a person does not have one true foreground; instead a person may have multiple foregrounds in different contexts. Foregrounds can also change over time (Alrø, et.al., 2009).

Foregrounds relate to the future as students interpret their schooling in relation to their visions of future opportunities in life (Skovsmose, 1994). The meaning of foreground cited above and given by Alrø, et.al. (2009), contains the word possibilities, which might be interpreted as something positive. Therefore, it is important to point out that a foreground might include both opportunities and obstructions, and can be considered part of a student's life situation or, in Skovsmose's (2014) words, a life-world. For example, a person who interprets his or her foreground negatively may feel unable or unwilling to act and so the intended learning does not occur. A life-world is structured by economic, political, cultural, and discursive factors of which life-conditions or lived-through realities are a part (Skovsmose, 2014). However, Skovsmose (2014) also points out that a foreground stretches beyond a life-world since it contains, for example, hopes, aspirations, wonderings, frustrations and despairs. It is also important to point out that through exploitation and stereotyping, foregrounds can be imposed on a group of people (Skovsmose, 2014).

As mentioned, foregrounds impact on students' reasons for engaging in the learning of mathematics (Alrø, et.al., 2009) as students relate past experiences to the potential future. Therefore, I found it important to use the notion of foreground as an analytical tool when analysing immigrant students' perceptions of their opportunities to learn mathematics (studies I and II). Students come to school with interpretations of their background and foregrounds, which can have a major impact on their participation in the learning processes and thus on their performances in various subjects. For example, students' foregrounds can be ruined in ways that lead them to question how learning mathematics can enhance their future opportunities at all, potentially affecting their intention to learn mathematics.

The aim of the first study was to discuss immigrant students' opportunities to learn mathematics by exploring how they describe their foregrounds. The guiding research question was: How are immigrant students' foregrounds expressed, and how do they contribute to the students' interpretations of their opportunities to learn mathematics? This is presented in article I. In the second study, another layer was added in the analytical process; a discourse analysis approach (I will present and discuss my use of discourse further on in this chapter). This means that I also explored how public discourses about immigrant students had infiltrated the discourses of a group of immigrant students, and so in order to understand how their opportunities for learning were affected by these public discourses, I used the notion of foreground. The guiding research question was: How are immigrant students' perceptions of their foregrounds and opportunities to learn mathematics influenced by wider discourses? This is presented in article II.

In the next section I discuss the second theoretical perspective that this thesis draw on, the Foucauldian perspective, within which studies III and IV are framed.

The Foucauldian gaze

The work of Foucault is often written and talked about as postmodern or post-structural, and sometimes also as critical theory (Alvesson & Sköldbberg, 2008). There are both similarities and differences between a post-structural perspective and a postmodern perspective (see for example Agger, 1991). However, it is not my aim to place him within one of those theories. Instead, I will present and discuss his work in theoretical relation to how it has influenced my thinking and work in studies III and IV. In

those two studies, I use “tools” from the work of Foucault to analyse the data. Thus, I have primarily used Foucault’s views on discourse, power and identity formations, or subjectivity. However, I will discuss his work in a broader perspective, in the interests of transparency, to enable the reader to follow how it may have influenced my work. Another reason for doing this is to enable discussion of the breaks and disparities between the two theoretical perspectives that I combine in the last section of this chapter. A third reason has to do with the second research question, in which I explore the different contributions and consequences of adopting two theoretical perspectives. I therefore present and discuss his view on the relationships between knowledge, discursive practices, power and the construction of the subject.

Since the notion of discourse in study II drew on Gee’s (2011) work with “Big D” Discourses and “little d” discourses, I first discuss this notion before returning to Foucault once again.

From Gee to Foucault

Discourse is a concept that is widely used both in everyday and in academic language. A discourse can be explained as a certain way of talking about and understanding the world. In its broad sense, a discourse contains all types of interaction, formal and informal speech, and all kinds of written texts (Gee, 2011; Potter and Wetherell, 1987).

In the second study, I drew on Gee’s (2011) work that discusses two kinds of discourse. Immigrant students are positioned as a certain kind of person in what Gee calls “Big D” Discourses, which are wide and include language and social practices. Gee (2011) defines “Big D” discourses as language and more (Gee, 2011). He clarifies this by saying that a discourse involves how one uses the language to think, to value, to act and to interact in the right situation, at the right time, and with the right object. He writes: “You can’t just “talk the talk”, you have to “walk the walk” as well” (Gee, 2011, s. 28). According to Gee (2011) “little d” discourses refer to language in use, stretches of language, and are related to an individual’s everyday activities. It is, for example, about the ways the students talk about themselves. Discourses are part of the students’ lives, both in school and outside of school and structure how they talk and act in different contexts. Thus, students are influenced by Discourses. For example, in the field of mathematics education research Norén (2010) showed, in a Swedish context, that discourses can create both opportunities and hindrances when learning mathematics. Another example, in a Danish context, is a study by Lange (2008) who showed how dominant public

discourses about immigrant parents and homework support have infiltrated the life of an immigrant girl and her learning of mathematics. Thus, I assumed that public discourses may have consequences for immigrant students' opportunities to learn mathematics and therefore study II explored how Discourses about immigrant students have infiltrated the discourses of a group of immigrant students in Sweden.

However, when continuing my studies, I became interested in Foucault's work and thus a theoretical displacement on the notion of discourse occurred between the second and third study. Foucault, like Gee, was interested in large societal discourses - he examined the social construction of madness (The history of madness), punishment (the birth of the prison), and sexuality (the history of sexuality) (Foucault, 2002), which in Gee's words (2011) may be viewed as "Big D" discourses. However, in contrast to Gee's work on discourse Foucault more explicitly focused on how discursive practices relate to power, and how power both constitutes the discourse and is constituted by the discourse, producing regimes of truth (Foucault, 1980). This is further discussed in the next section.

Discourse and power

According to Foucault (1966/73) a discourse can be thought of as a systematic, recurrent and certain way to talk about and understand the world and humankind. However, discourses do not only include words and communication. A discourse unfolds in a discursive practice; thus, it also includes actions and ways of operating. Further, discourses structure institutions, for example the school, in which discourses operate by unwritten rules and define, for example, "the good mathematical learner". That is, the discourses inform us what it means to be a "good mathematical learner" at a certain time, creating a "truth" about the good mathematical learner and how he/she is thought about. This means that discourses, according to Foucault (2002), regulate what it is possible to think, say and how to act; thus people are products of discourses (Foucault, 1974). This is not formed by any consciousness of the individuals. Instead discourses operate beneath the consciousness of individual subjects, define possibilities and limits within the discourses, and produce special knowing and truths, all in a particular time.

Consequently, the role of power is evident. Discourse and power go hand in hand in the work of Foucault (1974), since knowledge cannot exist without power. He writes:

Man bör snarare medge att makten producerar vetande (och inte bara gynnar vetandet för att det gagnar den eller tillämpar vetandet därför att det är nyttigt); att makt och vetande direkt förutsätter varandra: att det inte finns något maktförhållande utan att ett därmed sammanhängande område av vetande skapas och att det inte heller finns något vetande som inte samtidigt förutsätter och utbildar ett maktförhållande. (Foucault, 1974, p. 33)

You should rather admit that power produces knowing (and not only favours knowing because it benefits it or uses knowledge because it is useful); that power and knowing directly assume each other: that there is no power relationship without creating an associated area of knowledge and that there is also no knowledge that does not simultaneously presuppose and inform a power relationship. (my translation)

This means that the subject is the sum of effects of the relationship between power and knowledge and its historical transformations. Knowledge is produced by the power-knowledge relationship and its processes (Foucault, 1974). Accordingly, I interpret discourse, knowledge and power as closely interwoven. That is, knowledge is produced and shaped within a discourse, which in turn is regulated by different power relations. Different kinds of knowledge are valuable, count in different discourses, and are an effect of power relations. Power, in the work of Foucault, is not simply something you possess nor something repressive, nor something someone exercises over another individual or group. It is not just a sovereign view on power. Instead, power should be viewed as circulating, relational and productive, and as constituted through discourses (Foucault, 1980; 2003). He describes power as

employed and exercised through a net-like organisation. And not only do individuals circulate between its threads; they are always in the position of simultaneously undergoing and exercising this power. They are not only its inert or consenting target; they are always also the elements of its articulation. In other words, individuals are the vehicles of power, not its points of application. (Foucault, 1980, p. 98)

This means that individuals are always part of power. Consequently, we make judgements and decisions in our everyday lives based on the effects of power that we are part of without being fully conscious about it. Furthermore, Foucault relates power to a “regime of truths”, that “we are subjected to the production of truth through power and we cannot exercise power except through the production of truth” (1980, p. 93). He speaks of a “regime of truths” as maintained and reproduced in discourses through power:

In the end, we are judged, condemned, classified, determined in our undertakings, destined to a certain mode of living or dying, as a function of the true discourses which are the bearers of the specific effects of power. (Foucault, 1980, p. 94)

This also means that discourses define what is “normal”. Norms or *natural rules* (Foucault, 1980) are shaped, a form of power that is exercised through *discipline* (Foucault, 1974; 1980; 1982), which regulate the behaviour of the individuals. These norms may also create what Foucault named *dividing practices* (Foucault, 1982; 2000), processes in which the subject is objectivised. The subject may be divided inside herself or from others, for example, “the good mathematical learner”, and “the bad mathematical learner”. I provide the following reasoning as an example of how I have thought about this process in my work - discourses that explain immigrant students’ achievement in mathematics in relation to deficiencies has been normalised, meaning that they are “normal” explanations, widely and often used when discussing immigrant students’ failure with mathematics. Moreover, they impose a regime of truth - for example, it becomes a “truth” that immigrant students fail mathematics because of their deficiencies in the language of instruction. This thinking has the potential to divide immigrant students, both within themselves and from other (Swedish) students, and identify them as deficit. Thus, dividing practices enables the categorisation of people.

As mentioned, from a Foucauldian standpoint, discourses are recognised as social practices structured through power relations that enact different identities and activities (Foucault, 1993). He describes the relationship between power and the individual thus:

In fact, it is already one of the prime effects of power that certain bodies, certain gestures, certain discourses, certain desires, come to be identified and constituted as individuals. The individual, that is, is not the *vis-a-vis* of power; it is, I believe, one of its prime effects. The individual is an effect of power, and at the same time, or precisely to the extent to which it is that effect, it is the element of its articulation. The individual which power has constituted is at the same time its vehicle. (Foucault, 1980, p. 98)

This means that different discourses, through the workings of several power relations, enable different identity formations or subjectivities. Thus, a discourse “shapes” the subject by its rules, regulations and norms, and governs social practices; however, while directing the thinking and behaviour of the subject, it simultaneously reproduces this power. This type of power relations exercise is what Foucault calls *conduct*: “the exercise of power consists in guiding the possibility of conduct and putting

in order the possible outcome” (Foucault, 1982 p. 789). This includes conduct of others and conduct of self; to lead or drive others, and to behave. This leads into the discussion of *subjectification* (Foucault, 1982). However, although I use subjectification as an analytical tool, particularly in study III, I have chosen to use the concept of identity formations instead. This is because Walshaw’s (2013), Stentoft & Valero’s (2009) and Norén’s (2011) work with identities in the field of mathematics education research has inspired me and guided my thinking. They base their understandings of identity on the work of Foucault but do not name the notion of subjectification or subjectivity as Foucault does. In the next section I present and discuss how I have thought about identity formations when using it as an analytical tool in study III.

Identity formations

When students transition between different schools, as in the third study, the question of identity becomes emphasised since the move may require them to re-negotiate their identities. Thus, students’ identity formations constitute the analytical tool of study III. I draw on identities viewed from a Foucauldian perspective, with the understanding that there is a certain relationship between identity formations and power relations. Foucault (1982) believes that

... power applies itself to immediate everyday life which categorizes the individual, marks him by his own individuality, attaches him to his own identity, imposes a law of truth on him which he must recognize and which others have to recognize in him. It is a form of power which makes individuals subjects. There are two meanings of the word “subject”: subject to someone else by control and dependence; and tied to his own identity by a conscience or self-knowledge. Both meanings suggest a form of power which subjugates and makes subject to. (p. 781)

Identities then are not about who you are, but what you do, a process of becoming (Grootenboer, et. al., 2006; Gutierréz, 2013) or identities-in-action (Stentoft & Valero, 2009). Thus, from a post-structural perspective, identity formations are related to discourses, which can then be thought of as “fragile identification processes embedded in discourse and, therefore, tightly related to peoples’ actions and participation in on-going discursive practices” (Stentoft and Valero, 2009, p. 62). Walshaw, who has conducted influential work on identity formations from a post-structural perspective in the mathematics education research field, acknowledges this and uses the vocabulary of Foucault (1982) to explain how formations of

mathematical identities are entangled in power, constituted in discourse. She states:

The theoretical category by which Foucault unravels the constitution of identity/subjectivity is discourse. For him, discourses mean more than communication and speech; they imply forms of social organization and social practices that, at different times, structure institutions and constitute individuals as thinking, feeling, and acting subjects. Functioning like unwritten rules, discourses actively constitute social entities and relations, sketching out ways of being in the world, defining the possibilities, as well as the limits, of meaningful existence. They shape our thinking, our viewpoints, our beliefs, and our practices. They tell us what it means to be, for example, a teacher or a student at a particular time. Their effect is to produce truth and since they are the means by which reality can be read, discourses are extremely powerful. (Walshaw, 2013, p. 102)

People involved with mathematics education, “participate in a social web of power that allows us to “perform” (or not “perform”) as students, teachers, educators, researchers, and so on” (Walshaw, 2013, p. 103). This social web of power entangles the students in the mathematics classroom and governs, regulates and disciplines them (as well as the teachers) through different discourses. These discourses can be of an economic and political nature, or more directly related to the classroom. For example, according to Walshaw (2013), power operates through “the classroom’s traditions; through its material, discursive, and technological forms; through its mathematical enactments; and through its discourses that relate to categories of class, gender, ethnicity, and other social determinations” (p. 103). These kinds of processes subtly shape students’ identities, suggesting that discipline and regulation are both practices in identity formations (Walshaw, 2013).

An argument for adopting a post-structural perspective on identities in line with Foucault (1982), is that it enables social justice issues to be addressed, since it moves beyond a search for “universal cognitive, social, and cultural effects of practices and processes” (Walshaw, p. 101). Instead it offers “a way of exposing the conditions that make divisions between people in their efforts to identify and become proficient with mathematics” (Walshaw, p. 101), and thus offers a way of understanding what can be done to effect social and educational change. In study III, the intention behind closing the school and allocating the students to different schools, was to provide the students with opportunities for improved academic achievement and thus brighter futures. This puts social justice and equitable education on the agenda and constitutes an argument for approaching identity formation from a post-structural perspective in the

third study. Furthermore, social and educational change may take place for students when they are transitioning, which can be explored empirically. However, a post-structural approach provides the opportunity to understand what can be done to effect these changes. Thus, I use the notion of identity formations from a post-structural perspective when analysing the girls' stories. In study III I acknowledge identity formations as dynamic and embedded in discourses in which power operates by governing, regulating and disciplining students through related discourses, thus allowing them to perform as certain kinds of people, as mathematical learners. The analysis and result are presented in article III.

Fabrication

Another theoretical concept that is applied in the analytical work in this thesis is the concept of *fabrication*, in which I draw on Popkewitz (2004, 2012, 2013), who himself draws on the work of Foucault. In the fourth study, Swedish policy texts about newly-arrived students were explored with the intention of identifying discourses about learning for newly-arrived students in Sweden and how they fabricate the newly-arrived student as a mathematical learner. The purpose for doing this was to widen the understanding about immigrant students' learning opportunities by learning about processes that may enable immigrant students' perceptions of themselves. That is, to learn more about how certain categories of students may come into existence and become normal ways of thinking about these students, and how processes of in(ex)clusion in mathematics in school are generated. Therefore, I view the analysis of the policy texts as a complement to the other three studies which are based on the students' voices. In article IV, I think of discourses in line with the work of Foucault, assuming that discourses are governing practices, and viewing the analysed policy texts as discursive practices, since texts build on already existing discourses and are written within a certain discursive practice. I also understand practices in institutionalised fields, such as making (political) decisions and writing policy texts on how to integrate newly-arrived students in school, as discursive practices. The category "the newly-arrived student" came into existence through policy texts, and so, to explore what that category holds, I use the concept of fabrication as an analytical tool since it

entails simultaneously practices of inventing fictions about people that respond to things of the world (such as adolescence as a human kind); and

the making of that “kind” as theories, programs, and cultural narratives, producing people to navigate and order life itself (Popkewitz, 2012, p. 170).

Popkewitz (2012) uses fabrication as an analytical concept as a way of pursuing the governing of schooling:

The concept is to think about the categories and distinctions of the child and teacher as simultaneous inventions that create maps for planning that respond to issues of the world; and *are* rules and standards to constitute what is thought about, hoped for, and done. (p. 173)

Fabrication concerns “practices about how to think about people, a way of acting on particular populations, and for people to act on themselves that excludes and abjects in the impulse to include” (Popkewitz, 2013, p. 440). Fabrication produces kinds of people. That is, images of certain kinds of people are constructed through systems of reason, which governs conduct. Thus, the fabrication of a certain kind of human is an effect of power relations. Inclusion and exclusion are part of the same phenomenon. For example, not all students match the image of the fabricated student produced in the school policy texts. The students who do not fit into the fabrication or “description” become defined in the endeavour to include, since they lack the described and desired qualities and characteristics of the fabricated desired person. This is the process of abjection (Popkewitz, 2012, 2013). Fabrications of the successful student in mathematics, and what it means to be such a student, may work their way into the classroom as a normative state of being, thus enabling the process of abjection. In this way, fabrications of certain kinds of people, who they are and who they should be, work their way into the lives of people, and become a way of thinking about themselves (Popkewitz, 2013).

When conducting the analysis of policy texts in the fourth study, I drew on these conceptualisations of fabrication, abjection, and discourses. The analysis and result are presented in article IV.

From Skovsmose to Foucault

My first and second studies employed Skovsmose’s (1994) critical mathematics education (CME) framework to explore students’ foregrounds, while my third and fourth studies use a Foucauldian perspective to analyse students’ identity formations as mathematical learners and the fabrication of newly-arrived students as mathematical learners in Swedish policy documents.

This move, from the work of Skovsmose towards a Foucauldian perspective entailed a theoretical displacement. These two perspectives both relate to and differ from one another. For example, Skovsmose and Foucault understand power differently.

When trying to understand the disparities I draw on two books. A book by Popkewitz and Brennan (1998), in which disparities between critical theory and the work of Foucault are discussed, and a recent book by Skovsmose (2014) in which he develops the understanding of foreground, and reformulates the notions of intentionality and life-world, and thus develops the notions of intentions-in-learning and foregrounds-for-learning (Skovsmose, 2014).

To recap, Skovsmose views learning as action (1994) - the intentions of the individual constitute the rationales for action. In turn, the intentions of the individual are grounded in the dispositions of the individual, also called pre-intentions. These dispositions are formed by the individual's background and foreground, and it is these intentions of the individual that need to explore in more detail to make the theoretical displacement transparent. Skovsmose (2005) talks about deciding to engage in, for example, mathematics learning. Notions of the individual's intentions to learn and the individual's decision to learn are both related to the assumptions about the philosophy of consciousness, which has dominated the liberal and critical sciences. This becomes an issue since there are disparities with Foucault's critical approach (Popkewitz and Brennan, 1998) when it comes to the philosophy of consciousness. I will get back to the philosophy of consciousness.

First, I would like to mention the word "future", which is related to the foregrounds of an individual. Skovsmose (1994) states that students interpret their schooling in relation to their visions of future possibilities in life. This suggests that future relates to a form of progress. Progress is an assumption in critical traditions and accordingly there is a break between the work of Skovsmose (1994) and a Foucauldian approach (Popkewitz & Brennan, 1998). In the philosophy of consciousness, systematic knowledge is described as the motor by which "reason" can direct social action and guarantee future betterment in society. This "reason" is applied by specific sets of actors who are identified through the knowledge of social science (Popkewitz & Brennan, 1998). Another assumption of the philosophy of consciousness thus has to do with disciplinary knowledge having a subject. It means that "actors" are identified and are the source of change; actors that in the critical perspective of the Frankfurt school, repress and prevent. These two assumptions could be summarised to progress and actor, which critical traditions are committed to. According to Popkewitz and Brennan

(1998) these two epistemological assumptions are not adequate when conducting research that explores and attends to the politics of governing, and the circulating power in contemporary societies. Instead, they suggest bringing in the work of Foucault to enable an exploration of the relationship between power, knowledge, and change, and to historicise the problem of knowledge. They call it a social epistemology. This is also where there are disparities between Skovsmose and Foucault.

According to Popkewitz and Brennan (1998) the work of Foucault can be viewed as an expansion of the early Frankfurt School, since it provides a historical specificity to the observations. They explore the contribution of Foucault to the social sciences and the critical tradition, and state that Foucault's "concern with how the subject is constituted in power relations forms an important contribution to recent social theory, providing both methodological and substantive challenges to the social sciences" (Popkewitz & Brennan, 1998, p.287). They hold that the work of Foucault generates specific breaks with the traditional critical theory that has dominated Western Left thinking since the turn of the century. According to Popkewitz and Brennan (1998), this is a new development in critical thought, since critical theory regards knowledge as a part of the epiphenomena through which social, material practices are formed, while Foucault argues that knowledge is a material element in social life. Foucault challenges Marxist theories on issues of power (Foucault, 1980). Thus, to explore the notion of power and its epistemological roots in critical traditions Popkewitz and Brennan (1998) compare the assumptions of the philosophy of consciousness that has dominated liberal and critical social science with a "social epistemology" in which they place the work of Foucault. It is in light of this comparison that I later discuss the notion of foreground.

