

Exploring Learning Conditions for Adult Learners in a Mathematics Course in Manitoba
from a Critical Perspective

by

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ABSTRACT

This qualitative study explores the learning conditions of marginalized adult learners enrolled at an adult high school. The study also explores the role of mathematics in the adult learning environment. The study collected data from two sources: a survey collected data from 64 adult learners enrolled in a high school mathematics course that leads to graduation; interviews were also conducted with ten of these participants. The findings indicated that although both external and internal factors were identified by the participants as affecting the learning environment, these were not regarded as barriers to learning. The participants had a positive view of their own abilities. Mathematics was regarded by the learners as important and was not regarded as an obstacle to their goal of a high school diploma.

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INTRODUCTION

In today's society, a high school diploma is generally regarded as the minimum educational requirement necessary to benefit both individuals and Canadian society as a whole (Hankivsky, 2008, p. 5). In its commitment to education, the province of Manitoba has recently amended legislation to raise the compulsory age to attend school to 18 years, from 16 years of age (Government of Manitoba, 2011a; Government of Manitoba 2012a). In fact, Manitoba Education has a vision that every learner will complete a high school education with a profound sense of accomplishment, hope and optimism (Government of Manitoba, 2012b). In a just world, every learner would have this opportunity because education is transformational on both a personal and societal level. It can contribute to a certain level of economic and social well-being, but it can also contribute to a more socially just and democratic world.

According to statistics provided by the provincial government, the Manitoba high school graduation rate for June 2011 was 83.5% and the rate is trending upward (Government of Manitoba, 2012c). While this is good news for our province, there remains a significant percentage of people who do not attain a high school diploma on time. I work at a school where many of the learners have returned to school as adults in an attempt to earn a high school diploma. It is a self-described school of "second chances" for students 19 years of age and older who have not yet graduated from high school. Most of the students are Canadian born, however, approximately one third of the students are foreign born and either did not have the opportunity for education when they were younger, or did not receive accreditation for prior education once arriving in

Canada. I have been teaching at this school for approximately ten years, and in that time, I have met thousands of students who did not achieve a high school diploma on time. After a while, their stories began to sound similar; some lived through childhoods of neglect or abuse, some were caught up with the wrong crowd, many had had negative experiences with school when they were younger and others did not have the opportunity to attend school when they were younger. Most of these learners, when asked, will say that they returned to school to improve the quality of their life and the lives of their children, which supports my personal belief in the power of education to change lives. However, after working as a teacher in the public school system for a number of years, I began to realize that, although the intentions are stated otherwise, public education in Manitoba produces disparities in learner achievements, based, it seems, on socio-economic status. Equal access to education does not necessarily result in equal outcomes.

School itself is difficult for many learners but mathematics assumes special importance in Manitoba. Manitoba is the only western province in Canada that requires a Grade 12 mathematics credit in order to graduate with a high school diploma. The reasons for this remain unknown; communication with the Manitoba Department of Education Mathematics Consultant (Grades 9-12) and the Manitoba Government Coordinator in charge of curriculum revealed that they could not locate any written rationale for this requirement (personal communication, November, 2012). However, recent media articles suggest that the mathematics skills of Manitoba students seem to be of particular concern to the current government, based in part on Manitoba's poor standing in a recent national mathematics test. The Minister of Education, Nancy Allan, convened a mathematics summit to indicate that she is concerned with ensuring that all

Manitoba graduates have the necessary mathematics skills they need for university, college, and the workplace (Martin, 2012). Allen's comments seem to imply that the requirement of a Grade 12 mathematics credit for graduation purposes will not disappear in the near future.

Manitoba offers three distinct mathematics pathways that all lead to a Grade 12 mathematics credit: Pre-Calculus Mathematics, Applied Mathematics, and Essential Mathematics. The Essential Mathematics course was previously called Consumer Mathematics (the course was restructured and renamed in 2012). At the time of this study, the course offered was the former Grade 12 Consumer Mathematics course so I will refer to the course by its previous name, Consumer Mathematics, in this thesis. Each pathway is distinct with regards to content, level of difficulty, and to future opportunities in terms of acceptance into post-secondary programs.

A lack of education can affect one's future. Low mathematics and literacy skills have been linked with economic and social problems. People with low literacy have few choices in jobs, in education, and in housing and also experience higher rates of poverty. The effects of poverty on health have been well documented; insufficient food and a lack of money for prescription drugs, vision care, and dental care all contribute to poor health. Children from low-income homes are also more likely to have low birth weights and suffer from malnutrition; they also have higher rates of death than other children (Campaign 2000, 2010 p. 3). Considering the high economic and social costs that accompany low literacy and numeracy rates, it is in the best interest of governments to provide all citizens with the necessary education and skills needed to obtain jobs and contribute to the tax base, thereby minimizing the costs of providing social assistance.

Providing education also offers citizens a better quality of life and the personal pride that accompanies achieving a diploma (Amstutz & Sheared, 2000, p. 155). This study will focus on adults who have returned to school for high school completion purposes and who are enrolled in a Grade 12 Consumer Mathematics course.

In Manitoba, a mature student is defined as one who is at least 19 years of age and has been out of school for at least six months (Government of Manitoba, 2012d). A mature student can receive a high school diploma by earning eight high school credits; four credits must be at the Grade 12 level and these must include a grade 12 English credit, and a Grade 12 mathematics credit (Government of Manitoba, 2012e).

Why some learners do not attain a high school diploma on time is a complex issue and the reasons would seem to be as diverse as the learners themselves. This study will focus on two broad groups of adult learners who are attempting to earn a high school diploma: Canadian born learners who dropped out of school when they were younger, and learners who came to Canada from other countries.

Canadian Born Learners

Despite the fact that the Province of Manitoba increased the compulsory age to stay in school to 18 years of age, many learners still leave school well before they graduate or turn 18 years of age. There are many reasons for premature departure; these include health problems, family issues, and personal problems (Statistics Canada, 2011). The decision to return to school is often due to job or training requirements or occurs when the learner starts a family. Although adult learners have made a voluntary and conscious decision to return to school, many still experience difficulty with learning, especially if

they have had previous negative experiences at school. They may suffer from feelings of a fear of failure or low self-esteem and, if these students are also members of a non-dominant culture, they may experience disconnect with institutional standards like curricula or teaching styles. Some learners may distrust the educational system in general (Flynn, Brown, Johnson, & Rodger, 2011, p. 46).

Foreign Born Learners

Foreign born learners may have been denied an education in their countries of origin; others have had their education interrupted. These learners may also possess education from other countries that is not recognized as equivalent to Canadian standards. Foreign born students may encounter cultural differences regarding roles and responsibilities for teachers and for themselves as learners. Some may also experience lingering physical and/or psychological effects of traumas experienced before they came to Canada, which may adversely affect learning. These after effects may include difficulty in concentrating and in processing and remembering information (Magro, 2008, p. 24).

The most efficient way for an adult learner to attain a high school diploma in Manitoba is under the mature student status, as defined earlier. Adult learners in Manitoba have a number of options for attaining a high school diploma under this status: at an adult learning centre (ALC), at a regular high school, at a high school for adults or through distance learning. Most of these options are tuition free.

Purpose

The purpose of this study is to obtain the personal perspectives of adult learners enrolled in mathematics at an urban Manitoba high school. This research study developed through my current professional role as a mathematics teacher in a high school for adult learners. After several years of teaching at this school, I observed many adult learners who encountered difficulties in their attempts to attain a high school diploma, and, in particular, struggled with the mathematics required to obtain that diploma. In September of 2010, out of a total of 961 students registered for all mathematics courses at my school, only 387 completed their courses by the end of the semester, an approximate completion rate of 40% (School Principal, personal communication, 2011). This is of concern to me both as a teacher at the school and, personally, as someone who believes in the power that education has to change lives. I want the students at my school to succeed academically, and obtaining a Grade 12 mathematics credit is part of this success. Exploring the learning conditions of these adults and their perspectives on the mathematics they are enrolled in, would be a valuable endeavour for my students and for myself. I believe that seeking to understand the experiences of adult students will enhance both my teaching, and the academic experiences of my adult learners.

Rationale for the Study

The school involved in the study is a high school for adult learners, with approximately 900 students attending on either a part-time or full-time basis. It offers a variety of courses, including all levels of the three pathways in mathematics: Pre-Calculus Mathematics, Applied Mathematics, and Consumer Mathematics. These three

pathways are different in content, level of difficulty, and in terms of future opportunities available to learners.

There have been other studies done with adult learners in Manitoba but these studies have not focused specifically on the learning of mathematics and these other studies have taken place in learning environments that differed from the school in the study, in terms of both size and structure. These studies will be described in more detail in a subsequent chapter of this thesis.

It is the intent of this study to gather information about the perceived learning conditions for adult learners at a large urban high school, one which offers diverse learning opportunities. The findings of the study will hopefully lead to a deeper understanding of the needs of adult learners and their learning environment.

I am approaching this study from a perspective of research for social justice. Research for social justice is undertaken with a concern to right both individual disempowerment and structural injustices of gender, social class, race, sexuality, and disability (Griffiths, 1998, p. 32). Research for social justice is an orientation which recognizes that persons' ability to change their socio-economic position is limited by existing social, cultural, and political domination. This research orientation will affect both how I approach the study and how I interpret the data.

In my experience as a teacher at this school, the adult learners have never been formally asked to share their perspectives on their learning environment or to explain why they chose the mathematics courses that they did. They have not been given a forum to voice what they feel may enhance their learning, or alternately, what they feel may impede their learning. Perhaps it is assumed that, as adults, they will freely identify and

express their opinions about their learning environment if they have concerns. However, from personal experience, I have found that adult learners are usually reluctant to voice their concerns; they rarely question educational authority and also seem unaware that they may have some control over their learning environment. As a result, the reasons why many adult learners fail to achieve their academic goals remains unknown. Since one of the overarching goals of the Manitoba Education is to significantly increase achievement levels of those students who have been historically less successful (Government of Manitoba, 2012b), it would seem appropriate to gain the perspectives of these learners on their particular learning environments.

This study evolved from my personal involvement with adult learners and a desire to explore what could assist them to become more successful. By giving these learners a voice, I hope to gain knowledge that will improve my teaching, and improve the academic experiences of the adult learners at my school.

Research Questions

The following questions will guide my research: From their perspectives, what are the learning conditions that support or hinder adult learners in an adult Manitoba high school? In particular, given that a Grade 12 mathematics credit is a pre-requisite to graduation in Manitoba, what conditions support or hinder the learning of mathematics for adult learners?

