EXPERIENCES OF IRANIAN HIGH SCHOOL IMMIGRANT STUDENTS IN LEARNING MATHEMATICS IN CANADA

by

Maliheh Manzouri

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

in
THE FACULTY OF GRADUATE AND POSTDOCTORAL STUDIES

(Mathematics Education)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

October 2019

© Maliheh Manzouri, 2019
The following individuals certify that they have read, and recommend to the Faculty of Graduate and Postdoctoral Studies for acceptance, the thesis entitled:

Experiences Of Iranian High School Immigrant Students In Learning Mathematics In Canada.

submitted by Maliheh Manzouri in partial fulfillment of the requirements for the degree of Masters of Arts in Mathematics Education

Examinig Committee:

Susan Gerofsky
Supervisor

Cynthia Nicol
Supervisory Committee Member

Samson Nashon
University Examiner
Abstract

Studying in a new country with a new culture and language is a challenge for new immigrant students. The problems these students face may vary based on their country of origin.

As an Iranian mathematics tutor in Vancouver, I realized that Iranian immigrant students were struggling with learning math in Canada, and I conducted this study to find out which factors affect their math learning process. Seven Iranian students aged between 14 to 17 years old who immigrated to Canada between one and five years ago were chosen to participate in this study. Fourteen interviews with participants were used for this qualitative study, using a Thematic Analysis (TA) method. Based on this method (TA), I transcribed and coded the student interviews, and then constructed themes via these codes.

The results showed that these students have had different experiences in learning math in Canada with regard to language of instruction, teaching methods, use of technologies, classroom setting, and parental control. They utilized several strategies to deal with the problems arising from these differences, but despite these strategies, they still struggled with doing their math homework or studying for exams. Reduced parental control in Canada gave them autonomy to decide when and how to study for their tests or finish their homework, but most students did not know how to use this autonomy wisely. In the end, I believe it would be beneficial for these students to be advised and taught how to be autonomous in their education. I recommend that math teachers do more to help these students face and overcome their problems.
Lay Summary

The results of this study showed that Iranian new immigrant high school students felt less stress when they were learning math in Canadian schools compared to Iranian schools. In Iran, learning mathematics is taken very seriously by parents and teachers. Students (in Iran) had to study math and finish their math homework under the supervision of their teachers and parents. In contrast, in Canada, students have the freedom to decide when and how to study mathematics. In Canada, decreased teacher and parental control over math learning gives children the power to make their own learning decisions. However, as many of these children never had the autonomy to make decisions regarding their own education, they might not know how to use this power, or they might misuse it.
Preface

This thesis is original, unpublished, independent work by the author, Maliheh Manzouri. Dr. Susan Gerofsky provided suggestions in terms of methodology and approaches to data analysis for this study. The results that have been reported in Chapter 4 covered the rules of the Behavioural Research Ethics Board at the University of British Columbia (ethics certificate number H18-02630).
Table of Contents

Abstract ........................................................................................................................................ iii
Lay Summary ................................................................................................................................ iv
Preface ........................................................................................................................................ v
Table of Contents ....................................................................................................................... vi
List of Tables ............................................................................................................................... ix
List of Figures ............................................................................................................................. x
Acknowledgements .................................................................................................................... xi

Chapter 1: Introduction .................................................................................................................. 1
  1.1 Purpose of This Study and Research Questions ................................................................. 4
  1.2 Significance of This Study .................................................................................................. 6

Chapter 2: Literature Review ...................................................................................................... 7
  2.1 Demographic Factors and Immigrant Students Education ................................................ 7
  2.2 Mathematics Education ..................................................................................................... 10
    2.2.1 Word problems ........................................................................................................... 10
    2.2.2 Bilingualism and learning mathematics ...................................................................... 11
  2.3 Mathematics Learning and Culture .................................................................................... 14
  2.4 Mathematics Learning and Technology ............................................................................ 17
  2.5 Mathematics Learning and Teaching Methods ................................................................. 18
  2.6 Study Context and Participants ......................................................................................... 21
    2.6.1 Religion ....................................................................................................................... 24
    2.6.2 Immigration in Iran ..................................................................................................... 25
Chapter 3: Research Method

3.1 Participants
  3.1.1 Sample size
  3.1.2 Recruitment of participants

3.2 Research Method: Interview
  3.2.1 Designing the questions

3.3 The Researcher

3.4 Data Analysis: Transcription of Data
  3.4.1 Thematic analysis

3.5 Credibility
  3.5.1 Debriefing
  3.5.2 Data checks
  3.5.3 Full description of the phenomenon and context

Chapter 4: Results

4.1 Findings
  4.1.1 The language of instruction
    4.1.1.1 Improving English language
      4.1.1.1.1 Having English-speaking friends
      4.1.1.1.2 Using ELL programs
      4.1.1.1.3 Watching English language movies
    4.1.2 Teachers’ Methods
      4.1.2.1 Mathematics homework
      4.1.2.2 Parents


List of Tables

Table 4. 1 Participants’ information .................................................................................................................. 44
List of Figures

Figure 4. 1 Farsi numerals with corresponding Canadian standard numerals (left) and long division algorithm (right)................................................................. 50
Acknowledgements

First, I would like to thank my research supervisor, Dr. Susan Gerofsky, for her kind mentorship and motherly guidance throughout this study and beyond. With a grateful heart, I thank my lovely committee member, Dr. Cynthia Nicol, for challenging my thoughts to shape and develop my thinking. I feel very privileged to have had these experienced people guiding me through the process of my Masters’ degree.

This study would not have been possible without the willingness of those Iranian new immigrant high school students who participated in my interviews and their supportive families.

I am also grateful to my dear husband, who always encouraged me along the way and helped me wherever I needed. Without his support, I would not be where I am now. Special thanks to my daughters, who patiently allowed me to study.

Sincere gratitude is also offered to the Faculty of Education for prestigious grants and supporting my research.
Chapter 1: Introduction

My first teaching experience was in Grade 3. I still recall it vividly. Our teacher asked each of us to present a chapter from our social sciences text. I remember being very excited and feeling responsible. Feedback from our teacher was that the clarity of my presentation helped students “really understand.” This experience marks the start of my journey to assist others in expanding their world through learning. At that time, I was sure that I would become a teacher. However, life demanded another direction and I became a mechanical engineer. The path back to education began 11 years ago when my family had a chance to study in Malaysia. Once again, I entered the teaching world. As a research assistant, I had the opportunity to teach several courses. This experience reminded me of my strong interest in helping others learn and my aptitude for this noble work.

Immigrating to Canada in 2013 rekindled my hope of following my never-dying desire to pursue teaching. I began by tutoring mathematics (as it was my favorite subject). At first, it was a volunteer position to allow me to contribute to my community and get to know my new society. I soon realized that although most of my students had an excellent mathematical background in Iran, they faced difficulties in learning math after relocating to Vancouver, British Columbia (BC) Canada.

As a mother of two kids concerned about my children’s education in a new country, I connected with the parents of my Iranian students to better understand their educational issues. Most of the parents I spoke with were puzzled, especially since their children did not have problems with math the first months after moving to Vancouver. However, after several months to one year, they faced difficulties and could not get as high a grade in mathematics as they had expected.
My students also uniformly expressed that they did not expect to have any problems with math when they first arrived in Canada. However, they did have problems learning new mathematical topics at school. These students agreed with their parents and said that in the first months, they knew all the math topics, and it was easy to solve questions and write tests. But after a while they faced problems understanding and solving questions.

Levels and Dronkers (2008) highlight that the academic experience of immigrant students is critical to their educational success in their new country. Mathematical learning is also highly influenced by the mathematical background of immigrant students in their country of origin. However, in the case of my students, although they have had a good math background in Iran, they still faced difficulties learning mathematics in Vancouver. To explore this issue and achieve a better understanding of it, I completed a review of the Iranian mathematics curriculum to compare and contrast it with the Canadian curriculum. Findings show that the Iranian mathematics curriculum is almost one year ahead of the Canadian. This means that, for the most part, the topics that students learn in Grade 9 in Iran are taught in Grade 10 in Vancouver.

Young immigrants have more difficulties than adults facing a new educational system. As Hou and Zhang (2015) found, some of the educational problems of immigrant students might be related to their socioeconomic or ethno-cultural characteristics. For example, in Iran, schools for boys and girls are separate and studying in a mixed-gender classroom (in Vancouver) is a new experience for Iranian students. And, in Iran, the priority of parents is their children’s education. The most valued parts of education are the sciences and mathematics. This point of view might be influenced by the culture of a new country when they immigrate to a new country.

The culture and ethnicity of teachers influence their teaching methods (McAllister & Irvine, 2000). It is not surprising if Iranian new immigrant students struggle with new and different
teaching methods in Canadian schools. These different approaches might impact the learning processes of these students. It is not clear to what extent these methods are different from the experiences of these students in Iran and to what extent these influenced math learning of these students.

Using technologies and educational tools influence teaching methods of teachers (Palak & Walls, 2009). Iran is a religious country and its Islamic laws abandoned using several aspects of new technologies. The political conflict of this country with Western countries made these rules restricted. Moreover, it is a developing country, and most of its schools are not equipped with new computer systems.

Statistics Canada (2017) revealed that since 1999 approximately 235,000 people have immigrated to Canada each year. In 2016, it was estimated that approximately 210,405 Iranian-Canadians lived in Canada (Government of Canada, 2017). The majority of these are first generation, which indicates Iranians are a new community in Canada. Immigration to a new country with a new environment and culture is a challenge. Khaleghi (2011) stated that ethnocultural diversity has created numerous problematic issues for Iranian immigrants in adapting to the new society in Canada. She points out, for example, that although community centres are helpful for immigrants to get involved in the new environment, Iranians do not have such a community centre in Vancouver. Since Iranians are not involved in the new community, it takes time for them to learn about their new society. An important part of a community is school. Iranians are not familiar with the new educational system in which their children are involved. This issue hinders Iranian parents in supporting and helping their children to cope with a new system.

Clarkson’s (2008) work shows that immigrant students experience a unique set of issues in their studies. However, most of these problems are not reported. He believes that the lack of
available resources for collecting information or the different cultures and languages of immigrants makes it challenging to collect data. Also, in most social research the number of immigrants is usually less than non-immigrants, so their set of data is too small to be reported. Besides, immigrants in each country are include different ethnicity groups. Hence, their issues and problems in dealing with a new society might be different from that of others. Although each group of immigrants makes up a small part of a society, understanding and investigating the issue of each group is vital to integrate all groups and shape a successful society.

I believe there is a gap in the literature regarding mathematical learning experiences of Iranian new immigrant high school students in Vancouver, BC. Although Iranians are a small group in Vancouver, their issues in the classroom might influence other students. Their problems might distract them in math class. This distraction and lack of attention can distract other students. Investigating and exploring the issues that hold back learning for Iranian students in a math course might expose problems in other courses. Additionally, lack of mathematics understanding might discourage these students from attending school altogether and cause loss of interest in continuing their education.

1.1 Purpose of this study and research questions

Civil, Planas, and Quintos (2005) believe that an immigrant student’s learning process is affected by social structure. From their perspective, in a mathematics classroom, the needs and problems of immigrant students indicate the social system and culture of their society of origin. Based on the country of origin of new immigrant students, their need for support and help at school varies. For Iranian immigrant students, Canadian school culture and its rules are new. Examples
of these differences can be the classroom setting, the language of instruction, teaching methods, etc. These differences influence student learning processes, especially in the first year. There is some research on the mathematical learning of immigrant students (e.g., Levels & Dronkers, 2008; Riordain & O’Donoghue, 2009; Vilenius-Tuohimaa, Aunola, & Nurmi, 2008). However, most of these studies focused on elementary students with little attention to high school students.

As Portes (1999) states, most students at risk for educational failure come from minority groups like immigrants. However, minority status is not a satisfactory explanation. Hence, there is a need to investigate and understand the mathematical learning issues of each individual minority group. I believe that there is a need to explore the mathematical learning process of Iranian immigrant high school students as a minority group in Vancouver since there are no studies on this topic.

To fill this gap and investigate the experiences and issues of these students, I have conducted a qualitative research study. In this study, I rely on educational theories from Vygotsky (1978), Berry (1985), Rogoff (1994), and Civil, Planas, and Quintos (2005). Bishop (1994) suggests that exploring and analyzing the similarities and different experiences of minority groups (like immigrants) in society will help us to deal with cultural dissonance. Based on these studies and suggestions, my research questions are:

1) In what ways are the mathematical learning experiences of Iranian high school students different in Vancouver compared to their previous experiences in Iran?

2) To what extent may these differences affect the math learning process of these students?
1.2 Significance of this study

The significance of this study lies in the fact that there is no existing research that explores the challenges and issues of Iranian new immigrant high school students in Vancouver, BC. Knowledge and understanding of factors affecting these students may provide additional insight into students in other communities, as well as insight into supports required to improve mathematical learning. Research of this kind also offers insights to understand the learning issues of these students in other courses. Clarifying these issues may assist researchers, teachers and other stakeholders to obtain more comprehensive supports for these students.

This study may yield valuable results due to its qualitative research method. One to one interviews will provide in-depth knowledge of students’ issues and insight regarding math education in Vancouver, BC. Each student can freely express her/his feelings and perceptions regarding their math learning processes. Confidentiality in the collection of data helps students to feel free to talk about personal, family, or cultural issues. Some of these issues might not be mentioned in other situations because of sensitivity and cultural issues. Iranians tend to keep their personal and family problems private. They are a small community in Vancouver, and most people know each other and they might be afraid of talking about private matters as they could be exposed in the community.
Chapter 2: Literature Review

Available literature on mathematics learning of immigrant students is mostly related to elementary school students (Levels & Dronkers, 2008; Riordain & O’Donoghue, 2009; Takeuchi, 2018; Vilenius-Tuohimaa, Aunola, & Nurmi, 2008). The limited research that investigated the issue of math learning of high school immigrant students (e.g., Bengtsson, 2012; de Araujo, Roberts, Willey, & William, 2018; Marks, 2005; Martin, Liem, Mok, & Xu, 2012) is mostly focused on general or language issues in solving math word problems. None of these studies focused on mathematics learning of immigrant students in Vancouver, BC.

To understand the issues of these students, current research on factors related to learning mathematics, immigrant students, culture and language, teaching methods, technologies and teaching tools are reviewed to give readers insight into probable issues that might influence the mathematics learning process of immigrant high school students.

2.1 Demographic factors and immigrant students education

Demographic factors such as ethnicity, parental marital status, parental educational level, family income, family size and religion influence immigrant students’ educational performance (Gibson, 1998; Marjoribanks, 1996; Portes, 1999; Suárez-Orozco & Suárez-Orozco, 2002). Marks (2005) found that socio-economic issues decrease immigrant student performance in their education. In the same way, Portes (1999) states the important role of culture on the academic performance of immigrant students. He reveals that despite community and school efforts, immigrant students are at risk of being educationally and socially disadvantaged. He believes “variations in achievement motivation regarding school and occupational success, as well as differences in communication, perceived discrimination, and self-esteem, maybe co-constructed
as part of the cultural adaptation process” (p. 491). Tharp (1989) also believes that student beliefs, goals, attitudes, and routines affect their adaptation to the dominant culture and the new educational system.

Torre (2002) wrote a review on Suárez-Orozco and Suárez-Orozco’s (2002) book that categorized immigrant students’ reactions to a new culture as three pathways; 1) rejecting the new culture, 2) rejecting their own culture, or 3) developing a bicultural identity. She believes the first and second type of adaptation is dangerous for immigrant students. In the first reaction, when children feel hostility and negativity from the new society their “defense is to hate back. The danger [for these children] is in living with this attitude of hostility” (p. 2). They lose their motivation and self-confidence to study. The second reaction (rejecting own culture) “can eventually present problems of separation, alienation, and distance from family” (p. 2). Rejecting their culture was also shown to cause loneliness, depression and lack of self-confidence in these students. Both groups suffer from anonymity crises, which dramatically lowers their educational performance. The third group

may see the negative image, but rather than believe it, they choose to disprove it. They focus on the positive reflections they see and continue in the hope that what their family struggled for is still possible. These children preserve their self-esteem through a sense of agency, and utilization of all the support systems they encounter. (Torre, 2002, p.2)

Huang (2000) investigated mathematical learning achievement of immigrant students in several countries and found that the mathematics performance of immigrant students is lower than that of non-immigrant students. This result is in contrast to the study by Hou and Zhang (2015) that the math performance of immigrant students was higher compared to non-immigrant students. This contradiction raises the question which groups of immigrants were examined in these studies and
what was their mathematical background. Also, as Portes (1999) highlights, the effect of demographic factors and cultural differences should also be examined. For instance, students who have had a strong mathematics background in their country of origin might have good math performance when they start their education in the new country. Economic problems may also be an influencing factor (Clarkson, 2008). Finding a job in a new community with a different language is difficult for immigrant parents, and they may experience financial difficulties and stress. This financial pressure affects children of these families (Portes & MacLeod, 1996). They might not have the same facilities and comfort that they had in their home country.

Family characteristics, socio-economic factors, or parental marital status also affects the academic achievement of students. Chiu and Xihua (2008) argue that most of the time, children of deprived families become poor adult with low-income jobs. Poverty is usually transmitted from generation to generation. However, Chiu and Xihua (2008) stated that family members can offer students extra resources (resource provider) or compete for them (resource dilution). Family members with more educational resources provide more learning opportunities on which a student can capitalize to achieve more. For example, families with higher Social Economic Status (SES), tend to have more educational resources (e.g., books), spend more time with their children (e.g., cultural communication about films and political issues), and are more involved in their children’s schooling. Amato (2001) emphasized the effect of parental separation and challenges on student’s education. He believed these such challenges hurt children emotionally and reduce their academic motivation.