There are both important points of continuity and breaks with the epistemological assumptions when comparing The Frankfurt School with the work of Foucault (Popkewitz & Brennan, 1998). The breaks in the epistemological assumptions concern the notions of change and power. So, let us have a look at the notion of power. To locate the breaks, I revisit the philosophy of consciousness, which has its legacy in nineteenth century social thinking, and which are carried into the social and educational theories of today. According to Popkewitz and Brennan (1998), the study of power within the philosophy of consciousness is an attempt to identify the origin of power, which implies identifying the actors who control and for whom existing arrangements are beneficial. This puts the actors at the center as the wielders of power, enabling a view of power as sovereign. This further enables a view that power is something you own and that it

can be restructured among people or groups to challenge inequities. This view of power sees actors in a position to make decisions and to allocate values within communities. This refers to its connection to the philosophy of consciousness. According to Popkewitz and Brennan (1998), this sovereign view of power is limited since it assumes a unified historical processes and power as immanent to a certain context, which does not question how power exists or interrogate the conditions necessary for it to exist. Other limits concern its ability to homogenise and essentialise categories of analysis. For example, instead categories such as race, class, and gender must be treated as historically constructed categories. Otherwise a consequence may be creations of a dichotomous world, in which the oppressors and the oppressed exist.

The power of sovereignty is different from how Foucault (1980, 2003) views power. Foucault also views power as productive (1980, 2003), which

concerns its effects as it circulates through institutional practices and the discourses of daily life". Foucault argues that power is embedded in the governing systems of order, appropriation and exclusion by which subjectivities are constructed and social life formed (Popkewitz & Brennan, 1998, p. 304).

According to Foucault, power can be seen as deployment. With this move from power as sovereignty, to power as deployment, a move from controlling actors to "the systems of ideas that normalise and construct the rules through which intent and purpose in the world are organized" (Popkewitz & Brennan, 1998, p. 305) takes place. Even if the two views of the notion of power hold different assumptions, they both, according to Popkewitz and Brennan (1998) have to do with a general political commitment to social change and can be viewed as complementary.

In summary, the notion of power as sovereign is connected to the philosophy of consciousness and the earlier critical theorists of the Frankfurt school, and thus differs from how Foucault views power as deployment. This move decenters the subject, which opens possibilities for exploring "how power circulates through and is productive in daily life, providing a strategy for disrupting that knowledge/power relation through making "reason" appear as socially constructed and as embodying power relations" (Popkewitz & Brennan, 1998, p. 306). Power as deployment leads into the discussion on Foucault's notion of governmentality which can be applied when analysing how power relations work. Governmentality offers a way of talking about regulating the fabrication of newly-arrived students in Swedish policy (see the fourth study in this thesis). This is a move to a Foucauldian perspective, since de-centering the

subject makes it possible to explore how students are discursively constructed as different student subjects, with assumptions about what students ought to be and become through definitions of “the good newly-arrived student”.

Returning to the notion of foreground and Skovsmose’s view on learning, as mentioned above, Skovsmose (1994) talks about intentions for learning and decisions to engage in learning, which relate to a form of consciousness. Foregrounds are connected to the future of the person; thus, an underlying assumption could be progress as is one of the characteristics of the philosophy of consciousness. The notion of progress is concerned with a kind of forwardness and both intentions and foregrounds are forward-directed, which is in line with Brentano’s view on intentionality (Skovsmose, 2014). However, in the book *Foregrounds Opaque stories about learning*, Skovsmose (2014) tries to deal with the relationship of intentions for learning and philosophy of consciousness and thus develops the notions of foreground by reinterpreting the notions of intentionality and life-worlds. In so doing he examines the work of Brentano and Husserl, (who developed the notion of intentionality), in relation to consciousness. Husserl developed the notion of life-worlds. In so doing Skovsmose came to interpret intentions and life-world differently from Brentano and Husserl. Instead of relating them to a stream of pure consciousness he relates them to complex real-life experiences that are socially structured and restructured by economic, political, cultural, and discursive factors. In so doing he acknowledges what he calls the opacity of the mind and its profound social structuring (Skovsmose, 2014). This is a response to the view of Brentano and Husserl that intentionality and life-world build on the assumption of transparency of the mind, which can be said to represent a universal directedness, and that it is possible to grasp the complexity of the mind. Skovsmose (2014) disagrees with this - instead of acknowledging the transparency of the mind he acknowledges the deep opacity of the mind. Meaning that intentions and foregrounds are opaque. Further he states that he sees intentionality “as representing a dramatic set of tensions, contradictions, aspirations, frustrations, and sub-conscious forces” (Skovsmose, 2014, p. 96), and that intentions should be interpreted as historical, acknowledging all the particularities of the context.

As discussed above, there are disparities and breaks between the frameworks that need to be transparent when moving from one to the other. In the bridging texts in chapter 5 I will get back to this when I discuss the different contributions of the theoretical frameworks when exploring immigrant students’ opportunities to learn mathematics.

4 Methodological perspectives

The aim with this chapter is to provide an explicit picture of the research process. Since my experiences of the process most likely have impacted the choices I have made when conducting this study, I will give an account of my experiences with the research process. By doing this, I make myself visible as a researcher and the text becomes more personalised, which also is in line with the adopted socio-political approach (Knijnik, 2004; Valero, 2004). A way to make the researcher visible is to use the pronouns we and I, which I do in this chapter and thus "...open to the critical examination of the reader the products of the research process, the intentionality of the researcher, and the paths that the researcher decided to take when meeting the people, she engaged with in the research" (Valero, 2004, p. 15).

According to Knijnik (2004), personalising a research text, by using, for example, "we" and "I", is a political act in which it becomes clear that knowledge production is not a neutral activity, which I would like to acknowledge. This stance has had an impact on the methodological choices I have made. The research we conduct reflects our deep moral and political concerns and holds assumptions about society. According to Popkewitz (1984), these assumptions have to do with the nature of social control, order, and responsibility and are not neutral since human activity is involved, which in turn involves hopes, values and unresolved questions about social affairs. Thus, my underlying assumptions provide a certain lens for how I see and think about the research in this thesis. Therefore, my aim is to be explicit about my assumptions and my role as a researcher in this study by personalising the text as I present the methodology. The aim of this thesis is to widen the understandings of immigrant students' opportunities to learn mathematics and therefore different aspects that may be important for their perceptions are important to grasp. Thus, I have chosen to do two types of data constructions: student interviews (studies I-III), and a document analysis of policy texts (studies IV), which are presented and discussed in this chapter. The theoretically-driven methods of analyses, the selection of school and students, methodological and ethical considerations, and the quality of the research, are presented and discussed. The table below provides an overview of the four studies.

Table 2. Overview of the studies.

Study	Aim of the study	Empirical material	Analytical tools
I. Learning Mathematics: Hope and Despair	To discuss immigrant students' opportunities to learn mathematics by exploring how they describe their foreground.	Semi-structured life-world interviews with students in focus groups. (With a narrative approach)	Foregrounds (Alrø, et. al., 2009; Skovsmose, 1994, 2005, 2012, 2014)
II. Immigrant Students' Perceptions of Their Possibilities to Learn Mathematics: The Case of Homework	To highlight the complexity of the situation in which immigrant students are positioned, by interrogating their perspectives on mathematics homework and the importance of parental support, and how their views have been shaped by wider Discourses.	Semi-structured life-world interviews with students in focus groups. (With a narrative approach)	Foregrounds (Alrø, et. Al., 2009; Skovsmose, 2005) and Discourses (Gee, 2011).
III. Identity formations as mathematical learners in the context of transition.	To explore the relationship between the discourses two immigrant girls draw on in their discussions and their identity formations as learners of mathematics. And in so doing, discuss their opportunities to learn mathematics in a context of a school transition.	Semi-structured life-world interviews. (With a narrative approach)	Identity formations from a discursive perspective (Stentoft & Valero, 2009 and Walshaw, 2013).
IV. Fabrication of newly-arrived students as mathematical learners.	To explore emerging discourses and how the newly-arrived student as a mathematical learner is fabricated in these discourses.	Policy texts on newly-arrived students issued by Skolverket and Skolinspektionen.	Discourses (Foucault, 1966/73) and Fabrication (Popkewitz, 2012).

Data construction

My choice of using the notion data construction instead of data collection is because I want to emphasise that I see the data material as a co-construction between me and the students I interviewed (Goodson and Sikes, 2001). An interview is not just a collection of data. It is a complex situation, in which parallel processes may occur. For example, the students construct their stories from their experiences at the same time as the students and I construct the stories together. I also view the policy texts in study IV as a data construction since I did not just collect the documents. Instead, I chose them using some criteria, which means that the data were constructed. It means that there is no such thing as objective, empirical data since the data are constructed through a perspective. Thus, I find it problematic to use the notion data collection since it implies that there are data “out there” and it is just for me as a researcher to collect them.

The empirical material in this thesis contains audio-recorded student interviews and policy texts on education for newly-arrived students in Sweden. The first round of interviews was conducted in 2012 and constitutes the data in studies I and II (reported in articles I and II). These data were also used in my licentiate thesis. In articles I and II, some of the results of my licentiate thesis are presented as case studies to illustrate important findings of the licentiate thesis (see Svensson, 2014). However, the analyses of the data in articles I and II have been moderated and refined. For example, in the second article the analysis more explicit addresses public discourses in the media by referring to quotes in different newspapers. The second round of interviews was conducted in 2014 and constitutes the data in study III (reported in article III). The data construction on policy texts was conducted in 2016 and constitutes the data in study IV (reported in article IV). In the following sections I present the empirical material in relation to the different studies.

Empirical material in relation to studies I and II

In the first two studies, I used the notion of foreground to explore immigrant students’ perspectives on their learning opportunities. To be able to explore the role of the macro context in the second study, I zoomed out and explored how public discourses influence immigrant students’ foregrounds and perceptions of their opportunities to learn mathematics. The empirical data in these two articles consist of material from the first round of interviews conducted in 2012, with seven ninth grade immigrant students. They lived and went to school in a multicultural and socioeconomically disadvantaged and stigmatised area characterised by

high poverty rates, high unemployment rates and a high number of immigrants and newly-arrived refugees in relation to the average municipal and national rates.

When conducting the interviews, I applied a narrative approach since it is fruitful when it is important to receive knowledge about how humans or a group of people with certain characteristics interpret and experience their situation and particular events (Goodson & Sikes, 2001) - in this case, how immigrant students perceive their opportunities to learn mathematics. In so doing, I draw on the work on life histories by Goodson and Sikes (2001). They argue for using life histories when doing research with socially marginalised students, which also justifies the use of a narrative approach in these studies. They write that “within the field of educational studies, working with teachers and pupils who are, again, arguably marginal in terms of social power, life history has been seen as particularly useful and appropriate” (Goodson & Sikes (2001p. 133).

According to Polkinghorne (1995), there are two different types of narrative that are concerned with stories and that are used in qualitative research: the paradigmatic and the narrative. The narrative is the type that I believe best matches the approach in this study since one of its aims is to produce knowledge about certain situations, whereas the paradigmatic approach produces knowledge about concepts, and has as the goal of producing categories and taxonomies (Polkinghorne, 1995). The purpose of narratives is not to reproduce an actual story of an event. Instead, the purpose can be said to “highlight and weave together those features that had the most resonance for the children” (Lange & Meaney, 2011, p. 40). In these studies, I focus on the students who by telling their stories, provide access to their experiences and perceptions of their opportunities to learn mathematics. This makes the students important not just because of what he or she is telling, but also because I get access to who has been telling, and from his or her perspective (Sandlund, 2010).

My assumption behind this kind of data construction - student interviews with a narrative approach - is that these students have important stories to tell that can provide “better” or deeper understandings about immigrant students’ situations in school and in particular as learners of mathematics, which allows for discussions about their opportunities to learn mathematics from their perspective and not just from the perspectives of others. In addition, such students, who are confronted with not belonging, often become reflective about the norm to which their belonging is questioned (Højlund, 2002 in Lange, 2009; Lange & Meaney, 2011). For example, Lange (2009) suggests that low-achieving children possess valuable insights into school mathematics that are otherwise not easy to

access. Students living in and attending schools in multicultural and socioeconomically disadvantaged areas, like the students in studies I and II, are often categorised as low achievers in school (Bunar, 2009; Norén, 2010). Thus, they may be confronted with not being “normal”, and therefore may reflect on what is “normal” and whether they belong to the norm or not. Since narratives provide insights into students’ perceptions of their worlds, they also provide understandings of their experiences with learning mathematics (Juzwik, 2006). Consequently, I assume that the immigrant students in these studies possess valuable insights about schooling and learning mathematics that will be accessible by using a narrative approach and thus provide valuable information and insights into school mathematics that is not accessible in other ways.

In the first two studies, I followed Alrø, Skovsmose, and Valero (2009), who suggested using dialogues as a research approach. When exploring foregrounds, students’ utterances may be interpreted as foregrounds and through dialogue, perspectives within the students’ reach and capacity may be identified, examined and challenged (Alrø, et. al., 2009). This may encourage these students to examine their own thoughts more explicitly, and thus it becomes possible to interrogate foregrounds (Alrø, Skovsmose and Valero, 2009). Therefore, it has been my intention, when constructing the data, to create dialogue with the students and between the students. To facilitate conversations and dialogue I chose to conduct the interviews as semi-structured life-world interviews (Kvale, 1997) in focus groups (Morgan, 1996; 1997). In the following paragraphs, the methods are more explicitly described.

The interviews in studies I and II

Interviews work well as grounded theory, participatory research and narrative methods. There are different types of interviews which are named and grouped differently. The differences may lie in to what degree the purpose of the interview is open, how structured they are, to what extent they are explanatory or test hypotheses, if a description or interpretation is being sought, or if they are cognitive-focused or focused on emotions (Kvale, 1997). According to Kvale (1997), structured interviews are useful to apply when the researcher is aware of what he or she does not know and thus is able to ask questions that can provide the desired knowledge. In contrast, unstructured interviews are useful to apply when the researcher is not aware of what he or she does not know and thus must rely on the interviewee to tell him or her. In this study, I have chosen to conduct semi-structured life-world interviews (Kvale, 1997) to gain access to relevant

data in relation to the aim of the study and the research questions. Kvale (1997) defines a semi-structured life-world interview as

en intervju vars syfte är att erhålla beskrivningar av den intervjuades livsvärld i avsikt att tolka de beskrivna fenomenen mening (Kvale, 1997, p. 13).

"an interview whose purpose is to obtain descriptions of the life of the interviewee in order to interpret the meaning of the described phenomena " (my translation).

The semi-structured life-world interview is a qualitative research method whose purpose is to try to understand different issues in the life-world from the perspectives of the interviewees (Kvale, 1997). Thus, in these studies it can be said that I explore immigrant students' life-worlds in relation to opportunities to learn mathematics. Further, I decided to conduct the interviews in groups, building on a common assumption about focus groups, which is that I will receive richer empirical material when interviewing in groups (Fern, 1982), since in groups it is possible for the students' responses to 'bounce off each other' and facilitate richer discussions. Frey and Fontana (1991) state that:

Not only do group interviews take advantage of group dynamics, provide insight into social relationships in the field, reduce distance between researcher and the social context, and reduce total cost, but this type of interview can stimulate new ideas, identify language or symbols not previously acknowledged, serve as a testing ground for hypotheses or analytic suggestions, and expand the depth and variation in response or description of relevant social events. (p. 184).

The possibility for group dynamics to generate more valuable information when conducting focus groups was also highlighted by Morgan and Spanish (1984) who argue that focus groups provide more information than one informant. However, research conducted by Fern (1982) on focus group methodology, has challenged this, by showing that individual interviews generated ideas of significantly higher quality than focus groups. But unlike Frey and Fontana's (1991) study, Morgan and Spanish's (1984) research, and this thesis, that are conducted within the social sciences, Fern's (1982) research was conducted from a market research perspective, which may have consequences of the role of group dynamics. I also conducted a pilot study using individual interviews with students (see Svensson, 2014), which led me to conduct focus group interviews here, because I considered the individual interview data lacking.

Thus, semi-structured life-world interviews are combined with focus groups (Morgan, 1996; 1998). I apply an inclusive approach to focus groups, which means that focus groups are viewed “as a research technique that collects data through group interaction on a topic determined by the researcher” (Morgan, 1997, p. 130). More explicitly, focus groups are devoted to data construction, which Morgan (1996, 1998) describes as data collection, in which the interaction in a group discussion is the source of the data, and the researcher’s active role in creating the group discussion for data collection purposes is acknowledged (Morgan, 1996). As focus group interviews are based on the interaction between the informants in the group, I have to rely on this interaction to bring forward the informants’ views and perceptions. My main aim for using focus group interviews in this thesis is to be able to explore an issue in depth through group discussions (Morgan, 1996; 1997) - in this case issues that relate to opportunities to learn mathematics from the perspective of immigrant students.

The focus group interviews were conducted with students who already knew each other so that they would feel secure and safe with each other, which I assumed would be productive. However, I am aware that this may not always be the best approach. For example, Fern (1982), who conducted his study in the field of market research concluded that it is better if the participants in the group are strangers to each other, although he found no significant difference in the quality of data between these two groups. Challenges when choosing what kind of focus group interview to conduct include the following: when people who already know each other are interviewed together they may omit certain information that they assume the others already know; if the informants do not know each other beforehand they may speak more openly and freely, but they also may feel limited to speak freely in a situation with people they do not know.

The data in studies I and II consist of two focus group interviews with 7 students in total (who will be presented further on in this chapter). In the first interview three students participated - one boy and two girls, and the interview lasted for 56 minutes. The second interview was conducted with four students (all boys), and lasted for 54 minutes. An assumption from the field of market research is that groups should be composed of 8 to 12 members. (Fern, 1982). However, Fern (1982) found that the number of ideas that were generated in focus group discussions did not double when the group size increased from four to eight. He also suggested that more information might be obtained by having two four-person groups instead of one group with eight participants. Thus, group size may be one factor

among others that may affect the participants' responses and thus the discussions in the group.

I conducted the interviews in a small classroom at the students' school. The classroom was located in a somewhat secluded part of the school, which meant that we could talk without being disturbed by the teachers and students in the school. We sat around a table that was constructed using four student desks. Both interviews were audio recorded and fully transcribed.

Interview guide – studies I and II

When constructing the interview guide (Appendix 1) I followed Morgan and Scannell's (1998) work on focus groups, which suggests that less structured focus group interview guides should comprise fewer questions, and then mostly open-ended questions used in a semi-structured way to ensure that important questions are highlighted and discussed, and to allow for flexibility when it comes to feedback and discussions, or to answer questions initiated by the informants. Consequently, I constructed and used a semi-structured interview guide with different themes. In the first theme, I invited the students to talk about themselves so that I could get to know them. I started every theme with an open question and when needed I followed up with supplementary and clarifying questions. When formulating the questions in the interview guide and during the interviews, when asking follow-up questions, I aimed at providing questions that were initiating, circular, supportive and clarifying (Goodson & Sikes, 2001) to be able to gain access to the students' life-worlds. According to Alrø, et. al. (2009), themes or topics do not need to be prearranged as they may emerge during the interviews or when the researcher actively asks questions. However, they suggest that it is important to actively ask questions about mathematics since it may be that the topic of mathematics does not arise when interviewing about foregrounds (Alrø, et. al., 2009). To avoid this situation, I included four statements about mathematics for the students to discuss in the interview guide. My intention for doing this was to trigger the students' thinking about mathematics, to get them to talk more freely, and to achieve a focus on mathematics in the interviews. After the students had introduced themselves I presented the four statements for discussion, one at a time, on a paper placed on the table in front of them. The four statements for the students to discuss were the following:

- You have to know mathematics to achieve a good future. (In Swedish: Man måste kunna matematik för att få en bra framtid).

- Everyone can succeed in mathematics if they want to. (In Swedish: Alla kan lyckas med matematiken om de vill).
- If you only learn the Swedish language you will do well in mathematics. (In Swedish: Om man bara lär sig svenska språket klarar man matematiken bra).
- If students from schools with bad grades were to take the bus to attend other schools in the city with good grades the students' grades would increase. (In Swedish: Om man bussar elever från skolor med dåliga betyg till skolor med höga betyg blir elevernas betyg bättre).

I retrieved the last statement from an article in a local newspaper in which a principal suggested this as a solution to the low achievement in some multicultural schools in the city.

After the statements were discussed, four different themes for discussion followed (see below). Each theme contained an open, initiating question followed by more specific questions that I could ask if needed. That is, if the students had a hard time talking about or discussing the initiating question, the interview guide contained more specific questions that I could ask the students to provide a richer discussion. The themes were:

- Parents and mathematics.
- Friends and mathematics.
- The future and mathematics; with a focus on applications for, and choices about, upper secondary school, and what the students thought their lives would look like in ten years.
- School mathematics.

After the above themes, the interview guide contained a concluding question, that asked if I had missed anything that the students considered important for me to know, and that they wanted me to know.

The selection of school and students in studies I and II

Since the aim of this study was to explore immigrant students' experiences of their opportunities to learn mathematics in schools in marginalised areas, the choice of schools was limited. The school I selected for this study is a public comprehensive school located in a large city in Sweden, in such an area. The selected school has a poor reputation, and the area in which it is located is characterised by high poverty rates, high unemployment rates and a high number of immigrants and newly-arrived refugees in relation to the average rates of the municipality. The school provides preschool to grade 9. At the time of the interviews the school held approximately 450

students, who were all entitled to classes in their mother tongue. A very low proportion of students' parents had post-secondary education. This low level of education of a majority of parents in one area is rare in Sweden.