LITERATURE REVIEW

This literature review focuses on two main areas of research: adults returning to school to complete a basic education and the role that mathematics plays in this endeavour. The United Nations Educational, Scientific and Cultural Organization (UNESCO) defines a basic education as a broad pool of knowledge that everyone, children, youth and adults alike, are entitled to at any stage of their lives as a right. This not only includes basic academic programs such as reading, writing, and arithmetic but also the ability to express oneself in a language that lends itself to dialogue and understanding, (UNESCO, 2007, p. 7).

Critical Adult Education

Adult education encompasses a large and diverse range of programming. It includes any non-higher education learning undertaken by adults; this includes basic literacy, education offered in the workplace to improve skills, courses taken for high school completion purposes, and lifelong learning courses taken for personal interest. UNESCO states that the purpose of adult education is twofold: to contribute to the full personal development of the learner and also to contribute to the learner's participation in a balanced and independent social, economic and cultural development (UNESCO, 2009, p. 13).

Other parties may view the purpose of adult education quite differently. Government is invested in education, especially adult education, as a means to keep its citizens employed and contributing to the economy by supporting the tax base.

Employers may view adult education as a way for employees to update their skill sets in a rapidly changing world. Educators might see adult education as an attempt to provide equal opportunities for all as well as for the learners' personal growth and development (Ahl, 2006, p. 385). Adult learners may view adult education as a way to improve their lives and the lives of their families. Taking into consideration all of these different perspectives, adult education is not only an academic pursuit but a moral and political endeavor (Nesbit, 2006, p. 173).

Malcolm Knowles, a key figure in the world of adult education, popularized the term *andragogy* to exclusively describe the teaching of adults, and to separate it from the teaching of children, known as *pedagogy* (Knowles, 1990). Knowles presented five assumptions about adult learners: that adults are self-motivated, have an abundance of life experience on which to draw, are goal-oriented, are relevancy-oriented, and are internally motivated to learn. These assumptions suggest that once adults make the decision to return to school, success is inevitable. However, many adult learners are not successful, even when the personal stakes are high.

As stated previously, adults return to school for a variety of reasons, including to obtain credentials for better employment opportunities or to access higher education (Government of Manitoba, 2010a). There is usually an element of choice involved when an adult returns to school, however, "choice" may be a somewhat misleading term; many adults may feel forced to return to school, whether they want to or not, due to lack of job opportunities. Adults may also view education as an inescapable activity, because those in power expect it (Crowther, 2000, p. 483). Just as adults may choose to return to school, they may also choose to leave, which is one of the differences between adult and child

learners. Children must legally stay in school until a certain age and therefore must put up with what they might perceive as uncomfortable or disrespectful learning environments, whereas adults may leave when they feel threatened or uncomfortable. Retention then becomes an important issue in adult learning. Adult learners leave programs for reasons which may be specific to the individual learner or specific to the program itself. The challenge for adult educators is to recognize the many contextual elements influencing learning in and out of the adult education classroom in order to create effective and just learning programs for adults (Alfred, 2002a, p. 3).

Knowles limited his discussion of adult learning to psychological traits. These include the move towards becoming self-directed as we mature, the readiness to learn on an “as needed” basis, accumulating life experiences that can be drawn on as a learning resource, and seeing education as a way to achieve one’s full potential (Knowles, 1990, p. 3). Knowles’ assumptions seem to imply that adults function in their learning environment apart from any impediments of their individual circumstances. However, others have stated that external factors, whether societal, political, or economic, may have more influence on adult learning than psychological factors (Lee, 2003, p. 19). Caution must be taken, however, against overemphasizing these external factors, as this might underplay the efforts and achievements of individual learners (Bamber & Tett, 1999, p. 471). When discussing issues faced by adult learners, there is a danger on focusing solely on the learner’s potential barriers; this approach may not only result in assigning blame to the learners for their particular life circumstances but it can also ignore the potential biases and inequities in the educational system. Lack of participation in education may not be due to a lack of motivation or indifference on the part of the

learners but due to a resistance to mainstream education, formed in part by previous negative past experiences with it (Crowther, 2000, p. 488). When examining any potential barriers for adult learners, we must also to examine the education system itself for learning barriers it may erect or support.

By definition, in Manitoba, adult learners share the common characteristic of being 18 years of age or older, although this does not make them a homogeneous group, nor does it necessarily make them an uncomplicated group to teach. In fact, teaching adults has many challenges due to its potential for a wide diversity of ages, backgrounds experiences and expectations (Kerka, 1995, p. 1). As we examine learning across the lifespan, variables such as culture, ethnicity, personality and political views assume far greater significance than chronological age (Brookfield, 1995, p. 1).

The Adult Learning Environment

The decision to re-enter the school system as an adult is an important first step but does not guarantee the successful completion of an academic program. The expectation of personal success and a belief that this success will lead to positive consequences must outweigh any negative factors that the adult learner may experience, such as loss of income or loss of social acceptance. Even the initial motivation to participate in education is influenced by both external and internal factors, which may also then affect the learning environment (Ross-Gordon, 1990, p.10). The external and internal factors that influence adult learning have been studied and documented by many in the adult education field and are often categorized as dispositional, situational, or institutional in nature (Crowther, 2000; Flynn et al, 2011; Ahl, 2006; Bamber & Tett, 1999). These

factors are often interrelated and self-perpetuating, and the majority of adult learners encounter at least one of them over their lifetime (Ritt, 2008, p. 14).

Dispositional factors

Dispositional factors include such concerns as a fear of returning to school, which can be attributed to low self-esteem, previous negative experiences with education, or identification with a social group where education is not valued (Rubenson, 2009, p. 192, Ahl, 2006, p.395). A negative history with education adversely affects participation in adult education (Bamber & Tett, in Flynn et al, 2011, p. 44). Disapproving views about education from one's family and friends can also affect participation in adult education. Learners may face a struggle between bettering their life circumstances through education and maintaining their position in their culture group. Another important consideration regarding adult learners is the recognition that when there is a history of unsuccessful school experiences, any accompanying diminished self-confidence and anxiety may have had years to become embedded (Mullinex & Comings, 1994, p. 6).

Situational Factors

Situational factors involve issues regarding geographic location, family and work commitments, financial limitations, or lack of adequate child care. Work commitments can conflict with school and can also interfere with the amount of time that a learner has to study. People with limited incomes are more likely to be limited with regards to technology such as computers or Internet access and are less likely to buy books or newspapers (Flynn et al, 2011, p. 46). Child care and family responsibilities are the

greatest barriers to women's participation in education; this is especially true for single mothers (Hoffman, in Flynn et al, 2011, p. 44). Domestic abuse is another factor in women's education; they may be prevented from attending classes due to threats of physical or emotional abuse (Horsman, in Flynn et al, 2011, p. 44).

Institutional Factors

Factors that are institutional in nature impose restrictions that may be outside of a student's or adult educator's circle of influence. These include limited or no access to education or high costs associated with it, curricular content, course scheduling and program design (Ritt, 2008, p. 14; Magro, 2008, p. 26). Curriculum that is not relevant or uninteresting can frustrate adult learners (Flynn et al, 2011, p. 45). People who do not speak the dominant language may also feel excluded in an educational setting (Sparks, in Flynn et al, 2011, p. 45).

Considering the potential barriers, adult participation in learning becomes a complicated response to a series of issues. Despite the resources offered to adult learners and special considerations such as the mature student diploma, many adult learners still encounter the same issues or obstacles that prevented their earlier academic success. Adult learners may also experience a gap between their expectation and reality, which may result in frustration due to lack of progress or achievement, resulting in dropping out (Hamann, in Kerka, 1995, p.2).

A new approach to adult education might offer a different learning experience for adult learners, one that may lead to more success for learners and eventually, to a more equitable and just society. Transformative education attempts to address issues of

marginalization, inequity, and imbalances of power and resources, with a goal of restructuring society. Presently, many adult education programs focus on addressing the shortcomings of the learners so that they can fit into the existing societal structure, rather than identifying and working with the learners' strengths or identifying any possible shortcomings of the educational system itself (Amstutz & Sheared, 2000, p. 161). A critical or transformative approach to education addresses societal problems such as racism and discrimination and examines its effects on education and learners (Keddie, 1980, in Sparks, 1998, p. 245). This approach does not blame the learner for resistance to education or for not succeeding; it looks to the social structures that produce and reproduce the status quo and that may impede participation and success of all learners.

The Role of Adult Education

Although adult education is intended to ameliorate the personal and social disadvantages created by one's circumstances and background, it often clarifies or exacerbates these existing disadvantages (Nesbit, 2006, p. 171). Scholars are beginning to question how the adult education community empowers some learners and silences others (Alfred, 2002a, p. 11).

The belief in North America that our culture represents the height of human achievement represents immense cultural ignorance (Orr, 2004, p. 12). The dominant view in North America typically involves the promotion of capitalism, individualism, consumerism, and social efficiency. Skills, competencies and attitudes linked to these aspects of the dominant view are considered "cultural capital", which includes the prior knowledge and language forms required to fit into this dominant culture. In academic

institutions, this cultural capital often results in a hidden curriculum, a term for the informal knowledge that serves to reinforce the academic and moral values of the dominant culture and to uphold social inequities. A strong sense of self is essential if learners are to become truly autonomous and confident enough to effect change in their world. Therefore, exclusion of some students' cultures in educational settings can lead to a lack of self-esteem and confidence (Frankenstein, 1990, p.347, Lee & Sheared, 2002, p.28).

Societal issues such as culture, race, and social class and how they manifest themselves in the classroom are of particular concern to adult educators (Alfred, 2002a, p. 8). Social constructions like these, whose meanings are continuously being reconstructed, create inequity in power structures in economic, political, and social spheres (Apple & Weis, in Cain, 2002, p. 67). Education is a major arena of social activity and is shaped by both cultural and economic influences (Althusser, 1971; Gramsci, 1971, as cited in Nesbit, 2006, p. 172). Education also shapes how we understand the structures of society and power and how we either accommodate or resist these power relations in our personal and public lives. Educational systems are one of the most important vehicles for *hegemony*, the process by which a society inculcates and maintains dominant ideas by portraying them as natural and normal. Some may use the educational system, and its associated institutions, policies, approaches, and practices to perpetuate their own positions of privilege and power and reproduce existing patterns of social relations (Nesbit, 2006, p. 172); others may be unaware of their role in the perpetuation of hegemony. This lack of awareness occurs both among educators and among members of marginalized groups. The term "to marginalize" is defined as "to

relegate to an unimportant or powerless position within a society or group (Merriam-Webster, 2013).