Downey (2001) pointed to additional family members (like grandparents or siblings) as competitors of family resources. Having siblings means sharing family facilities and resources, resulting in children having fewer learning opportunities which might lead to lower academic
achievement. In the case of immigrant families, I believe having siblings emotionally supports children due to the lack of family and friends that were left behind. Siblings can help each other in getting to know the new society’s norms. Living with grandparents also has advantages and disadvantages for these children. Sharing family resources with grandparents may limit children’s options. Conversely, the information, knowledge and emotional supports provided by extended family may increase their motivation and self-esteem.

2.2 Mathematics education

In 1992, McLeod reviewed 100 articles related to mathematics education in the Journal for Research in Mathematics Education (JRME) published over 25 years. The results of this study revealed that students’ emotions, attitudes and beliefs impact mathematics learning (McLeod, 1992). Polya (1957) in his book How To Solve It also explained that students’ determination and emotions are effective in solving mathematical problems. Immigrant students are new to the school’s rules, staffs and teachers. Feeling uncomfortable in the classroom or lonely at school or in the community affects their behaviours, emotions, and attitudes. Similarly, Hannula (2015) points to motivation as an essential factor that affects math learning. Kosko and Wilkins (2012) highlight that increasing the level self-confidence in students will increase their ability to understand math.

2.2.1 Word problems

Solving word problems is one of the challenging parts of mathematics for students (Kintsch & Greeno, 1985; Vilenius-Tuohimaa et al., 2008). Most of my students (immigrant and non-immigrant) say that they are afraid of word problems. Tobias (2006) reveals most of the students
see themselves as incapable of solving a word problem. They assume that they cannot understand these questions and may not make an effort to answer the question. As a tutor, when I ask my students to solve a word problem, they say there is no point in taking time and reading a word problem because they cannot solve it. Most of the time when I urge them to read the question and explain its main points, they then find the solution. Kieran (2014) highlights that students often have trouble conceptualizing a word problem. As Kintsch and Greeno (1985) state, students must understand the story of math questions to find the solution. However, it is tough for most of the students to extract the required information from the word problems. Vilenius-Tuohimaa et al. (2008) believe that a lack of reading comprehension competency hinders students to understand a word problem.

Mellone, Verschaffel, and Van Dooren (2014) investigate the best method to help students with word problems. They find that rewording word problems (replacing difficult words with simpler, more understandable words) is a good strategy to recognize the main point of the question. It will allow students to form “intermediary situation models” to highlight actions and quantitative information, which will lead them to the answer. Hegarty, Mayer, and Monk (1995) state that directly and unthinkingly translating the word problems into an equation is not a good strategy for solving math questions.

2.2.2 Bilingualism and learning mathematics

Immigrant students may lack English language proficiency. They may not understand their math teacher when she/he is teaching a topic or explaining a question. They may not be able to do their homework or write a test as they cannot understand the questions. Several studies confirm these issues of bilingual students in solving mathematical questions (e.g., Gerjets, Scheiter, &
Catrambone, 2004; Koedinger & Nathan, 2004; Riordan & O’Donoghue, 2009; Scheiter, Gerjets, & Schuh, 2010; Van der Schoot, Bakker Arkema, Horsley, & van Lieshout, 2009). For example, Kempert, Hardy, and Saalbach (2011) reveal that without language proficiency most immigrant students are incapable of solving mathematical questions.

Planas and Setati (2009) conducted a study among young immigrant students in Spain to investigate how bilingual students switch between their first and second language when working on math questions. This study was implemented among 24 Catalan-Spanish bilingual students in Spain. The teacher was a bilingual Catalan native speaker, so she/he could help students in both languages. The results of this study show that students use their first and second language based on the complexity of the situation that they were involved in. In learning mathematics vocabulary in the second language, students used the second language, but in solving mathematical questions, they used their mother tongue more frequently. However, when participating in a whole-class discussion, immigrant students prefer not to be involved in a discussion. If they must participate, they use their second language. This study reveals that students prefer to use their mother tongue when they feel free and safe. Clarkson (1992) highlights that students prefer to share their knowledge in their first language because, as Adler (2001) points out, learners need to feel ease when they are exploring ideas. When they feel that they might be judged, they prefer not to show weakness (in language) and try to speak in the second language. Solving math questions under the pressure of talking in the second language might distract immigrant students from finding the best or correct solution. Fear of judgment might prevent these students from expressing themselves in the classroom or demonstrating their abilities.
Parvanehnezhad and Clarkson (2008) conducted a similar study among Iranian bilingual students in Australia to investigate why these students switch between their first and second language when they are solving mathematics questions. Sixteen students in Grades 4 and 5 participated in this qualitative study. They were studying in an Australian school on weekdays and an Iranian school on the weekend. The authors used three types of questions; symbolic items, word problems, and open-ended questions. They believe that these ranges of questions show which kind of question provoke students to engage in language switching. After completing the test, each student was interviewed by the first author to clarify the reasons behind their language switching. The results of this study show that, although students switch their language in all three types, they use it more in word problems questions, especially difficult ones. Another finding of this study was that students use some mathematical terms in their first language because they used them in the home or Iranian school in their first language. It is interesting that students know and can use the English version of these words, but they used them in their first language only because they are more familiar with them in their mother tongue. Continued switching might distract students from solving questions or at least interrupt their thinking processes.

Ambrose and Molina (2014) understand that students intend to build a meaningful relationship among events, numbers, and actions in solving a question. They manipulate numbers to make them more understandable and useful. In fact, they attempted to change the story of a question to make it was more familiar to them. Based on Ambrose and Molina (2014), in contrast to questions' familiarity, complicated vocabulary did not distract students in comprehending questions entirely. In this regard, Stacey and MacGregor (1999) suggest that “Early in bilingual children’s schooling, teachers should use problems that are as coherent as possible, so that children persist in trying to understand the situations described in the problems rather than develop a
compulsion to calculate” (p. 1492). The same strategy can be used for bilingual students who have little competence in their second language. Beginning with solving simple, familiar problems will reduce the possibility that a lack of language proficiency and different culture will hinder a learner from understanding the question. Practicing solving word problems not only decreases student fear of solving these problems but also makes them familiar with a variety of questions. Simultaneously, learners can improve their second language.

Clarkson (1992) puts emphasis on another aspect of language proficiency in solving word problems. He realizes that “the influence of students’ original language is cognitively significant right through primary school” (p. 428). A high level of proficiency in the first language helps students learn mathematics in the second language. It is noteworthy that these bilingual students with high competency in both languages performed better on math exams compared to monolingual students who attend schools with more teaching resources (Clarkson, 1992).

2.3 Mathematics learning and culture

Based on Hofstede (2012), cultural values differ depending on the country. Culture in Iran is derived mostly from Islam.

People learn cultural values in different ways. Some of these values are taught by families or teachers at the school. Other values are learned through laws, social rules or norms (Markus & Kitayama, 2010). Ming and Xihua (2008) believed that student behaviour and learning may be influenced by their cultural values. Students from a culture that perceive people as all equal are likely to be friendly with their classmate, share their resources and help each other to attain higher academic achievement (Crosnoe, Cavanagh, & Elder, 2003).
Zhou, Zhang, Beckford, Zhong, Jiang (2012) found that Chinese immigrant parents were less likely than non-native parents to contact teachers, be a volunteer, or participate in decision-making at school. The main reasons behind this behaviour can be lack of English language proficiency or inadequate knowledge of the school system and culture (Wang, 2016).

Cultural differences also affect the behaviour of immigrant students. For example, Chinese parents believe that play activities are for amusement and passing time, while good education leads to success in life (Parmar, Harkness, & Super, 2004). Chinese mothers are interested in print-based literacy interactions and support their children in explicit, eventful and precise ways. (X. Wang, Bernas, & Eberhard, 2002). This behaviour affects Chinese children’s reactions to the school setting, and as a result they usually do not value play time at school or participation in fun programs (Wang, Bernas, & Eberhard, 2002). However, Wang (2016) believed that in spite of cultural unity that exists among the people of a nation, this unity might change family to family, or child to child.

To minimize the impact of cultural differences and to create a beneficial learning environment for students, Ladson-Billings (1995) suggested using students' home languages in the classroom and involving parents in classroom activities as potential tools for creating cultural values and trust between teachers and students. Although in a multicultural classroom using students’ mother languages seems very difficult, it is not impossible. For example, older bilingual students who are proficient in both languages can help teachers and students to use different language in the class.

Bishop (1994) believes that the idea that mathematics is culture is a myth; mathematics is culturally-based knowledge. He warned that “many young people in the world are experiencing a dissonance between the cultural tradition represented outside school (for example in their home or their community) and that represented inside the school” (Bishop, 1994, p. 12). Berry (1985) adds
to this argument that in many cases, cultural differences are the main reasons behind immigrant students' issues in learning math. To explain the influence of culture in understanding mathematics, Berry cites the view of the Setswana culture regarding numbers and counting objects. In Setswana culture, counting is taboo, for example, Taiwanese do not count their possessions because they believe that will cause their possessions to suddenly be destroyed or disappear. Henderson (1996) summarized his experiences with multicultural students. In his article, he reveals that 31% of his multicultural students have shown him a new piece of mathematics. He finds multiculturalism the main reason behind these new ideas. From his perspective, multiculturalism is “listening to and learning from others who come from different experiences” (p. 50). He has an interesting conclusion that “Persons who differ the most from me, for example, regarding cultural background and gender, are most likely to have different meanings and thus have different why-questions and different proofs” (p. 49). The influence of culture on students’ mathematical thinking reveals that immigrant students' assumption about solving word problems, as Tobias (2006) states, is usually rooted in student’s culture and mathematics background. In some cultures, like in Iran, students are pressured to study math. In Iran, mathematics is one of the most crucial subjects in high schools. A student’s ability is mostly evaluated based on their math marks. Iranian new immigrant students may feel pressure to get a good mark in math, however, they might face challenges that prevent them from reaching their mathematical studies goals.

Immigrant students bring their knowledge and beliefs to their math classroom. Sometimes using new techniques in doing old operations (like multiplication or division) is difficult or frustrating for immigrant students. It takes time and effort to learn new methods. These challenges might distract immigrant students from learning new topics. In my study, I will explore to what
extent Iranian new immigrant high school students are facing cultural issues in learning math and to what extent these problems affect their math learning process.

2.4 Mathematics learning and technology

Dede, Honan, and Peters, (2005) suggest that several variables influence the implementation of technologies in the school setting. Examples include lack of supports for teachers and students to overcome snags in using software and hardware or rapid change and development of new software which requires upgrading hardware and teacher training.

Currently, there is a wide array of apps available to help teachers teach school topics. For example, there is an app used in my daughter’s Grade 1 class to help students improve their reading, writing and spelling skills. My daughter has a user-name and password to use the app at home. The app contains many stories that have been categorized in different levels. Selecting a book at a suitable reading level for my daughter can be challenging and time-consuming as are regular visits to the public library to borrow books. Using the school supplied app provides us with an array of appropriate choices in a very time-efficient manner.

In the same way, there are apps to facilitate teaching mathematics at schools. Shuler (2012) stated that 50% of the top-selling apps in the Apple store target students. Of all subjects, mathematics is the second most popular subject area. Most of these apps are designed for elementary students to facilitate fluency in mathematics operations.

Rosenbloom (2012) highlighted that “middle school girls engage more in school when education involves the use of social network tools” (p. 16). She believes that “By incorporating these tools into our programs, we are not only trying to use skills that adolescents have but utilizing these abilities to socialize in a mathematical context” (p. 16). She offered an example of a teacher
in Toronto who asked her students to record her math work on computers. These students were using an online board to share their thoughts, solutions and answers with their teacher and classmates.

The use of technologies at schools is not easy, nor is it inexpensive. Many immigrant students might not have been exposed to technologies when they were studying in their home country. In this study, I am going to investigate to what extent Iranian students have used technologies in Iran and Canada and to what extent it influenced learning mathematics.

2.5 Mathematics learning and teaching methods

Students are facing difficulties in recalling facts and understanding mathematics meaningfully. One of the important reasons behind this problem are educational systems and traditional teaching methods (Akhter, Akhtar, & Abaidullah, 2015). Kim (2005) stated that “traditional teaching undertakes the following steps: 1) introduction; 2) development; and 3) review” (p. 11). It (traditional teaching) is usually developing, memorising and evaluating student’s content knowledge (Gardiner & Gregg, 1997). These methods ignore the application of those topics in the real world and other subjects customarily focus on developing skills to help students solve mathematical problems. Students who have mastered these procedures easily pass exams even though they may have little understanding of their meaning (Gardiner & Gregg, 1997). Memorizing procedures helps students pass tests but they do not learn the application of operation. Hence, they may not know how to use their knowledge in other cases (Feynman, Leighton, Hutching and Hibbs, 1997). If students solve mathematics questions that are based on
real-world situations, the excitement of finding the answer motivates them to invent new concepts (Akhter et al., 2015).

Although posing real-world questions is beneficial, most of the time this causes difficulty for immigrant students who are unfamiliar with their new society and culture. Most of the real-world questions are related to a phenomenon in society like sports or social cultural events. Newcomer students do not have proper knowledge of these situations, and understanding this kind of question can be difficult for them. Examples of this are abbreviations such as for provinces (like AB), or Indigenous symbols (like a Saami tipi); which distract these students from the main idea of the questions. Even using a deck of cards to solve a probability question, common in Vancouver classrooms, may cause confusion for Iranian students as in Iran, playing cards is illegal (religion issues). Also, in Iran, popular sports are football (soccer) and wrestling, which are not as popular in Vancouver. Instead, ice hockey, baseball and golf are popular sports in Canada, which are not Iranian preferred sports. Referring to a hockey player in a word problem may add a confusing element for a new immigrant student. Domínguez (2011) argues that good mathematics problem-solving is related to a level of student familiarity with the question. Lack of familiarity with the content of the questions hinders immigrant students in solving these questions.

Problem-solving is a key skill (Goldman & Booker, 2009) in learning mathematics as it is attempting to “finding a way around a difficulty, and a solution to a problem that is unknown” (Polya, 1957, p. 74). Problem solving methods teach students to think about the question and possible solutions then use their mathematical skills to find the answer. Schoenfeld (1992) also supported this by describing that using problem-solving methods encourages students to raise, analyse and invent new ideas to empower their knowledge. These methods change the traditional teaching methods by asking teachers and instructors to act like a facilitator (Akhter et al., 2015).
Facilitators usually do not lecture on topics and they do not ask students to memorize materials; rather they help students develop. However, as a math teacher I realized that in geometry or trigonometry subjects, there are some formulas like surface area or double angle identities for trigonometric ratios that students need to memorize to find solutions. I think memorizing these formulas is necessary.

One good example of memorizing procedures is dividing fractions (2/3 divided by 5/7). One way to teach this is asking students to 1) rewrite the first fraction (2/3), 2) convert division to multiplication 3) flip the second fraction (7/5), and then 4) multiply two fractions to find the answer (2/3 * 7/5 = 14/10). However, in this procedure, there is no logical explanation. Although students who follow these steps successfully solve division questions, they might not learn the concept of dividing fractions.

However, a problem-solving method has disadvantages too. It is time-consuming and as Xiuping (2002) argued, classroom time is limited. Due the high volume of materials, students must learn lots of topics in a short time. So, problem-solving is not a good method in all situations.

The ultimate goal of high school students in Iran is passing the Konkur (university entrance exam). All questions in the Konkur are multiple-choice with a very limited time to answer. To be successful in this exam, it is crucial to be efficient in solving questions and not waste time. Recently, teachers have been focusing on Konkur questions. Learning these methods requires memorizing many formulas that are not useful in any other situation. For example, in finding the slope from an equation on a line when it is in a general format, students in Iran must memorize several formulas to answers these questions in the Konkur. However, this can be solved by making changes in the general form of the line equation. Since this method is time consuming, it is not viewed as practical in the Konkur examination.
2.6 Study context and participants

Iran, officially known as the Islamic Republic of Iran is a country in Western Asia. It is the 18th most populous (81 million inhabitants) and the 17th largest country in the world (Financial Tribune, 2017). Education in Iran is separated into three parts, elementary school (1-6), high school (7-12) and higher education at universities or colleges. The Ministry of Education supervises the first and second parts, and the Ministry of Science and Technology manages the third part. Elementary school education is compulsory for all children. The admission requirements for higher education is a high school diploma and passing the national university entrance exam known as the Konkur.

In Iran, students can choose from public schools, private schools or half private schools. All public schools and public universities are free. In the half-private and private schools, students must pay a tuition fee. The government funds half of the expenses in the half-private schools. To be admitted to these schools, students must pass the entry exam and have a GPA (grade point average) higher than 3.8/4. Half-private and private schools have more resources (library, science lab, or gym), experienced teachers and longer school hours. For instance, public elementary school begins at 7:30 am and finishes at 12.30 pm while private elementary school days are from 7:30 am to 3:30 pm.

There is a national curriculum for elementary and high schools in Iran and the Ministry of Education has defined the content, types, and number of courses. Each course has a set textbook, and its content is taught during an academic year (September to June). There are no elective courses in elementary or high school. Like Canadian elementary schools, there is a teacher for all courses in elementary school, but in high school, each course has a different teacher. At the beginning of an academic year, a group of students is chosen by a teacher committee to study in a
particular classroom (in both elementary and high schools). In high school, teachers move from one class to another. That means each group of students has a specific classroom for a whole year and teachers move from one group to another. The marking system in elementary school indicates a student’s abilities on a scale from excellent, very good, and good, to need more effort. In high school students are marked out of 20, and a minimum of 10/20 must be achieved to pass a course.