At the selected school, there were two ninth grade classes, which I visited to inform the students about the study. I also informed the students about the study and what participation would mean for them in small groups of 3 to 4 students. One reason for doing this was to create more of a conversation or dialogue than me simply informing a whole class about the study at one time. My assumption was that the students would feel freer to ask me questions in a small group than in a whole-class situation.

The students who showed an interest in participating in the focus group interviews received a letter of consent (Appendix 3) for them and their parents/guardians to sign when agreeing to participate. The small-group conversations took place on a Thursday and 16 letters of consent were handed out. The following Monday I visited the school to collect the signed letters of consent and to talk to the students and schedule the interviews. It turned out that only three students had managed to get the letters of consent signed; the rest had forgotten. So I chose to conduct the interview with these three students that day. It meant that I had to visit the school again the following day. I received four signed letters of consent and another interview was conducted with the four students. The rest of the students who received letters of consent and had expressed an interest did not show up at school on the day we had agreed, which I interpreted to mean that they were no longer interested in participating. Consequently, only students from one of the classes were interviewed in two focus group interviews - three students in the first and four in the second interview.

Thus, the selection of students was more or less random, that is the students who were interested in participating and remembered to get the letter of consent signed by their parents/guardians were selected to participate. My intention was to select students consciously instead of randomly as suggested by Goodson and Sikes (2001), and Morgan (1997), to be able to select "purposive samples" (Morgan, 1997, p. 30) of informants that matched the research problem. But, since only a small number of students were interested in participating in interviews I could not make a selection. Thus, I interviewed all the students who were interested in participating in the study. However, my feeling was that the participating students had the desired characteristics and provided rich conversations.

As my intention was to explore students' foregrounds, I decided to interview students who were about 15 to 16 years old, as suggested by

Alrø, Skovsmose and Valero (2009). At the time of the interviews, the students were about to finish comprehensive school (ninth grade), and by then had applied for a programme in upper secondary school and thus had made a choice for future studies. That is, they had most likely reflected on their futures, had made a choice regarding their futures, and could therefore provide important information on their learning opportunities.

In the following paragraphs, I present the students participating in studies I and II. I have preserved anonymity by giving them different names.

The students – studies I and II

Ana

Ana is 15 years old, about to turn 16. She lives with her parents and three siblings in the area in which the school is located. Ana was born in Sweden and has lived in this area her whole life. In 1990 or 1991 her parents moved to Sweden from Kosovo. When they first came to Sweden they stayed at another place in Sweden for a few years before moving to where they live today. Both Ana's parents work as cleaners. Ana describes herself as a happy and funny person. She believes that people who know her think she is funny.

Jasmin

Jasmin is 15 years old, turning 16. She was born in Sweden, but in another city. However, when Jasmin was three years old her family moved to this city and the area where they live today. Jasmin lives with her parents and a three-year old sister. Both her parents are from Iraq. Her father came to Sweden in 1990 and her mother in 1993. Neither of her parents work. When describing herself, Jasmin says that she thinks that people think of her as strange.

Chang

Chang is 15 years old and lives in the same area as the other students in the study. He was born in Sweden and he thinks his parents moved to Sweden from China in 1993. Chang lives with his mother and older brother who is 22 years old. He does not mention his father during the interview, so I do not know if he has a father. He also does not talk about his mother's occupation. When describing himself he says that he thinks people would describe him as active, successful and diligent.

Khaled

Khaled is 15 years old and lives in the area where the school is located with his parents and four siblings. In contrast to the other students Khaled came

to Sweden in August 2008 from Afghanistan, which means that he had been in Sweden for almost four years when the interview was conducted. Khaled and his family left Afghanistan because of war there. When he started school in Sweden he was placed in a preparatory class and during the spring term in grade eight he started mainstream classes. This means that Khaled had attended a mainstream class in the selected school for approximately one year at the time the interview took place. Before coming to Sweden he attended school in Afghanistan. His mother tongue is Pashto. His mother does not work, but his father delivers newspapers.

Mohammed

Mohammed is 15 years old and lives with his family in the area where the selected school is located. In 2001, when Mohammed was five years old, he and his family came to Sweden from Kurdistan. Consequently, Mohammed has only attended school in Sweden. Mohammed is a part of a large family. He has 11 siblings and a mother and father. He is the second youngest of the siblings and some of the older ones have moved away from home. Both of his parents are on the sick-list and are not able to work. His father has injuries from the war and his mother has hip injuries.

Tarek

Tarek is 15 years old and lives in the same area as the rest of the students in the study, with his parents and three siblings. Tarek and his family came to Sweden from Iran in 2001 when he was five years old. However, before coming to Sweden they stayed for some time in Iraq. Tarek has attended all his schooling in the same Swedish comprehensive school. His mother does not work, but his father is a diesel mechanic.

Hassan

Hassan was born in Sweden and is 15 years old. He lives with his mother and three siblings in the same area as he has done his whole life. His parents are from Somalia and he thinks his mother came to Sweden in 1992 and his father a few years earlier. This is the only time he mentions his father during the interview. Hassan's mother works in an association/organisation and wants to start her own restaurant.

Empirical material in relation to study III

In the third study, I explore immigrant students' identities as mathematical learners in the context of an imposed irregular school transition. The methodology and the rationales for using a narrative approach and semi-

structured interviews are the same as for studies I and II. However, in this third study I also acknowledge a discursive approach to narratives when exploring identity formations. Bamberg (2005) who champions a discursive approach to narratives states that the narrative always reveals the narrator's identity:

The narrative point-of-view from where the characters are ordered in the story world gives away—and most often is meant to give away—the point-of-view from where the speaker represents him- /herself. By offering and telling a narrative, the speaker lodges a claim for him/herself in terms of who he/she is. (p. 224).

This approach allows for exploring how subjects position themselves in relation to discourses by which they also are positioned. That is, “analyzing talk in interaction along these lines enables us to circumvent the aporia of two opposing subject theories, one in which the subject is determined by existing narratives, the other in which the subject is the ground from which all narratives are invented” (Bamberg, 2005, p. 225). Thus, a narrative approach can be interpreted as related to identity formations and is relevant for this third study.

The context in relation to study III

In the interviews in studies I and II the students discussed a newspaper article on closing schools. In the newspaper, it was suggested by a principal that students who attended schools with low grades should be allocated to other schools in the city with higher grades, and consequently the allocated students' grades would increase. The principal in the newspaper article based his argument on a case in which students who attended a school in a multicultural and socioeconomically disadvantaged area in the city were allocated to a school in the city in an area with opposite characteristics. That is, a school located in a “Swedish area” with high socioeconomic status. The students interviewed in studies I and II thought this solution may be good for some students but not for all. In particular, they thought it would be a solution for rowdy students who do not work much during lessons (see Svensson, 2014). A year later this was the reality when part (grades 7 to 9) of a public comprehensive compulsory school, located in a multicultural and socioeconomically disadvantaged and stigmatised area with a poor reputation and characterised by high poverty and unemployment rates, was closing because of low achievement and a negative working climate. The grade 7 to 9 students at the closing school were allocated to other schools in the city, and an irregular imposed transition to other public comprehensive public schools occurred. This

opened an opportunity for me to explore the transitioning students' experiences of their situation and the consequences for them as learners of mathematics and their learning opportunities. This specific context came to constitute the third study in this thesis.

The closed school, from which the students were allocated, is here called the old school (OS). The school provided pre-school to ninth grade, and held approximately 400 students with many different backgrounds. Approximately 90 percent of the students were of foreign backgrounds and approximately 16 percent of the students had parents with tertiary education (Siris database).

The school the students (in article III) were allocated to, is here called the new school (NS). The NS comprised approximately 60 percent immigrant students, and approximately 50 percent of the students' parents had tertiary education. When the interview took place approximately 350 students at the school attended school from years one to nine.

The interviews in study III

My intention when constructing the data for study III was to use semi-structured interviews in focus groups as a method since it had been fruitful for the data construction in studies I and II. However, it was not possible since I did not get as many students to participate as I wanted to, and two of the students wanted to be interviewed individually. Study III therefore consists of two individual semi-structured life-world interviews (Kvale, 1997), both with girls, and one semi-structured interview with two girls. In this thesis, the interview with the two girls contains the data in the analysis presented in article III. The interviews lasted 1 hour and 5 minutes, 54 minutes, and 32 minutes respectively. I conducted the interviews in small classrooms at the students' schools. The classrooms were located in somewhat secluded parts of the schools, which meant that we could talk without being disturbed by the teachers and students in the schools. All interviews were audio recorded and fully transcribed.

The interview guide – study III

When constructing the interview guide I drew on the interview guide from studies I and II (Appendix 1). Consequently, the interview guide for study III (Appendix 2) starts out by inviting the students to talk about themselves, and thereafter contained five themes to discuss:

- The new school and the transition.
- Mathematics.
- Parents and mathematics.

- Friends and mathematics.
- The future and mathematics; with a focus on applications for, and choices about, upper secondary school, and what the students thought their lives would look like in ten years.

Each theme started out with an open and initiating question, for example: can you tell me about the new school and the transition to the new school? Each theme also contained sub-themes and specific questions to follow up if needed to trigger the discussion and have the students to touch upon specific and relevant experiences that I wanted to hear about. The second theme, mathematics, also contained three statements about rationales for learning mathematics for the students to discuss. These were:

- I learn mathematics to get a good grade and to be able to get access to a national programme in upper secondary school.
- I learn mathematics because I need it or will need it in my everyday life,
- Something else. I learn mathematics because...

The interview guide ended with the following specific question:

- If you should give a recommendation about this kind of school transition, that is if you have younger siblings, how should it be for them?

As I did for studies I and II, I ended by asking if I had missed anything important that they wanted me to know.

The selection of students in study III

All students who were allocated to new schools after eighth grade and who I was able to track down, were invited to participate in the interviews. There were 39 students who were allocated to eleven different schools in the city. I visited four of the schools and informed the students about the study; some of my colleagues visited three other schools and did the same. The rest of the schools, four, were not visited since the allocated students who were supposed to attend the schools were seldom there. However, all 39 students received written information about the study by mail. When visiting the schools, the students were informed about the study and what participation would mean. A letter of consent (Appendix 4) was handed out to the students who showed an interest in participating in interviews. This letter of consent had to be signed both by the students and their parents/guardians for the student to participate in the study.

However, only four girls from three different schools wanted to participate, so I made no special selection of informants or schools. My reflection on this is that the closing of the school had received a lot of attention in the media and journalists had tried to get interviews with students. When I informed students about the study, some revealed that many of the students were tired of being pushed to be interviewed and wanted to be left alone and not identified as the students who had been allocated because of the closing of their “bad school”.

At the time of the interviews the students had attended their new school for almost a year, and were about to leave comprehensive compulsory school. They had thus had the opportunity to reflect on what had happened over the past year. In the following paragraphs I present the students participating in study III. Iman and Faiso were allocated to the same school and were interviewed together at their new school. Zahra and Aisha attend two other schools after the closing of the OS and were interviewed individually. To preserve anonymity I have given them new names.

The students in study III

Iman

Iman was born in Sweden, but her parents came to Sweden just before she was born. Her parents are Palestinians from Lebanon. She attended the old school from first grade until eighth grade when she had to transition to the new school. She lives in the area where the OS is located. Iman has two brothers and a foster brother, and is the oldest of the siblings. Her mother studied architecture but has not found a job in Sweden, working instead as a receptionist. At present she is on parental leave, and is looking for a job. Iman’s father is a taxi-driver.

Faiso

Faiso is 16 years old. Just like Iman, she attended the OS from the first to eighth grade. Faiso was born in Sweden, but her parents were born in Somalia. She thinks they came to Sweden 25 years ago (the interview was conducted in 2014). She lives with her mother, older brother and a younger brother and a younger sister in the area in which the OS is located. She also has an older sister and an older brother, who have both moved away from home and who are both married and work.

Zahra

Zahra is 16 years old. She is of Kurdish ancestry and moved to Sweden from Iraq in 2011. She had been in Sweden for three years at the time for the interview and according to the School Act she is still considered a

newly-arrived student. She started Swedish school in a preparatory class, but was in a regular mainstream class in grade eight at the OS, before transitioning. Zahra lives with her parents and five siblings in the area of her OS. Her mother does not work, and her father works at a pizza restaurant.

Aisha

Aisha is 16 years old. She was born in Sweden, and her parents are from Iraq. Aisha has lived her whole life in the area of the OS with her parents and two sisters, one younger and one older than her. She tells me about her parents and what they do for a living, but sometime after the interview she tells me she does not want me to write about that. Thus, there is no information about her parents in this thesis.

Reflection on the implementation of studies I-III

In line with Goodson and Sikes (2001), I have tried to pay attention to life stories and their suggestions and recommendations when implementing my studies.

When conducting life story research, the personality of the researcher is important. According to Goodson and Sikes (2001), not everyone can or should use the method, since it is individualistic and personal, and based on an intensive idiosyncratic personal dynamic. It is not an easy task to learn how to use life stories as a method (Goodson and Sikes, 2001). However, they state that it is possible to develop and improve life story work by learning from others who have used the method (here for example, Andrews & Hatch, 2002; Lange, 2009). These studies are my first attempt at conducting interviews with a narrative approach.

Other important qualities of the life story researcher are, according to Goodson and Sikes (2001), the ability to listen attentively and beyond what is really said; that is “to hear what is not said”, and the ability to pose relevant and appealing questions in a non-threatening way. It also requires a willingness to share one's own experiences if it is considered appropriate, and requires the researcher to be the kind of person people want to talk to and share their stories with. Consequently, the narrative method places certain demands on the personality of the researcher (Goodson & Sikes, 2001). I attempt to attend to these.

When using the narrative method, an informal and relatively unstructured conversation is generally preferred (Goodson & Sikes, 2001). When conducting the interviews, I strove to create an informal atmosphere and an unstructured conversation; I showed an interest in listening to the

students' stories and asked curious questions and affirmed what they were saying. Further, Goodson and Sikes (2001) maintain that conducting life history interviews means that you as an interviewer listen, reflect back and ask questions that are non-judgmental and call for further reflection. This approach is something that I aimed at, and in so doing I have tried to ask questions that are initiating, circular, supporting and clarifying as Goodson and Sikes (2001) propose. Further, as Lange and Meaney (2011) suggest, I tried to "maintain a curious, open-minded and noninterpreting state of mind in order to support and stimulate children in unfolding their narratives" (p. 39). I tried to listen carefully to understand the students' utterances and to be able to pose follow-up questions. When needed I asked the students to clarify and explain what they were saying. My interpretation is that the interviews went well, while being aware that there were moments when I missed asking follow-up questions. Admittedly, I also asked follow-up questions that were not relevant to the topic.

There are different dilemmas to attend to when conducting interviews, such as for example, the role of the researcher (Kvale, 1997). This dilemma may involve the concern of mutual trust – namely that my role as both a teacher and researcher could have been problematic. I am a mathematics teacher (or used to be), which the students knew, and thus it may have affected our conversation. It could be that since I was not a complete stranger they wanted to talk to me and tell me their stories. However, it could also be the opposite - that they did not want to tell me about themselves and their lives. My interpretation was however, that they wanted to share their stories and tell me about their experiences. Furthermore, I knew some of their mathematics teachers, which also may have affected the conversations in the interviews. One consequence of this could be that the students did not trust me and were therefore restrained in what they shared with me, since they may have worried that their stories might affect their grades. However, this could not be the case for the students in studies I and II, since the interviews were conducted after the grades were set for the semester. When it comes to the students in the third study, I just knew their former mathematics teacher, not the mathematics teacher at their new school who was grading them. I also interpreted the atmosphere as relaxed and positive during the interviews, which may be because of my past relationship with the students and the relationship between the students as well. This may have contributed to the students trusting me and the other students in the interviews, and therefore helped them to feel safe to share how they really felt about different things. However, one should keep in mind that when the interviewer has a past relationship with the students' problems may also arise. One example is,

the students not being sufficiently clear or explicit in telling their stories, since they assumed that the interviewer already knew what they had to say. Another potential problem with a past relationship between the interviewer and the interviewees, is that the interviewer may hold preconceived notions of who the students are and what they want to say. This may have led me to make assumptions which caused me to miss opportunities to follow up on interesting conversations. I may also have missed opportunities to ask students to explain or clarify statements.

On the other hand, there may also have been a number of positive consequences – one advantage could have been my familiarity with the context in which the students are situated in, thus sharing their frames of reference, which could have contributed to a common understanding of the content of the conversation. When summarising my reflections of the above-described, I interpret my relationship with the students as having had a predominantly positive impact on the interviews. I believe that I obtained rich narratives about their experiences of school mathematics, their future plans, school transitions, and about being an immigrant student learning mathematics in a multicultural school.

A dilemma when conducting focus group interview, as in studies I and II, has to do with the dynamics of the group (Morgan, 1998), where the composition of the group becomes important. That is, it becomes important to reflect on whether the participants should be strangers to each other or whether they should be familiar. Depending on the situation, one or the other may be preferred since they provide different group dynamics. I decided to conduct the studies at one school, which means that the students knew each other. This has consequences. For example, it may have produced group-thinking - that is, friends “pair up” and agree with each other even if they actually do not agree with each other (Morgan, 1998). However, my interpretation was that this was not the case. My experience of conducting the interviews was that there was always one student in each interview who talked more than the others in the group in my studies I-III. However, I paid attention to this during the interviews and tried to involve all students in the conversations and made sure that everyone got to speak and was heard. If some of the students were sitting quietly when discussing a theme, I asked for their opinions - that is, if they agreed or had different opinions. Most times they agreed, but added their experiences and at times shared other opinions and had different experiences.

The decision to conduct the interviews right before graduation from compulsory comprehensive school brought both advantages and disadvantages. For example, the disadvantages in studies I and II were that some of the students had already stopped coming to school, probably

because the teachers had already documented their grades. Consequently, students who had shown an interest in participating in the study had stopped coming to school and had lost interest in participating in the study. An advantage with conducting the interviews in studies I and II a week before graduating, and after their grades were set and documented, was that the students did not have to worry that what they said would affect their grades in mathematics. Another advantage, which also applies to study III, was that they had almost completed comprehensive compulsory school, which meant that they could look back and reflect on the mathematics teaching they had experienced through the years of comprehensive school.

Another advantage of conducting the interviews close to graduation, was that the students may have felt more able to speak freely about their school and mathematics teaching experiences, without any feelings of obligation to the school, or experience other loyalty dilemmas, since they were about to leave the school.

Method of analysis – studies I-III

In previous sections the data construction has been described and explained. In the following sections, the method for analysing the data in studies I, II and III will be presented. The results of the analysis are presented in articles I, II and III.

To structure and guide my thinking during the analysis process I have been inspired by Kvale's (1984) three levels of interpretation procedure. One reason for using this procedure was to make the analysis process transparent. Another reason was to gain knowledge about, and to understand, the students' perspectives, and to avoid making arbitrary and subjective interpretations of the students' narratives. However, when presenting the results of this analysis process in articles I-III, the three levels are not visible because of limited space. Instead I have interwoven the three levels of interpretation when presenting the results, and thus the three levels of interpretation are not explicitly expressed. A purpose of presenting the results in this way was to make the text more readable, shorter, and to avoid too many repetitions. However, in the process of analysing the interviews I have applied the three levels of interpretation to order my thinking. The three levels of interpretation are described in the following sections.

Kvale's three level interpretation procedure

The three interpretation levels are *self-understanding*, *critical common sense* and *theoretical understanding* (Kvale, 1984; 1997). To each of these

levels different contexts of validity are attached. Hence the first level- self-understanding- refers to the interviewee; - the second level- critical common sense refers to the public; and the third level - theoretical understanding - refers to the research community (Kvale, 1984; 1997). The three levels of interpretation are described in the three following sections.

The first level of interpretation

The first level is about self-understanding, that is, the interviewees' self-understanding. It consists of a summary or concentration in which the researcher tries to formulate and express what the interviewees have said based on how the interviewees themselves perceive the meaning of what they have said. The researcher makes an interpretation of the interviewees' self-understanding, and the interviewees should recognise themselves in that interpretation (Kvale, 1984; 1997). The interpretation on this level should remain within the students' frame of understanding. In these studies, student excerpts pertaining to the research aims and questions constituted this first level of interpretation. To identify these student excerpts the transcripts were read repeatedly and grouped into relevant themes (Braun & Clarke, 2006). To create a concentration, after the grouping of the excerpts, I selected excerpts that best represented and caught the essence of the students' stories. These excerpts were then also interpreted at the second and third levels.

The second level of interpretation

The second level of interpretation, the critical common sense, entails extending the interpretation beyond the self-understanding of the interviewees. However, the interpretation stays within the context of common sense (Kvale, 1984; 1997). Compared to the first level of interpretation, this interpretation has the potential to be based on a broader understanding than the interviewee's own frame of understanding and focus. The interpretation may also be critical about what is being said and go beyond, "like reading between the lines" (Kvale, 1984). The analysis at this level adds a common or public knowledge to the interpretation, which enriches and broadens the interpretation of the excerpts (Kvale, 1984; 1997). This type of interpretation is placed within a public frame of understanding. Consequently, the criteria for validity are about how well-documented and logically coherent the interpretation is. This also means, at this second level of interpretation, that the interviewees do not have to accept and agree with the interpretation, since the validity has to do with the extent to which the documentation and the argumentation can convince the public (Kvale, 1984; 1997).

When analysing at the second level of interpretation in the first study, by examining immigrant students' own perspectives on their opportunities to learn mathematics, two narratives emerged. These two narratives contrast opportunities and obstructions for learning mathematics. Thus, at the second level of interpretation, two results sections were constructed by placing student excerpts in the corresponding section. Excerpts about the students' futures were placed in the first results section, since they demonstrated hope. Excerpts about school mathematics and the multicultural school, which contained possible obstructions for learning mathematics, and which demonstrated feelings of despair, were placed in the second result section.