Previous studies with adult learners indicate that marginalization has effects on learner retention. Sparks (1998) conducted research with a group of Mexican-American adult learners who were enrolled in an adult education program in the Southwest United States. These learners all left the program before completion; Sparks interviewed these adults to ask why they left. The findings of the study reported that many of the students said that they had left the adult learning program because they felt marginalized and excluded, due in large part to the structure of the adult learning environment. The program offered individualized, self-paced instruction, which the learners cited as making them feel isolated and excluded. They reported that the individualized approach led to being easily ignored by the teachers, enhancing their feelings of marginalization. These learners preferred a group learning environment where they could collaborate and share resources. They added that a group learning environment was also more aligned with their culture. The findings of the study indicated that adult education must be restructured to be more inclusive and supportive of non-dominant groups. The study also concluded that there would be no change to the status quo if we focus only on the shortcomings of the learners and overlook the shortcomings of the learning programs.

To become aware and to think critically would mean questioning the status quo, both by educators and by learners. Educators should ask themselves if their teaching is in fact contributing to the goal of all learners becoming full and equal participants in a democratic society or if their teaching is perpetuating an inequitable status quo. Learners

also have a role in questioning any educational practices that may contribute to social and economic inequality.

Critical education theorists maintain that knowledge is not neutral. It is in fact part of a gendered, racial, economic, and social class context (Amstutz & Sheared, 2000, p. 157; Crowther, 2000, p. 479). Although assumptions and beliefs about the concept of knowledge should be questioned, this is rarely done (Ahl, 2006, p. 397). The aim of Critical Theory is to develop an awareness of the stratification of society and that one's position in society is based on these constructs of class, race, gender, and culture (Giroux, 1981, 1997).

As classrooms become increasingly diverse, there is growing concern about the lack of school success for students of colour, immigrants and refugees, and minority language speakers; such learners are often marginalized (Hawkins & Norton, 2009, p. 1). However, we must remember that just as adults do not represent one homogeneous group of learners, all foreign born students do not represent one homogeneous population, and we must be inclusive of all cultures in the classroom (Martin, 1990, p. 17). Foreign born learners' socioeconomic status, their immigrant status, and how they operate within a school are highly correlated with academic performance and success (Fordham & Ogbu, 1986; Ogbu, 1978, 1987, cited in Lee & Sheared, 2002). There is a need for inclusion of these diverse perspectives, histories, cultures, and identities and the recognition that these different contexts influence the dynamics of teaching and learning (Alfred, 2002b, p. 89). Foreign born learners arrive in Canada with a variety of skills, experiences and educational backgrounds that are not always recognized and acknowledged in the classroom. Despite the fact that immigration is on the rise, literature on cultural

differences in formal settings and learning among immigrant adult students is rare (Alfred & Hvitfeldt, in Lee & Sheared, 2002, p. 27).

Transformative education, with its roots in Critical Pedagogy, does address issues such as hegemony and marginalization. It attempts to expose implicit educational practices such as the hidden curriculum and questions the current idea of North American “knowledge” with its Eurocentric roots. It attempts to promote a critical consciousness among learners through a questioning and a challenging of the status quo, addressing social, economic, and political issues in an attempt to rebalance power and resources in the world. Critical Pedagogy is concerned with enlightening learners to the fact that those with power and status dominate the rest of society and that if this stratification is not addressed, inequalities will continue to be maintained and reproduced.

This approach requires democratic collaboration between teachers and learners; the teacher is not the authority figure in this approach but instead must engage learners in what Freire calls a problem posing dialogue. According to Freire, this facilitates the emergence of critical thinking among learners which is fundamental to freedom and autonomy for the learners (Freire, 2006, p. 79). This democratic collaboration between teacher and learners can prove to be difficult to implement, however, and it is easier to obtain in some settings than others. The early educational experiences of many adult learners took place in traditional classrooms that valued silence and passivity from learners. Many students are therefore most comfortable in a classroom where the teacher represents authority and is the dispenser of knowledge. Students may also be reluctant or unable to participate in a truly critical dialogue; they may feel inadequate as critical thinkers and hesitant to participate (Brookfield, 2005, p.50). As well, students from

minority groups may be predisposed to prefer the mainstream understandings when minority views are placed alongside dominant ones (Brookfield, 2007, p. 558). This may require educators to veer from what is taught in traditional teacher education courses and take sides with minority views, or practice what Marcuse calls a liberating tolerance (cited in Brookfield, 2007, p. 564). Many students, especially adult learners, also feel that political, social, or cultural issues have no place in a classroom, and that to address these issues complicates the already difficult task of learning. Also, although adult learners may be aware of discrimination and inequity, many may view these injustices as their personal problems rather than institutional or societal ones and as such should be dealt with personally (Frankenstein, 1990, p. 345). In addition to resistance from learners, opposition to a more radical form of education may also come from the institutional side of education. In many classrooms, teachers are under pressure to complete a curriculum and may also face the pressure of standardized tests; a traditional teacher-centred approach to adult education is much more efficient in terms of time and resources (Gutstein, 2005, p. 30). Many adult learners also face time constraints, generally wanting to finish school as quickly as possible, either to begin working or to begin their post-secondary education. They may also be receiving financial assistance for a limited time period. In Manitoba, adult learners may receive funding to attend school through agencies such as Employment Insurance (EI), the Worker's Compensation Board of Manitoba, or the Society for Manitobans with Disabilities. First Nation students may also access resources for education through their band, which receives money for education through the federal government and dispenses funds as they deem fit (Aboriginal Affairs and Northern Development Canada, 2010). In summary, there are forces acting on both

teachers and learners that may affect the successful implementation of an alternative approach to education.

However, liberation and education are inextricably connected (Gutstein, 2006, p. 22). Only an education that emphasizes student participation and promotes action can result in social equity.

Critical Mathematics Education: The Role of Mathematics

Mathematics has long held a position of importance in our world. In ancient times it was used to organize societies and give meaning to the world as well as being studied for purely intellectual pursuits (D'Ambrosio, 1985, p. 44). Today, numeracy, along with literacy, is regarded as necessary to a modern education, as evidenced by the presence of mathematics as a core subject in North American schools. Mathematics also receives status as the basis of knowledge related to science and technology (D'Ambrosio, 1990, p. 21). Although much of the type of mathematics required to drive our technology remains hidden from the average person (FitzSimons, 2008, p. 8), it underpins the software and hardware that is embedded in our day to day lives (Davis, 2003, p. 41).

This raises the question: If much of the mathematics we use remains hidden from us, is there really a need for those not in the fields of science or technology to study or understand mathematics? How much mathematics is really needed in everyday life? While most people would agree that everyone should have a basic sense of numeracy, only a few need higher level algebra or advanced mathematics, according to some (Davis, 2003, Hacker, 2012, Wedege, 1999). A recent article in the New York Times questioned the need for algebra for all (Hacker, 2012). The author premised that the enforced study

of algebra was placing students under duress, leading to disengagement and dropping out. He concluded that the study of higher level mathematics is not needed for most students because it is rarely needed once the student leaves school. This is not a unique thought; one of the most common questions asked of mathematics teachers by their students is: “When will I ever need this?” It is often a difficult question to answer, especially when the topic being studied is one of an abstract nature and difficult to relate to the students’ lives outside the classroom.

However, to eliminate the study of algebra and geometry for those who find it difficult is both unreasonable and alarming. To eliminate the study of any subject due to its difficulty or foreign nature is the antithesis of education. For students who may already be seen as marginal, depriving them of the benefits of a higher mathematics education would only seek to increase this disparity. The National Council of Teachers of Mathematics (NCTM) summarizes its views on the importance of mathematics: “All students should have access to the highest quality mathematics teaching and learning in a world where everyone is empowered by the opportunities mathematics affords. In addition, policies, practices, attitudes, and beliefs related to mathematics teaching and learning must be assessed continually to ensure that all students have equal access to the resources with the greatest potential to promote learning” (NCTM, 2011). Not studying higher level mathematics limits the choices available to students after graduation, restricting access to many programs and careers that require higher level mathematics as a pre-requisite.

Despite the fact that the average person does not actively use mathematics in his or her everyday life (Davis, 2003, p. 41), it operates as a critical filter, or gatekeeper, in

present day society. Students who do not possess a certain type of mathematics are restricted from obtaining high status occupations in later life (Astin et al., in Shapka, Domene, & Keating, 2006, p. 349).

While the average person may not need to know much mathematics in order to live in today's world, this line of thinking is based on the assumption that this average person being referred to is, in fact, already ensconced in a job that does not require mathematics and is living a comfortable life. For those who are not yet established, are attempting to obtain a high school diploma, or are otherwise making efforts to improve their standard of living, mathematics may assume a position of great importance.

Therefore, a lack of mathematics can be a source of disempowerment for adults; those without a basic sense of numeracy are often denied a full participation in society. The links between competency in mathematics and socioeconomic standing are well documented. Men and women with poor numeracy are more than twice as likely to be unemployed and are far less likely to receive work-related training, get a promotion or receive a raise (Southwood, 2011, p. 14). Mathematics can also be used to control access to certain careers and occupations, limiting a full social and political participation for some (Kantner, 2009, p. 6). Higher level mathematics courses are required for entry into programs such as business, medicine, and engineering, the so-called high status careers. By placing these mathematics requirements for entry into these programs, the educational system plays a part in perpetuating hegemony. Institutions often use prerequisites such as higher mathematics as a "hoop, a badge, a totem to impress outsiders and elevate a profession's status" (Hacker, 2012). In this way, mathematics qualifications have been used as admission for high-paying jobs and as a way to create a perpetual lower class of

citizen by keeping the “less gifted” from admission to these programs (Lesser & Blake, 2007, p. 12). To summarize the significant role that mathematics plays in education today, “Those who understand and can do mathematics will have opportunities that others do not. Mathematical competence opens doors to productive futures. A lack of mathematical competence closes those doors” (National Council of Teachers of Mathematics, 2011, para. 2).