As a student, I remember that homework was an essential part of education in Iran. Based on my friends who are living in Iran and have children in elementary and high school, it still is important. Students have homework beginning in Grade 1. In elementary school, every day students must practice spelling, reading, science, and mathematics. It usually takes two to three hours daily for students to finish their homework. This time increases in higher grades. My friends told me that completing homework is taken seriously by teachers and they do not tolerate incomplete homework. Although elementary students are not graded by numbers (out of 20), they must write exams for each course. The academic year is divided into two semesters in Iran. Teachers usually teach half of the book in semester one and the remaining half in semester two. At the end of each semester, students must successfully write an exam for each course. The average of these two exams determines the final mark for the course. The exams in the second semester are cumulative containing course materials from the first and second semesters.

After finishing elementary school, students have three different options for high school: 1) the theoretical branch, 2) the technical-vocational/professional branch, and 3) the manual skills branch. Those students who are willing to directly enter the job market (after finishing a high school) may choose the technical-vocational/professional branch, or the manual skills branch. The theoretical branch is suitable for students who plan to continue studying in a university or a college. In Grade 10, those students who have chosen the theoretical branch must choose between
literature/humanities, experimental sciences or math/physics branches. Each of these paths has its own courses that lead students to the specific path in a university or college. For example, the courses in the math/physics branch mostly focus on sciences and lead the student to study engineering in the university or college. The Konkur questions are different for these different branches. Students’ choice in Grade 10 defines their future path. Choosing an experimental sciences branch leads students to medical fields in universities.

Several courses are shared between all three branches (literature/humanities, experimental sciences or math/physics branches) like physical activities, Farsi literature, history, Ghoran or religious education. Iran is an Islamic state and religion is part of education. Five to six hours a week students must study religious courses. About 99.4% (Khaleghi, 2011) of Iranians are Muslim, but many of them do not practice Islamic rituals. However, all students must follow Islamic rules in the schools. Boys and girls study in a different school. Female teachers can teach in a girls' school and male teachers can only teach in boys' schools. It is compulsory for girls at all ages to wear a hijab (cover whole body except hands and face) at school (elementary and high school). Each girls' school has a specific uniform that all students must wear every day. Girl students cannot wear any makeup or nail polish at school. Although boys' schools do not have a uniform, they cannot wear a T-shirt or shorts. Students do not have any music courses at schools. All these rules must be followed in private or public schools.

In Iran usually, schools have one or two buildings and a yard approximately the size of a football field. There is not any playground for kids, and not usually a gym (though there may sometimes be a small gym). There is a wall around each school that separates the school from other buildings. Usually, each school has two doors, a main entrance for students and a small entrance for teachers and school staff. Every morning when the bell rings, all entries must be
closed. If anybody comes after school begins, they must buzz and the school janitor opens the door. No student can enter school after the bell rings unless her/his parents accompany him or her. The school's office does not tolerate late coming or absence of students. Report cards have a column for student's behaviours (called discipline), which is included in the grade point average. Discipline marks are lost for such things as being late for school, absenteeism without a physician’s note, any misbehaviour and inappropriate dress.

2.6.1 Religion

As mentioned, according to 2011 statistics, 99.4% of Iranians (90-95% Shias and 5-10% Sunnis) are Muslim. 0.56% are Christians, Zoroastrians, or Jews, and the religion of 4% is unknown (Khaleghi, 2011) Islam has rules for many aspects of human life, for example, rules for relationships, marriage, accounting, shopping, education, and death. Male and female relationships are limited to their close families like mother and son, or uncles and niece.

Islamic rules affect children’s education. Based on Islamic rule, girls must follow all Islamic rules when they turn nine years old and boys at age 15. A nine year old girl should have hijab in front of any man except her father, brothers, grandfathers, and uncles. She cannot have a relationship with boys (except brothers and uncles). Boys and girls study in separate schools. In Islam, boys do not have restricted rules for clothing, but they must cover their bodies.

The hijab for girls covers all parts of the body except the face and hands. Hijab’s external element is clothing. The cloth cannot be attractive, colourful, or tight. It must be thick to obscure body shape. A girls’ elementary and high school uniform must have a hijab’s characteristics. The school office checks to ensure that all rules are followed. Any failure to comply with hijab is
severely suppressed. The inner aspects of hijab are a women’s behaviour. She is not to laugh or speak loudly and have no contact with boys.

Muslims pray five times a day, early morning, noon, afternoon, evening and night. Each prayer has a specific time. The noon prayer usually falls in the middle of school hours. So, all girls age nine years old and up and boys 15 and up pray at school. This rule must be followed in all high schools. All students must gather in the school prayer room and must pray together. It is compulsory, not optional. In Shia, there are several other rituals that students must participate in, ceremonies and rules to follow.

2.6.2 Immigration in Iran

Naghdi (2010) stated that in the history of contemporary immigration in Iran there are 10 waves of immigration: 1) the political, 2) the social and cultural, 3) the economic, 4) the ethnic minorities, 5) the religious minorities 6) immigration to gain knowledge 7) business immigration 8) artistic migration, 9) regime officials and 10) immigration due to natural and environmental events. The persistence and intensification of political crises, along with the rise of social and economic crises, and the addition of natural disasters (such as the water and air pollution crisis) tightened life in Iran. Under such circumstances, many with expertise and financial ability immigrated to safer countries. While the total number of immigrants in Canada has increased by only 4%, the number of Iranian Canadian immigrants has increased by 60% from 2011 to 2016, compared to five years earlier (2006-2010) (Government of Canada, 2017).

Iranian immigrants like other immigrants face many barriers to adapt to their new society. Finding a job, renting or buying a new home, arranging and monitoring their children’s education,
shopping, medical issues, the economy and climate of a new country are examples of issues they have to deal with. Khaleghi (2011) stated that

Community centers offer the choice of participating and engaging in the new environment through a familiar channel and the Iranian population in Vancouver has not established such a center. The problem with forming legitimate organizations aimed at helping the Iranian Canadian community to integrate better is that Iranian-Canadians tend to be distrusted and therefore, Iranians will not participate in these efforts based on their beliefs of effective communication webs that are dictated by Iranian culture. This lack of participation may be considered as reluctance on the part of Iranian-Canadians to help their own cause (p. 46).

One of the critical issues for Iranian immigrants is finding a job related to their past experiences and education. Employment in a Canadian company often requires Canadian experience, but a newcomer does not have this experience. Additionally, finding a professional career requires a relevant education. Yet another challenge is that the educational system in Iran is different from Canada and many Iranian academic degrees are not recognized in Canada. An example is when I applied for a teaching certificate at a university in Vancouver. I was asked to supply a syllabus of the science courses I had successfully completed in Iran. They did not know the content of these courses, so to make a decision, they needed the syllabus. It was impossible for me to provide this information because my last university in Iran would not give me an official copy of this information. In Iran, some governmental agencies (like my previous university) do not provide information to foreign universities. This is not a common practice among all universities in Iran and some provide the required information. It was difficult to explain that there is a dichotomy between Iranian universities where some provide information and others do not. So, lack of
credential recognition is a barrier preventing Iranians from getting a job in the same field or relevant to their work experience in Iran.

Most Iranian saved enough money to settle in the new country. In the last 40 years, the Iranian currency has not been stable and steadily dropped. Recently Iranian currency was 4000 T (Toman)/$1 yet, within one month it dropped to 12000T/$1. Many newcomers using their savings to settle in Vancouver were shocked. This change ruined their plans and put them in financial trouble resulting in being forced to find any kind of employment. Difficulty in finding a job in their field meant many families face great problems.

As an Iranian who is working and living in the Iranian community in Vancouver, I realized that many Iranian immigrants are from wealthy and educated families with well-paying occupations in Iran. The women of these families are educated but choose to stay at home and take care of their children. Except for a small number, all of them sent their children to private schools and lived in a large house in a wealthy and respected area of a big city in Iran. They sent their children to arts and sports after school programs and commonly children were used to spending a lot of money.

Immigrating to a new country and facing financial issues means these families are deprived of previous resources and comforts. They now need to downsize their home, live in a smaller apartment or townhouse and they cannot afford luxury furnishings, cars, housekeepers, or paying for art or sports programs. Women must find jobs, limiting their ability to support and supervise children. Low-paying jobs put a lot of financial pressure on these families. To add to that, they are ashamed of their position because they were used to being well-paid in a highly respected career in Iran. This has resulted in many becoming depressed.
Talking to other Iranian new immigrant parents helped me to understand that if some families among these newcomers can afford to provide more facilities for their children, such as registering in art or sports programs, they do not have proper information regarding these programs (location, how to register, when to register, etc.) or how to access resources in facilities such as community centres. It takes time for them to learn how to use community centre facilities. I recall when I first came to Vancouver, it took one year for me to learn about community centre facilities. I still feel I need more information to fully utilize these centres.

Shopping for food is another challenge for new Iranian immigrant families. Most want to buy Halal products that are not accessible in all shopping centres. Almost all food products are new, and they do not know what taste is right for them. Rice is an essential part of Iranian cuisine, but finding Iranian rice in Vancouver is not easy and is expensive. That results in a need to buy different brands of rice to find one that is acceptable to their family. Commonly, it takes trial and error to find the quality of rice the family likes and unfortunately, wasting several packages of rice.

In Section 2.6.2 I tried to illustrate a holistic view of Iranians life before and after coming to Canada. The education system in Iran, the religion of most people, the influence of religion, the reasons for immigration, and after immigration life of these people have been briefly discussed. I presented a picture of student life before coming to Canada to help readers understand the issues, reactions and potential impact on these students to their new education system and experiences.
Chapter 3: Research Method

This study sought to explore the challenges faced by Iranian immigrant high school students in learning mathematics in Canada. Through conducting two series of interviews (14 interviews), I researched how Iranian immigrant students are learning mathematics in Vancouver and how they were learning it in Iran. The study was guided by the following research questions:

1) In what ways are the mathematical learning experiences of Iranian high school students different in Vancouver compared to their previous experiences in Iran?

2) To what extent may these differences affect the math learning process of these students?

In order to comprehensively address the above questions, an interview research design, as discussed in the next section, was deemed appropriate. Participants, sample size, data sources and data analysis procedures are explained in detail to prepare the reader for the following chapter in which the results are reported.

3.1 Participants

The population of this study is Iranian immigrant high school students’ age 14 to 18 years (Grade 8 to 12) who immigrated to Vancouver, BC, Canada, one to five years ago (2013 to 2018). The reason for choosing this time interval is that students who immigrated more than five years ago were usually studying in an elementary school in Iran and did not have the level of knowledge to answer the questions in the interviews. In Iran, students start high school from Grade 7. To have at least one year of Iranian and Canadian high school experience, my participants must be at least in Grade 8.
3.1.1 Sample size

Qualitative analysis requires an in-depth study of participants but compared to quantitative analysis it does not need a large sample size. Patton (1990) states that there is no specific rule to find a sample size of a qualitative study. Seidman (2015) presents that a researcher cannot predict its sample size before starting a study. However, after beginning to gather information if the researcher "begins to hear the same information reported" (p. 55), they can assume there is no new information and their sample is enough. In contrast to Patton and Seidman, Morse (2000) advises having at least six participants in a qualitative research study. Similar to Mores, Cypress (2018) suggested conducting phenomenological interviews with at least five people to get the best result. Based on these suggestions, seven Iranian immigrant high school students were selected to participate in this study. Upon collecting interview information, I added another participant (number eight) to make sure previous participants mentioned all important points. During the eighth interview, I realized his information was similar to what other participants has shared as Seidman (2015) described, I started to hear the same information reported), so I removed his data.

3.1.2 Recruitment of participants

I designed a flyer (Appendix D) containing brief information and a summary of my study. To recruit participants, I approached Iranian immigrant families (parents, guardians, and other family or community members) during Iranian community social gatherings. They were families who moved to Vancouver one to five years ago and enrolled their teenagers (14-18) in schools in Greater Vancouver. I distributed flyers (during Iranian community social gatherings) to inform potential participants and identify families who might wish to participate in my study. I stayed in the social gatherings waiting for potential participants to approach me. Then, I gave consent forms
to families wishing to participate in my research. As it is believed that at least one week is adequate for prospective participants to assimilate the information provided, pose any questions they may have, and then consider whether they will participate in the study or not, the families were given one week to make a decision. After one week, I called those families who agreed to participate in my study. I arranged a time and location for our first interview with those parents who consented to their teenager participate in my research.

3.2 Research method: interview

In order to describe the learning experience of Iranian immigrant high school students in Iran and Canada, I employed a qualitative research method. This method helps to describe the characteristics of a phenomenon or a group of people (Schuman, 1982). It provides information regarding human behaviour, emotions, and experiences. Observation and interview are the two popular methods of data collection in different qualitative research designs such as phenomenology, ethnography, or grounded theory (van Manen, 2017). “Phenomenological interviewing involves an informal interactive process that aims to elicit a comprehensive personal description of a lived experience of a phenomenon for a small number of individuals who have experienced it” (Cypress, 2018, p. 304). It is "a powerful way to gain insight into educational and other important social issues through understanding the experience of the individuals whose lives reflect those issues" (Seidman, 2015, p. 14). In this study, using observation is not an appropriate method because one part of the students’ experiences already occurred in Iran. Furthermore, the main objective of this study is to understand the feelings and experiences of these students from their point of view, not mine. Therefore, to understand their behavior, emotions, and experiences, I selected the interview as an approach to collect required information.
Conducting interviews takes time; however, I believed to establish a deep understanding of the experiences of these students, it is important to take the time needed to hear directly from the participants and conduct interviews. It was an exploratory study so using a semi-structural interview allowed me to ask extra questions during the meetings to clarify any ambiguous points. The in-person interview helped to capture the verbal and non-verbal cues of participants. I avoided asking questions that might make the interviewee uncomfortable, and I asked for elaboration when the interviewee indicated they wished to add. The nature of open-ended questions allowed participants to talk about their feelings and thoughts freely and widely. There were elements not mentioned in the questions but raised during the interview, so in-person interviews provided the opportunity to investigate those issues.

For in-depth phenomenological interviews, Seidman (2015) suggested the three-interview series. This allows us to make a connection with participants in the first session. He recommended three days to a one-week interval between each interview to help participants think about their experiences, feelings, and answers. This allows the participants to reflect on the meaning of their experiences and respond. The participants in my study were adolescents who may not enjoy long conversations or several interviews. Hence, a structure of two 30-minute interviews several days apart was chosen for this study. A relaxed atmosphere for participants to freely express their views (Boyce & Neale, 2006) was created by conducting interviews in a location convenient for participants: their home or a café, and at a time suitable for participants. After finishing the first interview I asked participants what their availability was in the next three to seven days.
3.2.1 Designing the questions

The context of my interest was the mathematics learning of immigrant students in Vancouver. The questions for the interviews were designed based on the objectives, research questions and literature review. The questions were separated into two sections to be asked in the two different interviews. At the beginning of the first meeting, I asked participants to complete a one-page questionnaire. This form gathered demographic as well as socioeconomic information (Appendix A). I opted for a form versus direct questions because Iranians tend to be sensitive when talking about personal topics such as finances, occupation or marriage. As these factors can affect learning, it is relevant to gain this information but in a respectful manner.

In the first interview (Appendix B), I asked participants about their: background, story about coming to Canada, challenges in settling in a new country, experiences of Iranian and Canadian schools, and any strategies for coping with a different lifestyle in a new society. The second interview (Appendix C) solicited information regarding their experiences in learning math in Iran and Vancouver; the differences that they have recognized, and strategies they have used to face those differences. I asked them to compare their experiences in learning math in Vancouver (Canada) and Iran by explaining to what extent these differences influence their learning process and to discuss what type of support helped them to overcome problematic issues and improve their learning process in Vancouver. All interviews were audio-recorded and password protected digital files were made.

To design these questions, I relied on Bishop's (1994) and Reyes and Stanic's (1988) points of view regarding the influential factors in learning mathematics. Bishop (1994) emphasizes that language, geometrical concepts, calculation procedures, symbolic representations, logical reasoning, attitudes, goals, and cognitive preferences may create conflict for immigrant students.
in learning mathematics. Reyes and Stanic (1988) on the other hand, emphasize the "societal influences, school mathematics curricula, teacher attitudes, student attitudes and achievement-related behavior, and classroom processes" (p. 39) as reasons behind the different mathematical achievement of students. Based on these points of views, I posed questions to determine the influential factors in the mathematics learning of these students.

To address ambiguities, bias and blind spots in interview questions I conducted a pilot study. I interviewed another Iranian immigrant high school student who was willing to participate in my research. The results of this interview led to rephrasing some of the interview questions and a change in the order of questions. These changes enhanced the reliability of the questions (Yin, 2014). These modifications only clarified the questions and did not significantly change the original intent of the questions.

Since all participants arrived in Canada one to five years ago, I assumed they would prefer conducting an interview in Farsi. However, I had not thought of translating interview questions to Farsi because I assumed they would understand the questions in the English language. Conducting a pilot study indicated they might not fully understand the questions. To ensure understanding, I translated the interview questions into Farsi. To ensure the translation of interview questions to Farsi did not unnecessarily alter the original English version, I engaged a professional translator of Farsi to English to verify the translation. This step was essential to achieve the validity of my instrument.

The interview questions were designed to keep the interviewee students focused on the research goals. There were certain instances where I required more information, description or explanation, and in those instances I asked for more explanations and some examples. Since the aim of questions was finding the different experiences of math learning of these students,
sometimes they answered two questions at the same time. I did not interfere and let them explain, in whatever way was most comfortable for them.