When analysing the interviews in studies II and III at the second level of interpretation, I used a discourse approach in order to explore discourses in the students' excerpts in relation to their opportunities to learn mathematics. This meant that I read the excerpts carefully several times with the aim of identifying and relating to discourses about school, school mathematics, the multicultural school and deficiency explanations. In this way different discourses, in which the students seem to position themselves emerged. Since I changed the theoretical focus between studies II and III, discourse is defined somewhat differently in the two analysis processes. In study II I drew on Gee's (2011) work on "big D" Discourses and "small d" discourses, and in study III I defined discourse in line with the work of Foucault (1966/73) (as presented in the chapter *Theoretical approach*). According to Winther Jørgensen and Phillips (2000), the purpose of using a discourse analytical approach is not to go beyond the discourses and try to understand what the informants actually mean. Instead, the aim is to analyse what is said, how it is said, to explore patterns in the excerpts, and what social consequences the different discursive representations of reality may have. Thus, in studies II and III, at the second level of interpretation, I have interpreted what discourses emerge in the student excerpts when they tell stories about themselves and their experiences with school and learning mathematics, and what consequences these discourses may have for their interpretations of their opportunities to learn mathematics.

The third level of interpretation

This level of interpretation engages the research community, and employs a theoretical framework when analysing the data. Consequently, this interpretation goes beyond both the self-understandings of the interviewees and the common-sense interpretation. At this level, the validity criteria have to do with the extent to which the applied theoretical framework is valid for the object of research. In studies I and II, the third level of

interpretation consisted of analysis, by applying the theoretical notion of foreground (Skovsmose, 1994; 2005). I read the excerpts carefully and repeatedly to explore what constituted the students' foregrounds and how the foregrounds may contribute to their perceptions of their possibilities to learn mathematics. In study III I did the same, but with the aim of exploring their different identity formations (Stentoft & Valero, 2009; Walshaw, 2013), and specifically what different identity formations the different emerging discourses enabled.

Reflection on the analysis process

When conducting qualitative research, the analysis of the data is an ongoing process (Kvale, 1997). Hence the analysis does not just occur at the end as in most quantitative studies. Instead, the analysis starts and continues as data are constructed. The findings do not just emerge from the data in the end. Thus, I think that it is important to give an account of my reflections on the analysis process to discuss what may have influenced the analysis along the way.

Life stories or narratives are co-constructions that are constructed by the interviewees and the researcher together. This means that the researcher interprets the interviewees' subjective interpretations. Consequently, me knowing the students beforehand may have affected the analytical work. For example, it could mean that the analytical clarity is blunted because I think I know what the students mean, perhaps leading me to make arbitrary and subjective interpretations. However, I have, throughout the analytical process, tried to be aware of this, and question whether I am identifying valid issues in the excerpts - like for example, is the discourse about the multicultural school in Sweden really discernible in the excerpts? Is what I am saying really evident and coming through in the excerpts? Is it really possible to interpret the excerpts in this way? Or am I jumping to conclusions?

Empirical material in relation to article IV

The aim of the fourth article is to explore discourses about education for newly-arrived students in Sweden and how the newly-arrived student is fabricated as a mathematical learner in these discourses.

Policy documents intend to steer curriculum and classroom practices through the discursive texts which hold principles about what is thought of, hoped for, and acted on (Popkewitz, 2012). For example, a curriculum can be considered the system's view of the ideal person in which it

functions (Cummings, 2003). That is, educational reforms are grounded in and build on a vision of the ideal person that is wanted in society. In other words, who is going to be taught, what they are going to be taught, how they learn, and how education should be organised, derive from society's image and wish for the ideal person (Cummings, 2003). These attributes become goals and values for the institution - in this case the school - which then gets the role of developing this ideal person. Thus, to be able to explore how the newly-arrived student is fabricated, or in other words who the ideal newly-arrived student is or is not, exploring policy documents becomes important. My empirical material thus consists of policy documents.

I have chosen to analyse four recently published policy documents about schooling for newly-arrived students in Sweden. Three of them are issued by Skolverket and have been selected since they are intended to direct and support education for newly-arrived students. For example, the general guidelines for the schooling of new arrivals (here named Guidelines) was issued by Skolverket (2016) to give recommendations for how to organise and work with education for newly-arrived students to meet the requirements in the Swedish Education Act, the Education Ordinance, and the curriculum. The second and third documents, also issued by Skolverket, are support materials that give examples of how to organise education for newly-arrived students, and builds on the Guidelines. These second and third documents were selected since they exemplify schooling for newly-arrived students in line with the Guidelines. The fourth document is a report issued by Skolinspektionen (2014), in which an evaluation on education for newly-arrived students is presented. This report was used in the development of Guidelines which is why I chose to analyse it.

Table 3. The analysed policy documents.

Document	Short description of documents
Allmänna råd för utbildning av nyanlända [General guidelines for the schooling of new arrivals] (Skolverket, 2016c). Here named <i>Guidelines</i> .	General recommendations for municipalities, principals, teachers and other school staff setting out how they should organise and work to meet the requirements/regulations in the Swedish Education Act, the Education Ordinance and the curriculum. It aims to direct development in a certain direction and to promote consistency in law. The recommendations must be followed.
Studiehandledning på modersmålet [Supervision in the mother tongue] (Skolverket, 2015b). Here named <i>Supervision</i> .	This is support material primarily for principals, teachers and supervisors in their work with organising and implementing student tutoring activities in the mother tongue. It was revised in 2015.
Att främja nyanlända elevers kunskapsutveckling – med fokus på samverkan, organisation samt undervisningens utformning och innehåll [To promote newly-arrived students' knowledge development - with a focus on collaboration, organisation and teaching design and content] (Skolverket, 2012c). Here named <i>Promote</i> .	This is support material primarily for principals, teachers and officials of focal education departments. The aim is to describe and give examples on how municipalities can promote newly-arrived students' development of knowledge and skills with a focus on cooperation, organisation and teaching design/methods and content. This material has its starting point in the <i>Guidelines</i> .
Utbildningen för nyanlända elever. Kvalitetsgranskning. [Schooling for newly-arrived students. Quality report] (Skolinspektionen 2014). Here named <i>Quality report</i> .	This document reports from an investigation on 10 different municipalities in Sweden where the purpose was to examine whether the schools visited provided newly-arrived students' prerequisites to achieve sufficient knowledge in Swedish and simultaneously achieve proficiency in all subjects. Within this area, the review focused on whether the teaching was planned, implemented and adapted to the newly-arrived students' abilities and needs, as well as on whether the visited schools were working on giving the newly-arrived students' confidence in their own ability, motivation and influence.

Method of analysis – study IV

In this study I view the policy documents as discursive practices, since texts build on already existing discourses, and texts are written within a certain discursive practice. Practices in institutionalised fields, such as making (political) decisions and writing policy texts on how to integrate newly-arrived students in school, are also here understood in terms of discursive practices.

When analysing the documents Kvale's (1984; 1997) three level of interpretation procedure was used as a thinking tool even if the data did not consist of student excerpts. At the first level of interpretation the documents were read repeatedly and carefully and independently by me and the other author of article IV, Eva Norén, with the aim of constructing prominent emerging themes from the documents. This was a way of organising and summarising the texts in the documents. Four themes were agreed upon: 1) mathematics as the example, 2) the importance of mother tongue for learning, 3) the importance of acknowledging newly-arrived students' background (prior knowledge and experiences) when learning, and 4) deficient thinking. Thereafter, a discourse analytical approach was applied at the second level of interpretation as in studies II and III. Discourses about schooling for newly-arrived students were explored in each theme. The discourses were then compared and agreed upon by the other author and I. In this study, I chose to define discourse in line with Foucault (1966/73), that is as a systematic, recurrent and certain way to talk about and understand the world and human kind (for a more detailed explanation see the chapter on theoretical thinking tools). At the third level of interpretation, the theoretical understanding of fabrication (Popkewitz, 2012; 2013) was applied (for a more detailed explanation on fabrication see the chapter Theoretical thinking tools). I explored the fabrication of the newly-arrived student in each of the themes by investigating the principles underpinning what is thought about, hoped for, and acted on when it comes to the newly-arrived as a mathematical learner in Sweden. All policy documents are written in Swedish so I have translated quotes into English.

Ethical and methodological considerations

As mentioned in the previous paragraph, the intention has not been to generalise the results or to prove something by providing evidence about immigrant students' opportunities to learn mathematics. Instead the intention has been to dig deep into the students' perspectives about their situations and their perceptions of their opportunities to learn mathematics.

Thus, the number of interviewed students is not relevant in this study. However, other ethical issues that have to be considered emerge from the research process. Ethical considerations have to be made throughout - during the thematicisation, the planning, when conducting the interviews, when transcribing, when analysing, and during the verification and the reporting (Kvale, 1997). Hence it is important for me as a researcher to ask myself several different ethical questions during the research process, such as, for example: how much information should I provide and for whom? What is private knowledge and what is public knowledge? How can the investigation help or harm the interviewees? Who will have access to the data? What will happen if the researcher makes a different interpretation in relation to the interviewees?

During the research process I have tried to reflect on the different stages in the research process and I have problematised ethical considerations. I have reflected on my role as a researcher, and in particular on the role I have in giving voice to the students. I believe that it puts me in a risky position - who am I to interpret their perceptions and speak for them? Since they construct their stories with me, a researcher with her own social context and particular view of learning mathematics, I have consciously tried to treat the students' voices as authentically as possible throughout the process.

A common argument is that a researcher from the outside should not conduct research within a community to which he or she does not belong (Bridges, 2001). This view assumes that an outsider cannot understand the experiences of a community other than their own, and that a researcher who believes she can, bases her belief on false premises (Bridges, 2001). However, he argues that it takes an outsider to explore the taken-for-granted experiences within a community, "making the familiar strange" (Bridges, 2001). In this study, I was an outsider in terms of age, ethnicity, and role in school. A way of dealing with this issue is to involve the informants by reporting back to them and sharing the knowledge. Thus, I offered the transcripts for the students to read. However, no one wanted to, which I interpreted to mean that they trusted me to accurately tell their stories.

In this study, the students were selected because of their backgrounds as immigrants and where they attended school, so it was possible for the students to believe that they were selected because of being deviant. This is potentially problematic since it may reinforce the categorisation of the students as rowdy immigrant students with deficiencies in relation to the Swedish language and Swedishness. Being selected for participation in the interviews can make such categorisation visible for the students, which can

potentially contribute to their stigmatisation as immigrant students in Sweden. A study like this, that clearly states that it is concerned with equity and social justice for immigrant students may end up as a study of inequity, since it may “reinsert notions of inequality as differences between children” (Diaz, 2014, p. 7). However, in my meetings with the students I could determine no negative feelings related to being singled out in this way, although this could be attributed to that fact that I was not a complete stranger to them, and they trusted my good intent. However, feelings of stigmatisation may still have existed in the students’ thoughts and feelings, even if not expressed in front of me. Me not being a complete stranger to the students may also have contributed to the students’ willingness and openness to participate in the interviews and share their stories. My impression of the interviews was that the students spoke openly and freely and were engaged in the conversations. When I informed them about the study initially I also emphasised that it was important for others to be made aware, through this research, of their views and perceptions. The students were told that their views and perceptions were valuable, and that as insiders, only they could provide this kind of valuable knowledge.

Even so, it is not possible to ignore the asymmetry in the power relationship, and the fact that it cannot be changed, despite my attempts to moderate. It may be of relevance to point out that the empirical material (the interviews) is a result of this power relationship. Meaning that, there is always an asymmetric relationship between the researcher and the informants, even if it is not the intention (Wedegge, et. al., 2006). This asymmetric relationship is created because it is the interviewer who has the initiative and sets the rules for the interview.

When conducting the study, during the different stages in the process, I have considered and applied the Swedish Research Council’s ethical research principles (Vetenskapsrådet, 2002). Before conducting the interviews, I met the students in small groups and informed them about the study and what their role in it would be if they chose to participate. They also had the opportunity to ask questions directly in these small-group constellations. I also informed them that their participation was voluntarily and that they could choose to cease their participation at any time (Vetenskapsrådet, 2002), and I would be able to use the recorded data. Furthermore, since the students were 15 and 16 years old, I had to get their parents’/guardians’ permission for their participation. These consent letters (Appendix III and IV) contained information about the study and how to get in contact with me via phone or email. Both the students and their guardians/parents had to agree on the participation and sign the letter of consent to be able to participate in the study.

In addition, in line with the research principles of the Swedish Research Council, the students were given the opportunity to read the transcriptions of the interviews. The students were also informed that their anonymity and that of their schools would be guaranteed by the use of fictitious names.

Discussion on the quality of the thesis

Quality criteria rooted a positivist paradigm, like generalisability, objectivity, and reliability are not relevant for the kind of qualitative research methods I use in this thesis (Tracy, 2010). Instead, to be able to understand what makes qualitative research good, Tracy (2010) suggests eight “big-tent” criteria for excellent qualitative research.

In this section I discuss the quality of this study by applying these eight key markers of quality: (1) *worthy topic*, (2) *rich rigor*, (3) *sincerity*, (4) *credibility*, (5) *resonance*, (6) *significant contribution*, (7) *ethics*, and (8) *meaningful coherence* (Tracy, 2010).

The topic of this study has to do with immigrant students’ opportunities to learn mathematics from the perspective of the students themselves. Further, it is also about questioning and exploring taken-for-granted issues like deficiency discourses about immigrant students’ schooling and in particular learning mathematics. According to Tracy (2010), research that questions taken-for-granted assumptions often meets the *worthy topic* criterion. My topic is relevant at this particular time because of the current dearth of research about immigrant and newly-arrived students’ learning of mathematics in the Swedish context, from a student perspective. In addition, due to the refugee crisis in the Middle East, Sweden has received the highest proportion of refugees in the EU in relation to its population (Migrationsverket, 2016), which means that the Swedish educational system is confronted with the significant challenge of providing good education for substantial numbers of newly-arrived students. Since students need a passing grade in mathematics to continue to upper secondary school, mathematics becomes a gatekeeper to further studies and future possibilities. It is thus relevant to study immigrant students’ opportunities from their perspective, and to learn more about their situation which will enable us to provide better futures for them. This concern for social justice and equity makes the topic highly relevant and worthy.

The second criteria, *rich rigor*, looks at how the study uses sufficient, abundant, appropriate, and complex theoretical constructs, data and time in the field, sample, context and data collection, and analysis processes. I focus specifically on time in the field and the size of the sample. That is,

did I spend enough time in the field, and are the data enough to answer the research questions and support the claims I make? Although I spent time setting up and conducting interviews, I would argue that the 12 years I worked as a mathematics teacher in a multicultural school located in a multicultural and socioeconomically disadvantaged and stigmatised area with a poor reputation, counts as time spent in the field. When it comes to the data, I conducted 5 interviews, with 11 students in total and analysed four policy documents. The length of the interviews varies from 32 to 65 minutes, most of them lasting for approximately 50 minutes. However, according to Tracy (2010), good qualitative research is not about the amount of data and the time spent in the field, it is rather about whether the data is sufficient to answer the research questions and support the claims. Thus, I will discuss whether the data are sufficient, and what I may have gained by constructing more data. I am not convinced that more interviews would have provided a richer data set. Let's look at the criterion *crystallization*:

Crystallization encourages researchers to gather multiple types of data and employ various methods, multiple researchers, and numerous theoretical frameworks. However, it assumes that the goal of doing so is not to provide researchers with a more valid singular truth, but to open up a more complex, in-depth, but still thoroughly partial, understanding of the issue. (Tracy, 2010, p. 844)

I constructed different types of data; I conducted individual interviews, focus group interviews; I analysed policy documents; and I employed a variety of methods and theoretical frameworks to reach a complex and in-depth understanding about immigrant students' opportunities to learn mathematics.

The third criteria, *sincerity*, can, according to Tracy (2010), "be achieved through self-reflexivity, vulnerability, honesty, transparency, and data auditing" (p. 841). For Tracey, sincerity does not relate to a single truth or reality even if it relates to the concepts of authenticity and genuineness (Tracy, 2010). Honesty and transparency are integral to these criteria, meaning that the research includes discussions about the researcher's biases, goals, weaknesses, and the role of the researcher in the research process. Also, the researcher shows due diligence, effort, care and thoroughness. I have tried to attend to all of this during the research process. For example, I have shown self-reflexivity by being explicit about my assumptions, my role as a researcher, the choices I have made, and approaches I have chosen to apply.

Credibility deals with the trustworthiness, verisimilitude, and plausibility of the research findings (Tracy, 2010). To achieve qualitative credibility the research should be characterised by thick description, concrete detail, explication of tacit knowledge, and showing rather than telling, triangulation or crystallization, and multivocality, partiality and member reflections (Tracy, 2010). As mentioned above, I have used crystallization. Furthermore, I have also aimed at giving a thick description when presenting the participating students and schools, giving as much detail as possible without revealing identities. Another example that relates to this criterion is the analysis process in the fourth study, in which a type of triangulation was used to identify different discourses in the policy documents.

Resonance refers to research's ability to meaningfully affect an audience (Tracy, 2010). This may, according to Tracy (2010), be achieved through aesthetic, evocative representation, naturalistic generalisations and transferable findings. Further, she states that all good qualitative research must have an impact. This is not for me to evaluate.

When discussing quality in research it is relevant to discuss *significant contribution*. Research may provide a significant contribution theoretically, practically, morally, methodologically and/or heuristically (Tracy, 2010). By providing a thorough description of the related research field in chapter 3), and conducting four studies, I have tried to add knowledge to the existing research field about immigrant students' own perspectives about about their opportunities to learn mathematics. I also tend to the theoretical contribution when addressing the fifth research question: *What are the different contributions and consequences of adopting the two theoretical perspectives, when exploring immigrant students' opportunities to learn mathematics?* which has provided theoretical valuable insights from exploring immigrant students' opportunities to learn mathematics.

According to Tracy (2010), ethics "constitute a universal end goal of qualitative quality itself, despite paradigm" (p. 846), and should consider procedural ethics (such as human subjects); situational and culturally specific ethics; relational ethics and exiting ethics (leaving the scene and sharing the research). Self-reflexivity, which I have already discussed above, can also be considered part of this criteria.

The last quality criterion is *meaningful coherence*. This criterion deals with how well the study achieves its stated purpose; uses methods and procedures that partner well with the stated goals and applied theoretical approach; and meaningfully interconnects literature, research questions, methods, findings and interpretations with each other (Tracy, 2010). I have

aimed at producing a meaningful and coherent piece of work, and have dealt with issues about coherence when making choices about methods and theoretical frameworks. I have also tried to be transparent about my choices in the text. For example, in the section *From Skovsmose to Foucault* in chapter 3, I make the theoretical move transparent by showing how the two different perspectives both relate to and differ from each other.

5 Bridging the articles

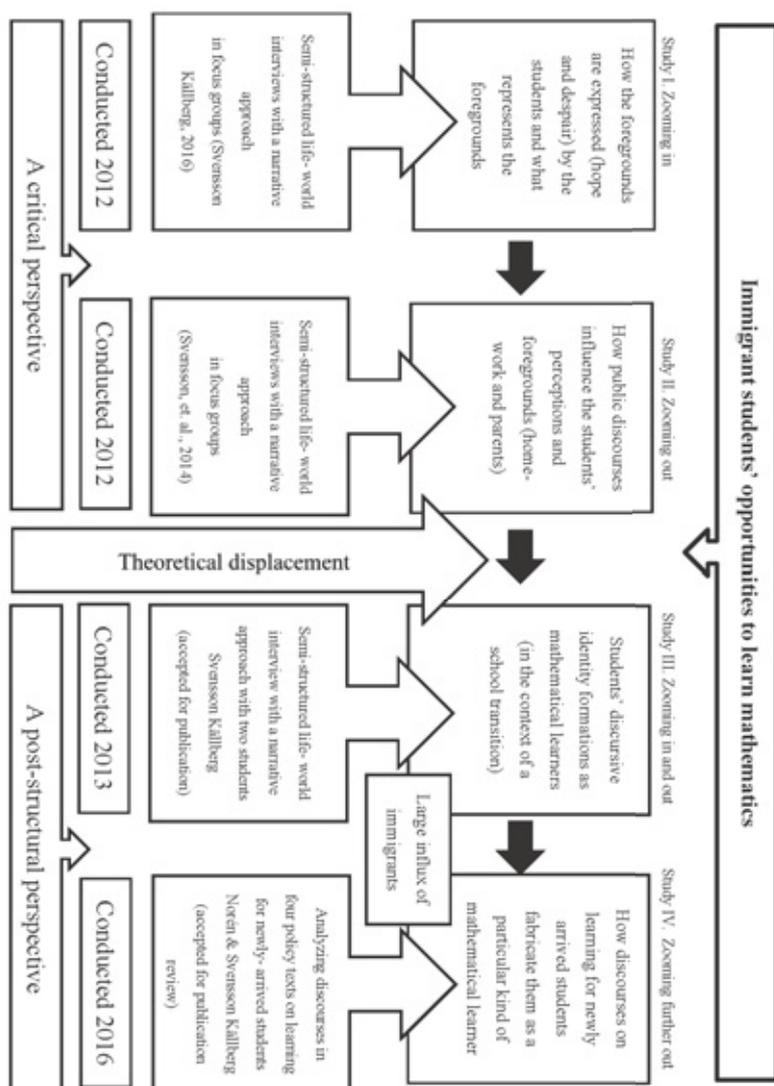


Figure 1. Visual overview over the four studies presented in the four articles and their relationship.