To develop proficiency and power in mathematics among marginalized students can be difficult, however, especially if they have negative preconceived notions about their own mathematics abilities (Frankenstein, as cited in Skovsmose & Nielsen, 1996, p. 1265). There is evidence of a relationship between social class and feelings of inadequacy regarding mathematics and the much publicized mathematics anxiety, thought to be an individual problem, is actually a product of society (Frankenstein, 1983, p. 329). Ethnomathematics explores issues such as these. It is an area of research in mathematics that challenges the ways that Eurocentrism permeates mathematics education and challenges the notion that mathematics is usually seen as a neutral subject, unaffected by culture (Powell, 2002, p. 7). Ethnomathematics questions both the mathematical knowledge that is presently taught in schools and the way that it is taught. Most of the mathematics taught today attributes its origins to the Greeks; missing from most textbooks and curricula is the mathematics that preceded Greek times, including that from Africa, Asia, and the Americas (Anderson, 1990, p. 349). This is also apparent in the style of mathematics that is taught in today’s classrooms, especially at the senior years. The mathematics that is valued today is taught by applying rigorous deductive, axiomatic logic, a product of Greek mathematics, while utilitarian mathematics from

other cultures has been relegated to lower status and thought to be primitive and naive (Joseph, 1987, p. 22). Present day mathematics rose alongside capitalism, industrialization, modern science, and urbanization with a focus on individualism (Davis, 2001, p. 18).

Today's classrooms still focus on these values which are not aligned with all cultures, resulting in the hidden curriculum that was previously mentioned (Gardner, in Woodrow, 1997, p. 12). Schools are a major social institution and, as such, contribute greatly to the perpetuation of the status quo. Mandated curricula carry both overt and covert messages that represent the criteria by which all learners are judged. This can be empowering to some but oppressive to others, thus influencing the experience of learners according to their socio-cultural history (Alfred, 2002a, p. 8). This knowledge is not explicitly stated in a formal way but rather unfolds naturally throughout the educational system every day and students must learn to navigate this hidden knowledge if they are to be successful. This covert knowledge was not always hidden; in fact, differential education existed in the early days of public education and was accepted without question. Historically, learners in public schools were educated to the level that was deemed necessary and appropriate for them and their class in society (Apple, 2004, p. 46). Today, a stratified education still exists but it is not formally acknowledged; it is what accounts in part for the relationship between social class and educational achievement, or the reinforcement of the status quo. The hidden nature of mathematics mentioned previously not only contributes to the mystery and myth of mathematics but also contributes to a commonly held belief that only certain people can "do" mathematics. This false notion can also be used to deny certain groups entry into high

status mathematics courses, limiting choice and opportunities. This is another example of how mathematics and social stratification interact (Kantner, 2009, p. 6).

Ideally, the role of mathematics as a gatekeeper should be challenged by learners, however to reach the point where one can critically engage requires a certain level of knowledge and confidence about the subject and also a certain stature in society. One of the goals for Manitoba students, as stated in the Mathematics curriculum documents, is to make informed decisions as contributors to society (Government of Manitoba, 2009). However, making truly informed decisions would involve a questioning of the assumptions of the curriculum documents themselves. A pedagogy that does not question the power relations involved in the status quo only serves to reinforce it (Knijnik, 2002, p. 13).

The solution is not to offer less mathematics, as proposed by some, but to offer better mathematics. All learners should attain a minimum standard of mathematics in order that they may survive and thrive in the dominant culture (Darder, 1991, in Gutstein, 2006, p. 28). Mathematics programs should certainly involve reasoning, problem solving, estimation, and access to higher mathematics, but they should also involve the development of critical numeracy. Critical numeracy is necessary not only for decision making but also to avoid relying on "experts" who may be using quantitative data to politically skew arguments (Kantner, 2009, p. 4).

In a mathematics classroom, critical numeracy can be developed by employing a Critical Pedagogy; social justice pedagogical goals can be infused into the mathematics content. The goals of social justice are simultaneously independent of and interdependent with subject matter goals (Gutstein, 2006, p. 24). Critical mathematics education is not a

specific form of mathematics but a perspective on education which includes mathematics. A critical understanding of data allows students to make decisions about how a society is structured and enables them to question social inequities (Frankenstein & Powell, in Lesser & Blake, 2007, p. 3). Mathematics for social justice seeks to deconstruct aspects of inequality and also to change them (Gutstein, 2005, p. 31). Mathematics is therefore both an object and a tool for critique (Skovsmose & Nielsen, 1996, p. 1260). The idea of increasing mathematical literacy among adults is not only to gain skills in mathematics but also to be able to use this knowledge to address assumptions about social and political structures. For example, learners can use mathematics to compare basic food costs between large suburban supermarkets and the smaller grocery stores found in the inner city. This discussion can be expanded to include the health concerns that accompany lack of access to affordable, nutritious food. Transformative education urges learners to think of themselves not only as individuals but as global citizens and to become aware of injustices in their community and the larger world and to act for social change. Freire calls this a praxis of reflection and action upon the world in order to transform it (2006, p. 51).

Previous studies on adult learners of mathematics have resulted in various findings. Comings and Mullinex conducted a survey of instructors of fifteen different basic adult education programs in Massachusetts. The instructors reported that adult learners have mixed feelings about mathematics; while they are fearful of it, they seldom question the need for it in their lives. Although they may not question the need to learn mathematics, adult learners become frustrated when the mathematics becomes too abstract or removed from reality (Comings & Mullinex, 1993, p. 7). The study found that adult learners differ

from children in both experience and orientation to education and that previous negative school experiences has a significant effect on adult learners, eroding their self-confidence, which may have had years to become embedded (Mullinex & Comings, 1994, p. 6).

Nesbit (1995) conducted research with adult learners studying mathematics in a basic education program at a community college. The focus of the study was to determine how teaching mathematics is shaped by social and institutional forces. The findings indicated that the teacher was the dominant authority figure in the classroom, made all the decisions, and served as the source of knowledge. This approach only served to reinforce the difficult and mysterious nature of mathematics (Nesbit, 1995, p. 5), but it may also be due to institutional factors. Nesbit reported that the teachers felt under pressure to “cover the curriculum”, resulting in efficiency winning out in classrooms, manifesting itself in teacher-centred classrooms. Nesbit concluded that the teaching of mathematics at this college reinforced to adult learners that their experiences and purposes are of little value. He also concluded that mathematics is still used to instill the values that Western society regards as necessary (Nesbit, 1995, p. 6).

The findings of both of these studies seem to reflect the statements of the literature review; that adult learners accept the importance of mathematics and often do not question what they are learning or why. They are also comfortable being passive learners and accepting the teacher as the source of all knowledge. As well, contrary to what research may advocate, adult learners’ rich depth of experience is not always utilized in a classroom setting.

THE CONTEXT OF THE STUDY

Adult Learners in Formal Education in Manitoba

Formal education is defined as structured learning that takes place in educational institutions and that leads to diplomas or other certification (UNESCO, 2012, p. 8). Adult learners seeking a high school diploma in Manitoba can do so in a variety of ways; in high schools, through independent study, or through an adult learning centre (ALC). The government of Manitoba has supported this adult learning through its funding of various programs such as Adult Learning Centres and the Manitoba Adult Literacy Program. The most recent annual report from Adult Learning and Literacy (ALL) states that there were over 9,000 adult learners attending 45 registered adult learning centres throughout Manitoba in the 2010-2011 academic year (Government of Manitoba, 2011b, p. 12). Adult learners attending adult learning centres or adult high schools follow the same curricular outcomes as younger learners but compensations are made in the number of credits required to attain a high school diploma under the mature student status, as defined earlier. The mature student diploma is equivalent to a regular high school diploma in terms of post-secondary acceptance.

The province of Manitoba has chosen immigration as a strategy for economic growth to sustain economic development, strengthen cultural diversity, and drive community development (Government of Manitoba, 2010b). In 2009, Manitoba received 13,520 immigrants, an increase of 20.5 per cent from the previous year (Government of Manitoba, 2010c) and has a goal of receiving 20,000 immigrants annually within 10 years. The province works with the federal government, businesses, communities, and

others to support recent immigrants and refugees, offering a variety of programs, including educational opportunities. With Manitoba's continued commitment to immigration, the number of foreign born students in adult learning programs can be expected to increase in the coming years.

Adult education research has previously been conducted in Manitoba at two adult literacy programs (Terry, 2006, 2007, 2009). Terry's study, described in three parts, explored the experiences of adult learners in two community based adult literacy programs. The Manitoba study involved adult learners enrolled in two adult learning centres which offered basic literacy as well as high school courses. The learners worked on an individual basis but in the same room together all day, resulting in close bonds between learners and instructors. These close bonds were cited by the learners as being very important to their learning environment. The adult learners in this study also valued individualized learning, in part because it allowed for a flexible attendance policy, allowing the learners to come and go as needed in order to attend to children and work situations. This study seems to support other research which found that adult learners need flexible attendance policies, one-on-one support systems and learner support groups (Isselis, 2008, p. 25). The findings of Terry's study suggest that in that particular adult education setting, the instructor-learner relationship and the learner-learner relationships were important to learner success. Terry also reported that the friends and family of the learners were significant in both the decision to enrol in the program and also to complete it. The adult learners in this study had had extremely negative school experiences when they were younger. The study concluded that the past experiences of the learners affected

their confidence as adult learners, and that the support by family and friends was important to both enrolling in and staying in school.

Although Terry's study involved Manitoba adult learners, the adult learning centre in Terry's study differs in many ways from the school in this study. The size of the school often necessitates initial class sizes of 30 or 40 students, which inhibits close daily contact between teachers and learners. Large class sizes also prevent the individualizing of programs for learners. The structure of the timetable at the school also requires both learners and teachers to move from class to class over a six slot day, resulting in constant motion with little time to connect on a personal level.

What is evident from previous studies is that, given the background, culture, and experience of the learners each learning environment is unique, requiring programming that is also unique to each specific group of learners. To define a strategy for a specific school should involve student input and strategies should also be targeted for specific subpopulations with a curriculum based on learner culture (Kerka, 1995, p. 4).