3.3 The researcher

Having completed studies up to an undergraduate degree in Iran, I am familiar with the education system in that country. However, to get current insights and update my knowledge regarding the most recent changes in educational systems, I contacted four friends in Iran. Two of them currently send their children to public schools and two to private schools. We talked about teachers' methods of teaching mathematics, different math textbooks, writing exams, doing homework, students' behaviour and using electronics at school. These conversations and discussions provided me with a better understanding of recent changes (Section 2.6 is partially based on these discussions). I realized that although some aspects of the education system in Iran have changed since I was in high school, most has remained the same.

Working as a TA at the University of National Malaysia (UKM) stimulated my passion for teaching. As I wanted to stay in the academic world when we immigrated to Canada, I started tutoring mathematics and studying Mathematics Education at UBC. I have tutored mathematics in Vancouver, based on the BC curriculum, for almost six years. I have not studied in a Canadian high school, but tutoring mathematics helped me to become familiar with the Canadian school system. To get a better understanding of the British Columbia high school education system, I contacted the North Vancouver school district with a letter from my supervisor explaining our request for me to visit a classroom. I also provided a police background check. The school district allowed me to contact a school principal to get attendance permission. The school principal connected me to a math teacher and I observed in a math classroom in a high school in North
Vancouver for more than three months. I attended these classes at different times of the day and week. I arranged to visit the classroom when students were learning a new lesson, writing a test, having free time and doing their homework. The most interesting part of my experience during these visits was that in contrast to Iran, students were free to walk, stand, or sit in class. The teacher would not impose anything. He nicely asked students to listen, show their homework, or ask their questions.

3.4 Data analysis: transcription of data

Transcription of the interview data was the first step of the data analysis process. Audiotapes of each interview were transcribed by a native Farsi speaker with experience with transcribing. Transcription of the interviews was written in the Farsi language. To familiarise myself with participants' comments and control the transcribed version of the interviews, I listened to the audiotapes several times before starting to read the transcription. Each transcribed version of the audiotapes was sent to me to make sure it was transcribed correctly before starting the next transcription. Transcription of the interview audiotapes was completed carefully and every word matched what the participant said. Checking the transcription helped me track common patterns or nuances in each data set. The results of this research are documented in English. There are many direct quotes from my participants in my report. To ensure translations were unaltered and validate findings, I translated the quotes to English and then asked my friend the professional translator to do the same to verify accuracy.
3.4.1 Thematic analysis

Thematic Analysis (TA) method was used to analyze the qualitative data. It helps researchers to pinpoint, examine, and record patterns of meaning within data. It is a basic research method that is applicable in a wide range of research and theoretical perspectives (Braun & Clarke, 2006). TA helps researchers to seek out and generate code and theme from data through the process of constant comparison. In contrast to grounded theory that seeks to propose a theory, TA is looking for generation codes and finding patterns (Pidgeon & Henwood, 1997; Tuckett, 2005). Strauss and Corbin (1990) stated that when proposing a theory is the main objective of a researcher; grounded theory is one of the most effective methods of qualitative research. However, in this study, I am not looking to propose a theory; but rather to seek similar patterns among the experiences of these students.

Based on TA, students' interviews were examined to find common patterns and ideas. The pilot study data was not included in this analysis. The first step was familiarisation with the data, when I read the transcript and listened to audio-recorded interviews several times. In the second step, I started finding common codes by generating pithy labels (Maguire & Delahunt, 2017) for important features of my data (Appendix E). For example, language, making friends or doing homework was mentioned by all participants, so I choose them as codes. In the third step, through common codes, I searched for a common theme. Maguire and Delahunt (2017) explained that finding a theme through codes is similar to using bricks to build walls (theme) for a house. As Clarke and Braun said, themes were not hidden in my data set; rather I had to construct them via the common codes. Therefore, I constructed some themes based on repeated codes. For example, I realized language as a code; language barriers made learning math difficult for all of participants, so I choose it as a theme. Or all the participants were talking about their math teachers and how
these teachers influenced their math learning, so I choose teaching methods as another theme. In the fourth steps, I reviewed my themes to make sure that the constructed themes presented the aim of my research questions and did not have overlaps. In this step, I made some changes in my themes; combing some themes or splits some others in two or more themes. After coming up with final themes I chose a concise and informative name for each theme. My last steps of TA analysis included writing about my extracted themes, connecting them, and developing a story with using existing literature.

3.5 Credibility

Determining the credibility of data is a critical step in a qualitative study. For the first step, Merriam (1998) suggested the researcher ask, "How congruent are the findings with reality?" Graneheim and Lundman (2004), believed implementing a proper method of data collection makes findings more compatible with reality. Elo et al. (2014) also added that the first step in trusting our data is making sure our data collection method is the best for achieving our goals. To trust our data, Loh (2013) suggested considering transferability, dependability, and conformability of our collected data.

In my study, the collected data are about the experiences of participants in Iranian and Canadian schools. The passing of time would not change these students’ experiences; therefore, I can assume that this data is dependable. After talking to seven participants in 14 different interviews, a pattern emerged from their experiences. Hence, the results of the collected data can be transferable to other Iranian immigrant students with the same conditions.

Regarding the validity of data, Seidman (2015) also explained that
The three-interview structure incorporates features that enhance the accomplishment of validity. It places participants' comments in context and encourages interviewing participants over one to three weeks to account for idiosyncratic days and check for the internal consistency of what they say (p. 24).

It was expected that the proposed two-interview structure will have similar benefits. Furthermore, the comparison of the comments of all participants helped to make sure data is reliable. I closely followed Seidman’s (2015) and Granot, Brashear, and Cesar’s (2012) suggestions and conducted a number of interviews with several days intervals. I have compared all the collected data to make sure my data are valid.

3.5.1 Debriefing

Throughout the research process, discussions were held with my supervisor on matters relating to the interviews, preliminary coding scheme and other relevant issues that formed the bedrock of the interpretative process and reporting of the study's findings. My supervisor brought to bear her experiences and perceptions, which broadened my scope. Such discussions provided alternative approaches for consideration versus relying just on my judgments. This was instrumental in decreasing inherent biases.

3.5.2 Data checks

It is essential to check the accuracy of collected data at every stage of our research. The accuracy of the data ensures the researcher can bolster the study's credibility (Loh, 2013). In my study, interviews were conducted in Farsi (Iranian language); however, I made sure the English quotes of the interviews represented what the participants said or meant, as described earlier. A
partial member check process used was verification that the translations were correct. The translator who interpreted the English to Farsi interviews read their interview with quotes to the participants (students) in Farsi for confirmation and any correction if needed. Such member checking may have increased this study's credibility and clarity to some degree.

3.5.3 Full description of the phenomenon and context

Another effort towards building credibility, evident in this study, is the full description of the participants, context, and their relationship with the overall research question in this study. Without this insight, it is difficult for the reader of the final account to determine the extent to which the overall findings "ring true" (Shenton, 2004, p. 69).
Chapter 4: Results

This chapter presents findings from the analysis of data on Iranian immigrant students’ mathematics learning in Canada. The results are presented thematically for easy elaboration. Themes were analyzed from students’ interview data. The themes are supported by representative verbatim excerpts from the data sets. The analysis and findings from this study are an attempt to answer the following guiding research questions:

1) In what ways are the mathematical learning experiences of Iranian high school students different in Vancouver compared to their previous experiences in Iran?

2) To what extent may these differences affect the math learning process of these students?

Seven first-generation Iranian immigrant students participated in this study. I had no prior relationship with these students before starting the interviews. I met their parents at different Iranian events held in the greater Vancouver area, and I gave them my research flyer. After each event, I contacted the parents of the teenagers who agreed to participate in my study. Based on participants’ convenience, we arranged a time and location for their interviews.

Three boys and four girls, aged 13 to 16 years old, agreed to participate. These very friendly and helpful adolescents did their best to answer my questions. They listened carefully to the questions and explained their answers thoroughly. At the beginning of the first interview, each of them mentioned that they were not good at explaining and may not be able to answer my questions correctly. Some of them told me that they did not have proper information about Canadian schools and their answers may not be correct. I assured them there was no right or wrong answer; their opinion was what was helpful, and they only need to honestly share their experience.

In reporting the results, the names of participants have been changed, as shown in Table 4.1. All students in the study live in their family home with their parents and siblings. They all
have one or no siblings, except for Ali, who has two sisters. Their parents have a minimum education level of a bachelor’s degree. Some participants’ fathers currently work in Iran. These students preferred not to specify their father’s jobs, perhaps because some of the fathers had government positions. These fathers live in Iran and come to Vancouver a few months of the year to visit their families. Their opinion was that finding a relevant and well-paid job for highly educated immigrants is difficult. Therefore, most of them prefer to go back to Iran and work there.

All participants arrived in Vancouver a couple of years ago, and have lived here since, except for Angela and Sam, who came to Canada when they were in elementary school. After living in Canada and studying in a Canadian school for one year, they left Canada for two years. Both came back to Canada four years ago.

The family status of all participants (gleaned indirectly from their parents' occupations, address in Iran, etc.) showed that they are from wealthy families. In Iran, most wealthy families send their children to a private school. All participants revealed that they had attended private schools in Iran. They told me that in Iran, private schools have a higher level of education and facilities compared to public schools. Private schools hire more experienced teachers, facilitate more school hours, and provide more lab equipment for students. They have intensive learning programs that not only cover the Iranian national curriculum but also provide additional curriculum.

In contrast to Iranian public schools that run from 7:30 am to 1 pm, private schools begin at 7:30 am and end at 3:30 pm. In private schools, students have more homework and more regular scheduled tests (compared to public schools). They study from textbooks but also practice and do exercises. The science labs and gyms of these schools are better equipped compared to public schools. Teachers supervise students’ learning progress and report to parents regularly.
There are two International Baccalaureate (IB) school in Tehran the capital of Iran. Some Iranian private schools copy Canadian, US, or other countries’ education systems (I call these Special Private Schools, SPS). One reason behind offering curriculum from different education systems is some families planning to leave Iran believe their children need to be familiar with the educational system of their new country. Angela, Sam, and Sara studied for one year in these private schools (SPS) in Iran. These students believed that in many aspects, their Iranian school (SPS) was like Canadian schools. For example, Sam said, “We had less homework like Canadian schools. Teachers did not force or push us to study”. Sara mentioned, “In our school students had a locker, so I was familiar with having a locker and how to use it when I started studying in a Canadian school.” Sam added,

When I started studying in this school (SPS) I was shocked. It seemed to me students are free to do whatever they like, no pushing or forcing. We do not have to write regular tests. Our report card did not contain numbers. They only described our knowledge and abilities in words.

I believe that the national curriculum, different culture, and religion in Iran hinder Iranian special private schools (SPS) from fully implementing the educational system common in Canada, the US, or other countries. For instance, in contrast to Canada, in Iran, boys and girls have different schools, and in Iran, teachers must entirely cover the textbook selected for each course.
<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Grade</th>
<th>Date of arrival in Canada</th>
<th>Parent education background and occupation</th>
<th>Sibling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liam</td>
<td>16</td>
<td>11</td>
<td>2016</td>
<td>Mother: Masters, Laser treatment specialist Father: PhD., Ph.D. Student</td>
<td>no</td>
</tr>
<tr>
<td>Ali</td>
<td>16</td>
<td>11</td>
<td>2014</td>
<td>Mother: Bachelor’s Degree, Financial advisor Father: Bachelor’s Degree, not clear</td>
<td>two</td>
</tr>
<tr>
<td>Sam</td>
<td>15</td>
<td>10</td>
<td>2013</td>
<td>Mother: Bachelor’s Degree, Nurse Father: PhD., University Professor</td>
<td>One</td>
</tr>
<tr>
<td>Angela</td>
<td>13</td>
<td>8</td>
<td>2013</td>
<td>Mother: Bachelor’s Degree, Nurse Father: PhD., University Professor</td>
<td>One</td>
</tr>
<tr>
<td>Mary</td>
<td>15</td>
<td>10</td>
<td>2017</td>
<td>Mother: Masters, Masters Student Father: Masters, not clear</td>
<td>One</td>
</tr>
<tr>
<td>Sara</td>
<td>13</td>
<td>8</td>
<td>2018</td>
<td>Mother: Bachelor’s Degree, housekeeper Father: Bachelor’s Degree, not clear</td>
<td>One</td>
</tr>
<tr>
<td>Jazi</td>
<td>16</td>
<td>11</td>
<td>2017</td>
<td>Mother: Bachelor’s Degree, housekeeper Father: Bachelor’s Degree, not clear</td>
<td>no</td>
</tr>
</tbody>
</table>

4.1 Findings

To address my research questions, I searched through the data corpus by comparing and sorting points that appeared to be responses to the questions. This led to the drafting and refining
of key themes that characterized answers to my questions. I have categorized these themes in four groups of: (1) language of instruction, (2) teaching methods, (3) using technology and classroom environment, and (4) mixed-gender classroom.

In each section, I reported one theme related to each student’s different experiences. Then I explained its influence on the student’s learning process and concluded by proposing some possible solutions to help these students overcome their issues. In reporting my results, I referred to the participants of this study as “My Participant” (MP) to avoid confusion with the students and participants of other studies that I have used for my discussions.

4.1.1 The language of instruction

Liam, Ali, Sara, and Jazi had participated in an English language program in Iran before coming to Canada. Angela and Sam came to Canada when they were in elementary school (they left Canada and came back when they were in high school), so they already had experience speaking and studying in the English language in Canada. The last student (Mary) had little knowledge of the English language when she arrived in Canada. She said, “My English language was awful; it seems I did not know the letters!” She could not understand, read, write or speak English when she arrived in Canada.

Although the students in this study knew the language of instruction was different in Canadian schools, learning and communication in the English language was a shock for all of them. In contrast to many countries like Canada, in Iran, there is no official second language. In Iranian schools, the English language is being taught as the second language but limited to learning grammar and memorizing words. Moreover, the application of the English language in Iran is almost zero. Students might never have a chance to speak in the English language unless
they have a wealthy family who can afford to send them abroad. Even for these students, the travel time is limited, not enough to learn a new language. The lack of use of the English language while in Iran hinders students from learning this language thoroughly. In addition, all movies or TV series have been translated to Farsi and access to English language films is limited. The government or education system does not promote learning the English language because due to political issues between Iran and western countries.

For most participants (MP), it took one and a half years to get used to the language of instruction in Canada. However, after spending several years in a Canadian school, they (MP) still have issues studying in English. At the beginning of the interviews, I suggested that they could answer the questions in Farsi or English. All of them chose to speak in Farsi. Even when I read a question in English, they still answered in Farsi. Although Ali switched between Farsi and English most of the time, he mainly used Farsi. I asked them which language (English or Farsi) they prefer when they need to speak with their friends. Only Angela said Farsi, and the others said, "It does not matter for me anymore." Mary told me when she is speaking with a Farsi speaker, even if her audience could speak English fluently, she prefers to speak Farsi. Mary’s preference to speak Farsi showed me that my participants spoke Farsi during the interviews because I am a Farsi speaker, and they feel more comfortable speaking Farsi with me.

Ali told me after three and a half years of living and studying in Canada he knows some words in English that he does not know in Farsi. And there are many words in Farsi that he still cannot use in English. This is one of the reasons why these students switch between Farsi and English most of the time. Code-switching is alternating between multiple languages in one conversation (Planas & Setati, 2009; Truscott & Smith, 2017). It occurs consciously or unconsciously among multilingual people when they are talking to another multilingual person.
Parvanehnezhad and Clarkson (2008) state several reasons for code-switching in their studies, such as lack of one language proficiency, habit, and comfort. It must be difficult for these students and other multilingual students to express themselves in English when they do not know a word in the English language and cannot use code-switching.

My daughter (A., seven years old) has the same issue at school. Her teacher told me that sometimes when A. is explaining something or telling a story, she suddenly stops talking. Her teacher thought the reason for this problem was a distraction. She said A. is distracted quickly by her friends and she needs more concentration. As her mother, I know this is not the only reason. A. becomes distracted because she does not understand some words and phrases that her teacher is using. Also, when she is describing something, she does not know some words in English, and she cannot switch to Farsi. Therefore, she stops talking. At home, she quickly switches between two languages to express herself. Sometimes she asks, “Mom, what is a dentist in Farsi?” or “What is yek (one) in English?” When I told A.’s teacher that A. has a language issue, she seemed surprised. She said she had never considered that as an issue because most of the time A. speaks English very well. I supposed most bilingual/multilingual students might be judged in the same way by their teachers because they may not be familiar with the issues these students are dealing with. Sometimes not knowing one word prevents a student from starting her/his whole sentence. My older daughter (E., 13 years old) told me that she has a new classmate who recently came to Canada from Iran. E. said, “Mom my classmate’s education background is very strong, but nobody realized that she is good because she cannot express herself in English. In fact, English is everything at school because we speak English”.

One of the study participants ((MP) Jazi, told me that this year in her math class, there was a student-teacher teaching them mathematics. She said,
I could not understand her (Ms. T.) because she speaks so fast and her accent was not understandable for me. So I did not pay attention to the lesson and made myself busy with something else. So, when Ms. T. asked me a question about the topic, I could not answer, which made her upset.

I asked Jazi if she told her teacher the reason why she was not listening, he replied “No, in front of my classmates, I was not comfortable explaining. Besides, what was the point? She could not change her accent because of me”.

In the same way, Liam stated that “In the first months of going to a Canadian school, I did not pay attention to my teacher when I could not understand him. I made myself busy with other stuff. Because my teachers did not know the reason, they assumed I was a playful student who was not willing to study”. Ali also pointed to another aspect of language issues and said

In the first months, there were many times that my math teacher asked a question that I knew the answer for, but I could not say it in English, so I stayed silent. Sometimes I said the answer in Farsi and one of my Iranian classmates who spoke English said the answer to the teacher. My teacher never realized I was the person who solved the question. So I felt it was not fair.