The figure above is a visual summary of the thesis. My purpose is to show, not only the included studies represented in four articles, but also the research process and the bridging between the studies. To be able to address the contributions of the two theoretical approaches and how the articles connect to each other, this thesis is structured as a hybrid (see for example Palmer, 2010; Serder, 2015) between a monograph and a compilation thesis. Thus, in this chapter, when presenting the summaries of the articles, I also present what I call bridging texts that are positioned inbetween the summaries of the articles, in which I discuss how the studies in the articles relate to each other and the contributions and limitations of the different theoretical frameworks. This, I also base on the text, *From Skovsmose to Foucault*, presented in chapter 3. The bridging texts are illustrated with black horizontal block arrows in figure 1 above. Further, the discussion of the second overarching research question concerning the theoretical contribution in the next chapter builds on these three overarching texts.

Article I summary: learning mathematics: hope and despair

The aim of the article was to discuss immigrant students' opportunities to learn mathematics by exploring how they describe their foregrounds. The rationales for this exploration of the students' foregrounds was based on matters of social justice and restricted life opportunities for immigrant students in Sweden. Another argument for exploring the students' foregrounds was to get away from deficiency explanations that describe immigrant students' achievement by referring to deficiencies that derive from their backgrounds - such as, immigrant students' fail in mathematics because they do not have sufficient Swedish language skills and have not acquired the Swedish culture. The following question was approached: How are the students' foregrounds expressed, and how do they contribute to the students' interpretations of their opportunities to learn mathematics?

In order to obtain the students' perspectives the data consisted of semi-structured life-world interviews with a narrative approach in two focus groups (for more details of the method and the students see chapter 4. The analysis was theoretically driven by using the notion of foreground (Alrø, et.al., 2009; Skovsmose, 1994) as an analytical tool.

Two opposite narratives could clearly be discerned when analysing the data. One of positive perceptions and hope - *a narrative of hope*, and

another of obstructions and limitations - *a narrative of despair*. The students' foregrounds in both narratives were analysed.

The narrative of hope was connected to the students' ideas about the future, whereas the role of school mathematics, their experiences with mathematics teaching and learning, and their rowdy and noisy mathematics classrooms, contributed to constructing the narrative of despair. When the students talked about their plans, elements of their foregrounds were expressed. In this case, the students, except one, expressed explicit plans for their futures and thus clearly foregrounded hope. However, when discussing possible hindrances to the achievement of those plans, with the exception of two students, school mathematics was regarded as the hindrance. Thus, from the perspectives of the students, school mathematics was shown to play a gatekeeping role with regard to their further studies and dreams for the future (Skovsmose, 1994; Stinson 2004). Despite this, the students still regarded their plans as realistic. Interestingly, those students without a passing grade in mathematics still showed confidence regarding their future.

For all students, except one, school mathematics seemed to have played a negative role and had created mostly negative feelings. The students expressed that they needed more help with mathematics than the teacher could provide in the mathematics classroom. Also, rowdy peers and a rowdy mathematics classroom were talked about as obstructions to learning. Another obstruction that emerged in the discussions was their segregated multicultural school, which they regarded as a worse choice than a "Swedish school". Immigrant status, segregated schools, and injustice emerged as learning hindrances contributing to their feelings of despair. These perceived obstructions were shown to represent parts of the students' foregrounds and constituted the narrative of despair.

In summary, different elements of what represents their foregrounds were revealed, with likely some of the elements more specific to immigrant students than other students; like, for example, the role of segregated schools. Further, it emerged that the immigrant students had to negotiate a balance between the two contrasting narratives and imposed foregrounds when interpreting their foregrounds, thus impacting on their perceptions of their opportunities to learn mathematics. I argued that the use of the notion of foreground as an analytical tool enabled an examination of other aspects regarding immigrant students' opportunities to learn mathematics than those connected to the students themselves and their backgrounds.

Zooming out – foregrounds and discourses

In the first article, immigrant students' foregrounds were explored with the aim of investigating their perspectives on their opportunities to learn mathematics. I assumed that exploring immigrant students' foregrounds would provide information on their perceptions of their learning opportunities and thus information on motives for action and intentions for learning or not learning mathematics. Further, I expected that listening to the students' narratives and using foregrounds as an analytical tool would enable examining other aspects of immigrant students' opportunities to learn mathematics than those connected to the students themselves, such as cognition and backgrounds - like deficiencies in the language of instruction and the Swedish culture. That is, I assumed using foregrounds as an analytical tool would enable me to pay closer attention to social and political issues that impact on the students' learning opportunities.

The analysis showed how issues, like otherness, segregation, injustice, and rowdy mathematics classrooms, were part of the students' foregrounds, and perceived as obstructions for learning mathematics. It was also possible to show how, for most of the students, school mathematics played a gatekeeper role, since they perceived mathematics as a hindrance to their plans for the future; thereby giving school mathematics a specific role in their interpretations of their foregrounds. Thus, by applying the analytical framework, the students' foregrounds could be described, and it was valuable to be able to say something about the students' perceived opportunities to learn mathematics in relation to social and political issues.

However, when reflecting on the results of this first study, I started wondering about the role of the macro context in the students' interpretations of their foregrounds. In other words, after revealing the students' foregrounds with the aim of learning more about their learning opportunities, I became interested in actually trying to find out how the socio-political context may have had an impact on the students' foregrounds. Furthermore, the way the students talked about their school, seemed to match how multicultural schools in Sweden are portrayed in public discourses (see article I and Svensson, 2014). That is, they are often portrayed as bad schools with rowdy classrooms, a negative social climate, and students with bad grades (Bunar, 2009). This led me to reflect on the role that public discourses could have when immigrant students interpret their foregrounds, and how public discourses about immigrant students and mathematics may have a way of working their way into the lives of these students and impact their learning opportunities. Therefore, I decided to further and more explicitly attend to the role of the socio-political context

when analysing the data in the second article. I wanted to widen my understanding of immigrant students' learning opportunities by exploring how their perceptions and foregrounds came into existence. Consequently, in article II, I zoom out to explore the influence of public discourses on immigrant students' perceptions of their foregrounds. This is illustrated with an analysis of the students' discussions about mathematics, homework and parental support. My assumption is that this can contribute to a broader and deeper understanding of what may influence the students' interpretations of their foregrounds, and thus their opportunities to learn mathematics, from a macro context.

Exploring the role of public discourses is also, for me, a way of addressing the issue of the students being positioned as the centre of the research, a way of escaping deficit thinking and blaming the students for not achieving as expected in school mathematics. In my efforts to do so, in the second study I turn to Gee (2011) and his work on "Big D" Discourses and "little d" discourses. According to Gee (2011), "Big D" Discourses are broad and include language and social practices, whereas "little d" discourses refer to language in use and are related to an individual's everyday activities. I assumed that a focus on public discourses about the multicultural school which circulate in media, public discussions and wider society as "big D" Discourses, and the ventriloquation of these by the students in the interviews as "little d" discourses, would help me to zoom out and include the macro context, thus exploring its relation to immigrant students' interpretations of their foregrounds. Consequently, with the assistance of Gee, I expected to be able to say something about this relation and how it may influence immigrant students' opportunities to learn mathematics.

In summary, the reflection on the results in article I contributed to the interrogation of public discourses in article II, with a zooming out (Stinson & Bullock, 2012) to include the macro-context in the analysis.

Article II summary: immigrant students' perceptions of their possibilities to learn mathematics: the case of homework

In this article, immigrant students' foregrounds were explored in relation to public discourses. The relationship between the immigrant students' perspectives on mathematics homework and the importance of parental support was explored, as well as how their views seemed to have been shaped by wider discourses. One aim for doing this, was to be able to

critique explanations for immigrant students' failure in mathematics that are based on deficit discourses common within Swedish society. Thus, in order to understand how students' opportunities for learning mathematics may be affected by wider discourses about immigrant students, media reports and public discussion was explored and contrasted with the students' stories and discussed in relation to their foregrounds. The data analysed in this study came from the same semi-structured focus group life-world interviews with a narrative approach as in study I with the same set of students (for more details see chapter 4). Most of the data I analysed came from responses to prompts about the students' parents' opinions about school mathematics. For example, the students were asked if they talked about mathematics at home and how they talked about it. A discourse analysis approach was used in the analysis process, in which the notion of discourse was used in line with the work of Gee (2011) on "Big D" Discourses and "little d" discourses. Results were presented by interweaving the students' discussions about mathematics homework with discussions about the importance of mathematics to the students' lives and what it meant to be a good parent.

The analysis showed how the students' perceptions of their opportunities to learn were dominated by the interplay of a number of different discourses - discourses which circulate in the media, public discussions and wider society, about the importance of mathematics, about "good" parents, and about the need to be Swedish, were evident in their discussions. For example, the discourses about "mathematics is important" and "good parents" were manipulated by the students, and thus enabled interpretations of their foregrounds similar to those of all the other students who matched these values about mathematics as important and what constitutes the good parent. In contrast, the discourse about "the need to be Swedish" was shown to be a discourse that the students could not manipulate so it reflected their reality. For example, when the students talked about the importance of homework and help from their parents in mathematics they highlighted their parents' background and education. Thus, they had accepted that they had limited opportunities because of their parents' deficiencies in Swedish language and background. This, could not be manipulated by the students to fit the norm of what it means to be a "good" mathematics student. Thus, it was possible to conclude that the acceptance of the discourse "the need to be Swedish" by the students, negatively affect their interpretations of their foregrounds and thus their opportunities to learn mathematics, since it enables the students to view their parents from a deficit perspective, as being inadequate and contributors to their difficulties with learning mathematics.

Zooming in and out - a theoretical displacement

In the first two studies, the students' learning or not learning of mathematics was the centre of the problem, and I assumed that the students' foregrounds were important to explore when learning about their opportunities to learn mathematics. Further, it meant that the students in the first two studies could be positioned as the actors – actors of change with the aim of progress (Popkewitz & Brennan, 1998). Thinking about how power is viewed in critical theory - as something one may or may not have, and as something that can be restructured, enables an interpretation of the students as actors with the power to change, or as oppressed and powerless to change. If the aim then is progress - in their learning of mathematics - then the students become responsible for making the progress - which thinking could itself be a problematic, since it creates the possibility for students to be blamed if no change occurs. Using foregrounds as an analytical tool was successful in revealing their foregrounds, but it did not give explicit information about the processes that enable the students' perceptions of themselves, for example, as the deviant immigrant student, since the view of power as sovereign does not acknowledge power as relational, and thus does not allow for that kind of exploration. Thus, the notion of power needed to be addressed from other perspectives in which power is acknowledged as relational.

Consequently, I turned to other theories since I thought that the work of Skovsmose would not be sufficient when trying to understand the processes that enable the students to think of themselves in certain ways.

One event that led me to Foucault was the decision to close a school in a multicultural and socioeconomically disadvantaged and stigmatised area, which imposed a forced school transition on the students (see chapter 4). This was also one of the “solutions” discussed in the interviews in my licentiate thesis (see Svensson, 2014). In the newspaper article upon which the discussion was based, a principal suggested that students in schools with poor performance transition to schools with higher performance, which he believed would raise their grades. In the public discussion about this issue a common phrase became “bussa elever” – the act of placing students in “better schools” in “better” areas in the city. “Better” in relation to the socioeconomic status of the area. This meant that these students would have to take the bus to school, hence the term: “bussa elever”. The students in the licentiate study perceived it as a solution to raising their grades in mathematics, in particular they talked about it as a solution for rowdy students. They based this reasoning on peer-effects, meaning that if their classmates were well-behaved motivated students they would be the same, or in contrast if their classmates were rowdy unmotivated students

they would act in the same way. In other words, the way students act in a classroom is contagious, and new students will adopt and assimilate to it. They also based their reasoning on a vision of the “better” schools as schools with a good learning environment with engaged and motivated students, in contrast to their own school. In these discussions “Swedish” emerged as the desirable state of being (Svensson, 2014).

However, even although they perceived such a transition as a potential way to raise their grades, the students had not tried to make a move like this. So, when this actually happened a year later, I wanted to investigate further. The third study thus came to address this school transition. In my thinking, even although the students had previously perceived moving schools as a solution to improving maths grades, I considered the decision and process of closing a school very complex, and raised many questions for me - particularly questions about the mechanisms of power. That is, how this process of closing a school unfolded, how the decisions behind it were taken, and how it may have impacted the students’ and their opportunities to learn mathematics. In my thinking about the issues and consequences, a Foucauldian vocabulary helped me to structure my thinking and to find words for talking and writing about it. Thus, I decided to learn more about the work of Foucault.

A further reflection that led me to draw on the work of Foucault, was that it would help me to de-centre the students and more explicitly attend to the macro level by investigating immigrant students’ learning opportunities in relation to discursive practices. Adopting a Foucauldian framework allowed me to view the students as subjects, governed and regulated by power relations constituted in the discursive practices of the mathematical classroom, instead of students as actors and wielders of power. I assumed that drawing on Foucault’s view of power, discourses and subjectivity would contribute to widening the understandings about immigrant students’ opportunities to learn mathematics. Accordingly, when conducting the third study I became interested in how the students discursively constructed themselves as learners of mathematics. Thus, with the focus on an interview with two 16- year-old girls, who were displaced by the closing their “bad” school, I turned to Foucault to help me deal with issues of power and ask questions about how certain identities (subjectifications) as mathematical learners come into existence. I asked myself what may govern and regulate the students’ identity formations as mathematical learners through power relations constituted in the discursive practices of the mathematical classroom.

Before article III is summarised I would like to give some examples of how I reasoned about the context of the third study with help from the work

of Foucault. I believe that this can provide information on the context and background of the forced school transition. I would like to point out that this is not a reasoning that emerged from a close analysis of some empirical material. Instead, it is my way of thinking about the decision and the process of closing a school in a multicultural and socioeconomically disadvantaged and stigmatised area. My reasoning consists of my own reflections intertwined with the influence of my readings of official documents, official reports and media reporting on the process of closing the school, within the framework of Foucault. I will not refer directly to any of these of official documents, official reports or media reports since it would identify the school.

First of all, deciding to close a school is a political act which reveals the assumption that the students in question need to be acted upon. The decision to close the school by local politicians and officials was based on the low academic achievement of students at the school and a rowdy and unsustainable working environment which, according to official documents, had been the case for many years. The school was often reported in the media as a “problem school”. To solve this problem the school was closed, and the students reallocated to other schools in the city. The students were thus acted upon, not the institutions directly. This raised many questions for me: Did that mean that the politicians and officials viewed it as a problem of the individuals and not as a problem of the institution? Could it be that deficit discourses about immigrant students had defined the institution? Could the decision-makers, with their decision to close the school, hereby be defining the immigrant students at this school as deficit? Are the students viewed as deviant (that is lacking the desirable qualities of good students) in relation to the norm, and are thus acted upon to be saved, by moving them to another school? If they were not thought of from a deficit perspective, why were there not any other alternatives suggested that did not include closing the school or reallocating them? Does this mean that closing the school has, as Foucault might say, produced a “truth” about these students through the operating discourses about them? If so, this would mean that the immigrant students were considered from a deficit perspective as low achievers and rowdy learners, since low achievement and rowdiness constituted the rationale for the closing. According to Foucault (1974), people are products of discourses. Thus, discourses regulate what it is possible to think and say, and how to act and produce special knowing and truths. If truths about the immigrant students who had to endure a forced transition, is produced through deficit discourses, these truths are then likely to loop into the lives of the students themselves. Also, since the closing of the school was reported in both the

local and national media, the reasons for closing the school were probably something the transitioning students' new classmates were very well aware of. Consequently, it became possible and likely that the immigrant students would be associated with any similar problems that emerged at their new school. That is, coming from the multicultural school with a bad reputation that had to be closed because of low achievement and a rowdy working environment, may have condemned these immigrant students to be labelled as rowdy and low achieving immigrant student at their new schools, which would confirm that the problem lay with them. Also, being positioned as deviant is a way of being defined as "the other", which was the case for the students in my licentiate thesis (Svensson, 2014). Considering definitions of "the other", in line with the work of Foucault, leads us to understand these kinds of categorisations as effects of power relations. Power then, is viewed as circulating, relational and productive, and as constituted through discourses (Foucault, 1980; 2003), not just as sovereign and exercised over one by another. The deviant students who were forced to change schools and who need to be acted upon, may be categorised as not belonging to "the norm" through what Foucault names dividing practices (Foucault, 1982; 2000). This is a process in which the subject is objectivised. This means that the subject, here the student changing school, may be set apart (in his or her own perception, or perceived by others), as the "rowdy low-achieving immigrant student".

This reasoning is strengthened by the findings of León Rosales' (2010) study, in which he showed how some immigrant boys understood themselves and were understood by others on the basis of discourses in society in which they were identified as deficient and problematic. Thus, deficiency discourses about immigrant students' low achievement and rowdy working environments in multicultural schools become widely and often used, and thus normalised in society. In the language of Foucault, this imposes a regime of truth - it becomes a "truth" that these immigrant students are rowdy and low-achieving. In this way, these immigrant students may subjectivate themselves as rowdy and low-achieving students through these dividing practices. Foucault's notion of power, where the subject is simultaneously an effect of power and its vehicle (Foucault, 1980), allows the understanding that different discourses, through the workings of power relations, "shape" the subject by its rules, regulations and norms. That is, power relations govern social practices and thus direct the thinking and behaviour of the subject, but also simultaneously reproduce the same power. This is what Foucault calls conduct - conduct of others and conduct of self. If I adopt this thinking to the immigrant students that were subjected to the forced school change, we understand

how categorisations of them as rowdy and low-achieving had the potential to direct their thinking and behaviour, as a result of their being subjected to different discourses and thus the mechanisms of power. This kind of reasoning clearly shows how power operates and enables the different categorisations and possible subjections of students, enabling fresh insights about students' opportunities to learn mathematics. For example, how is it that immigrant students are thought of in deficit ways in different contexts? And how is that students come to think of themselves in deficit ways? What makes this kind of thinking possible?

Furthermore, it enables us to interpret the closing of the school as an effect of mechanisms of power that are part of our lives. The questions then become, what are the discourses that enable the decision, and how may the mechanisms of power involved in this be revealed? I can speculate that economical discourses are also operating and have influenced the decision. However, it is likely that the decision to close the school was based on good intentions - like providing these immigrant students with a better education, improved achievement and thus better opportunities in life. This can be interpreted as a way of acting upon the students with the aim of improving their opportunities to learn in school.

Popkewitz (2012, 2013) calls this salvation - separating (saving) the immigrant students from the "bad" multicultural school to enable them to become something better - the "normal", good student. But this necessarily entails a process of fabrication (Popkewitz, 2012, 2013), in which the immigrant students become students who are in need of being rescued, and their salvation is achieved by closing the school and transferring the students to new, improved school contexts. However, in this process of inclusion in a new context, the student is again defined as deviant, or different - the rowdy and low-achieving immigrant student who has to be rescued by being included in a new context.,

Acting on the students, when closing their school, may not only have the negative consequences I discuss above. Students subjected to this kind of change will most likely have different experiences and encounter different consequences. Therefore, I would like to highlight that even if the students were pointed out and stigmatised, it may also have created new learning opportunities for some. Some may have experienced opportunities to become a different kind of student depending on what kinds of new (pedagogical, social and relational) discourses (see article III) they were exposed to in their new circumstances. Accordingly, being subjected to a forced school change may also contribute to successful stories for students. I am not judging the decision to close the school as good or bad. Rather, I want to stress that we need to be aware of and problematise the "invisible"

(for example, stigmatising) effects, taken-for-granted facts (here: that the students' learning opportunities will improve by moving them to another school), and the consequences for in(ex)clusion of these students in school and mathematics. I elaborate on this in the third article, where two girls' subjections (identity formations) as mathematical learners in the context of the forced school transition are explored.

Article III summary: Identity formations as mathematical learners in the context of transition

Listening carefully to the narratives of two girls who were allocated to a new school, about their experiences with transitioning and mathematics teaching and learning in two different contexts, their identity formations as mathematical learners were explored. I conducted a semi-structured interview (Kvale, 1997) using a discursive narrative approach (Bamberg, 2005) with two 16 years old girls, Iman and Faiso (for more details see chapter 4). In the school the girls were allocated to, approximately 60 percent of the students had foreign backgrounds, and approximately 50 percent of the students' parents had tertiary education (Siris database, 2017).

The notion of identity formations, drawing on the work of Foucault (1982), Stentoft and Valero (2009) and Walshaw (2013) constituted the analytical framework. Identity formations are acknowledged as embedded in discourses in which power operates by governing, regulating and disciplining students. In this case, the two girls then portray themselves as certain learners of mathematics. However, before the identity formations were explored, discourses about the transition and mathematics teaching and learning in the girls' stories were identified, and three different themes or dimensions were constructed: *social and relational*, *mathematical pedagogical* and *achievement*.

The results showed how the girls' stories about the transition were embedded in a social and relational discourse which enabled identities as strangers and outsiders, but also as belonging to the new group of students depending on their relationship to their new classmates and teachers. Thus, peers and teachers were viewed as important for their sense of belonging in the new school.

The mathematical pedagogical discourses evident in the girls' stories were different in the two schools. They described the pedagogical discourse of the old school as slower-paced and foregrounding collaborative learning, more whole-class teacher instruction with a focus

on students understanding the content knowledge, more fun because of practical work, and with a focus on the basics of mathematics. They described the pedagogical discourse at the new school as focused on individual learning by working individually through the textbook, less whole-class teacher instruction, with a fast pace and a focus on solving tasks from the textbook. The girls showed a preference for the pedagogical discourse at the old school, and did not approve of the pedagogical discourse at their new school. However, they did not display any resistance to it. Instead, they blamed themselves for not achieving in mathematics at the OS for not paying attention to the teachers, forming an identity as unengaged “bad” students which seemed to be regulated by a social relational discourse. The article showed how the two different pedagogical discourses enabled the girls to form different identities as mathematical learners, since learning mathematics mean different things in the two different discourses. Thus, the girls had to negotiate and reconstruct what it meant to be a learner of mathematics in their new mathematics classroom. The girls were bored by mathematics at the new school, but at the same time they had adapted to the new pedagogical discourse and formed identities as engaged “good” students at the new school.