The Manitoba Mathematics Curriculum from an Adult Education Perspective

While it is certainly true that many people function quite well in their lives without a high level of mathematical knowledge, current conditions for learners in Manitoba indicate that the role that mathematics plays as a critical filter shows no sign of abating. As mentioned, Manitoba is the only western province to require a Grade 12 mathematics credit for high school graduation. To obtain this credit, students must choose from one of three mathematical pathways; this choice begins in Grade 10. All three pathways will qualify as a grade 12 mathematics credit for graduation purposes and all courses meet the

minimum pre-requisites for general entry into community college or Manitoba universities, however there are vast differences in the consequences for learners when they choose a particular mathematics pathway. In Grade 10, students must choose to either pursue Introduction to Pre-Calculus and Applied Mathematics (IAP), or Consumer Mathematics. This initial choice begins the streaming process that mathematics imposes on learners. The IAP mathematics course was designed for those who wish to study mathematics or science after graduation; students enrolled in this course go on to study either Pre-Calculus or Applied mathematics in Grade 11 and Grade 12. A Grade 12 Pre-calculus mathematics credit will satisfy the mathematics pre-requisite in any program offered at the university or college level. The Pre-Calculus course is regarded as the most difficult mathematics course and is required for entry into programs such as business, medicine, or engineering. It is generally regarded as the course with the highest status because it potentially leads to the highest paying and highest status careers. The Applied mathematics course is the next most recognized mathematics course in Manitoba in terms of pre-requisite acceptance. The Applied mathematics course is technology based; many students who are interested in a technical course at a community college take this course; it is also required as the minimum mathematics pre-requisite for programs such as the nursing program at Red River College (RRC) (Red River College, 2012) and the Manitoba Hydro Aboriginal Pre-Placement Programs (Manitoba Hydro, 2012). The Consumer course is the third pathway offered in Manitoba and is intended for students whose post-secondary planning does not include a focus on mathematics and science related fields. Consumer mathematics is regarded as the easiest way to obtain a Grade 12 mathematics credit; for adult learners, it is also the most efficient way, in terms of time. It

is the most popular Grade 12 mathematics course in Manitoba, with the highest assessment numbers of the three pathways, (Government of Manitoba, 2010d, p. 23). At the school involved in this study, most of the adult learners opt for Consumer Mathematics. This may be because it is the easiest course in terms of content, but the popularity of the Consumer Mathematics course among adult learners could also be due to the effects of diminished aspirations as one matures. Shapka et al. conducted a study following a group of high school students over the span of six years, where it was found that career aspiration levels tend to decline over time. Once learners encounter obstacles, many discard their original highly prestigious aspirations in favour of less prestigious but more attainable ones (Shapka et al., 2006, p. 356).

However, Consumer mathematics has recently seen a decline in its acceptance as mathematics pre-requisite by post-secondary institutions. This includes the previously mentioned nursing program at Red River College, which is a popular post-secondary course for many of the adult learners at my school. Although the nursing program itself did not change, the mathematics pre-requisite for this program has recently been changed to Applied Mathematics from Consumer Mathematics. This seems to be another example of a post-secondary institution that is using mathematics as a “hoop” that must be passed through in order to gain entry. Red River College did not give a reason for this change, however, the Nursing program webpage indicates that they have enough applications to fill available spaces until the 2015 intake periods (RRC, 2012). This may imply that, due to the popularity of the nursing program, mathematics is once again being used as a critical filter or as a gatekeeper instead of a gateway.

The Manitoba Department of Education also requires a 30% standardized final assessment in each of the Grade 12 mathematics courses. In the Pre-Calculus and Applied Mathematics courses, the students must write a provincial cumulative exam that contributes 30% to their course mark; in the Consumer Mathematics course, students must complete a three part final assessment process, which includes project work, a portfolio, and a written exam. These three pieces of work account for 30% of the student's final mark.¹ Standardized exams place pressure on both the learners and the teachers. It creates test anxiety in the learner and it places pressure on the teacher to “cover the curriculum”, whether the curriculum is relevant to the learners or not.

Manitoba, as a member of the Western and Northern Canadian Protocol (WNCP), shares educational goals with all Western provinces, the Yukon Territory and Nunavut. Although each province and territory is responsible for publishing its own curricula, all members of the protocol are committed to common educational goals and a sharing of resources. Hence, the rewriting of provincial curricula must not only meet provincial needs but also conform to the goals of the WNCP. This only serves to highlight the potential disconnect between curricular content and learners of a specific province, region, or community. The ability to offer an accessible and inclusive education for all learners of mathematics is a challenge for mathematics teachers in Manitoba.

A study of adult learning of mathematics in Manitoba raises a number of questions. Can current mathematics curriculum be made more accessible to adult learners in Manitoba? What are the needs and values of adult learners of mathematics in Manitoba?

¹ The new Grade 12 Essential Mathematics course requires the students to write a final cumulative exam, worth 20% of their final mark.

Can a parallel social justice curriculum be infused alongside the Manitoba mathematics curriculum? A parallel social justice curriculum would involve using mathematics to understand the relations of power and resource inequities and to develop a sense of social agency among the learners (Gutstein, 2006, p. 25).

The Specific Context of the Study

The school involved in this study is an adult high school located in a Manitoba low-income urban area. It has approximately 900 students attending on a part-time or full-time basis and is designated for adults of 19 years of age or older who have been out of school for at least six months. Most of the learners are attending the school to earn credits towards a Mature Student high school diploma; a smaller number are attending to upgrade courses or meet pre-requisites for further education or employment. The school offers ten week and five-month courses throughout a six period day, following the Manitoba high school curriculum. Students can schedule up to six courses a day. Course offerings consist of both preparatory courses and credit courses which can be used for graduation purposes.

Most large Canadian cities have a single dominant cluster of low-income neighbourhoods (Heisz & Mcleod, 2004) offering low rent accommodations, which is an important consideration for people with limited incomes. Unfortunately, these neighbourhoods also experience high crime and violence rates (Fitzgerald, Wisener, & Savoie, 2004). Living in these neighbourhoods, therefore, provides another contextual layer to the adult learning environment. Context is extremely important for urban adult education because it tends to create physical, psychological, and socio-cultural distance

between and among learners and providers of adult education programs, thereby creating barriers and affecting learning opportunities for some urban populations (Martin, 2004, p. 3).

At this school, approximately 54% of the learners are living below the low income cut-off and many of the learners are parents (School Principal, personal communication, 2011). Living in poverty and lacking an education would seem to qualify for marginalized status, which would also affect the children of these learners. Children living in poverty have higher mortality rates, a higher incidence of health problems, and are more likely to experience addictions and mental health difficulties later in life (Campaign 2000, 2010, p. 3).

The school population is representative of the ethnically and culturally diverse neighbourhood in which it is situated. The majority of the school population would identify as being members of a visible minority; approximately one third of the students are from First Nations ancestry and one third of them are immigrant or refugee students (School Counsellor, personal communication, 2011). Exact numbers are difficult to access due to demographic information being supplied on a voluntary basis. Both immigrant newcomers and Aboriginal people represent a large segment of the neighbourhood population where the school is situated. These two demographic groups also rank as having among the lowest incomes in Canada.

The majority of immigrant newcomers settle in the largest urban areas after arriving in the province (Government of Manitoba, 2010c). Many of these newcomers find themselves in lower income neighbourhoods where accommodations are affordable and where there are usually organizations located which help newcomers adjust to their new

home and assist in locating resources. In 2002, low-income rates among immigrants during their first full year in Canada were 3.5 times higher than those of Canadian-born people (Statistics Canada, 2007a). As immigration continues to be a priority for the Manitoban government, the population of foreign born students can also be expected to increase. When asked about their reasons for settling permanently in Canada, immigrants most often cited the quality of life and the future prospects for their family in Canada (Statistics Canada 2007b). For many, this means returning to school to upgrade or to attain Canadian accreditations. However, despite the presence of strong internal motivation, these students still face difficulties in attaining a Canadian education due to language barriers and cultural differences.

Aboriginal people also represent a growing population in the low income neighbourhoods of the largest Canadian cities (Heisz & Mcleod, 2004). Statistics Canada reports that in the 20 to 24 year age group, Aboriginal students also have a higher than average drop-out rate from high school (Gilmore, 2010). Reasons cited for the high drop-out rate include a general distrust of the school system, resulting in negative views of education. Aboriginal students may also experience personal and situational issues that affect learning, including generational poverty, lack of role models and support systems, and a fear of success. Alienation and isolation are also sometimes seen as a consequence of success; therefore, sacrificing their relationships with friends and family is not worth becoming educationally successful (Ivers & Downes, 2012, p. 385).

Most of the adult learners at my school returned to school to earn a high school diploma, which also involves earning a Grade 12 mathematics credit. Despite the fact that this school offers all three pathways of mathematics with increased time for Grade 12

Pre-Calculus classes and access to necessary technology for Applied classes, the number of learners in the Consumer Mathematics courses outnumber those in the Pre-Calculus and Applied courses by five to one. In addition, recent statistics also show that approximately two thirds of all learners who enrol in mathematics courses end up dropping out of the course before completion (School Principal, personal communication, 2012). The focus of this study is to explore the learning conditions of adult learners in an attempt to discover why many leave before graduation, and to explore if mathematics is an obstacle for them. The study will also explore why they chose the Consumer Mathematics course for their Grade 12 mathematics pre-requisite.

Being a mathematics educator at an adult high school is rewarding and challenging. Although my main responsibility is to teach the mathematics curricula and support my students in their educational endeavours, it is at times difficult to align the curricular objectives with the needs and best interests of the learners. I have encountered many learners leaving school prematurely; the exact reasons remain unknown to me. I am aware that many adult learners face life circumstances that make attending classes difficult and I remain aware that these circumstances may never change. However, I am interested in exploring the learning conditions of my students. Teachers need to understand and situate both their teaching and their students' learning as well as develop the language to describe them (Gutstein, 2006, p. 22). Adult learners, especially those who are marginalized, need to be given a voice, an opportunity to share perceptions of their educational experiences. Many of these learners have historically been treated as insignificant, while others come from backgrounds where they have learned not to speak out, for fear of repercussion.

What do these adult learners think about their education? Do they encounter barriers to learning? If so, what are they? What do they think about the compulsory mathematics course that they must take? Giving adult learners an opportunity to answer these questions validates their opinions and their presence in the learning process.

METHODOLOGY

The study is a qualitative study within a theoretical framework of social justice. Research for social justice is typically undertaken to address issues of inequality and domination by understanding and explaining social phenomena (Carspecken & Apple, 1992, p. 512).

According to Carspecken and Apple, (1992, p. 511) all social justice research begins with a personal orientation towards an issue, an orientation that concerns inequality or injustice. In other words, social justice research begins with the idea that something is wrong and needs to be righted (Griffiths, 1998, p.26).

Social justice research may address issues of individual empowerment and/or structural injustices (Griffiths, 1998, p. 13). One of the goals of research for social justice is to give a voice to a certain under-represented or marginalized group in an effort to empower them (Griffiths, 1998, p. 3). Since education is one of the largest social institutions and it is often described as political, (Apple, 2004, p. 63), it would seem worthwhile to explore the experiences of its most important participants: the learners. Research about learning, undertaken from a social justice orientation, would serve to inform educators and administrators, and ultimately benefit learners, especially those from non-dominant classes.