In contrast to other participants (MP) who refused to ask questions when they could not make correct sentences in English, Sara did her best to find a way to ask her questions. She said,

Sometimes when I tried to ask a question, I did not know some words in English, which makes it hard for me to speak. So I used a synonym or pointed to the question in my book or found another way to express myself. I had to learn, so I found a way!
These students (MP) saw their lack of English language proficiency as their fault. They assumed that it was their problem, and that they must deal with this issue on their own. They did not dare comment about it at school. Even if the accent of a teacher (as in the case of Jazi) was the reason that these students could not understand a lesson, they did not complain. During our discussion in interviews, I realized that they (MP) do not see they have the right to complain at school, so they stay silent and endure the issues. Their teachers and classmates do not realize that they are struggling. So nobody steps forward to help them. For example, in the case of Mary, nobody would realize that she spent several extra hours studying math because she does not know the language. In Farsi, we use (/) for showing decimal numbers, for example we show 3.3 as ۳/۳.

We also use a completely different set of numerals and we do some operations like long division differently (Figure 4.1). This makes it difficult for new students to adapt. The extra time Mary allocated to translation limited her study time. She was under a lot of extra pressure because she did not have enough time to study for all of her courses. Additionally, when she could not complete her assignments, her teacher thought she was lazy, and the real reasons were hidden.

Similar to Mary, Liam was being erroneously seen as lazy, unknowing, playful, or distracted because of language issues that teachers couldn't see or did not notice. In class, these students talked in English so the teacher assumed they did not have a language problem. However, for these students there were many unknown words in the English language, which prevented them from fully comprehending sentences. Moreover, some of these students (MP) told me that they were pretending to understand their teachers in the class to avoid embarrassment, so it was difficult for teachers to realize these students (like Liam) had language problems.
These students (MP) also missed lots of opportunities and contests at the school because of language issues. For example, they told me that they did not have a chance of winning in those classroom games in mathematics where the instructions required careful listening and comprehension required in a long story were given in a short amount of time. As they (MP) mentioned, they usually cannot be a part of voting on issues in the class or school because they do not understand what is going on or cannot speak for themselves. They would miss the due date of homework or projects as they did not understand the teacher when she/he was instructing them. Their main problem is that most of the time they did not realize that they were missing something. Most teachers speak fast, and for these students, this is challenging.

As far as I understood, it seemed a set of these issues makes for an unfair and unbearable environment at school for these students (MP). Not understanding their teacher or a lesson left them feeling dumb and stupid (as Jazi and Mary said). Liam thought was not fair when they knew an answer, but they could not communicate it to their teacher in English. It is suffocating for them (as for example Sara mentioned) when they have a lot to share in a class discussion, but they cannot express themselves. Much of their potential is wasted because of language difficulties.
4.1.1.1 Improving English language

Each of my participants (MP) believed that after two years in school in Canada, communicating in the English language has become more comfortable for them. I asked what kind of support they have had or how they have improved their English language. They pointed to (1) having English speaking friends, (2) using school ELL programs, and (3) watching English language movies.

4.1.1.1.1 Having English-speaking friends

All students (MP) stated that hanging out with native English language-speaking friends has had a significant influence on their English language improvement. Aside from Ali, who has had a bit of difficulty finding a friend, other students have made friends. Ali shared that before starting school, he did not have any friends in Canada, and he felt lonely and unhappy. He said, “I had lots of friends in Iran, and I hung out with them most of the time. So, living here without any friends was sad. I had to spend most of my time with my family, which was weird for me”.

Friendships during adolescence are the main source of youth support and have a major impact on their psychological adjustment (Rubin et al., 2015). It has been proven that having high-quality friendships with features such as self-disclosure, intimacy, and support can reduce depression, and loneliness (Hodges, Boivin, Vitaro, & Bukowski, 1999; Rubin, Coplan, Chen, Bowker, & McDonald, 2011).

Mary emphasized the importance of living in a multicultural society in finding friends and stated, “Most of the students in my school are immigrants, and they are looking for a new friend, so it is easier for me to make a friend. Most of these students have a different culture and
mother tongue. So, I am not the only person with language difficulties. Therefore, it is easier to make a mistake when I speak English.”

In contrast to Mary, Liam started his education in a school with few immigrant students. At first, he had to find some Iranian friends because it was difficult to join a group of non-immigrant students. He said, “We had a different language and culture, so it was difficult to join them”. After three years, he has many non-Iranian friends. Kruse, Smith, van Tubergen, and Maas (2016) claim that adolescents prefer to be friends with children with the same ethnicity. However, sharing the same neighborhood encourages adolescents to make friendships with their classmates regardless of ethnicity. Since most of the students of a school live in the same neighborhood, making friends for Iranian immigrant students across ethnic boundaries was not difficult.

Although Liam finds non-Iranian friends without difficulty, he still does not feel comfortable participating in their (non-Iranian) cultural celebrations. He pointed to Christmas Eve and said his family never celebrates Christmas in Iran, and he does not know much about it. He does not like to participate in Christmas parties or shopping for Christmas. He does not feel he has anything in common with his friends in these events and that results in issues connecting with his non-Iranian friends.

Like Liam, Jazi found cultural differences to be a barrier in communication with her friends at school. She said when students are talking about their cultural celebrations like Thanksgiving dinner, she has no idea what they are talking about. In the same way, when she celebrates an Iranian event like Yalda, her friends do not have any interest in that event because they do not have any information regarding the traditions around that event. Jazi explained, “We do not have the same experiences, so we do not have much to talk about.” In contrast to Jazi,
Sara was open to participating in Canadian cultural events and learn more about them. She said they were celebrating Christmas in Iran because her family believed it was a lovely celebration. She was familiar with all aspects of this celebration and is open to learning more about these events and celebrations.

The process of cultural assimilation is different among immigrants. For some people like Sara who had prior knowledge about the dominant culture (Canadian culture), it is easier to learn and understand it. However, for other people like Liam and Jazi, new to the dominant culture, it takes time and effort. Cultural assimilation gets complicated for people who valued their culture of origin and are not willing to learn about a new one. For example, Muslims who strongly practice Islamic laws do not celebrate Christmas. For children of these families learning and understanding, Christmas is pointless. They are not allowed to participate in any Christmas parties or celebrate it at home.

Different reactions of these students (MP) to Canadian culture showed the importance of children’s background when they came to Canada. Having prior knowledge or willingness to learn about Canadian culture helps children to connect with new friends. This connection helps these children (MP) to improve their language and learn about their new community. Language proficiency supports these students (MP) in improving their education including mathematics.

Etkin and Bowker (2018) stated in their study that friendship has an important role in an adolescent’s life. Having an intimate friendship means facing less depression and loneliness. Although all friendships are not beneficial, in most cases, it helps teenagers to feel supported and safe. Different culture hinders some immigrant students from making an intimate friendship. They do not share the same cultural events or celebrations, so they cannot support each other in these situations. The bigger the cultural difference, the greater the distance between friends. In
the case of religious students (MP), this distance gets bigger. Islamic rules add restriction in children’s relationships. For instance, religious girls and boys must limit their relationship with their opposite sex, so making friends would be more difficult. I will explain this further later in this chapter.

4.1.1.1.2 Using ELL programs

All students (MP) participated in ELL programs since they started studying in a Canadian school. They found these programs quite useful. Liam stated that when he began school in Canada in Grade 8, he had ELL socials and science courses. He said since all students in these classes were immigrants, they had the same language issues. So he was comfortable studying in this classroom because making mistakes in the English language was not embarrassing. He has not had any ELL class for mathematics courses, but he does not feel that was necessary, because, from his point of view, math is about numbers. However, Ali, Jazi, and Sara stated that since they have not had any ELL class for mathematics, they are not sure whether it is useful or not. Hence, they could not comment.

In contrast to Liam, Mary has had a series of issues in her math class. She has not understood her teacher at all. She had to study her math curriculum at home, getting help from her mother. She said the only reason she has not failed math (in Grade 9) was that she knew all the material from her courses in Iran. However, it was still difficult for her to study these materials in a different language. Aside from Mary, who is still participating in an ELL program at school, the other students (MP) have stopped participating in the ELL class as they believe it is not needed anymore. Mary has arrived in Canada most recently, and her English language proficiency was minimal and she still needs an ELL program.
In contrast to Mary, other participants (MP) had studied the English language before coming to Canada and speaking, listening, and reading in this language was not new for them. Therefore, they might not need the ELL program as much as Mary. Due to Mary's problems in math class, it seems if there were an ELL program for mathematics, it would be helpful for her. She knew the topics and needed help in learning mathematics language. As she told me, it takes several hours for her to translate one part of the math textbook from English to Farsi. She said most of the time, translating the word to word did not make any sense, so studying mathematics was time-consuming and tedious for her.

ELL programs have been designed to help non-English speaking students, improving their language proficiency while they are studying other courses. It provides a safe environment for immigrant students with language problems (Maxwell, 2014). In these classes, most students have the same issues, so the teacher can concentrate on these problems and help students to overcome their barriers. These teachers understand that these problems impact the students’ learning process. However, most non-ELL teachers are not familiar with these issues and understanding immigrant students’ issues might be difficult for them. A math teacher might not know how many extra hours the immigrant students are allocating for translating math terms. These students might not be able to finish their homework because they did not have enough time. They might be distracted by translating words in the classroom, and their teacher might think they were not paying attention in class.

In the non-ELL classroom teachers are dealing with a variety of issues, and an English language problem is only one of them. These teachers might not have time to help ELL students overcome their issues. It takes time to help each student individually to understand a lesson. Translating mathematical terms or leading students to translate needs special skills which non-
ELL teacher might not have. Moreover, helping ELL students in a normal classroom might distract other students from focusing on the topic and wasting their time. So, it seems ELL class is likely required in math courses for new immigrant students who are not yet competent in English. However, since the role of these classes is helping students learn explicit terms in specific courses (like mathematics), it would not take a long time to become familiar and learn those terms. So, these (math) ELL courses would be short term for new immigrant students. There is no doubt that learning a new language is not limited to learning a list of words and terms. However, these students are learning the English language in other ELL classes so, math ELL class can focus on mathematical terms and symbols.

4.1.1.1.3 Watching English language movies

Some participants (MP) believed that watching English language TV series and films helped them improve their English language skills. It was helpful to be familiar with the North American English accent. Liam has been watching English language movies since studying English in Iran. He believes it improved his listening skills. He watched these movies with English subtitles, which also improved his spelling. At first, it was a tool for him to learn English, but then it became a habit to enjoy in his free time. He still watches English language films and Canadian TV series because he loves them. He said,

I do not use any subtitles anymore because I understand everything. Although there might be very rare words that I do not understand, I think other teenagers who are native English speakers also might not understand those words too. For example, the name of foods, places or technical words.
In contrast to Liam, who watched English language movies since he lived in Iran, Sara, Ali, Mary, and Jazi started watching movies when they came to Canada. In Iran having access to English language movies is not easy for all people. Most of the films that are available for rent are either translated to Farsi or have Farsi subtitles. As they are free, most people watch Farsi movies or TV series, so might not search for English language films.

Sara, Ali, and Mary started watching films to learn English. However, Jazi used it for entertainment. Mary said, “For me watching movies was the best method to learn English. I compared the words that I already knew with the words used in the films, and I tried to learn the application of the new words”. Jazi stated that although she began watching movies as a hobby, after a while, she realized that her listening and spelling skills had improved. She said it was also helpful to improve her social communication skills, but it has not had any impact on her academic language.

All participants (MP) emphasized that using English subtitles in watching English language movies is beneficial for improving language skills. It helped them recognize words and learned correct spelling at the same time. Mary highlighted that using Farsi subtitles distracts viewers, and there would not be any challenge for finding and learning new words.

Among all the participants (MP), Sara was the only one who consciously watched movies for learning English and culture at the same time. She said,

I am choosing TV series or movies which are the stories about teenagers. It helps me to understand how teenagers react in different situations, how they celebrate, fight, invite, or many other things. When I learned their culture, I could have a more proper reaction in different situations at schools or in the community.
In contrast to Sara, Mary told me that “I am not looking to learn about culture via watching movies because when I learn the language, I can be connected with these people and learn their culture too.”

Watching films and TV series are the most popular non-print media used for teaching another language. Movies usually are available and popular for entertainment and educational purposes (Fata & Mutia, 2019). Aside from Jazi who watched movies for fun, other students (MP) have heard from their friends and parents that it is a good method for learning English. Learning another language is not an easy task; it is time-consuming and tedious. Watching movies motivates learners through an enjoyable way of learning reducing anxiety while learning. It clarifies cultural ambiguities (Sabouri, Zohrabi, & Vafa, 2014) and creates cultural awareness, which can include geographic, sociological, socio-economic, socio-political, and educational issues (Istanto, 2009). Most ELL teachers believed it increases learners’ writing ability in narrative text, and increases their vocabulary (Gorjian, 2014; Rarick, 2007). Although watching English language movies did not influence their (MP) mathematics learning directly, it helped them to improve their language overall. More proficiency in language means more understanding of their math teacher which likely leads to less misunderstanding and more confidence.

Aside from watching movies, participants (MP) did not use other media like the internet, or music to learn the English language. They did use the internet when searching for new topics in different situations like doing school projects, finding locations, or chatting with friends, but not for language learning. Ali listens to English music, but he stated that when his English language improved and he could understand the meaning of the lyric of songs. However, all of these tools are useful in improving language. Since English is not the first language of these students (MP), the more they use educational tools, the better it would be for them.
Students in my study who are very religious (three of them) did not watch English TV series or movies. They said that they are not interested in those movies and stories. I did not encourage these students to talk more about this as I realized they were not comfortable talking about this matter. As a Muslim I know in Islam there are lots of limitations around wearing clothes, having relationships with people, eating, or drinking. Most of these rules are not followed in non-Iranian movies and TV series. Therefore, most religious Iranians banned watching all of these movies and TV series (inside or outside of Iran). In Iran, the media must follow Islamic rules, so it is safe for religious people to watch an Iranian movie or TV series. Since all Iranian movies are in the Farsi language, it can be assumed that these participants do not use watching movies as a tool to improve their English language.

4.1.2 Teachers’ Methods

Teachers and teaching methods in Canada and Iran was another common theme in the students’ answers to the first question (In what ways are the mathematical learning experiences of Iranian high school students different in Vancouver compared to their previous experiences in Iran?). They repeatedly referred to different teaching methods in Iran and Canada. Doing homework was the first concern of all participants (MP). It seems there was a big difference for them. After homework, writing and marking exams, then using technology and teaching methods were emphasized as other differences.

4.1.2.1 Mathematics homework

All students (MP) expressed that in Iran, the volume of homework was much greater than in Canada. Liam said, when he was in Grade 8 in Iran, the amount of his math homework was
similar to his homework in Grade 11 here in Canada. He believes after several years studying in Canada, for the first time, in Grade 11, he has lots of homework like in Iran.

These students (MP) emphasized that doing homework was very important for their math teachers in Iran. At the beginning of each class, teachers (in Iran) checked the homework. If students have not finished their homework, they were punished by their math teacher. Sara said,

I was studying in a private school, and our parents paid lots of money for school, so teachers could not get mad and yell at students. Therefore, if students did not finish their homework, the teacher sent them to the office to talk to the school principal. Most of the time the office called our parents to let them know that their kid did not do her homework.

Liam said,

Teachers made a big deal if we did not finish our homework (they sent us to the office to talk to vice-principal, called our parents, assigned more homework); therefore, I preferred to do my homework to avoid the headache. I had to explain to my teacher, school principal, and my parents why I have not finished my homework. At home, my parents got mad and punished me too.

Sam said, “In Iran, teachers checked our homework in front of all students. If we have not finished it, my teacher blamed us in front of all our classmates and made us embarrassed.”

Angela said,

In Iran every day I had lots of homework, and since I was slow, I did not have time to finish it. I started doing my homework after coming back from school. By midnight I have not finished all my homework. So, every day at school, I was nervous that I might be punished or blamed in front of my friends.
She asked her parents to talk to her teachers (in Iran) and explained her situation (that she is slow and could not finish her homework). However, she still was worried about being punished!

Every day she went to school with stress and discomfort. It put pressure on her and prevented her from concentrating on her studies.

Mary explained that her math teacher in Iran took homework very seriously. In every class, the first thing was for the teacher to check homework to make sure students did their work. Then she called students one by one to solve homework on the board. If a student wrote the answer in her homework, but she could not explain it on the board, her teacher realized that this student cheated. So, her teacher punished those students who have not done the homework themselves.

As an Iranian I know that Iranian parents highly value their children’s education. For many of these parents, mathematics is one of the most important topics at school. They expect top math marks from their children. Low mathematics grades mean their children do not study enough. Most of these parents send their children to private schools because students’ learning progress is controlled and supervised at these schools. Teachers and school counselors report all educational issues of students, so parents are aware of every aspect of their children’s education. In these schools, teachers (specifically math teachers) are bound to control student’s homework every class to make sure they are studying well. They use a different approach (blaming students in front of their classmates, punishing them with more homework, reporting them to the principal and calling their parents) to force students to do their work. Putting lots of pressure on students or forcing them to do their homework might not be a suitable method in education according to
contemporary Canadian practices. However, all participants told me it was one of the reasons that they always finished their work.