The third theme was about discourses of achievement which enabled them (in their narratives) to identify as unengaged but able students at their old school, and as engaged, good students with better grades at their new school. This shows how power was exercised between and within discourses. The discourses that were operating in the classroom of the old school governed and regulated the girls, and enabled them to act in particular ways, forming identities as unengaged but able students. On the contrary, there were discourses exercising power in the classrooms of the new school that enabled the girls to form identities as engaged and good students. Thus, it was concluded that their identity formations can be viewed as dynamic, fluid and embedded in discourse, as in line with the work of Stentoft and Valero (2009).

Furthermore, while the girls formed identities as engaged, good students at the new school, they did not feel that they belonged there; and so a picture of well adapted students emerges. Positioned as subjects in this irregular transition, they may have been forced to take full responsibility for the adjustments and improvements required to succeed in this context, thus making it likely that they would personally shoulder the blame for any shortcomings that resulted from the adjustment.

Zooming further out – the role of policy

Since I am concerned with social justice for immigrant students, it was pertinent for me to explore and try to understand some of the consequences of a forced transition, and in particular, the consequences for learning opportunities and participation in school mathematics. Thus, in the third article, two girls' identity formations as learners of mathematics were explored in the context of a forced school transition.

The theoretical framework enabled addressing the notions of power, discourse and subjectivity; that is, acknowledging that the students' identity formations are a result of power relations constituted in different discourses. Accordingly, it was possible to obtain information on what it meant to be a learner of mathematics in the two different mathematical learning contexts, and show how relational power operated through and within discourses.

Furthermore, exploring identity formations by adopting a Foucauldian perspective was fruitful since it allowed me to show how the girls' identities as learners of mathematics were dynamic and unstable, and enabled by different discourses operating in the two different schools. It was possible to show the complexity of the situation in which the transitioned students were placed, and that acting upon them to increase their opportunities was neither a straightforward matter nor an easy task. We must question what the transitioning students had to give up in order to be included and accepted as a desirable student in their new school, and grapple with issues of inclusion and exclusion.

One reason for adopting a Foucauldian perspective when exploring students' identity formations, was the enabling of zooming out and decentering the students in the research, which then enabled seeing the students as carriers of power, and acknowledging power as relational. This was accomplished through the focus on exploring discourses (in the girls' narratives) that enabled their identity formations as learners of mathematics by governing their ways of thinking and acting. In this way, how the students constructed themselves as learners of mathematics in relation to the discourses operating in their schools and mathematics classrooms could be explored. However, it was not possible to explore how their identity formations as learners of mathematics were influenced by how they are positioned, constructed and talked about in larger contexts. That is, it was possible to explore how their identity formations came into existence through the pedagogical and social relational discourses operating in the schools, but it was not possible to explore how their identity formations relate to constructions of them at a macro or societal level. These kinds of constructions of different student groups (for

example, the low-achieving immigrant student with deficiencies) circulate, and become normal ways of talking about students which may loop into the lives of these students. This may be problematic as it generates feelings of in(ex)clusion and is therefore, in my view, something important to explore further when trying to understand immigrant students' opportunities to learn mathematics.

Consequently, when continuing with the fourth study I wanted to learn more about how constructions of groups of students may come into existence. Therefore, I decided to zoom out (Stinson & Bullock, 2012) further with the aim of widening my understanding about immigrant students' mathematical learning opportunities. Accordingly, I wanted to address and make visible larger discourses that structure how we talk and think (Foucault, 1993) about immigrant students' learning in Swedish school. Thus, in the last study I use other sources of data - policy texts - to further explore my understanding of immigrant students' opportunities to learn mathematics. According to Tracy (2010), one key marker for quality criteria in qualitative research is *crystallization*, which means that researchers should be encouraged "...to gather multiple types of data and employ various methods, multiple researchers, and numerous theoretical frameworks" (Tracy, 2010, p. 844). The aim of this is "...to open up a more complex, in-depth, but still thoroughly partial, understanding of the issue" (Tracy, 2010, p. 844).

In summary, to zoom out, to further de-centre the students in the research, and to more explicitly include a political dimension and address power as relational, I explore how immigrant students are fabricated as educational subjects by policy. In article IV, as in article III, the exploration draws on the work of Foucault. I assume that this exploration is important for understanding immigrant students' learning opportunities in mathematics, since fabrications of them as educational subjects may work their way into the students' lives.

Another rationale for turning to policy text and the notion of fabrication (Popkewitz, 2012, 2013), has to do with the role of policy in the formation of identities. Since policy has the intention of steering how education is organised in school, the discourses in policy govern the conduct of schools and teachers and therefore also the students and their identity formations. In other words, policy texts are discursive texts, which hold principles about what is thought of, hoped for, and acted on, and according to Popkewitz (2012), intend to steer classroom practices. Consequently, the desire for a particular kind of student is expressed in policy texts; in other words, a desirable student is fabricated. Thus, in study IV, in my endeavour to broaden my understanding about immigrant students' learning

opportunities, I explore how the newly-arrived student is fabricated in Swedish policy about education for newly-arrived students. However, I do not question the existence of policy documents or reject the notion of the desirable student. Policy texts build on a vision of the ideal person that is wanted in society, which becomes the goals and values for the school when developing this ideal person (Cummings, 2003), and it is neither of my concern or interest to question this. Instead, it concerns me to try to understand what possible fabrications policy texts hold and the role they may play for students' perceptions and feelings of in(ex)clusion in mathematics education. I aim to create awareness by making visible possible fabrications and the potential consequences these fabrications may have for immigrant students' participation in mathematics education and thus their learning opportunities.

The decision to explore policy texts is also a response to the release of several new policy texts on schooling for newly-arrived students in Sweden - a consequence of the large influx of refugees in Sweden in the last few years (see Chapter 1). The first three studies focused on immigrant students from multicultural and socioeconomically disadvantaged areas. Some of them were born abroad and some of them were immigrants born in Sweden. The recently issued policy documents use the term *newly-arrived students* to describe students who have been in Sweden less than four years. Examining these policy texts is likely to provide insights into how immigrant students in general are thought of, hoped for, and acted on, in order to produce the desired immigrant student in a Swedish school.

Article IV summary: Fabrication of newly-arrived students as mathematical learners

The four recently produced policy texts about newly-arrived students were submitted to discourse analysis, considering how the newly-arrived student as a mathematical learner were fabricated in these discourses. Hence, the two theoretical constructs, fabrication (Popkewitz, 2012, 2013) and discourse (Foucault, 1970/1993), were used as analytical tools. Three of the documents analysed were issued by Skolverket and one was issued by Skolinspektionen (for more details see chapter 4). Furthermore, the notion of abjection (Popkewitz, 2012, 2013) was used to discuss the potential the fabrications have to order and rank the students, for example, in relation to what degree they have come to master the Swedish language. The process of abjection entails an intention of inclusion that creates exclusion. In other

words, the way that the desired person is defined, automatically defines the undesirable (or deviant) person.

Four themes were constructed from the analysis: mathematics as the example, the importance of mother tongue for learning, the importance of acknowledging newly-arrived students' background and deficient thinking. Discourses about schooling for newly-arrived students as well as the fabrication of newly-arrived students were explored within each theme by investigating the principles for what is thought about, hoped for, and acted on when it comes to the newly-arrived as a mathematical learner in Sweden. From the analysis of the four documents, two discourses emerged: the first was inclusive and encouraged multilingualism and multiculturalism; the second was excluding these while preserving Swedishness. The findings were that the texts in the policy documents, issued by Skolverket, were in line with a discourse in which multilingualism and multiculturalism are encouraged and viewed as assets. However, in these texts, the newly-arrived student was also viewed as a student with less confidence and motivation to study because of insufficient Swedish language competencies. Still, the texts were inscribed with a hope that using the strongest language will overcome this. Further, some texts fell within an inclusive discourse, where the school success of newly-arrived students rest on viewing and treating them as assets by acknowledging their prior knowledge and backgrounds. At the same time these texts imply that the newly-arrived student is thought of as in need of special attention, wherefore a student in need to progress in school without the desired assets is fabricated.

Summarised, the analysis has shown how policy texts can fabricate particular kinds of humans, like "the newly-arrived student". It was shown how the policy texts were framed within an inclusive discourse that encouraged multilingualism and multiculturalism, which both view students' mother tongue and backgrounds as assets. However, at the same time, the newly-arrived student was presented in the policy texts as one with deficiencies, in need of Swedish language skills, and in need of progressing in the learning of mathematics in order to succeed in the Swedish school system. Through the analysis it could be shown how a process of abjection defines the "abnormal immigrant student" when fabricating the "normal immigrant student". That is who the newly-arrived student is, or should be, and thereby also who is *not* that type of human. This fabrication has the potential to loop into the lives of the students that they intend to (positively) act on - in this case newly-arrived or immigrant students, which may generate feelings of inclusion or exclusion depending

on how they “match” the fabrication. Thus, any move to include brings with it potential exclusions.

6 Concluding discussion

When I started my research studies towards a licentiate thesis in 2010 I was interested in learning more about immigrant students' opportunities to learn mathematics. This interest was based on my concern for social justice for all students. An underlying and implicit goal was to learn about immigrant students' own perceptions about their opportunities for learning mathematics, and in so doing indirectly provide information on how mathematics teaching and learning could be improved for them. Also, an underlying assumption was that exploring immigrant students' opportunities to learn mathematics from their perspectives, would provide explanations that are not based on a deficit perspective. This is how my research journey started.

As I continued with the research, immigrant students' learning opportunities was still under scrutiny. However, my focus was now on how I could expand my understanding about their learning opportunities. This meant that I got interested in learning more about how the students' perceptions about their learning opportunities come into existence. This resulted in a theoretical displacement between the second and third study, from Skovsmose (1994, 2005, 2014) to Foucault (for example 1966/73, 1980, 1982, 1993, 2002). Thus, the overarching aim has been to deepen and widen the understandings about immigrant students' learning opportunities in Sweden and in so doing critique deficiency explanations given for immigrant students' failure with mathematics. Rephrasing the aim, the research questions to be answered in the thesis are:

- I. How can immigrant students' opportunities to learn mathematics and the processes that enable immigrant students' perceptions of their opportunities to learn mathematics be understood?
- II. How do the understandings of immigrant students' opportunities to learn mathematics change when making a theoretical displacement from work of Skovsmose to the work of Foucault?

Adopting the two theoretical perspectives have had consequences for how I have chosen to structure this thesis. Thus, in the previous chapter I demonstrated how I moved from one article to the next and discussed the affordances and limitations of the different theoretical frameworks. I chose to add these bridging texts between the summaries of the four articles. The first research question is addressed in the four articles, and the second research question is addressed in the bridging texts.

Before attending to the research questions, I would like to give attention to some limitations and prerequisites of this thesis for the reader to bear in mind when reading the discussion of the research questions. The empirical material in the first three studies comprised student focus group interviews, and the students' narratives guided the content of the analysis. Prominent themes (Braun & Clarke, 2006) in relation to the research questions were analysed with different analytical tools. The thesis does not make an explicit and exhaustive presentation and discussion of all kinds of learning opportunities regarding immigrant students in Sweden. Instead, the goal has been to make visible, from the perspectives of a group of immigrant students and from a discursive approach, what constitutes immigrant students' learning opportunities and how they are en(dis)abled. The students' perceptions can only be understood from the perspective of a particular time and place (context). Thus, the results of these studies (presented in articles I – III) must be interpreted in relation to the specific sociocultural, sociopolitical and historical contexts in which it was possible to conduct such studies. Although the fourth study, presented in article IV, examined documents using a discourse analysis approach and was independent of the students' narratives, the texts should nonetheless still be understood as texts discursively constructed in a particular context, at a particular time, and thus influenced by the sociocultural, sociopolitical and historical context in which they are situated. Thus, a generalisation of the findings is not possible, and has not been of my intention. Instead, I would like to stress that this study, and others alike, are important since they provide detailed information on students' perceptions and experiences that adds to the understandings of how discourses shape students' opportunities. Without, this kind of information, certain "truths" that positions for example immigrant students as deficit and low-achieving could not be problematised and challenged.

In the following section, the two research questions will be answered and discussed in relation to the aim of the thesis and earlier research. Thereafter the conclusions are presented and discussed in relation to the in(ex)clusion of immigrant students as mathematical learners in Swedish schools. Lastly, I discuss limitations and implications for further research.

Unpacking immigrant students' opportunities to learn mathematics

After conducting this study, I argue that I now have knowledge about how the interviewed immigrant students perceive their learning opportunities. That is, what constitutes them (articles I, II and III), and how some of them are enabled (articles II, III, IV). However, since the students perceived their learning opportunities mostly as limited, this thesis has been more about what limits and obstructs immigrant students' learning opportunities than about the learning opportunities.

Revealing learning opportunities

When reflecting on the findings of the studies (I, II and III), narratives of both hope and despair are evident, which means that the students perceived both obstacles for learning and opportunities for learning. However, my interpretation of the findings is that the obstacles dominated the students' perceptions, specifically in studies I and II. In contrast, the findings of the third study, in which students' identity formations in the context of a forced school transition were explored, revealed a more hopeful narrative. However, it is not a completely hopeful narrative. I will get back to this, but first I will present and discuss the role of school mathematics and Swedishness that emerged through the analyses.

The role of school mathematics

When exploring the students' foregrounds, one obstacle that emerged was school mathematics itself (studies I and II). This was the case for all students, bar one. The students perceived mathematics as a gatekeeper to further studies, as the subject that may disrupt their plans for the future. Furthermore, when the students talked about the teaching and learning of school mathematics it was mostly expressed with negative feelings. It has been shown, by research in the affective domain, that mathematics often evokes strong negative feelings (see Leder & Grootenboer, 2005). For example, the students talked about mathematics as boring and that they had to struggle hard to pass. An investigation of the mathematical journeys of a class of adolescent students in New Zealand by exploring their relationships with mathematics (Ingram, 2011) showed similar results; the students in her study connected mathematics to boredom and difficulties. The dislike of mathematics was connected to the students' views of themselves as not good at mathematics and not meeting their own expectations or the expectations of the teacher, their parents, or classmates

(Ingram, 2011). The students in my study who expressed negative feelings were also the ones who struggled to pass mathematics. One student (Chang), who had the highest possible grade in mathematics, expressed positive feelings towards mathematics, which is in line with Ingram's (2011) findings. One explanation for this may be found in Lange's (2008) study, in which aspects of learning difficulties in mathematics were explored from a student perspective. The students in his study began to feel bored when they found mathematics challenging, and then started to disgress. This may be related to the rowdiness in the mathematics classroom that the students talked about. That is, the students believed that their classmates were rowdy because they had given up on learning mathematics, which Ana explains by saying "because maybe they think they can't do it and they think it is no point in trying so they don't try and just mess around". Also, not receiving enough support from their mathematics teachers and parents in their work with mathematics were found to be obstacles. This was the case for almost all students, and thus was part of their foregrounds and had significant implications for their learning opportunities.

The students in the third study thought of school mathematics in similar ways. They talked about school mathematics as *the* subject they struggled the most with at their new school. They perceived mathematics teaching and learning at their new school as boring and felt that they were behind as they had not covered all the content areas at their old school that they had at their new school. However, they did not perceive mathematics itself as boring, it was the lessons and the teaching at their new school that made it boring. This is in agreement with research conducted by Boaler (2002) and Ingram (2011); the students in their studies did not think of the nature of mathematics as the cause of their boredom. Immigrant students were not in focus in their studies, hence my findings can be viewed as complementing theirs.

In the fourth study of this thesis, school mathematics was shown to play a specific role in the policy texts compared to the rest of the school subjects. It meant that mathematics was used as *the* example of how to arrange and organise supervision in mother tongue. Thus, if interpreting "mathematics being *the* example" as a product of discourses prevalent in contemporary society about immigrant students' lower achievement in mathematics, together with the proclaimed importance of mathematics for the individual and society and mathematical activity being universal, the newly-arrived student may be fabricated as in need of progressing in the learning of mathematics. This, meet the expectations of a desired citizen who may contribute to increase Sweden's performance in international

assessments like PISA. This positions mathematics in a certain way in relation to the rest of the school subjects and emphasises the importance of mathematical competence wanted in society. Mathematics being *the* example fabricated the newly-arrived as students that have to be “fixed”, since their performance in mathematics is insufficient *and* mathematical knowledge is important. That is, the deficit student is constructed. This deficit student then needs to be saved by being brought into the norm. And here the salvation supposedly entails supervision in mother tongue when learning mathematics, in order for the newly-arrived student to match the norm and thus succeed and progress to become the desired mathematical competent citizen. Consequently, through analysing the policy texts it is possible to conclude that newly-arrived students’ learning opportunities in mathematics are important to improve.

The role of Swedishness

Another perceived obstacle for the students’ learning of mathematics (see articles I and II), has to do with immigrant status, otherness, segregated schools, and Swedishness being the norm and the desirable state of being. The students contrasted themselves to Swedish students where “Swedish” became the norm and the desirable state, leading them to construct themselves as the deviant other, who has fewer learning opportunities than Swedish students. For example, the students contrasted the rowdiness in their school in the multicultural and socioeconomically disadvantaged area with Swedish schools, which they thought of as having a better working environment (see article I; Svensson, 2014). This suggests that they perceived the noise as having to do with immigrant status. Further, they considered themselves as having been isolated since there were no Swedish students in their school. They expressed a wish for a school with a mixture of Swedish and immigrant students, since they believed it would increase their learning opportunities. They perceived this kind of exclusion a purposeful act by the municipalities and the state, reflected in feelings of exclusion and unfairness in their narratives. They also perceived that they received less education and less support in their learning of mathematics than do Swedish students, constructing themselves as having been given fewer learning opportunities. This result corroborates research conducted in Sweden and Denmark. For example, Runfors (2003) demonstrated how teachers referred to immigrant students in relation to “other children”, “normal children” and “Swedish children” and thus construed an ideal category of “Swedish children” or “normal children” and immigrant students as with deficiencies. This was also demonstrated in a study in Denmark conducted by Gitz-Johansen (2004). He demonstrated how the

teachers always construed the immigrant child in relation to how it differs from the Danish child and how this construction almost always was related to incompetence. These two studies demonstrated how teachers construe immigrant students differently from non-immigrant students, often in relation to deficiencies. In contrast to those studies, this thesis contributes a student perspective, showing how the students constructed themselves and immigrant students in general in relation to Swedishness as the norm. This may not be surprising if their teachers view them in this way. Two studies conducted with students in Sweden showing similar results to this thesis are those conducted by Parszyk (1999) and León Rosales (2010), which were discussed earlier. Parszyk (1999) investigated immigrant students' experiences of their working and living conditions in compulsory school. Her study showed how the immigrant students gradually internalised the perceptions of the surroundings about them, which led to many of the students accepting the label immigrant and belonging to an inferior category of students. To relate to Parszyk's study is not only of interest because her findings strengthen the findings of this thesis, it is also of interest to address this from a time perspective. That immigrant students of today (in this thesis) appear to experience and have similar perceptions of exclusion as the students in Parszyk's study nineteen years ago, indicates the power of the deficit discourses about immigrant students operating in Sweden. Another study, with similar result is a study conducted by Fairbanks, Crooks and Ariail (2011) in the USA, in which an immigrant girl's learning opportunities were restricted by her internalising the feelings of deficiencies that the school staff projected onto her, such as deficiencies in the the language of instruction.

The fourth study may contribute information on how these kinds of deficit discourses continue to exist and operate. For example, in the analysis of the policy texts in the fourth study it was shown how the discourse "Swedish as the norm" fabricated the newly-arrived students as deviant - in great need and as deficient, because they lacked the required Swedish language skills.

However, the girls in the third article, who were allocated to a new school when their school closed, did not compare themselves to Swedish students. Instead, they contrasted themselves with their new classmates, who were both Swedish and immigrant, whereas the students in studies I and II explicitly compared themselves only to "good" Swedish students. The comparison was not something that they were asked about in the interview but emerged in discussions about how their grades had been influenced by the change of school. In the comparisons, they argued that their prior competence in different school subjects (from their old school)

was as good as, or even better than their new classmates' knowledge (except in mathematics). This can be interpreted as their attempt to protect themselves from being positioned and constructed as deficit and deviant immigrant students by their new classmates and teachers. They distanced themselves from the category of the deficit, low-achieving, immigrant student. Accordingly, it was shown how the students' identity formations as learners of mathematics shifted to match the different discourses operating at the new school - how the students' identities were governed by the discourses in which they were immersed.

The discourse of Swedish being the desirable was not evident in the interview with the two girls presented in article III. Nor were feelings of unfairness or injustice in comparison to Swedish students, as was the case in study I. One possible reason for this is that the students had actually experienced integration in their new school context. It is possible that, in contrast to the students in the first two studies who had no actual experience of attending a school with classmates of Swedish backgrounds, and "only" the perception of what it would be like to attend what they called a "Swedish school", they had actual experience of it. Further, the school they were re-allocated to may not be characterised as a "Swedish school" by the students in the licentiate thesis since the students were not mainly students with Swedish backgrounds.

Increased learning opportunities?

The students all had hopeful plans for futures in which they perceived learning opportunities. However, most of them also regarded school mathematics as a hindrance to their plans with the potential for disrupting their foregrounds and thus their learning opportunities.