The adult learners described in this study could be regarded as marginalized simply by the fact that they are lacking an education and are attempting, as adults, to gain a high school diploma. Other characteristics or circumstances of the learners may also have contributed to this marginalization and may also have contributed to their failure to

obtain an education. The reasons for a lack of academic success are complex and often interdependent, as mentioned earlier. Although many adults return to school, many also eventually leave school again, before graduating. Data obtained show that approximately 60% of the students leave within the first month of school (School Principal, personal communication, 2011). This study is designed to obtain the learners' perspectives on factors affecting their learning environment.

Participants and Setting

The setting is an adult high school in an urban area in Manitoba, located in a low-income neighbourhood. Students attending this school must be at least nineteen years of age or older and have been out of school for at least six months. The student population is ethnically diverse and many of the students are English as an Additional Language (EAL) learners. The school offers adult students the opportunity to attain a high school diploma under mature student status, as defined earlier. The participants of the study are adult learners who were enrolled in a Grade 12 Consumer mathematics class during the school semester from September 2011-January 2012.

Research Tools

One of the goals of research for social justice is to give a voice to a marginalized group. With this in mind, two research tools were developed to gain the perspectives of the learners: a survey and a semi-structured interview. Questions were developed that were designed to gain the adult learners' perspectives on different factors that may affect the learning environment. The literature pertaining to marginalized adult learners

categorized these factors as situational, institutional, or dispositional, and the questions were designed accordingly. The survey and interview questions were also intended to understand how the learners viewed their mathematics learning and why they chose the mathematics pathway that they did. The survey was given to 69 students and was completed and returned by 64 of them; the interviews were conducted with ten of these students. The survey gathered broad data from a large group of learners and the interviews provided richer data from the smaller group of ten interviewees. The interviews allowed for individual conversations and for participants to give more extensive responses of their personal views on their educational experiences at the school. The interview dialogue also provided immediate feedback to the participants that allowed for further probing questions from the researcher as the conversations developed. The dynamic nature of a conversation and the semi-structured style also led to spontaneous and unanticipated data.

Data Collection

To address the power relationship and to ensure that students did not feel coerced in any way to participate in the study, an outsider, a former colleague of the researcher, was brought in to speak to four classes of Grade 12 Consumer Mathematics students. She introduced and described the study and asked for participation in both the surveys and the interviews. While my former colleague was speaking to the students, the teachers of these classes left the room, so that they would not be affiliated in any way with the study. The students were then asked to complete the survey and also to consider participating further in the interview process. It was emphasized to potential participants that there was no

consequence for declining to participate in the study and that they could opt out of the interview at any time.

Of the 69 students who attended classes that day, 64 students returned a completed survey (see Appendix 1). In addition, 21 of these submitted their names to indicate that they would consider participating in an interview at a later date. Of these 21 potential interviewees, two declined after it was explained again that the interviews were voluntary; two declined due to lack of time; three were unable to be contacted and four did not show up for scheduled interviews. The withdrawal of the students provides evidence that the voluntary nature of the study was emphasized before and during the study, and that the power issue was regarded seriously and addressed by the researcher throughout the study. In the end, ten students were interviewed for the study. The interviews were conducted from December 2011 to March 2012 (see Appendix 2 for the interview protocol). Each interview took approximately one hour. Before the interviews began, the interviewees were once again given a brief description of the study and informed again of the voluntary nature of their participation and their right to withdraw at any time. Each interviewee was also reminded that there would be a follow-up meeting a few weeks after the interview to allow the researcher to share the interpretation of what was gathered from the interview and to allow the interviewee to challenge any misinterpretations. The interviews were transcribed and analyzed and will be elaborated on in the next chapter.

Position of the Researcher

The study developed through my employment as an adult educator in the formal educational institution described in this study. I considered potential conflicts of interest and of the relations of power, since I am employed at the same institution where the study was conducted. I understood that the students might feel impelled to participate because of my status as a teacher at the school; however, every effort was made to address conflicts of interest and any issues of power relationships that may have been present. An outsider, a former colleague, was used to introduce the study, distribute the survey and to solicit potential interviewees. The voluntary nature of the participation in both the survey and the interview process was stressed by my former colleague and again by the researcher before and during the interview process. The fact that two of the potential interview candidates withdrew from the study illustrates that the power relationship was addressed throughout the study and that measures were taken to ensure that the learners did not feel coerced into participation.

Research Ethics

My role in the study is that of the researcher conducting the study, however, I am also a teacher in the school and this has research ethical implications. My most important goal was to assure participants that their participation was voluntary. I therefore asked my former colleague to read and explain the consent form to each of the classes to ensure that potential participants did not feel coerced. Participants were also assured of the confidentiality of their responses. This was conveyed both verbally and in written form and was also conveyed by the individual and private nature of the interview style. I did

not ask any current, former, or future students of mine to participate in the study.

Although I am a teacher in the school, I maintained a neutral, objective relationship with the participants as much as that was possible. The consent forms are attached to this thesis (see Appendix 3).

DESCRIPTION AND INTERPRETATION OF THE DATA

Data were derived from two sources: the survey responses and the interview transcripts. The survey was designed to gain a broad view of the adult learners and their perspectives on the factors affecting their learning environment; it included questions of a demographic nature, and also questions involving situational, institutional and dispositional factors (see Appendix 1). The interviews were designed to gain a richer and deeper understanding of the experiences of adult learners and included questions on the same topics as the survey (see Appendix 2). This dual approach to data collection was designed to provide a more thorough understanding of the perspectives of adult learners with respect to formal education, specifically regarding the learning of mathematics.

In order to ensure accuracy and minimize bias, the interviews were transcribed with care and precision and member checking was conducted.

Survey Data

The survey was designed to explore what supports adults in their learning, specifically in the learning of mathematics. The survey began with demographic questions and then proceeded with questions regarding external and internal factors that may affect the learning environment. These included questions about dependents (children or otherwise), jobs, transportation, childcare, problem solving strategies, attitudes towards mathematics and feelings of success. The survey also asked two open response questions regarding the learning environment: What supports you the most to be

successful in your learning in the school? What is the biggest problem for you (what prevents you from being successful) in your learning in the school? (See Appendix 1).

The survey results were entered into an Excel spreadsheet and the data were examined on a statistical basis. After reviewing the data, a stronger understanding of the adult learners at the school emerged.

Demographic Data

Table 1: Survey Results of Demographic Data ($n = 64$)

	Number of positive responses	%
1. I was born in Canada	44	69%
2. I have been in Canada less than two years.	7	11%
3. English was my first language.	38	59%
4. I have children who live with me.	30	47%
5. I have other family members whom I support.	29	44%
6. I have a job outside of school.	27	42%
7. I have a job that takes more than 20 hours per week.	17	27%
8. I have a job that takes more than 30 hours per week.	6	9%
9. I live within walking distance of the school.	28	44%
10. This is my first time taking the 40S Consumer Mathematics course.	43	67%

The demographic data reveal a good representation of the diversity of learners at the school. The survey statistics show that 69% of the respondents are Canadian born;

also indicating that 31% are foreign born. Regarding language, 59% claimed English as their mother tongue, meaning that 41% of those responding would be regarded as EAL learners. As well, 42% of the respondents have a job, requiring varying degrees of commitment. A large number of the respondents live close enough to the school to walk and the majority of them are taking the Consumer Mathematics course for the first time. Almost half of the respondents, 47%, had children living with them.

Besides the demographic questions, the survey also consisted of 14 questions that the respondents rated on a scale of strongly disagree to strongly agree. These questions were designed to probe the effects, if any, of situational, dispositional, and institutional factors on the learning environment. On the survey, the questions were not grouped by category, however, in order to describe the data, the questions have been grouped by category and will be discussed accordingly. In the data presentation, the questions are identified by the number as it appears in the survey.

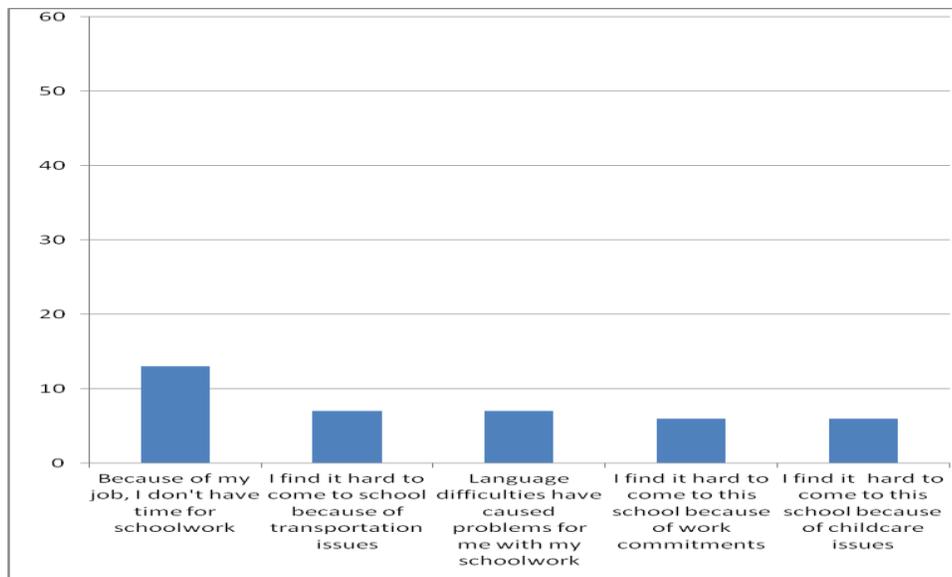
Situational Factors

The following table shows the results of the survey questions that were designed to elicit information about situational factors that may affect the adult learning environment.

Table 2: Survey Results of Situational Data (*n* = 64)

	Number of positive responses	Percent
9. Because of my job, I don't have time for schoolwork.	13	21%
7. I find it hard to come to this school because of transportation issues.	7	11%
8. Language difficulties have caused problems for me with my schoolwork.	7	11%
5. I find it hard to come to this school because of work commitments.	6	9%
6. I find it hard to come to this school because of childcare issues.	6	9%

Figure 1 Situational Factors



Adult learners typically have many other responsibilities in addition to being students and the survey responses reflect this. Almost half, or 47%, of the respondents have children living with them however, only 9% said they found it hard to attend school because of their children. As we will see, this may be because children are also a source of motivation for learning and are one of the primary reasons that many of the adult

learners came back to school. While 42% of the respondents have jobs, only 9% find it difficult to attend school because of their job, but 21% agreed that their job does interfere with the time they have to devote to studying and homework. This exposes the effect that work has on the learning environment. A work conflict may require students to not only miss school but it also interferes with time that may otherwise be used for homework, studying, and sleeping. Unfortunately, many students must work in order to survive and to support their families. This finding also underscores the effects that financial constraints have on the learning environment; this topic will be revisited when the interview data is discussed.