Although these students (MP) were doing their homework in Iran, most of them have not thought of benefits or the value of doing homework. They just finished it on time to avoid making their teachers and parents upset. Other researchers like Chen and Stevenson, (1989) and Xu and Corno (1998) reported the same results in their studies. They realized that sometimes students pretended to like doing homework to make their parents happy. Cunha et al. (2015) believed that this attitude toward doing homework pushes students to finish their assignments. Meeting parental expectations was a main reason that most of my participants (MP) finished their homework in Iran. They would have been punished (e.g., losing weekly allowance, tablet, or cellphone) if they did not study hard or did not get a good mark.

All students (MP) expressed that in contrast to Iran, in Canada, doing homework is not a priority for teachers. Most of the teachers collect the homework for a chapter all at once on the exam day. Then when students are writing their exams, teachers check the homework. Angela said, if for any reason a student has not finished her/his homework, the teacher gives her/him more time to finish it. Then, if a student does not complete her/his homework, they would only lose homework marks, with no other punishment. Liam said, sometimes a teacher might send an email to the parents of a student who did not do very well at exams and who had not been finishing their homework for a long time.

These students (MP) did not put much effort into doing their homework in Canada. Three (Liam, Sam, and Ali) out of seven students did not do their homework, and the rest of them did not finish it on-time or finish it partially. When I asked about their reasons for not doing their
homework, most of them did not have a specific reason. Only Liam and Sam said that their homework usually is repetitious, and they do not like wasting time doing repetitious work. Liam and Sam might be right, as Cunha et al. (2015) stated, homework’s design impacts students’ engagement in doing it. In fact, the type of questions and tasks must be matched with students’ learning needs. However, if redundancy of questions was the reason, then these students (Liam and Sam) should have done at least one part of questions that were not repetitive. Instead, they usually did not do it at all. Why then, did they take time and finish their homework in Iran it was also repetitious.

Based on my participants (MP), in Canada, teachers do not push students to do their homework. In contrast to Iran, each time a student (in Canada) did not do her/his homework, the teacher or school office does not contact parents to let them know. The only reaction of the teacher in Canada (as Liam mentioned) is dropping the homework mark. So, students do not feel obligated to do the homework. Although losing the homework mark reduces the final mark of students (as MP mentioned), they know their parents would not recognize the reason.

4.1.2.2 Parents

As an Iranian immigrant parent, I know that Iranian new immigrant parents are struggling with a variety of issues in their new life. They are extremely busy settling down in the new country and city. They do not have proper knowledge of the school system here. They do not have English language proficiency to connect with school counselors or teachers. They do not have adequate experience and financial strength to provide extra educational resources (like tutoring) for their children.
Almost all of these parents have higher education, but lack of English language proficiency and different school curriculum hinder these parents from helping their children learning mathematics (teaching them, answering their questions or checking their homework).

The set of these difficulties (language proficiency, the immigration issue, different school curriculum) make supervising children difficult. As an immigrant parent I heard from other Iranian parents that most of them do not know what factors affect the final grade of their children, how many tests students need to write, and which test has a higher value. Also, the value and amount of homework are not clear to them. They usually hear from their friends that in high school, students have a little bit of homework which students usually can finish in the classroom. Therefore, when children do not work on homework, these parents assumed there is none to do. Most of the time these parents ask their children whether they have any homework, and the answer usually is no. My participants told me that in Iran, their parents could contact the school and ask for clarification because, in Iran, parents expect their children to have homework. However, in Canada, parents do not know what they should expect because the school curriculum and teacher’s methods are not clear for them. Also, the lack of English language proficiency makes it difficult to contact the school’s counselors or teachers.

The results of the discussion with these children (MP) showed that they are aware of this disconnection between school and parents, and they do not feel obligated to take the time and finish their homework. In Iran, they were under pressure to do homework, but most of them never realized the reasons behind this pressure to study. They followed their teachers’ orders and finished their work. They have not understood what would happen if they did not do their work as they have never seen the consequences of laziness and lack of study. In Canada, when the
pressure is lifted, they (MP) feel free and leave study because they do not expect anything negative to happen.

As a tutor in the Iranian community I realized that aside from the lack of proper knowledge about the school system and lack of connection to teachers, Iranian parents are concerned about their children’s difficulties and new challenges in life in general particularly at school in Canada. Some issues like a new language of instruction, new education system, new environment, new curriculum, new friends, and new teachers which add distress to their children’s life. When I am talking to other Iranian immigrant parents about our children’s education in Canada, they tell me that their children have a lot on their plate, so they decreased pressure and do not push them to study as much as they did in Iran. Deep down, their expectations have not changed, and they still want their children to get high marks. However, they were telling me “We need to give these poor children a break!” They hold the belief that the new environment, lack of awareness about the new education system and language of instruction are the main reasons for lower marks. Despite this point of view, I realized that if they were aware their child has homework to do, they would push her/him to finish it and on time. However, as my participants told me most of the time children hid their homework or claimed it would be done at school.

From my discussion with MP I realized that students understood that their parents’ expectations had changed in Canada, and they do not put the same pressure on them as they did in Iran. Mary said, “My parents know that it is hard studying in another language, so they understand if I get a lower mark.” Angela said, “My parents only expected me to settle in the new school, so a low mark did not upset them.” Sara stated that “My marks are good, but I know
my parents would not mind if I get a lower mark because they know it is difficult to study in a new country.” Liam said, “My parents keep telling me to study hard, but when I got a low mark, they did not react very badly.” Ali believed their parents would like a higher mark, but they do not push him because they know studying and living in a new country is not easy for him.

I believe lowering parents' pressure and involvement gives the message to the Iranian new immigrant students (MP) that their education is not a priority anymore. In the same way, Chiu and Xihua (2008) stated that students’ beliefs about the value of their education is the reason why they engage in learning and studying. Moreover, Melhuish et al. (2008) and Wade and Cairney (2000) found that parental engagement in children’s learning is associated with higher levels of achievement among students. Reducing parental involvement in school affairs and activities decreases students’ intrinsic academic motivation (Pintrich & Schunk, 2002). Gottfried, Fleming, and Gottfried (2001) revealed that cutting down educational resources (tutoring or books) made these students disappointed and discouraged in learning. A set of these issues like lowering parents' pressure and supervision, cutting down educational resources, and the new education system made my participants not care about their math education as much as they did in Iran.

These students (MP) studied in Iran for more than seven years, when they had a routine for doing math homework after school. Their parents at home and their teachers at school supervised them to do it perfectly. However, in Canada, this habit has changed. They have had this freedom to do or not to do their homework most stated that they chose not to do their homework. After several years studying in Canada and facing difficulties in mathematics, some of them (like Liam and Ali) concluded that doing homework is necessary for their success. They told me that doing homework is required for learning difficult topics and increasing math
performance. They recognized (as Ali said) a significant reason why they were getting a low mark in math was that they did not do enough practice. They keep promising themselves (as Sam and Liam said) that they will start studying and do homework, but still, they do not. It appears that it is hard for them to re-initiating their previous habits in completing homework.

Lally and Gardner (2013) revealed that habit formation has four stages; making a decision, taking action, repeating the new action, and converting new action to new behaviour. In doing all stages, a person need continues encouragement and desire. Some of the Iranian students (MP) realized that they need good work habits, so they decided to develop them (first stage). Then they started doing some part of their homework (second stage). They still struggle with taking time and doing all their work, so it seems they are at the third stage of re-initiating their old work habits. They still need encouragement to repeat their actions and make it a new habit. It takes time and patience. Liam, Ali, and Sam are in Grade 11; they are going to finish high school soon, so they do not have much time to re-initiate their old habit in doing homework. Although after several years studying in Canadian schools, they realized that good work habits are essential, it seems it is late for them. They could have done much better in their education if they came to this understanding sooner.

4.1.2.3 Teaching methods

Students (MP) believed that teachers’ approaches to teaching a new topic in Canada and Iran are almost the same. They usually start by talking about previous topics that would be related to the new lessons then solve a couple of examples. They ask students to follow their lead and solve some questions with them. If no student seems to have a problem with a new lesson, they ask their class to solve examples on their own. Most of the time, Canadian teachers let
students do their homework in the class, but Iranian teachers would not allow students to work on their homework during class time. Sara said,

"In Iran, my teachers thought students would forget a new lesson after leaving the class, so students must review new topics at home. So, they ask students to do their homework after a couple of hours at home. Therefore, students who had forgotten the lesson had to review it. Reviewing the new topics for solving homework helps students to learn it."

As a teacher, I believe that learning mathematics is possible through practice. However, the timing of practice is very important. Most students can solve questions immediately after learning a new topic. They usually get help from the teacher or classmates. For example, solving operation questions is easier when the teacher reminds students to follow the “BEDMAS” rule. Getting a little hint from the teacher leads students in the right direction in solving a question.

When these students successfully finish their work in the classroom, they assume that they learned the lesson. However, after a while, when they are on their own, they faced difficulties solving similar questions. To learn a new math lesson, students must solve a variety of questions in a different time interval. They also must come back to the previous topics, time after time, and solve more examples. At least one part of these practices must be done alone by each student to make sure she/he has a full understanding. Hence, solving all homework at school would not be as beneficial for learning. They need to do at least one part of their homework later at home.

The participating students (MP) expressed that in contrast to Iran, their teachers in Canada are more straightforward. At the beginning of the academic year, teachers set a series of rules and give students a plan for that year. Every student must follow the rules to get a good grade. These rules indicate that the final mark is calculated based on students' work, which includes homework, attendance, participating in class discussion, projects, tests, and exams.
Each part has a specific percentage in the final grade. For example, homework is usually worth 10% of the final grade. These teachers do not push or force students to do anything; they only reduce the mark if students do not do a part of their work. In this regard, Mary said, “My teacher does not get mad at me if I have not done my homework; he reduces the homework mark. But in Iran, my teacher did not decrease my final mark, but she got mad and blamed me in front of all the students”. Angela expressed that “Here in Canada if I have not finished my homework, my teacher gives me more time to finish it. We usually have a couple of chances to finish our homework before losing marks”.

Based on MP, teachers’ methods in announcing the grades is another difference between Iranian and Canadian schools. Students (MP) stated that in Iran, the teachers announced individual students’ grades by name in front of the whole class. Students are fully aware of each other’s grades. Then the teacher shames students who got a low mark in front of their peers. This usually embarrasses students who received a low mark. Most students (MP) referred to this as a significant issue that they could not tolerate. Although it made some of them concerned, angry, or nervous, their reaction to this problem varied. Some, like Liam, studied hard to get a good mark. Other students like Ali and Angela found they could not concentrate on their studies in the classroom or exams. There were other students like Sara, who always got good marks, but they still were not satisfied with this method of teachers.

From my point of view, Iranian teachers intended to highlight students who have not studied well. Teachers use embarrassment as a tool to push students and force them to study harder. Although this strategy might work in some cases like Liam, fear and anxiety produced can place a great deal of pressure on an individual. For instance, Angela told me she was always nervous about getting a bad mark and being embarrassed in front of her classmates. So, on exam
days, she could not fully focus on solving questions because she was nervous. Or the day of getting grades the whole day she could not concentrate on anything other than her grade and possible embarrassment.

Fear of humiliation made students (MP) nervous in class. This prevents them from fully listening to the lesson and concentrating on classroom discussion. Canadian teachers’ methods in this regard were seen as more acceptable by participants. Teachers announced the mark by student numbers. Therefore, each student only knows her/his result. All students do know the highest and lowest grades, so they can compare their results with the class rate, and if it was necessary, they can plan what they can do for future improvement.

I believe putting pressure on students also impacts other aspects of their lives. The pressure of doing homework, writing a test, or getting an exam result might remain in their mind. They may react in other aspects of their lives with anxiety, fear, and anger. For example, fear of failure hinders them from trying a new program because they would not like to fail again. Their relationship with their friends and family might be impacted. Some like Angela might become withdrawn or others might act out aggressively. Complex feelings and discouragement might gradually make them uninterested in school and education.

MP stated that in Iran, in most schools doing homework, participating in classroom discussions, and attendance does not have any effect on a students' final mark. Doing homework and participating in classroom discussions only affect the teachers' opinion of the student. If a student always finishes their homework on time, participates in class discussion, and solves classwork but makes a small mistake in her/his exam, the teacher often ignores some of her/his mistakes and gave her/him the full marks. In contrast to Canada where the sum of all students’
work makes her/his final mark, in Iran, students are marked based on their teachers’ perspective of them.

Only a minority of the participants (three) agreed with Iranian teachers’ method of ignoring small mistakes of good students on tests. The rest of them (MP) expressed that following the rules and giving the mark based on student work is better and fairer. Angela was happy with the Canadian teachers’ method in calculating the final mark and said

If I get a bad mark in one test I have more chances to study harder and get a better mark in other tests which reduces my stress at exams. When I was in Iran, I knew writing this test was my only chance to get a good final mark, so it made me nervous, but here I have several chances. Also, doing my homework and projects help me to learn and increase my mark, so I am willing to take time and do my homework.

Sara was the only student who was satisfied with both Iranian and Canadian teaching method in calculating the final mark. She said, “I am happy with both methods because I would study the whole year for all exams and tests. I would finish my homework, whether it has a mark or not. I would participate in the class discussion, whether it increases my mark or not”.

However, Liam was more satisfied with the Iranian method and said,

I prefer to write one exam for each semester and be marked based on only one exam. It means I need to study only one time for one exam and that’s it. If I get a good mark in a test, it should not be important whether I have finished my homework or not. If the reason behind doing homework is learning, then a good mark would show I already have learned it.

Most of my participants were happy with Canadian teachers’ methods in giving several exams and marking students based on various tasks. However, one student preferred the Iranian
teachers’ method (marking based on final exams). Apart from whether this is a good idea or not, this student opinion showed that there are Iranian immigrant students who are used to this method and would not like to change it. Although only one of my participants had this point of view, since my sample size is seven students, one sample can represent a number of students. This point of view leads these students to not take tests, homework, class participation, and projects seriously in a Canadian school. In the first days of the academic year, they heard their teachers review the various tasks they need to do to get a good mark in mathematics. However, they were not familiar with this plan and how it might work thus, they did not take their homework, tests, or projects seriously. At the end of the year, when they faced the consequences of their decisions, it was too late, and they lost marks. Despite the experience of the last year, some still do not follow teachers’ rules and plan. In the next section, I will talk about some reasons behind this reaction.

Liam was one of the students who did not take his mathematics homework seriously. Although his math grade was not good, he did not finish his homework and did not like to study for tests. Some of his math marks showed that if he studies, he could get a good mark. I told him, “Your other grades like physics are good, but your math grade is low, why?” He said, “I did not study because these topics that we are learning in math are not applicable in my life. Also, my field of study in university does not require math, so why would I waste my time to learn math.” He decided to study philosophy at the university so he might not study math after finishing high school. So, I was wondering why he chose pre-calculus 11 instead of foundation 11. He said because his parents would not let him take the math foundations course. He told me, My parents think lazy and incapable students choose math foundations, and I would not like to be seen as an inefficient student, and I do not intend to argue with them. They also
pushed me to take pre-calculus 11 to keep my options open for the university as math is a requirement for most fields of study. So if I change my mind and choose another field in university that requires math, I would be prepared.

Liam’s parents are highly educated in Iran. As he (Liam) mentioned they are familiar with the Iranian education system, but they do not have enough information about the Canadian education system. In Iran, math plays a critical role in studying engineering or sciences. They made a decision based on their prior knowledge from Iran, which might not be correct here in Canada. Making a decision based on incorrect or insufficient information causes trouble for their children. They usually force their kids to take all of the sciences courses in high school whether these courses are required or not.

As MP stated, in Iranian high schools, students must take all courses, and they do not have elective courses. Hence, parents of new immigrant students are not familiar with the notion of required and optional courses in Canada. Therefore, in course selection, they advise their children based on their prior knowledge from Iran. They push or force their children to take science and math courses. Because they assumed studying sciences and math courses will help their children to get admission from universities. However, taking these courses puts a lot of pressure on students to study all of them. Most of them like Liam do not like some of these courses, but they do not have any choice, they must take them. I believe, taking all of the sciences and math courses prevents these students from taking other optional courses and experiencing other fields. Lack of experience and knowledge regarding other fields of study hinders these students from making a fully informed decision about their future. Hence, when they apply for university, they usually select those fields that are related to science. However,
choosing those fields does not mean they like them, or they have enough information about them. So, this process continues in college and universities.

Sara and Jazi were happy with Canadian teachers’ rules that usually give students another chance to rewrite an exam if they did not do it well or could not write it on the exam day. Jazi believed that this second chance would be beneficial for raising students’ marks when they are willing to improve their grades. In contrast to Jazi and Sara, I realized that some students might use this opportunity as an excuse to put off preparing for an exam. Liam, Ali, and Sam said they would have time to redo their tests, so they do not push themselves to study hard.

Having extra time to do projects and homework has the same influences on these students (MP). Procrastination or laziness can be promoted as they know they had an excuse not to finish their work by the original due date. They knew there would be another chance to write it so sometimes they did not study for a test or skipped an exam because they were lazy. Misusing an opportunity is not strange, but over time it might become a habit and changing a habit is not easy. Misuse of good rules at school might lead to the thought that they can misuse rules in society as well. Based on the “law of effect” (Gallistel, 2005) repeatedly misusing laws might shape a habit in the future leading to abuse of social laws whenever they can. Although this possibility is low and there are many parameters such as environment, or education that influence shaping these habits, it is wise to consider this potential impact.