According to the students, their grades had generally increased after being allocated to the new school (see article III). However, despite no improvement in their mathematics grades, they felt that they had improved their knowledge and skills in mathematics. Thus, an interpretation may be that moving the students from their immigrant-dense school in a multicultural and socioeconomically disadvantaged area increased their learning opportunities. They also talked about the learning environment at the new school in positive terms, and as being the biggest difference between the two schools. That is, the social relational discourse at the new school constituted a good learning environment in contrast to their old school, in which a discourse of noise dominated the mathematics classroom. However, except for the learning environment, the students did not talk about the teaching and learning of mathematics at their new school in positive terms. Two different pedagogical discourses about mathematics

teaching and learning in the two schools emerged. The pedagogical discourse they experienced in the mathematics classroom at their new school, with the focus on individual learning and a teacher who did not explain content as well as their teacher at the old school, made the teaching and learning of mathematics boring for them.

A possible interpretation is that the social relational discourses had a greater influence on their identity formations as mathematical learners than the pedagogical discourses. The students also believed that if they had not been “the noisy students” at their old school, and instead had payed attention to the mathematics teacher and the work, they would have actually learned more mathematics there than at their new school, thus blaming themselves for not achieving at their old school. This suggests that their opportunities for learning could have improved even more at their old school due to the pedagogical discourse in the mathematics classroom in the old school. But in reality, it was disrupted by a discourse of noise, which limited their learning opportunities.

The students did not feel a sense of belonging at their new school. They still felt as if they belonged to their old school, which may also have had an impact on their learning opportunities at the new school. Research by Darragh (2013) has shown the importance of attaining a sense of belonging in the new school when transitioning. She argues that confidence, belonging and identity are closely linked in mathematics learning situations, and thus sees a sense of belonging as part of identifying with mathematics. Thus, a possible interpretation is that the students’ learning opportunities could have increased further at their new school if a sense of belonging to the school and the mathematics classroom had been created. A conclusion to draw from this is that neglecting to listen to the voices of students when evaluating a school transition, leaves one merely with statistics on academic achievement. The statistics may show that it is a successful solution on a general level. However, they do not say anything about the individual students and how they perceive their situations. For some students, the act of reallocation will be successful whereas for other students it may be a disaster. For example, (Bunar, et.al., 2011) has shown that for immigrant students who live and attend school in an immigrant-dense area with low socioeconomic status who transition to a “Swedish” mainstream school, full integration does not automatically occur just because physical integration is created. Instead, as shown by Kallstenius (2010), the social representations associated with being “immigrant” create a territorial stigma for the students, which does not automatically disappear when they leave the multicultural school; feelings of otherness persist and can obstruct opportunities for brighter futures (Kallstenius, 2010).

In a study by Wigerfelt (2010), who investigated the consequences of closing a school in a multicultural area with low socioeconomic status, and reallocating the immigrant students to a school in an area with higher socioeconomic status with a low percentage of immigrant residents, it was shown that a division between the students from the two schools still existed after the transition. However, the students from both schools said that prejudices had changed, which had led to them getting along better. Also, several of the interviewed immigrant students from the closed school said that they spent more time on their studies than at their former school, and that the approach to studying was more positive at the new school, which Wigerfelt (2010) related to peer effects. And just like the students in the third article in this thesis, the reallocated students in Wigerfelt's (2010) study had improved their grades after transitioning. In contrast, some research shows that a background of low socioeconomic status has negative consequences for the students' opportunities to make successful transitions (see for example Evangelou et al., 2008; Galton & Morrison, 2000; Topping, 2011). However, research by Hernandez-Martinez and Williams' (2013) has shown that students from disadvantaged cultural and socioeconomic backgrounds can make successful transitions from school to college by being resilient. Thus, there is no simple general rule when it comes to the consequences of school transitions for immigrant students. Therefore, I would argue that closing schools and allocating students because of low achievement and bad working environment is not a straightforward matter, but a complex dilemma because the consequences are different for different students. In some cases, a transition will increase the students' learning opportunities and in other cases it will not. Based on the literature and findings in the third study, I therefore argue for listening to students' stories to learn more about what makes the transition into a new mathematics classroom successful and increases learning opportunities, since a successful transition cannot simply be measured in terms of student grades.

The role of discourse

Above I presented what can be said about how the students perceive their learning opportunities. That is, what constitutes them and what limits them. However, how these types of perceptions about the immigrant student as a learner of mathematics and their perceptions of their learning opportunities came into existence also needs to be addressed when discussing the first research question.

To demonstrate how macro context issues influence the students' perceptions, and thus their learning opportunities, the influence of public discourses on students' perceptions has been explored (presented in article II). It was shown how the students drew on public discourses circulating in the media about immigrant students, the importance of mathematics, about "good" parents, the need to be Swedish when talking about mathematics homework and the importance of parental support. The discourses enabled the students' interpretations of themselves as having limited learning opportunities because of their parents' deficiencies in the Swedish language and their educational background. Thus, the desirable qualities that emerged from the interviews were those of "Swedishness", which was shown to be enabled by the public discourses. Also, it was shown that the students had accepted that they themselves could not gain the appropriate mathematics homework help, which situated them outside the norm of what it is to be a "good" student. Consequently, immigrant students were shown to be situated within an interplay of a number of discourses, and thus in a complex situation which impacted on their perceptions of their foregrounds and thus their learning opportunities. A similar result was found by León Rosales (2010), who investigated masculine student positions in a multi-ethnic school in Sweden. In the study, it was demonstrated how students in school year 6 had understood themselves and were understood by others based on the discourses in society in which they were identified as deficient and problematic. León Rosales (2010) concluded that the students constructed themselves as individuals with limited opportunities for action in the present and as well as in the future since they identified themselves as belonging to a category of problematic students. Also, Lange (2009) showed the impact of public discourses on students' perceptions when investigating students' identity work in the area of social life constituted by school mathematics education. For example, he demonstrated how a ten-year-old Muslim girl in Denmark made an effort to identify herself as normal in relation to the social practice of mathematics education, and how she could uphold this identity as a normal student because of the classroom discourse, which was inclusive and free from any labelling practices.

The consequences of the discourses acting on the students' learning opportunities in the third article were both positive and negative in character. It was shown that the different discourses available to the students enabled them to form different identities as mathematical learners. Thus, their identity formations as learners of mathematics were shown to be dynamic and embedded in discourses. A discourse of noise at their old school seemed to have governed the students' conduct to form identities as

unengaged learners of mathematics, whereas the social discourse at the new school seemed to have governed them to form identities as engaged learners of mathematics. Consequently, the role of discourse is important when trying to understand immigrant students' learning opportunities and the processes that enable them. It was also shown how power works within and through the discourses. That is, how the different subject positionings (Foucault, 1982), or identity formations as mathematical learners (Walshaw, 2013; Stentoft & Valero, 2009), were an effect of power exercised through the systems of knowledge which made up the mathematical learner and what it means to be a learner of mathematics in the two contexts, and thus regulated the rules of conduct and the students' conduct to match this "truth" provided by the discourses (Foucault, 1974). Accordingly, exploring and trying to understand the role of discourse in line with the work of Foucault and how power is exercised, may be important when trying to understand the processes that enable the students' actions as learners of mathematics and thus their perceptions of their learning opportunities.

The results presented in the second study demonstrated how discourses about immigrant students and "good parents" had influenced their perceptions, and thus showed how categorisations of them as immigrant students with deficiencies had looped into their lives. Thus, processes of inclusion or exclusion are initiated, and depending on how well the students perceive themselves as matching those categorisations it will have consequences for how they perceive their learning opportunities. To further understand the processes of in(ex)clusion and how certain categorisations may come into existence, the fabrication of the newly-arrived student as learner of mathematics was explored in policy texts about schooling for newly-arrived students and discussed in relation to the process of abjection (study IV).

Policy texts aim to govern in a certain direction. That is, they are supposed to act on people in a certain desirable direction. The policy texts about schooling for newly-arrived students in Sweden that were analysed in study IV, describe the desirable newly-arrived student, and state that these students need to be acted upon since they lack Swedish language skills and need to progress in the Swedish school system to become the desired student. This constructs the newly-arrived students as deficient individuals (see article IV). That is, policy texts start with inequality with the intention of creating equality and thus have good intentions. Furthermore, they build on discourses that in this case are in line with research findings about schooling for immigrant students, like the importance of using the mothertongue for learning and discourses that

encourage multilingualism (see for example Barwell, 2016; Schechter & Cummins, 2003). Thus, the newly-arrived student was fabricated as a student with resources such as their mother tongue and prior knowledge; but also as a student with deficiencies in the Swedish language that need to be fixed for the student to succeed in the Swedish school system and society – a double gesture (Popkewitz, 2012; 2013). Further, the desired newly-arrived student was fabricated as a motivated and willing-to-learn student who can advance fast in her learning of mathematics if her strongest language was used. This is within the framework of good intentions. I do not question this, nor the importance of policy texts. If there were no policy texts there would be no curriculum. However, I want to highlight and raise awareness of the in(ex)cluding processes that the fabrications, constructed in and through the policy texts contribute to when the fabrications work their way into the lives of the students. This process of in(ex)clusion is what Popkewitz (2012, 2013) calls abjection, a process of inclusion that simultaneously contributes to exclusion. So, when the newly-arrived student was fabricated, through and in the discourses in the policy texts, the criteria for inclusion became defined and classification became possible. That is, it not only became possible to define the desirable newly-arrived student, but also to define who is not that kind of person, who is the deviant. Thus, a process that in(ex)cludes newly-arrived students may be generated through the including discourses in the policy texts about schooling for newly-arrived students.

In this thesis, the exploration of policy texts provided information on how certain people became constructed and categorised, the desirable newly-arrived, and it indicated how a process of in(ex)clusion can be generated. This is not an innocent act and may have consequences for the newly-arrived students' perceptions of their opportunities to learn, as well as for other immigrant students who are not newly-arrived. The risk is that these constructions loop into the lives of newly-arrived or immigrant students, and a possible consequence is a construction of those who do not match the desired ideal as losers who may not progress in the "correct" way in the Swedish school system. Accordingly, exploring fabrications of newly-arrived students in discourses in policy texts was a way to understand processes that enable in(ex)clusion of immigrant students' learning opportunities, and how certain categorisations of them come into existence and thus govern their conduct as learners of mathematics. Further, these kinds of explorations not only allow for discussions about in(ex)clusion, but also for discussions of the mechanisms of power from a macro and political level. For example, the fabrication of the newly-arrived student in the policy text discourses demonstrates, firstly, how she is

thought of by educators, politicians and researchers, secondly, how the classification and possible positioning of the newly-arrived students in excluding and deficit ways through the process of abjections, is an effect of power relations. It is through the power relations, constituted by and within the discourses, that it becomes possible to think of the newly-arrived student in certain ways. Consequently, it becomes problematic since there is the risk that, in the attempt to include and provide newly-arrived students with learning opportunities, those students who do not assimilate the characteristics of the desired newly-arrived student, are excluded.

A theoretical contribution in relation to the theoretical approaches

Elements to address the second research question are spread through the bridging texts in chapter 5. This section aims to provide a more cohesive answer and a discussion of how the understandings of immigrant students' learning opportunities change when making a theoretical displacement from the work of Skovsmose (1994, 2005, 2012, 2014), to the work of Foucault (1974, 1980, 1993, 2000, 2002). It has not been a straightforward task to adopt two somewhat different theoretical frameworks, since they are not based on the same epistemological assumptions. It would have been "easier" to write a more coherent thesis by staying within one theoretical perspective. Also, adopting two theoretical frameworks may result in a shallow presentation and discussion of the theoretical perspectives since obviously it takes more of the researcher's time to get to know and work with two theoretical perspectives instead of one. However, using two theoretical frameworks may also provide possibilities for expanding the understandings about immigrant students' learning opportunities. The assumption was, that using another theoretical perspective within a socio-political framework would help me to widen my understanding about immigrant students' mathematical learning opportunities. Furthermore, viewing this thesis not only as a research study, but also as a part of a PhD-education has meant that I, as a becoming researcher, have had the opportunity to dig deeper into two theoretical perspectives and thus expand my knowledge about these two perspectives when working with them, which could be viewed as an asset when trying to acquire a PhD-degree and as well as for future research projects.

Both the applied theoretical frameworks are concerned with socio-political issues (see for example Kolloosche, 2016; Stinson & Bullock, 2012; Gutierréz, 2010), which according to Gates and Vistro-Yu (2003) is

a way to adopt social consciousness and responsibility. Thus, an aim when conducting the four studies has been to attend to social and political issues when exploring immigrant students' learning opportunities.

The contributions and limitations of using Skovsmose's work on foregrounds

Using the notion of foregrounds as an analytical tool was useful for revealing students' perceived learning opportunities. It meant, that since foregrounds are about the students' perceived opportunities in relation to the socio-political context available to them (Alrø, et.al., 2009), it allowed me to see not only issues directly connected to the student and the mathematics classroom context that may impact on their learning opportunities, but also, issues they perceived to be obstacles, like segregated schools and otherness. The notion of foregrounds used with Gee's (2011) notion of discourse allowed for zooming out and considering the socio-political context. Thus, it was possible to show how different public discourses enabled the students' perceptions of their learning opportunities in different ways, since different interpretations of their foregrounds were made available by different public discourses.

In summary, using Skovsmose's notion of foreground was important for grasping the students' perceptions of their learning opportunities, what constitutes their perceived opportunities, and what socio-political factors (beyond just the personal and the background) obstruct them. However, the findings in the second article showed how the students drew on public discourses that enabled them to position themselves and their parents as deficit in relation to Swedish students and Swedish parents.

One assumption behind the use of foregrounds was that it would mitigate against deficit thinking in discussions about achievement. In one way this was accomplished, since socio-political issues that limit the students' learning opportunities were evident from their perceptions. However, the public discourses (see article II) contributed to perceptions of themselves as deficient in relation to Swedish students. Thus, I argue that using foregrounds and discourse as analytical tools when exploring immigrant students' learning opportunities may be useful for critiquing the use of deficiency explanations about immigrant students' learning opportunities, since it makes visible how public discourses influence students' perceptions of their learning opportunities. It is not acceptable that public discourses enable immigrant students to perceive themselves and their parents as deficit, and as less able or capable than Swedish

students and parents, which is why I argue that these discourses need to be critiqued and challenged.

Further, using foregrounds as an analytical tool, put the students at the centre of the research, which means that even while acknowledging the influence of the socio-political context, there is always the risk of locating the problem for not learning the expected mathematics with the students. Also, since the rationales for learning mathematics, according to Skovsmose (1994), are the intentions of the individual, which are grounded in a landscape of dispositions (pre-intentions) shaped by a person's background his or her foreground, the students are put at the centre as the wielders of power, with the power to change as a learner of mathematics in line with their intentions. But what happens if the foregrounds are ruined and there are no intentions for learning and no point in learning mathematics? Who has the power to change these conditions? That is, who has the power to provide alternative foregrounds for the students to act upon? This leaves many questions about power unanswered. Thus, the work of Skovsmose is limiting when trying to understand the processes that enable the students to think of themselves in deficit ways, since the notion of sovereign power viewed does not enable it.

The contributions and limitations of using Foucault's work on discourse and power

Using a theoretical approach in line with the work of Foucault, allowed the move from an underlying aim of improving teaching and learning of mathematics for immigrant students, which was the case when applying the work of Skovsmose. Improvement in mathematics teaching and learning that leads to provision of brighter opportunities for immigrant students requires change (studies I and II). This entails a progress in which the source of the change then was located with the students. This led to displacement towards the underlying aim of revealing and understanding the processes that enable the students to perceive themselves in certain ways. That is, using Foucault's thinking tools enabled an exploration of how power operates and enables different categorisations of students and possible identity formations. For example, in the analysis in the third article it was possible to show how different discourses enabled the students to form identities as engaged and unengaged learners of mathematics, providing information on how power operated and thus facilitated or obstructed immigrant students' learning opportunities. That is, their thinking and acting as learners of mathematics, their subjections (Foucault, 1980, 2002), were a result of being subjected to different discourses and

thus the mechanisms of relational power. Thus, drawing on the work of Foucault facilitated the investigation of how power operates as relational, how power enables the fabrication of the newly-arrived student as a learner of mathematics (article IV), and how power makes and possible students' identity formations as mathematical learners (article III). Further, this meant that in contrast to the first two studies, the students in the third study were de-centred, and the discourses operating in the lives of the students were at the centre of the research, which enabled the exploration of how students are discursively constructed, as different student subjects, like the "the engaged mathematical learner".

In the fourth study, in which policy texts about schooling for newly-arrived students were explored, the work of Foucault allowed for making visible the larger discourses that structure how we talk and think (Foucault, 1993) about immigrant students' learning in Swedish school. Larger discourses are discourses that the policy texts drawn on; for example, discourses on research about second language learners. The use of Foucault also allowed for the inclusion of a more explicit political dimension, since policy texts are discursively constructed with the view of a desired (Popkewitz, 2012; 2013) and ideal person (Cummings, 2003). For example, according to Cummings (2003), educational reforms build on a vision of the ideal person that is wanted in society. According to Popkewitz (2012, 2013), a process of abjection ensues when criteria for the ideal person is described in policy texts. Thus, by adopting a post-structural approach in line with Foucault and Popkewitz in the fourth study it was possible to explore how the newly-arrived student as a mathematical learner is fabricated. That is, how the desirable newly-arrived student is thought about and hoped for and thus how in(ex)clusion may come into existence as those fabrications loop into the lives of the students and depending on how they assimilate those categorisations or fabrications of them they may perceive feelings of inclusion or exclusion. This contributed to expanding my understanding about how categorisations or fabrications can influence immigrant students' perceptions of their learning opportunities.

Skovsmose and/or Foucault?

Kollosche (2016), who contrasts the work of Foucault with critical contributions based on the sociology of Marx, suggests that using a Foucauldian framework within a socio-political research framework is fruitful. The interconnection of power, knowledge and subject is, according to Kollosche (2016), the basis of this fruitfulness since it allows

for exploring “the connections between representations of power such as: the unequal distribution to wealth; education and political influence; knowledge (such as the knowledge of school mathematics or mathematics education research); and processes of subjectivation (especially learning, but also behaviour in- and outside of the mathematics classroom)” (pp. 79-80). This, I agree with, since theoretical tools from the work of Foucault were fruitful when analysing the data in the third and fourth studies. For example, the relationship between power, knowledge and discourse contributed to seeing how the students in the third study were governed to form subjectivities as mathematical learners. However, adopting the work of Foucault when analysing the data did not result in any direct suggestions for improving learning opportunities for immigrant students. For example, in the fourth study it was shown how the newly-arrived students are fabricated in policy texts and how a process of abjection may contribute to the newly-arrived students’ perceptions of inclusion or exclusion. But, not how the conditions may be changed to increase newly-arrived students’ learning opportunities. However, the work of Skovsmose (1994) on foregrounds may complement this, since revealing the students’ perceptions of their learning opportunities can contribute to an understanding of what needs to be changed. When the students talk about their school as an immigrant-dense and contrast it with “Swedish schools”, they speak of unfairness; when they express a desire for schools to have a mix of immigrant and Swedish students, they are indirectly indicating what needs to be changed for them to experience better conditions for learning mathematics. However, from a Foucauldian perspective, such ideas about improvement define what is “good” and prescribe certain values. In this case the Swedish students become “good” since they will “balance” rowdiness in the schools and thus increase immigrant students’ learning opportunities. So adopting a Foucauldian framework of analysis makes critique of these prescribed values possible.

Thus, using both theoretical frameworks provides important perspectives for understanding immigrant students’ learning opportunities. Similarly, suggest a hybrid theory - *Critical Postmodern Theory* - in which critical theory is combined with postmodernism in a hybrid space, despite the disruptions and breaks between the two. This hybrid framework then makes it possible deconstruct the category of deficit immigrant student, as well as to discuss changing mathematics teaching and learning to improve immigrant students’ learning opportunities. Stinson and Bullock (2012) suggest that using Foucauldian analytical concepts together with the moral guidance of critical theory and a praxis of uncertainty “...opens up inquiry into the dynamic of mathematics teaching and learning to empowering and

humanising yet uncertain possibilities.” (Stinson & Bullock, 2012, p. 50). Further, according to Stinson and Bullock (2012), this framework allows for zooming in and out when conducting research. For example, as in this thesis, zooming in on students’ foregrounds, zooming out when exploring public discourses, zooming in and out when exploring discursive identity formations, and zooming further out when exploring how the newly-arrived student is fabricated in the policy texts. However, in contrast to the hybrid theory suggested by Stinson and Bullock (2012) the theoretical frameworks of Skovsmose and Foucault are not used in the same studies in this thesis and thus cannot, be said to be framed within a Critical Postmodern Theory. But, if viewing the studies together with the preamble as a whole when addressing the overarching research questions, it is possible to talk about a Critical Postmodern Theory. I recognise the two frameworks as complimentary and both as contributing with valuable analytical tools that could give information on immigrant students’ learning opportunities when applied in the processes of analysis. Thus, I would like to conclude that despite disparities and breaks between the two theoretical perspectives adopted, that it has been fruitful to adopt both when trying to widen the understandings about immigrant students’ mathematical learning opportunities.

Further, it has been fruitful to use the two theoretical perspectives to criticise deficit explanations about immigrant students’ failure with mathematics, which was part of the aim of this thesis. By exploring students’ foregrounds, it was possible to get to know the students’ perceptions of their learning opportunities and in particular what constitutes them. In this way, it was possible to show other issues that may explain immigrant students’ low achievement in mathematics than issues related to their backgrounds and language deficiencies. For example, negative pedagogical discourses in the mathematics classrooms, their perceptions of school mathematics itself as difficult, and the perception of mathematics as a gatekeeper for future plans were issues addressed in relation to the students’ foregrounds and learning opportunities, which indicates that deficiency explanations alone cannot account for immigrant students’ low achievement in mathematics. Others have come to similar conclusions (see Langer-Osuna et.al., 2016; Moschkovich, 2002; Norén, 2010; Svensson, 2014a; Valero & Meaney, 2014). For example, Valero and Meaney (2014) argued that “socioeconomic influences on mathematical achievement should not be considered as a taken-for-granted fact that is accepted uncritically” (p. 977). They suggested that researchers within mathematics education should formulate more nuanced approaches for understanding the social, political and historical constitution of the

relationship between socioeconomic influence and mathematical achievement since the relationship reveals practices of inclusion and exclusion; and because research itself constructs how we come to think about this relationship.