Although 41% of the respondents claim a language other than English as their mother tongue, only 11% agreed that they encountered language difficulties at school. Finally, only 11% of the respondents found it hard to come to school because of transportation difficulties. This supports the demographic data which indicated that a large number (44%) of respondents lived within walking distance of the school. We will see that the interview data supports these findings; the interviewees also indicated that the school is conveniently located.

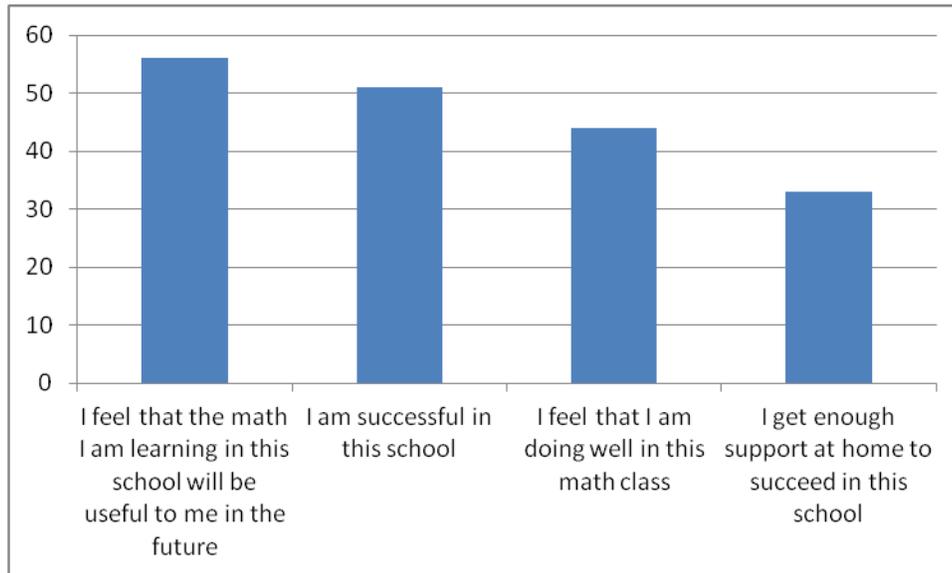
Dispositional Factors

The following table shows the results of the survey questions that were designed to elicit information about dispositional factors that may affect the adult learning environment.

Table 3: Survey Results of Dispositional Data ($n = 64$)

	Number of positive responses	%
14. I feel that the mathematics I am learning in this school will be useful to me in the future.	56	88%
1. I am successful in this school.	51	80%
12. I feel that I am doing well in this mathematics class.	44	69%
2. I get enough support at home to succeed in this school.	33	52%

Figure 2 Dispositional Factors



The questions that were designed to attain the attitudes or dispositions of the learners showed that 80% felt successful in school and 69% of the learners felt that they were successful in mathematics. As mentioned in the demographic data, 67% of the respondents were first time Consumer Mathematics students, which seems to indicate that these “first timers” had a positive first experience in the course. This could be attributed to a number of factors: the school, the teacher, the course itself, the attitudes of the

learners, or a combination of several of these factors. This positive feeling towards mathematics was also displayed by the respondents' views of the value of mathematics; 88% of the respondents agreed that mathematics is useful.

Although only half of the respondents felt supported by friends and family, we will see in the open response data that friends and family also motivate the learners to attend school. Overall, these findings show a positive attitude towards school, mathematics, and their own abilities.

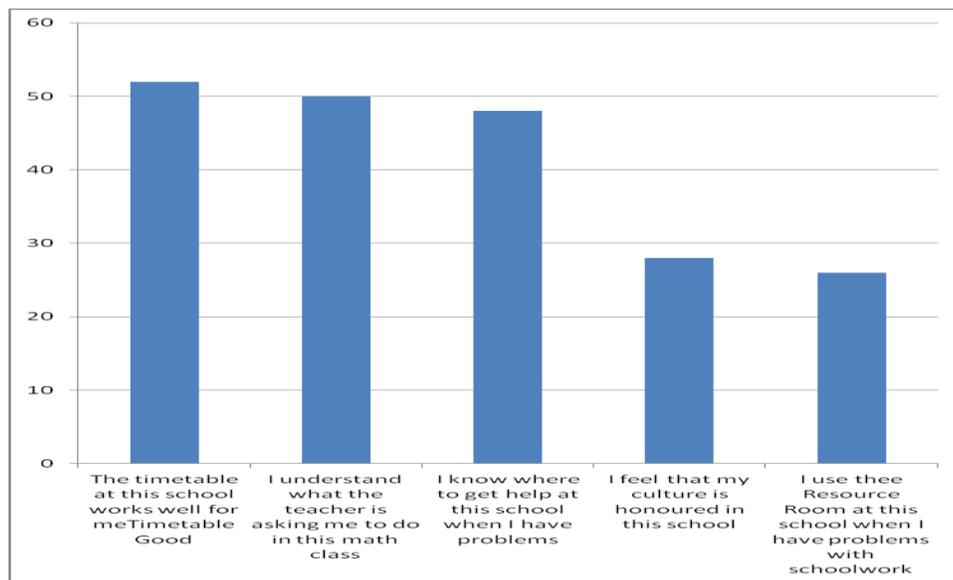
Institutional Factors

The following table shows the results of the survey questions that were designed to elicit information about institutional factors that may affect the adult learning environment.

Table 4: Survey Results of Institutional Data ($n = 64$)

	Number of positive responses	%
11. The timetable at this school works well for me.	52	81%
13. I understand what the teacher is asking me to do in this mathematics class.	50	78%
3. I know where to get help at this school when I have problems.	48	75%
10. I feel that my culture is honoured in this school. (* neutral responses are also included)	57	89%
4. I use the Resource Room at this school when I have problems with schoolwork.	26	41%

Figure 3 Institutional Factors



The positive attitude that came through in the dispositional data was also displayed towards the school and the teachers. Examining the data obtained from the questions focusing on institutional factors, the survey reveals that the learners generally felt very positive about the school and the resources it offers. A large percent of the students, 81%, endorsed the timetable; an almost equally large percent, 75%, agreed that they know where to get help at the school when they need it and 41% use the Resource Room. The Resource Room is a specially designated classroom in the school where students can go to receive extra help from teachers with homework and with understanding of content. The teachers in the school have a resource period embedded into their timetable, resulting in the availability, throughout the day, of teachers of the core subjects in the Resource Room who are able to assist students. When questioned specifically about their mathematics learning, 78% agreed that they understood the teacher in mathematics class. Regarding culture, 89% of the respondents either felt that their culture was honoured or

were neutral about the subject. The responses to the questions regarding institutional factors reflect a generally positive attitude regarding the teacher, the school, and its resources.

Open Response Questions

There were also two open response questions at the end of the survey that asked the respondents to list what they regarded as the biggest support to their learning and the biggest problem affecting their learning. This allowed the respondents to provide a personal response and to indicate what was unique to their particular learning situation. Six of the respondents replied with more than one answer to each open response question. All of the responses were included in the data collection and are displayed in the results. The data were coded by looking for common words or phrases and then grouped into key concepts (see Table 5). Figures 4 and 5 show the data in graph form. The data from the first question, which asked the learners what the biggest support to learning was, are more clustered than the data collected from the second question, which asked what the biggest problem to learning was. The data collected from the two open response questions was consistent with the data collected from the restricted response section of the survey.

Biggest support to learning. The findings indicated that the biggest support to learning came from family and friends. The learners indicated that they were either attending school because of family and friends or that they were supported in their learning, in some way, by family and friends. Many responded that their motivation to finish school was to provide a better life for their children. This may explain why,

although lack of childcare may cause learners to miss school, children are not regarded by the learners as a barrier to learning.

The next most cited supports to learning were the support of the teacher and the learners' personal attributes; both received 11 responses each. The teachers have already been mentioned as being supportive to learning in the findings of the data collected regarding institutional factors. Personal attributes mentioned in the open response section as supports to learning include such things as being self-motivated, being disciplined, and having definite goals for the future. These findings coincide with what has already been discussed in the previous section about dispositional factors.

There were other supports to success mentioned in but not in significant numbers. Two respondents stated that the school helped them be successful and two said that regular attendance helped them be successful. Although the school received very positive feedback in the first part of the survey, the fact that the school was only mentioned by two of the respondents in the open response section could possibly be due to the wording of the instructions in this section. The instructions implied that only one support and one problem were to be identified. If the wording had been changed so as to encourage multiple answers, perhaps the school and regular attendance may have been mentioned more often as being supports to learning success.

Biggest problem preventing success. Participants identified lack of attendance, lack of childcare, and work commitments as the biggest problems that prevent them from being successful learners. The literature review stated that factors preventing learning are often interrelated. The findings of the survey seem to support this when we consider that lack of attendance is often due to other factors, such as work commitments or lack of

childcare. However, since the data collected did not indicate the reasons for lack of attendance, it will be treated as a separate factor in the data presentation.

Although many adult learners do not consider having children as a potential barrier to learning, lack of childcare does affect attendance. Lack of attendance is identified by the participants as a reason for falling behind which could eventually result in dropping out.

Work and its related commitments also rank high as a potential problem preventing academic success. As mentioned previously, work can affect learners in several ways: work shifts may conflict with school schedules and they may also interfere with time available for homework and sleep. Unfortunately, adult learners need to support not only themselves, but many have children or other dependents, so work is necessary to survival. The interview section will shed more light on the financial constraints faced by many adult learners.

Illness was only mentioned by four participants as a significant problem to learning but, as with work commitments, illness can also affect attendance. This illustrates, once again, the interrelatedness of the factors affecting learning. Other categories that were mentioned, but not in significant numbers, were difficulties with understanding the mathematics content, language difficulties, and problems understanding the teacher. The findings seem to indicate that although some students do encounter problems of these types, they are not significant for the majority of the adult learners surveyed.