Iranian new immigrant high school students studied with other different rules (compared to Canadian school rules) for years. Now, they face new unfamiliar rules (like re-write a test or elective courses) with a likelihood that they do not know how to obey or apply them. For example, when they have several chances in doing their homework, they keep postponing it until
they lose all their opportunities. In Iran, they were not allowed to decide by themselves; rather they were always pushed and forced to study and to do their work. Now, quickly having freedom, in doing work or choosing courses this is likely not as clear for them. They need more directions and guidance to learn the right ways of using their freedom. It seems these students are given tools to improve their education but have not been taught how to use them. For students studying in Canadian schools their whole life, it might be obvious how to use these tools, but for Iranian new immigrant students, it is not.

4.1.2.4 Teacher supports

When I talked with my participants, I realized that Canadian teachers have different reactions to the issues of newcomer students. Out of seven participants, six of them stated that their math teachers usually did not care about their problems as a new immigrant. For example, Mary kept telling me that her math teacher (in Canada) told her that Mary’s difficulties in the second language (English) was not his problem and Mary must deal with it by herself. Jazi was the only student whose teacher helped her to understand the new topics and let her use a translator during exams. Mary said, “When I told my teacher that I am a new immigrant and my mother language is not English so that is why I wrote the numbers and signs wrong, my teacher said he did not care, and it was my problem, not his.” Teacher’s reactions influenced students’ feelings regarding their math course. In contrast to Jazi, who likes her math course, Mary had a bad experience with her math teacher. She said her teacher did not care about her issues, so she stopped making an effort to learn math in the classroom. Liam, Ali, Sara, Angela, and Sam did not have serious problems with their teachers because they have had a functional level of English
and mathematics background. They have had small issues in understanding some words, terms, or sentences, but no one was available to help them too.

As a teacher I believe we (teachers) have important roles in students’ adaptation to the new environment and situation. The first person a newcomer student formally face at school is their teacher. MP told me that they were heavily dependent on their teachers from the first day for support and help to encourage them to adjust to the new system. For these students (MP) who were unfamiliar with everything at school, teachers’ behaviour plays a significant role in helping them adapt to new conditions. Jazi and Mary indicated that students feel more comfortable and welcome when they have their teacher support. Although the situation is difficult for newcomer students, with teachers’ supports they do not give up and do their best to overcome issues. Mary’s teacher did not demonstrate any care about her language problem and left her alone to deal with the situation. However, Mary could not deal with her problems alone, so she put aside mathematics and concentrated on other courses. She is fortunate her current mathematics knowledge supported her and she could pass the course. However, after one year, she still was not comfortable study math at school and could not trust her new teacher to help her. She still thought math teachers do not care about newcomer students’ issues and would not support them. In contrast to Mary, the caring behaviour of Jazi’s math teacher has encouraged her to focus on her issues and found various methods to overcome those problems.

Canada is a multicultural country, so in a classroom, there might be several students who are from a different country of origin with a different language. It can be difficult and challenging for teachers to deal with this variety of students. The number of students in a classroom is not low, so it is hard for the teacher to deal with each student’s issue. However, it is
possible for teachers to show they care about students and understand their situation. Based on the student’s issue, teachers can suggest a variety of solutions. Teachers’ empathy and caring reactions make students feel safe and loved so they would be encouraged to seek solutions for their problems.

4.1.3 Using technologies and classroom setting

4.1.3.1 Classroom setting

MP stated that every aspect of Canadian schools was new and strange for them. The schools are much larger than Iranian schools (four to five-times larger). The school’s perimeter is not separated from neighbors with walls, and the buildings’ doors are not closed during the school days. The classrooms are much bigger and brighter. In contrast to Iran, where students had to share a desk with one or two students, here in Canada, they have their own desk or share with only one student.

All participants were more satisfied with the physical classroom setting in Canada. For example, in describing her classroom, Jazi explained that "In Iran, my classes were organized and neat. There was nothing hanging on the walls or around the board. However, here in Canada, many posters are hung on the walls.” It seemed she was not satisfied with this classroom setting, but she immediately added, “But I think it is a good thing because there is lots of useful information on these posters like math and science formulas that we can use.” She added that in mathematics, there are many formulas related to geometry (like surface area or volume) or trigonometry (like sum or double angle identities) that students must learn. In contrast to Canada,
in Iran, students must memorize these formulas. They cannot use any formula or cheat sheets on
the test. So they could not hang up anything on classroom walls. In contrast to Canada where
students change their classroom for each course, in Iran, students have a fixed classroom, and
teachers must move from one class to another. This means one class is used for all courses so
difficult to hang up posters or formula sheets of all courses in one class. Sara had the same point
of view as Jazi and said it is not cost-effective for public schools (in Iran) to provide so many
posters for all classrooms in Iran.

MP told me that in the first days, with huge buildings, new classrooms, and labs the new
school was scary. After a while, they liked it more than their schools in Iran with more facilities
like football or basketball fields that they never had in Iranian schools. The school library
equipped with more books and computers, study areas to do group projects, or work on their
homework. These facilities provide a better environment for study and education.

4.1.3.2 Using electronics

All students (MP) revealed that in Iran, they were not permitted to use any electronics in
their classes, and there was no internet access in their schools. Teachers were very serious about
not using a cellphone. As Liam said, if their teachers found out that one of the students was using
his cellphone in class, the teacher impounded the cellphone for the rest of the academic year!
Also, the teacher asked the office to call the parents of this student to let them know that he
disobeyed the school’s law.

Mary said,

YouTube is filtered in Iran, and if we were allowed to use electronics in the classroom,
we have no access to YouTube. In Iran, most people assumed YouTube contains only
inappropriate videos. However, here in Canada, when my teachers ask us to watch educational videos on YouTube, I realized that was not correct, and YouTube can be helpful for learning.

Angela explained that "In math class, my teacher lets us search and use the internet to find learning materials." It was interesting for her that none of her classmates used inappropriate websites. She wondered how her classmates respect their teacher’s trust and have not used electronics for non-educational purposes.

MP believed that limited access to educational websites in Iran hinders students from learning how to use these websites. These students (MP) learned to use online materials in Canadian schools. All participants (MP) believed that using on-line materials was beneficial to improve their math skills. MP explained that Canadian teachers usually upload educational videos, homework, new lessons, and the answer sheets on their websites. It helps students to easily have access to all of the materials related to their math class. Jazi said, “I watch my teacher’s videos at home to understand a new lesson. I can pause at any time to think about a question or translate a word”. Sara was so happy that she could access to YouTube and explained, “I search YouTube for educational videos whenever I did not understand a lesson, or I have a question. It helps me so much.”

MP stated that using electronics and connecting to various educational websites were another significant difference between Canadian and Iranian schools. In contrast to Iran, here in Canada, students are allowed to use the internet to find educational materials. Most of the teachers share useful resources on their websites and let students use these materials at school or home.
Ali explained that finding useful materials on the internet is new for these students (Iranian new immigrants) as they never had this opportunity in Iran. He added, nowadays, YouTube is a rich source of learning different topics. However, in Iran, it is banned (filtered) and the government advertised that it is not safe for teenagers to have access to YouTube because it has inappropriate content. So, even those families who have access YouTube (with Virtual Private Network, VPN) would not let their children use it.

Liam stated that in Iran students are allowed to use some Iranian educational websites, but these are very limited. Therefore, using on-line materials is not a source of knowledge in Iran. It is entirely new for these students (Iranian new immigrants), and most of them do not know how they can use them. Mary told me she learned how to make an account on social media when she came to Canada, and before that, she did not know how to do it.

These students (MP) told me that they were so excited about how access to the internet is helping them to learn different school topics. They realized that Googling regarding question is the most popular quick way to find the answers. At school, they have learned how to search for relevant materials on the internet and which materials are reliable to be studied. When they could not understand a lesson in the classroom, they can search it on YouTube and watch a couple of related videos. They have the chance to watch a video several times to make sure they fully understand the lesson. For those students (MP) who have a language difficulty, it is helpful to be able to watch the videos with subtitles to fully understand sentences. Jazi and Mary told me that they pause the video to take notes or translate words. Access to educational videos helped them feel more comfortable in the classroom; if they cannot understand a lesson, there are other options to learn it.
Connecting to teachers’ websites was mentioned by MP as another useful tool. They have access to homework, worksheets, lessons, and answer keys at any time and place. All teachers’ notes and class news are always accessible. If they miss a class or have any doubt about an important matter, they can check it on the class website. Those students with language issues are nervous that they miss something during the class. Access to teachers’ websites helps them to make sure they did not miss anything. So they felt more comfortable at the class, and they can concentrate more on what their teacher is teaching.

Talking to participants (MP) revealed that using the smartboard is more popular in Canada than in Iran. As they described, it seems using these boards was useful for these students in learning mathematics. Aside from Ali, who prefers a normal black or whiteboard, other students highlighted that it is more comfortable to use a smartboard. They can use a variety of colours, write as much as they like, without chemical markers, or chalk. All notes and materials on the board can be saved for future use. It is also easy to make perfect geometrical shapes and to copy and paste the information to a page. Angela likes this smartboard and reveals that “I am no longer worry about losing notes when my math teacher is teaching a new topic. I can focus fully and only listen to the teacher”. Based on the participants’ point of view, although using the smartboard is beneficial in learning mathematics, it does not make a big difference.

Another interesting topic in these interviews was using a calculator as technology in Canadian and Iranian schools. All participants (MP) emphasized that in Iran, students at all grades are not allowed to use a calculator, whether in a test or at the classroom. They (MP) added that however, here in the Vancouver area, most of the time, students use calculators. Especially in Grades 11 and 12 students use a graphing calculator to solve equations or graph functions. Participants believed that using a calculator decreased their operational mistakes at tests, helped
them to concentrate on the main point of lessons in the classroom, and made homework easier. Liam said that in senior high school, it does not make sense students take time to do multiplication or division without a calculator. They need to focus on more complicated operations.

4.1.4 Mixed gender classrooms

Based on all of MP, mixed-gender classrooms constitute another big difference between Iranian and Canadian schools. As they (MP) explained, in Iran, religious rules separate girls and boys in society. They cannot participate in any activity together (e.g., separate swimming pools, or use different parts of public transportation). There are parks, banks, taxi, and coffee shops for women that men cannot use. However, although the majority of Iranians are Muslim in Iran, some of them do not practice Islamic laws in their home. However, Iran has an Islamic government, so in public people must follow these Islamic laws; otherwise, the police would arrest them.

In non-religious families in Iran, boys and girls are in contact with each other, and girls do not have to wear a hijab in a family or private gathering. Kids of these families feel more comfortable contacting the opposite sex, so for them to study in a mixed-gender classroom is normal. Ali, Liam, Jazi, and Sara were not religious. They told me studying in mixed-gender classrooms did not make any difference for them. They did not care whether they were studying in a separate or mixed-gender school. It was interesting that when I asked about the issues of mixed-gender classroom, it seemed some of them have not thought about it at all. Liam said, “In
Iran, in every part of society, men and women are separated (in praying, celebrating, or sport). So it is normal to separate boys’ and girls’ in schools too.”

Religious students (who told me that they practice Islamic law, for example, girls wear a hijab) students (Mary, Angela, and Sam) did not like mixed-gender classrooms and believed that it distracts students (especially in senior high school) and hinders them from focusing on their education. As I understood from their explanations, this point of view is the opinion of their parents and these children were not sure whether it is correct or not. In our discussion, they never brought an example of an issue that they faced in their classroom. But since their parents told them mixed-gender classrooms are not appropriate, they believed it too. Sam explained to me that he does not care if he studies with boys or girls but as my parents said “What are the benefits of having a mixed-gender classroom? It does more harm than benefits. In the class, when the teacher is teaching, boys are distracted by girls and vice versa”. Angela told me that she does not feel comfortable asking questions in front of a boy, but she did not mention it as a problem.

In contrast to Angela and Sam, Mary did not object to mixed-gender classrooms and said,

When we study with boys and girls we can learn about our similarities and differences. For example, I like martial arts, but in Iran, girls laughed at me and said I am a boy because martial arts is for boys. However, in Canada, kids know about the boys' and girls' characteristics, so my behaviors seem normal, and nobody laughs at me when I am talking about martial arts. However, my mom believes it is not good.

From what I understood from talking to MP; religious students were influenced by their parents’ opinions regarding the mixed-gender classroom. It seemed they were discussing this matter a lot
at home. When these students were talking about the effects of mixed-gender activities (at school or outside of the school), they were constantly referring to their parents' words. They were told that contacting with the opposite sex would hurt them somehow. Hence, both boys and girls were careful not to be in contact with their opposite sex. They did not have any evidence of a threat, but they avoided their opposite sex anyway. However, avoiding the opposite sex in a mixed-gender classrooms must be difficult for these students. They must collaborate in group projects, participate in field trips, or do volunteer jobs together. These students do not trust their opposite-sex classmates. Lack of trust makes it difficult to do group work and study together.

I believe for kids, lack of trust in the classmates is the first step in lacking confidence in the rest of their new society. Mary and Angela kept telling me that if Canadians did not accept them as who they are, they would not accept them. I wondered what that meant so I asked them what parts of their behaviours might not be accepted by people in society? Their answer was not clear. It seems they do not know either! It was just a feeling that they had. These students wear a hijab outside of their home (school, street, etc.), I assumed they are referring to their hijab, but I did not ask as I knew it is a sensitive topic for them. Wearing a hijab and covering their bodies based on Islamic law made their appearance different from their classmates. Therefore, I asked them whether they have been accepted at school or not; the answer was yes. However, they still worried something if that will happen in the future, and they would be rejected. This fear and uncertainty might prevent these students from planning for their future education. A lack of hope for the future could prevent them from studying currently.

From the discussion with MP, I realized that aside from the relationship with the opposite sex, religious students were afraid of making a relationship with same-sex non-Muslim children.
Sam was telling me that he does not have any problem making friends at school. However, he would not do it because he does not know these children’s behavior outside of the school. He spoke, worked, and collaborated with his classmates whenever it was necessary for education, but aside from that, he would not contact them in any way. He chooses his friends among Iranian families who have the same culture and religion. As I understood from his explanation, he does not accept non-Muslim manners. Although he was not sure whether these people have right or wrong behavior, he would not take a risk and develop a relationship with them. He did not elaborate on what kind of manners he meant, but as a Muslim, I know he was concern about all aspects of his life. Islam suggests Muslims avoid contacting non-Muslims. Islam provided lots of reasons for this rule, these explanations are beyond the scope of this study. However, each Muslim who is practicing Islamic rules must follow them.

I believe connecting with only one group of the community (only Muslim) separates these children from the rest of their new society. They might never develop feelings of belonging to the community when they do not know the people of that society. This separation discourages these kids from attempting to help improve that society. They would not care to participate in group or volunteer activities that are beneficial for the whole community. Any plan for developing the country would be affected too. They will always see Canada as a temporary home.

In contrast to religious students, others were hanging out with their non-Iranian friends outside of the school. These students were not limited because of the culture or religion of their friends; their priority was having a good time and doing fun stuff. They talk, eat, drink, shop, or watch movies with each other without any restriction. Hanging out with non-Iranian friends was
interesting for learning new culture and improving their English language skills. Connection with their friends involves these students in community events. Participating in these events connects them to society and helps them feel attached. It makes them optimistic about the future, which encourages them to work hard and make plans.

During my discussion with these students (MP) I realized that mixed gender classrooms are a symbol of different religions and cultures for religious students. It reminds them that they are not connected to this new culture and people. The religious participants kept talking (in our interviews) about the influence of society on people’s beliefs and religion. It seems they have felt a danger to lose their faith, so they were careful not to lose their confidence in Islam. Religion affects their education, but lack of trust keeps them disconnected with their classmates and teachers. Angela would not make friends with her classmates because they do not have the same religion and lifestyle. Their food, hobby, clothes, and relationships are different. Religious students must eat and drink Halal foods so they cannot go to the same restaurant with their friends. They could not share their food because their friends’ food is not Halal. Their appearance is different because religious girls must wear hijab and cover their whole body.

Although religion remains important for the new immigrants (Ebaugh & Chafetz, 2000; Yang & Ebaugh, 2001), O'Brien (2005) argued that usually, the second generation of immigrants or children of immigrants abandon their native religion and culture to be melted in the new ethnicity and host culture. This abandonment of tradition often happens when these children were integrated with the new community’s children. New immigrant children would like to find new friends among their classmates. They tried to mimic their friends’ behaviours and follow
their lead (Simpkins, Delgado, Price, Quach, & Starbuck, 2013). For example, they started wearing the same clothes, doing the same sports, using the same hair cut or accessories.

I assumed that to prevent these issues among religious Iranian immigrant students, their parents and religious leaders advise youth not to let their friends’ thoughts and behaviours influence them. These students were taught that non-Muslim people intend to change these students’ beliefs, so they must remain alert. So, they are always suspicious about non-Muslims. They are doubtful about any comments or suggestions as they see it as a potential threat to their beliefs. There is a great fear of assimilation and loss of Muslim beliefs, practice and cultural elements.

The next chapter is the last chapter of this study. In this chapter, I will summarize all results and discussion of this research and conclude the answers to my research questions.
Chapter 5: Conclusion

In the previous chapter, I presented the results of my interviews with Iranian new immigrant high school students. These results attempted to answer these two questions: 1) In what ways are the mathematical learning experiences of Iranian high school students different in Vancouver compared to their previous experiences in Iran? 2) To what extent may these differences affect the math learning process of these students?

5.1 A summary of results

In answering the first question, participants pointed out that compared to Iranian math classrooms, in a Canadian math classroom, the language of instruction, teaching methods, use of technology, and classroom environment were different. They also talked about some similarities between the Iranian and Canadian teachers’ approach to teaching mathematics.