This thesis is just such an attempt to formulate a more nuanced approach. It explores students' foregrounds in ways that critique deficit perspectives about immigrant students and provides valuable insights into how immigrant students perceive their own learning opportunities. The roles that discourse and power play in producing deficit perspectives of immigrant students have been explored towards a better understanding of how deficit perspectives come into existence. Categorising the immigrant students as deficit has been shown to be an effect of power. Thus, understanding how these perceptions or categorisations operate is important if one is to challenge and question the deficit perspectives that that have been taken for granted in the Swedish public sphere.

In(ex)clusion of immigrant students in mathematics education

In the very beginning of this thesis I refer to the Swedish Education Act (SFS2010:800), which states that all students should be provided equal access to education (SFS 2010:800, chapter 1, 8 §) and equal quality of education (SFS 2010:800, chapter 1, 9 §), and that no matter which school students attend and from what social and economic background they come, from should be provided the same opportunities for learning (Skolverket, 2012). Consequently, it is possible to think of schools in Sweden as institutions of opportunities. Official reports, media reports and research in recent years have nonetheless indicated that this is not always the case (Tallberg Broman, 2014). As the students interviewed for this study reveal, immigrant students experience significant barriers to learning. However, the students in the third study were acted upon, by authorities, in an effort to increase their learning opportunities by having their school closed and being forced to move to other schools. The low achievement in mathematics of students from foreign backgrounds and/or from low socioeconomic backgrounds is well documented in, for example, PISA (Skolverket, 2013; 2016a) and TIMSS reports (Skolverket, 2012b, 2016b). This indicates that there is an *achievement gap* (Gutiérrez & Dixon-Román, 2010) between immigrant students and/or students from low socioeconomic backgrounds and native students in Sweden when it comes to mathematics. Thus, a possible conclusion is that the Swedish

school system has failed when it comes to equity and providing all students with equal opportunities for learning mathematics. Consequently, the categorisations and constructions of immigrant students and their parents as deficit in relation to Swedish students and parents will likely continue, and thus depending, on how individual students assimilate imposed characteristics of the desired/ideal student, feelings of in(ex)clusion in relation to school mathematics will persist. Further, since mathematics enjoys elevated status in society, the issues of the in(ex)clusion of immigrant students in mathematics education may play an even more significant role for immigrant students than other school subjects. Not only is school mathematics a subject that students need to pass in to attend a national programme in upper secondary school, it also acts as a possible gatekeeper (Skovsmose, 1994; Stinson, 2004) to further studies. Competence in mathematics also carries certain connotations such as intelligence and rationality. Traditionally, school mathematics has had an important role in the stratification of students (Lange, 2009). That is, it becomes possible to divide students into those who know mathematics and those who do not know mathematics, and often students who know mathematics and achieve well are regarded as intelligent. Hence mathematics has the potential to contribute to constructions of difference (Gutiérrez, 2010), and feelings of in(ex)clusion, and thus may play an even more significant role than other school subjects for immigrant students' perceptions of in(ex)clusion at school.

Furthermore, mathematics is highly valued in contemporary society and mathematical knowledge is viewed as important and beneficial both for individuals and national economies, since mathematicians, scientists and engineers are needed for a country to participate and be competitive and secure globally (Valero, 2016). Thus, mathematical competence is an important indicator for both school success and individual and social progress (Valero & Knijnik, 2015). The high value given to mathematics can be seen in a press release from the Swedish minister of education from September the 6th 2011, in which the minister indirectly connected the need for a skilled workforce to falling results in mathematics:

If Sweden should be a successful country in the next generation skilled engineers, scientists, and economists are needed. At the same time, Swedish students' performance in mathematics decreases in all international studies. We are falling behind, and this trend must be stopped.⁴ (My translation)

⁴ Press release. Mattelyftet - 2,6 miljarder ska höja resultaten [The Mathematics initiative - 2.6 billion to raise results], 6 September 2011.

Consequently, the Swedish government has invested a significant amount of money to develop mathematics teaching to improve students' achievement in Swedish schools through Matematiklyftet 2012 – 2016 (Utbildningsdepartementet, 2012). In the latest PISA survey, mathematics results had increased (Skolverket, 2016). If this is a result of the initiatives taken we do not know. However, the mathematics results of immigrant students and students from low socioeconomic backgrounds were still low, indicating an achievement gap. Since the release of the last PISA results Sweden has received a large number of immigrants, mainly refugees (as reported on in Chapter 1), which poses a great challenge for the Swedish educational system when it comes to including and providing these immigrant students with equal education. The possible effect on upcoming PISA-tests has already been discussed. For example, after the release of latest PIRLS study conducted in 2016 (Progress in International Reading Literacy Study), in which Sweden had increased its scores, achieving the same results as it did in 2001 (Skolverket, 2017), a Swedish researcher highlighted the upcoming challenges with newly-arrived students (who did not participate in the last study) in a media-report⁵. Thus, indicating that these students may interrupt the latest increase in performance. An example from the fourth study in this thesis also suggested that newly-arrived students may be fabricated as those who disrupt the goal of raising results in the upcoming PISA study. Such fabrications will perpetuate the achievement gap and processes of in(ex)clusion of newly-arrived/immigrant students in mathematics education in Sweden.

The students in the third study can be said to have been subjected to an act which strove to compensate for their social and economic backgrounds by providing better learning opportunities in the provision of a new school environment. However, the physical inclusion of students in a new learning environment does not guarantee that they will feel included. Instead, the experience of otherness can lead to feelings of exclusion (Kallstenius, 2010). I do not know if the students felt excluded, but they did not feel a sense of belonging to their new school (see article III). Feelings of not belonging may mean that the students see themselves as the other in relation to their new classmates, which has the possibility to produce

<http://www.mynewsdesk.com/se/pressreleases/mattelyftet-2-6-miljarder-ska-hoeja-resultaten-678034>

⁵ Media-report. Barbro Westlund: "Svenska lärare ska vara stolta", 5 November 2017. <http://skolvarlden.se/artiklar/barbro-westlund-svenska-larare-ska-vara-stolta-a-larare-ska-vara-stolta>

feelings of exclusion. Despite of that, their academic achievement at their new school improved. However, it was not, according to the students, a result of improved quality of mathematics teaching and learning at the new school. It was the calmer and better working environment at their new school that contributed to increased opportunities. Consequently, it was not education per se, nor the pedagogical discourse that was having a positive impact, but the new social and relational discourse that enabled the students to act as engaged learners of mathematics and improve their achievement. To be included and participate in the mathematics classroom at the new school the students had to adopt and accept the pedagogical and social and relational discourses at their new school. By all accounts they did this successfully, demonstrating resilience. Students from disadvantaged cultural and socioeconomic backgrounds can make successful transitions from school to college by being resilient (Hernandez-Martinez & Williams, 2013). However, being resilient may not guarantee feelings of inclusion. According to Reid (2012), the notion of resilience needs to be problematised since it can be "...to forego the very power of resistance" (Reid, 2012, p. 76). For example, students seemed not to have considered it an option for them to resist the new pedagogical discourse in the mathematics classroom in ways that may have to influenced the discourse to be more inclusive. Being a student who must adapt to a new situation to do better and to be included may be problematic. Also, adjusting to be included puts the responsibility on the student herself and has the potential to result in self-blame if the adjustment not have the desired outcome. Furthermore, if the desired outcome is not accomplished there may no longer be any point in participating further, leading to feelings of exclusion. Even if it was not the case for the transitioning students described in this thesis, I would like to stress the importance of remaining critical and problematising the concept of resilience. We need to ask whether we want students to respond with resilience when we impose transitions, and try to understand what the students must give up to become resilient in the mathematics classroom (Reid, 2012), and question the possible consequences for their learning opportunities.

Limitations and implications for further studies

Through the voices of nine immigrant students and an analysis of policy texts on schooling for newly-arrived students this thesis has contributed with analysis from a socio-political perspective, on immigrant students' opportunities to learn mathematics in Sweden and how their perceptions of

their learning opportunities and of themselves are enabled. Similar research that investigates immigrant students' perspectives in relation to school mathematics is scarce; from a socio-political perspective, non-existent in Sweden. There is also no research that looks at the relationship between student perspectives and discourse, making this thesis a contribution to the field. The thesis has also contributed with the application of two different theoretical approaches that broaden our understandings about immigrant students' opportunities to learn mathematics.

I would like to stress that it is not my intention to offer generalisations of the findings and the conclusions drawn in this thesis since the students' narratives are unique to the interviewed students at a particular point in time and limited to only nine students. Hence similar studies may generate different findings with other students who may have different experiences to tell. However, this does not mean that the findings of this thesis are not relevant for mathematics teachers and others working in education. For teachers, others in education, and politicians, the findings of this thesis may contribute with a deeper and broader understanding of immigrant students' learning contexts and learning opportunities. Hopefully, this will lead them to a better understanding of immigrant students' needs when it comes to mathematics education, and lead them to acknowledge the importance of listening to the voices of the students themselves. Hopefully there will be questioning anew, and challenging of taken-for-granted deficit discourses about immigrant students. This thesis has attempted to go beyond issues of academic achievement, specifically in relation to deficiency explanations. However, much remains still to be done. For example, in future research it will be important to try to understand and challenge the processes of in(ex)clusion of different groups of students in mathematics education (in Sweden) and the role that achievement-gap discourse plays in these processes.

One limitation of this thesis being structured as a monograph-compilation hybrid, is that a holistic view of the students' narratives, which includes the perceptions of all the students, could not be provided. It was not possible in the articles to present all the emerging themes from the interviews. However, all the themes about learning opportunities (studies I and II) were presented and discussed in my licentiate thesis (see Svensson, 2014), and thus provided a holistic view of the students' narratives, albeit analysed somewhat differently to the studies in this thesis. Also, since I chose to present only one interview from the third study in the third article, the findings of the other two interviews are not presented in this thesis.

Another limitation of this thesis concerns the fourth study, in which policy texts on schooling for newly-arrived students were analysed. When conducting the study, I chose to analyse the newly released policy texts issued by Skolverket and Skolinspektionen. Four texts were analysed since at that point these were the available documents. The fourth analysed document is a report on an evaluation of schooling for newly-arrived students from 2014. A similar evaluation from 2009 has been reported on, but was not included in the analysis since the interest was in how the newly-arrived students are fabricated in the policy texts of today. Time and space in the fourth article limited a more exhaustive presentation and analysis of the fabrication of the newly-arrived student as a learner of mathematics several more and older policy texts. This would have enabled an examination of how the category of immigrant student has been constructed over the years. Consequently, a suggestion for further research is to widen the analysis by including older texts on schooling for newly-arrived students in Sweden, as well as other types of policy texts issued by institutions other than Skolverket and Skolinspektionen to enable further exploration of the fabrication of immigrant students in Sweden and its consequences.

This thesis has aimed at widening the understandings of immigrant students' opportunities to learn mathematics from two perspectives: that of the students and that of policy texts. Accordingly, it may have been limited in the sense that it did not include the perspectives of teachers and parents. Teachers and parents may provide new perspectives that further broaden our understanding of immigrant students' opportunities to learn mathematics (see for example Civil, Planas & Quintos, 2012). Local politicians too, could provide further insights into immigrant students' learning opportunities. How discourses govern the perspectives of these people would also be instructive (see for example Sjöberg, 2011).

Thus, by investigating immigrant students' learning opportunities from different perspectives, such as from students, teachers, parents, local politicians, policy texts and discursive perspectives may be one way of gaining knowledge that contributes to action that has the potential to recreate the Swedish school as an institution of opportunities - a school that aims to provide all students with the very best opportunities to reach their full potential and to reach the traditional goals of education, which are to enable people to transcend any limitations of their social origins; and in so doing challenge the achievement gap.

7 Svensk sammanfattning

Bakgrunden till studien tar avstamp i den svenska kontexten och elever med utländsk bakgrunds måluppfyllelse i matematik, och hur denna måluppfyllelse förklaras utifrån bristförklaringsdiskurser. Det innebär att de låga resultaten förklaras utifrån elevers brister i det svenska språket och kulturen, vilket möjliggör för att förlägga problemet till enbart individen och dennes bakgrund. En del forskning har bedrivits kring elever med utländsk bakgrund och språkets roll för deras lärande i matematik, till exempel kodväxling och lära matematik med stöd av modersmålet. Men att positioneras som utländsk/nyanländ/invandrare kan även innebära andra svårigheter som inte är lika uppenbara som språket. Till exempel tillskrivna identiteter eller positioneringar, vilka beskriver elever med utländsk bakgrund som problemfyllda och lågpresterande. Detta relaterar ofta till kulturella, sociala och politiska aspekter, vilka inte är beforskade i särskilt stor utsträckning. Framförallt, inte i Sverige och i relation till matematikämnet och från ett elevperspektiv, vilket utgör ett argument för denna avhandling. Således är syftet med denna avhandling att fördjupa och bredda förståelsen av elever med utländsk bakgrunds möjligheter att lära matematik i Sverige och på så sätt utmana de bristförklaringar som används för att förklara elever med utländsk bakgrunds låga måluppfyllelse i matematik.

Avhandlingen antar ett socio-politiskt perspektiv, vilket möjliggör för att adressera och diskutera ämnen som berör social rättvisa och likvärdighet. Det möjliggör även för att ta både mikro- och makrokontexter i beaktande. Det öppnar upp för att undersöka hur mikrokontexter influeras av makrokontexter, till exempel hur större samhälleliga diskurser påverkar diskurserna i matematikklassrummet och således elevernas identitetsformande som matematikelever. Ytterligare, möjliggör det genom att fokusera på diskurser, för att ”avslöja” föregivettaganden och på så sätt till exempel problematisera och utmana dessa. Till exempel kan bristförklaringsdiskurser som blivit ett föregivettaganden utmanas.

Avhandlingen är uppbyggd som en hybrid mellan en monografi och en sammanläggningsavhandling. Det innebär att resultatet bygger på fyra artiklar och en teoretisk förflyttning, vilka diskuteras i kappan. Att det skett

en teoretisk förflyttning betyder att det i avhandlingen finns två teoretiska ingångar. Den teoretiska ingången i de två första artiklarna bygger på Skovsmoses (1994, 2005, 2012, 2014) arbete med begreppet förgrund, medan den teoretiska ingången i de två sista artiklarna utgörs av Foucaults (1966/73, 1980, 1982, 1993, 2002) perspektiv på diskurser och makt. Vidare innebär det att de fyra artiklarna adresserar fyra olika forskningsfrågor med syftet att fördjupa och bredda förståelsen av elever med utländsk bakgrunds möjligheter att lära matematik i Sverige. Utöver dessa fyra forskningsfrågor adresserar avhandlingen två övergripande forskningsfrågor med syftet att väva ihop resultaten av de fyra artiklarna och undersöka bidraget av den teoretiska förflyttningen.

Den första övergripande forskningsfrågan syftar till att fånga elevernas egna perspektiv på sina möjligheter att lära matematik, men undersöker också hur deras upplevelser om deras möjligheter kommer till stånd. Den andra övergripande forskningsfrågan undersöker vad de olika teoretiska perspektiven kan bidra med i analysen när man försöker förstå elever med utländsk bakgrunds möjligheter att lära matematik.

Resultaten i den första artiklen bygger på två fokusgruppintervjuer med elever med utländsk bakgrund som just är på väg att sluta årskurs nio. Eleverna går i skolan i ett mångkulturellt och socioekonomiskt utsatt område. I artiklen undersöks elevernas upplevelser om sina möjligheter att lära matematik med hjälp av det teoretiska begreppet förgrund. En förgrund innebär en tolkning av sina möjligheter att lära och val i livet, i relation till vad hen upplever acceptabelt i den rådande socio-politiska kontexten. Vad hen upplever som tillgängligt utgör förgrunderna.

I den andra artiklen kopplas förgrunder till allmänna diskurser om matematik som viktigt, matematikläxor och föräldrar med utländsk bakgrund. Det betyder att allmänna diskurser, som figurerar i samhället via till exempel media, och dess inverkan på elevers med utländsk bakgrund förgrunder och möjligheter att lära matematik undersöks. Datan i denna artikel utgörs också av de två fokusgrupperna med elever i årskurs nio.

Även den tredje artiklen, bygger på elevintervjuer, men i en annan kontext. Eleverna, två flickor, som intervjuas, har erfarit ett påtvingat skolbyte då deras skola i ett mångkulturellt och socioekonomiskt utsatt område stängde på grund av bland annat låga betyg och dålig arbetsmiljö. Alla elever förflyttades då till olika skolor. Eleverna i denna artikel, förflyttades efter årskurs åtta. Intervjun utfördes på deras nya skola när de nästan hade gått två terminer på den nya skolan. Elevernas identitetsformationer som lärande i matematik undersöktes i förhållande till de diskurser som framkom i diskussionerna med syftet att försöka förstå deras möjligheter att lära matematik i relation till ett skolbyte.

Den fjärde artikeln skiljer sig från de tre första eftersom empirin bygger på policydokument. Fyra dokument som berör nyanländas lärande analyseras med syftet att undersöka hur den nyanlade eleven fabriceras, det vill säga hur hen framställs genom de diskurser som texterna bygger på. Tre av de analyserade dokumenten är utgivna av Skolverket och det fjärde är en rapport utgiven av Skolinspektionen. Syftet med artiklen inkluderar också en diskussion om hur dessa fabriceringar kan ha en inverkan på elever med utländsk bakgrunds möjligheter att lära matematik. Denna diskussion bygger på begreppet abjection (Popkewitz, 2012, 2013) eller in(ex)kludering. Fabricering innebär att en person tillskrivs särskilda egenskaper och i förlängningen utgör en kategori som personen antingen identifierar sig med eller inte. Det är beroende av om man besitter de eftersträvarvärda egenskaperna eller inte. Denna process skapar känslor av inkludering och exkludering. Det betyder att det inte är möjligt att separera på inkludering och exkludering. Därför att, med intentioner att skapa inkludering medföljer en potentiell exkludering.

Resultaten visar att elever med utländsk bakgrund upplever möjligheter att lära matematik, men mestadels hinder för lärande. Dessa hinder utgörs av olika förutsättningar vilka formar deras förgrunder. Exempel på dessa förutsättningar är bland annat upplevelser av skolsegregation, utanförskap och av att vara ”den andre”, dålig arbetsmiljö/ arbetsro på matematiklektioner, och uppfattningar om sina föräldrar som bristfälliga på grund av deras bakgrund och det svenska/svenskhet som det eftersträvarvärda. Vidare visar resultaten att elevernas uppfattningar om sig själva och sina föräldrar påverkas av diskurser tillgängliga för dem. Till exempel, inverkan av diskurser om läxor, den gode föräldern och svenskhet som det eftersträvarvärda leder till att eleverna positionerar sina föräldrar som bristfälliga på grund av deras bakgrunder och därmed accpeterar att deras egna möjligheter att lära matematik är begränsade, särskilt i relation till svenska elevers möjligheter att lära matematik. Vidare visar resultaten också på hur kategoriseringar av elever med utländsk bakgrund som elever med brister i relation till det svenska eller svenska elever har blivit en del av elevernas liv, vilket kan orsaka känslor av exkludering. Också genom att undersöka elevernas identitetsformationer som lärande i matematik, var det möjligt att visa hur dessa möjliggörs av olika diskurser tillgängliga för eleverna. Alltså, olika diskurser möjliggör för olika identiteter som lärande i matematik och inverkar olika mycket. Till exempel visade de socio-relationella diskurserna sig ha en större inverkan på de skolbytande elevernas formering av sina identiteter som engagerade eller icke-engagerade elever i matematik än de olika pedagogiska diskurserna (hur matematik undervisas och lärs). Till exempel

framkom identiteter som oengagerade och stökiga elever med förmågan att lära matematik om de vill, i deras tal om matematikundervisningen på den gamla skolan. Medan identiteter som motiverade och engagerade och välanpassade elever framkom i talet om matematikundervisningen på den nya skolan. Utöver detta upplever eleverna matematikundervisningen på den nya skolan som tråkig och sämre än på deras gamla skola och betygen i matematik hade inte ökat. Trots detta möjliggörs för identiteter som lärande i matematik som motiverade och engagerade. En möjlig tolkning av det bygger på det relationella maktbegreppet, det vill säga att makt utövas genom de normer och värderingar som medföljer en diskurs. Det betyder att särskilda normer och värderingar om hur man som elev bör agera och vara i matematikklassrummet görs tillgängliga genom olika diskurser.

Genom de båda teoretiska ingångarna har jag kunnat belysa både vad som utgör elevernas uppfattningar om sina möjligheter och hinder för att lära matematik genom att undersöka deras förgrunder, och hur dessa kommer till stånd.

En slutsats är, för att kunna förstå elevers med utländsk bakgrund möjligheter att lära sig matematik och deras prestationer i matematik är förklaringar som utgår ifrån deras brister (brister i svenska språket och kulturen) inte tillräckliga. Istället är det viktigt att försöka förstå elevernas perspektiv och utforska diskursernas roll eftersom det tillåter förklaringar som grundar elevers möjligheter i den socio-politiska kontext där de framträder. Detta möjliggör för att adressera processer av in(ex)kludering och kritisera förklaringar till elevers med utländsk bakgrund tillkortakommande i matematik som utgår i brister hos eleverna.

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