These students explained that learning mathematics in Canada became difficult for them because not only the mathematical terms were different, but number style and some of mathematical signs and operations were different too. In terms of different teaching methods in Canada, they (My Participants (MP)) pointed to different approaches in doing their math homework, projects, in writing exams, and in using technology. All participants were happy with the Canadian classroom setting and size and revealed that larger and brighter classrooms in Canadian schools were beneficial for learning math. Although none of the students (MP) complained about the mixed-gender classroom in Canada, those students who were practicing Islamic laws (religious students) showed interest to study in the same gender classroom. Moreover, all participants pointed to the critical role of parents in their children education, especially in learning mathematics. They revealed that their parents’ reactions in pushing and forcing them in learning mathematics had been changed since they have arrived in Canada.
In answering the second question, these students (MP) told me that using the English version of numbers and signs confused them during learning mathematics in Canadian schools. However, since the mathematics curriculum in Iran was almost one year ahead of the Canadian curriculum, these students have had time to practice a new style and avoid failing their math course. It is not surprising that different language of instruction created lots of problems for Iranian immigrant students. Many researchers (e.g., Cuevas, 1984; Vilenius-Tuohimaa, Aunola, & Nurmi, 2007; Riordán & O’Donoghue, 2009; Mellone, Verschaffel, & Van Dooren 2014) discussed the problematic issues of students when they study math in a language other than their native language. Most of these studies usually focused on word problems solving issues of students. However, language issues of Iranian immigrant students were beyond word problems. For an Iranian new immigrant high school student who studied in the Farsi language for nine years, it is confusing to avoid writing numbers in Farsi or not to use (/) as decimal sign. For a Canadian math teacher who has an Iranian new immigrant high school student also, it might be challenging to understand that 2/3 is a decimal number, not a fraction. This kind of confusion is problematic for both Iranian students and Canadian math teachers.

Talking to the participants of this study showed that it takes several months to get used to the English version of numerals and mathematical symbols. They felt lots of pressure during these times to make sure they were using the English versions. Most of the time they have lost exam time because they were more cautious not using Farsi version of numbers and symbols. Or it takes time to review and edit this kind of mistakes at their math tests. At home, it also took time to practice using English versions. Mathematics was not the only course that they had problems with, so they endured lots of pressure. It decreased their overall performance at school.
All participants stated that studying mathematics is different (in many ways) in Canada compared to Iran. However, both Iranian and Canadian math teachers use the same methods in teaching a new subject. Teachers (both in Iran and Canada) start introducing a new topic with solving some examples and finishing it with asking students to do further examples by themselves.

In Canada, on the other hand, math teachers separate final mark into several portions and ask students to do a variety of tasks to get the full mark. For example, doing homework and projects, writing quizzes and exams, attendance, and participating in classroom work have a bearing on the final mark. However, in Iran, the math teachers marked students based only on the final test. So, in Iran, if a student studied thoroughly for the final test and got a full mark on that test, she/he would get the total mark for the course. For these Iranian new immigrant students who are used to be marked based on only one exam, Canadian teachers’ method would be confusing.

All participants stated that Canadian math teachers’ method in using a variety of technologies to teach math has had a positive impact on their math learning process. Using on-line materials like watching YouTube videos, using teachers’ websites for doing homework, or learning a new lesson were entirely new for these students. They could have viewed videos several times, paused the video to take a note, or added subtitles to make sure they understood everything. They have had access to classroom materials, homework, notes, test time, worksheets, exam review, answer keys, or videos via math teacher’s website. So they did not get nervous that they might miss something at the class because of the language issue or being absent in a class.

The demographic factors that influenced mathematics learning of these students were limited to their parental educational level, family income, and religion. All students were living with their parents (mother and father) and siblings. All have educated and wealthy parents who could afford to send them to a private school in Iran. Although all families were wealthy in Iran;
because of political issues that I explained in Chapter 2; they might face some financial problems in Vancouver.

As I discussed in Chapter 2, parental education positively affects children performance in learning mathematics, but this might not be true in the case of Iranian immigrant parents. The parents of all participants were highly educated, but most of them could not help their children in learning mathematics in Canada. Lack of knowledge about the Canadian education system and curriculum is the first reason why they cannot help and support their children. The second reason was the lack of English language proficiency. The third reason was immigration issues, which made them busy.

These parents could not help their children in their education, but they also encouraged their children to make wrong decisions. For example, the lack of proper knowledge about elective courses in high schools causes these parents to push their children to select wrong classes. They decided based on their expertise and background of the Iranian education system, which is not similar to the Canadian one. Since they are not in contact with their children’s math teachers regularly, they do not have proper information about their children difficulties in learning math as they had in Iran.

In Iran, the school’s counsellor and teachers immediately contacted students’ parents to let them know any issue of their children's education. So, if their children did not do their homework or got a low mark in a test, parents would know almost instantly. Hence, children studied hard to make their parents happy. Otherwise, they would have been punished by losing their allowance or electronics. In Canada, teachers or school counsellors do not contact parents for every single mistake of students, so parents might never know that their children did not study for a test or did not do their homework.
On the other hand, parents are not familiar with the school system to know what they should expect from their children in doing homework or studying for a test. Their English language issues also hinder them from contacting teachers and asking about their children progress. When they receive an email from the school, they cannot understand it well. Also, most of these parents are busy with lots of issues from immigration like housing, finding a job, to financial difficulties, so they cannot supervise their children education as they did in Iran. Their children feel sure that their parents would not know about their laziness and neglect towards their education, so they do not feel pressure from their parents or teachers to do their homework or study for a test, and they often do not study. Similar to their parents, they face many issues in a new community and school. So they might unconsciously be involved with these new issues and forget about their education.

To overcome their (MP) problematic issues in a Canadian school, especially in a math classroom, they have used several different strategies. For example, to deal with language difficulties, most of them made friends among English speaking students, participated in ELL programs, or watched English language movies. They learned how to use online materials and to connect to the teacher's websites. They still are struggling with finishing their homework and studying for their exams. Although they like having a second chance in doing homework, or writing a test, most of them still do not use it wisely.

From what I learned in these interviews, one of the essential differences between learning math in Iran and Canada is being or not being in a position to decide on doing math homework. In Iran, students study under the supervision of teachers and parents. Students cannot decide whether they do their homework or not. They have to study and finish their school work. Although students are must study for all courses at school, studying math is taken more seriously by parents and teachers. In Iran, fear of punishment (losing allowance, electronics, or losing playdates) pushed
students to do their math homework and study for their exams. These students were not in a position to make any decisions; they follow the rules.

Immediately after starting their education in a Canadian school, this changed. Now, these students are in the position of authority, and they need to decide whether to finish or do not finish their math homework. In the school (Canadian) math teachers gave them this choice to complete their homework in a time interval. If they have not had time to finish it by due time, math teachers usually give them more time to complete their work. They no longer feel the shadow of their teachers or parents (as it was in Iran) who were forcing them to finish their work or to study.

In Canada, they have the power of authority, but the question is to what extent these students are ready to have this authority? They came from a culture (Iranian culture) where the parents make all decisions for our children. Even when they (children) finished their high school, they are still under the supervision of their parents. They (parents) determine where they live, work, or study. They (parents) select their children’s field of education at the university. So, as Iranian parents, we do not educate our children to make a decision; instead, we teach them to follow us. We (parents) assume they are only children, and they do not know what is right or what is wrong. They need experienced and knowledgeable adults to help them and make the decision for them. Iranian new immigrant high school students are in a position that they have never been educated for. They have not had any similar experience in their life. Canadian teachers gave them the authority to do what these students think is suitable for them. Since they (these students) do not have any experience, they might not know what to do. During our discussion in the interviews, some of my participants told me that they seek help and guidance to decide their school issues. However, their parents could not help them. Their parents were busy with new life issues, and they do not have proper knowledge about Canadian schools.
Only one of my participant (Sara) told me she would study whether she is pushed or not. She likes learning, so she does not wait for their teachers or parents to force her. Therefore, having authority did not make any difference in her education. However, Ali, Liam, Angela, Sam, Jazi, and Mary did not know how to decide or what to decide. Although they were not ready (as they told me) to make a decision, they had to do it. Liam decided to take a math course though he does not like math, and Ali decided not to finish his math homework for a long time.

Aside from Mary who arrived in Canada one year ago, all other participants have been here in Canada for several years. However, based on our discussion, they still are making wrong decisions (as they said that) about their education. Ali and Liam told me that they need to take their math homework more seriously and finish it on time. They came to this understanding that not doing math homework decrease their math knowledge and mark. However, I am not sure whether they will do their homework in the next year or not.

Religious students kept talking about their negative feelings towards their classmates and teachers who (from these students point of view) would change their faith and feeling towards Islam. Nobody at Canadian school approached them to talk about their religious beliefs. However, they still were suspicious that connecting with non-Muslims will separate them from their faith. This doubt came from their parents' ideas, who advised them to do not establish a relationship with non-Muslims.

As I discussed earlier, Iranian parents tend to take control of their children's lives. They make decisions for all aspects of their children’s lives. I am not sure why religious Iranian parents prevented their children from making friends among non-Muslims, but this decision moves their children away from the general community. These children are supposed to be a part of Canadian
society and work hard to upgrade our community. However, I am wondering how they would do that if they feel separated from this society.

5.2 Recommendations

From what I learned from my study, these students need help and support to settle down in the new educational system. My participants told me that there are some programs in the different school districts in Vancouver that offer new immigrant students consultation sessions regarding the Canadian educational system. However, as my participants mentioned, these programs do not focus on a specific course like mathematics and also do not offer specific tips. Canada is a multicultural society and providing consultation sessions for students of all different culture is difficult and costly. However, it is good for immigrant association or multicultural government associations to know that making these consultation sessions would be beneficial for students, and these sessions could improve their education performance.

Using the English version of numerals and mathematical operations is difficult and tedious for Iranian new immigrant students. They need support to understand these differences and learn and to operate the new version. Moreover, translation mathematical words and terms from Farsi to English and vice versa is difficult for them too. They need a booklet explaining these differences and translating these terms. This booklet would be their guideline in their path of learning mathematics in the English language. This booklet can be used by Canadian math teachers to be familiar with the Iranian math methods and styles.

Iranian new immigrant students need support to learn how to make decisions and how to be more autonomous. Being autonomous is not only important for doing their homework or study for a test; they also need to learn how they should use their social authority in a variety of situations.
like driving a car, crossing a street or voting. On the other hand, the parents of these students need consultation sessions to learn how to give their children the authority and at the same time, supervise them to stay on the right path. For Iranian parents who are used to have full authority and to make decisions for their children, it might be frightening to give away their power. They might not know how they can deal with a child who has the authority to make decisions.

In the end, I believed math teachers (and maybe all teachers) need to have information about their immigrant students. For example, knowing immigrant students’ math background, their first language and the way they are used to doing some of the math operations would be beneficial for students and teachers to find the best way in helping these students. As a teacher who has experience teaching students who had problems understanding the language of instruction (when I did not know their mother language), I know it is tough making the connection with students and teaching them new topics. However, as we all living in a multicultural society, we (teachers) are obliged to understand and help these students. I know it might be impossible to learn about all different immigrant students in a math classroom, but it is possible to show them that we (teachers) know they are struggling and that we will try our best to help them.

5.3 Limitation of the study

In designing the questions, collecting and analyzing the data, coding and writing the results and discussion, I did my best to do not involve my judgment and thoughts and focus on literature, written questions and transcribed interviews. However, as a researcher, it is not possible to completely avoid bias/personal engagement to my study, so some themes and codes that came to my mind when interviewing my participants, listening to interview tapes, or reviewing interview transcripts might possibly contain some level of bias.
Most of the participants studied in the Iranian high schools for about two years (Grades 7 and 8) before coming to Canada. None of these participants finished Grade 10 in Iran. As I mentioned in Chapter 2, students in Grade 10 choose one branch out of three (literature/humanities, experimental sciences or math/physics) branches. The level of mathematics knowledge in each of these branches is different. However, the result of this study did not represent the issue of students who studied in any of these branches in Iran. It is expected that those students who studied in math/physics, and experimental sciences branches have a strong math background. In contrast, those students who studied in the literature/humanities branch might not have good math knowledge.

Similarly, the results of this study did not involve those students who choose the technical-vocational/professional or the manual skills branches high schools in Iran. The mathematical background of these students is different from those students who studied in the theoretical branch high schools. So, conducting another study would be beneficial to get a good understanding of the issues of these students.
References


Ganji, M. (2018). *New education system in Iran, Iranian education*. Retrieved from https://m-ganji.com/%D9%86%D8%B8%D8%A7%D9%85-%D8%A2%D9%85%D9%88%D8%B2%D8%B4%DB%8C-%D8%AC%D8%AF%DB%8C%D8%AF-%D8%A7%DB%8C%D8%B1%D8%A7%D9%86/


Marjoribanks, K. (1996). Ethnicity, proximal family environment, and young adolescents’
https://doi.org/10.1177/0272431696016003005

Marks, G. N. (2005). Accounting for immigrant non-immigrant differences in reading and
https://doi.org/10.1080/01419870500158943

https://doi.org/10.1177/1745691610375557

student mathematics and science achievement: Multination findings from the programme
for international student assessment (PISA). *Journal of Educational Psychology, 104*(4),
1054–1073. https://doi.org/10.1037/a0029152


https://doi.org/10.2307/1170592

*Handbook of research on mathematics teaching and learning: A project of the National
Publishing Co, Inc.

Melhuish, E., Phan, M., Sylva, K., Sammons, P., Siraj, I., & Taggart, B. (2008). Effects of the
home learning environment and preschool center experience upon literacy and numeracy

https://doi.org/10.1111/j.1540-4560.2008.00550.x


https://doi.org/10.1177/1053451215579272


https://doi.org/10.1080/15391523.2009.10782537


https://doi.org/10.1080/01650250344000307


https://doi.org/10.1207/S15327711JLE0102_6


https://doi.org/10.1017/S1366728916000742


https://doi.org/10.1177/1049732317699570


https://doi.org/10.1007/BF03177319


https://doi.org/10.2307/2657418


Appendices:

Appendix A

A.1 Questions for interview 1 of 2: Background information

1. How old are you?
2. What is the name of your school?
3. When did you come to Canada?
4. What grade did you complete before coming to Canada?
5. How many siblings do you have? How old are they?
6. What are your parents’ or other family members’ educational backgrounds?
7. Who are the people in your household? What is their relationship to you?
8. What are your parents’ occupations?
9. Which schools have you studied in when you were in Iran?
Appendix B

B.1  Questions for interview 1 of 2: Adapting to a new society in Canada

1. When you arrived, how comfortable did you feel communicating in the English language? How long did it take you to feel confident in communicating in English? What supported you in learning the English language?

2. How do you feel about being a part of the community here? How has your experience been in finding new friends informally or through clubs, youth programs, etc.?

3. To what extent did you have information about Canadian schools’ rules or teaching methods before going to school here?

4. How would you describe your performance at school?

5. What kind of similarities and differences do you recognize in school rules and practices (here and in Iran)?
Appendix C

C.1 Questions for interview 2 of 2: Learning mathematics

1. Could you compare your math textbooks in Vancouver and Iran? What do you notice that is the same or different?
2. Think back to how you learned mathematics in Iran. Think of your teacher’s strategies, how the classes were organized, what the teacher did and what you as a student did in math class. Please describe what this experience was for you in Iran.
3. Now let’s consider your experience here in Canada. Can you describe your experience of learning mathematics here in Canada, what does the teacher do, and what do you do as a student?
4. What are the significant differences between teaching and learning math in Iran compared to teaching and learning math in Canada? (What kinds of supports like tools or technology did they have; marking exams; homework). Aside from your math teacher and math classes, does your school have any other program, helping students improving their math (both here and Iran)?
5. What are your strategies to deal with differences in school rules or teachers’ methods?
6. How are the different teachers’ methods or classroom setting here affecting your math learning?
7. How is the different language of instruction influencing your math learning process? To what extent might utilizing a translator help you to write your exams?
8. How your math teachers are helping you (as a new immigrant) to facilitate your math learning here?
9. If you were asked to point to a specific issue that you encounter in your math class or learning mathematics in Canada, what it might be?
To Participate in a Research Study

What are the challenges faced by Iranian high school immigrant students in learning mathematics in Canada?

In the Faculty of Education, UBC, we seek to understand the challenges and issues that Iranian immigrant high school students are facing in learning mathematics. The ultimate goal of this project is helping students to improve their mathematics learning.

If you have a teenager 14-18 years old who has at least one year experience studying in Iranian and Canadian schools, you can help us!

We will come to you whenever and wherever is convenient for you!

We will interview your teenager two times.

For more information about the research:

Maliheh: [Redacted]; Email: [Redacted]

Susan: [Redacted]; Email: [Redacted].
### Appendix E

#### E.1 Table of coding

<table>
<thead>
<tr>
<th>Language proficiency</th>
<th>start talking</th>
<th>ELL</th>
<th>comfortable talking English</th>
<th>help to start talking English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liam Little</td>
<td>From the beginning</td>
<td>2 years. Social, and science. No ELL math</td>
<td>Not 100%. Some words in Farsi, some new in English, idiom</td>
<td>Talking to friends</td>
</tr>
<tr>
<td>Mary Nothing</td>
<td>One year</td>
<td>One year ELL No ELL math</td>
<td>Now, Farsi and English 50-50, depends on audience</td>
<td>Talking to friends</td>
</tr>
<tr>
<td>Ali Shy but already had class in Iran</td>
<td>After 3 month start speaking English</td>
<td>ESL in middle grade 8. From next year regular class. No ELL math</td>
<td>After 3 month start speaking English-Farsi is more comfortable but some words learn in English</td>
<td>Friend with English language hang out. Watching movie with subtitle, music in English, force me to speak English</td>
</tr>
</tbody>
</table>