Table 5: Results of Responses to Open-ended Questions ($n = 64$)

Biggest Support to Success	Number of times mentioned	Biggest Problem preventing Success	Number of times mentioned
Family & friends	25	Non-attendance	8
Teacher	14	Lack of Childcare	8
Self/Future Goals	11	Job	7
School	2	No time for homework	5
Attendance	2	Illness	4
		Understanding the mathematics	3
		Language difficulties	2
		Understanding the teacher	1

Figure 4 Biggest Support to Success

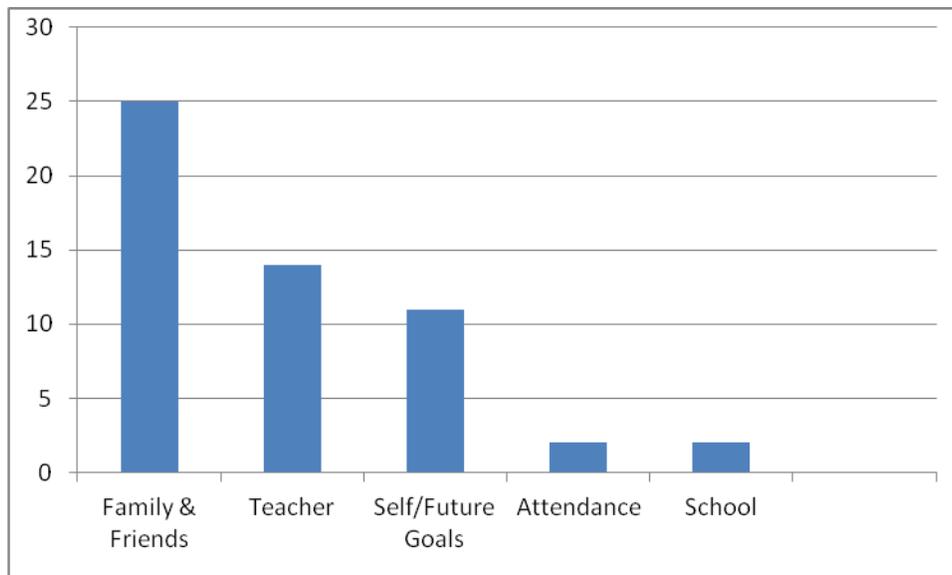
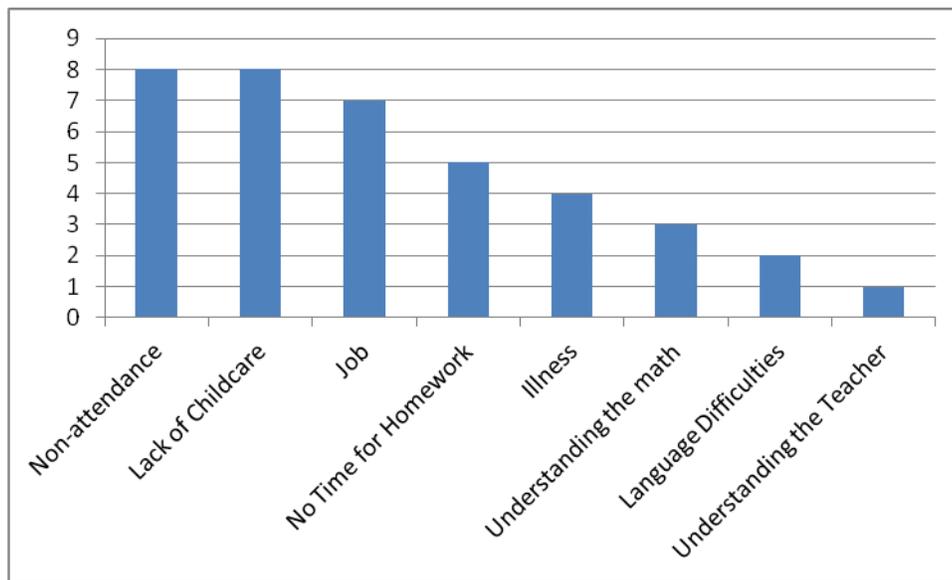


Figure 5 Biggest Problem Preventing Success



Overall, the findings from the open response questions agree with the findings from the first part of the survey. The respondents were very positive about almost all aspects of learning, specifically regarding their own dispositions and abilities and the support of the teacher. In the open response section of the survey, the teacher figured much more prominently as a support to learning success than the school, which seems to indicate that a personal connection is important to adult learners.

Interview Data

Ten of the learners who responded to the survey consented to participate further in the study and agreed to be interviewed about their experiences as adult learners. The age of the participants in the interviews ranged from 21 to 47 years; six were women and four were men. The interviews were conducted from two weeks to two months after the survey was conducted. This did allow the participants some time to anticipate the

interview questions and to prepare possible responses, given that they already knew the purpose of the interview. However, it did not appear that the participants had pre-prepared answers to any of the questions. As well, because the interviews were semi-structured, they proceeded organically and each interview touched on the unique perspectives of the participating individual. Demographic data of the interviewees is shown in Table 6 and is more extensive than the survey demographic data. It indicates a good representation of the types of learners found in the general population of the school. There was a fairly even gender split and a representation of both EAL and Aboriginal students. Eight of the interviewees had left school when they were younger, for various reasons. The remaining two interviewees were graduates but returned to school to upgrade. Seven of the ten interviewees reported that they were receiving financial assistance of some kind (Employment Insurance, social assistance, or band sponsorship) and indicated that they would not be able to attend school otherwise. Five of the ten interviewees were parents and had children living with them. Nine of the ten were taking Consumer mathematics for the first time. The demographic data of the ten interviewees is shown in Table 6.

Table 6: Demographic Characteristics of the Interviewees (*n=10*)

Characteristic	Number	%
Born in Canada	7	70%
Women	6	60%
Men	4	40%
Came to Canada as an adult	2	20%
Aboriginal	4	40%
Children at home	5	50%
Left school by choice before graduation	4	40%
Had to leave previous high school before graduation	4	40%
Receiving Employment Insurance	2	20%
Receiving social assistance	2	20%
Sponsored by Band	3	30%
First time in Consumer Mathematics	9	90%

During each interview I asked participants prepared questions which were designed to elicit information on what supported or hindered learning in their specific adult learning environment (see Appendix 2 for the interview protocol). Each interview was digitally recorded and transcribed. After reading and reviewing the transcriptions numerous times, a list of significant statements was developed.

From these statements, repeating words or ideas were identified and grouped together into larger units, or key concepts, which were then coded by using an identifying

word or phrase. These codes were then categorized as either a situational, dispositional, or institutional factor.

Situational Factors

Situational factors that were identified by the participants as affecting their learning environment include income, children, location of the school, health, and the reason they gave for initially leaving school.

i) Income. All of the interviewees mentioned that money is a daily concern for them and commented on the difficulty of living on a limited budget. Seven of the interviewees are receiving financial support of some kind, through Employment Insurance (EI), social assistance, or sponsorship from a First Nations band. Of the remaining three interviewees, one works approximately 30 hours per week to support herself and her family; another is supported by her husband (who is also a student) and one is supported by his father. All of the interviewees stated that they could not attend school if they did not have the financial support of either government agencies or their families. Those who were receiving financial support stated that they felt pressure to finish school before their funding runs out:

Joe: "I get EI right now but it runs out at the end of fall. I get \$250 every week; after expenses, I survive on \$40 every two weeks. It's hard. Financial is the biggest reason that I find it hard to come to school. Sometimes I have to work because I need the money."

Peter: "Being sponsored means I don't have to work part-time when I'm going to school. It makes a difference."

ii) Children. Children also affect the learning environment in an interesting and significant way. The survey (n = 64) found that although 47% of the respondents were parents, only 9% of responded that they found it hard to come to school because of their children. The interview data (n=10) corresponds with the survey results. Five of the interviewees are parents; coincidentally, they are also all women. Two of these women stated that they had to wait until their children were school age before returning to school because they could not afford day care. All of the mothers interviewed stated that the only thing that would keep them away from school would be if their children were sick. However, three of these five parents had not missed a day of school. These findings are very similar to the survey findings, where many of the respondents were parents but few of them reported that children were a barrier to learning. In fact, among the interviewees, all of those with children cited them as one of the main reasons that they returned to school. They wanted a better life for their children and they also wanted to be role models for them. This finding agrees with the data from the open response section of the survey. In both the survey and the interviews, children were identified as significant people in the lives of the learners and were frequently mentioned as providing the inspiration for the learners to return to school.

Sarah: *“Now it’s my turn to go to school. I also want to be the mirror for my son. I want my son to see me go to school.”*

Teri: *“I go to school to be positive for my son. He sees me studying and sees me wanting to get a career.”*

iii) Location. The survey indicated that the location of the school was convenient for the learners; only 11% of the respondents found it hard to attend school due to

transportation issues. None of the interviewees expressed difficulty in getting to school; almost all of them lived close enough to walk; those that could not walk to school stated that it was easy to access by bus. Since the learners are living on fixed incomes, it is important that cost of transportation does not prohibit access to education. The findings of both the survey and the interview data indicate that the school is suitably located for these adult learners and that public transportation is available for those who do not live within walking distance.

iv) Health. Health, referring to both mental and physical health issues, is an issue for half of the interviewees; health is also a contributing factor to the reason that some of the interviewees left school prematurely. Health affects the learning environment in various ways. Poor health prevents learners from attending, and lack of attendance is identified by survey respondents as being a key problem preventing learning. Health also affects one's ability to concentrate, to complete homework, and in general, to learn. This was brought forth during the interviews.

Philip: "My grades are bad because my attention span is very low. I went to a doctor and he put me on Ritalin and I never went back. I don't want to be on it. I self-medicate with illegal narcotics."

Donna: "The past couple of weeks, I've been in and out of the hospital. I don't want to tell anyone. I don't want sympathy."

v) Early departure from school. The learners who dropped out of school or left school prematurely can be divided into two groups: those who dropped out purposely and those who were forced to leave due to life circumstances. Eight of the interviewees left

school prematurely and of these eight, four chose to drop out of school, adding that they got in with a bad crowd and peer pressure forced them to drop out.

The other four interviewees who left school prematurely encountered life circumstances that made it difficult or impossible to stay in school. This group includes the two more recent immigrants; the first had to quit school to support her family when her father died, and the second had to flee Sudan when war broke out. The Canadian born learners who felt forced to leave school gave reasons such as severe family dysfunction, addictions, and traumatic experiences.

Donna: "Two of the kids in junior high decided it would be fun to pick on me and took it too far; they raped me. I couldn't go back into a school; I dropped out."

Connie: "School was easy for me but it was mainly home that was the problem. I had to move around a lot so I couldn't focus myself, which is why I couldn't finish school. I dropped out."

For some of the learners, a previous negative experience seems to affect self-esteem and affect their current learning environment situation. One of the learners mentioned that he is self-conscious about speaking in class or asking questions because he is fearful of being judged. He attributed this to how he was treated in school when he was younger; he felt picked on by the teacher.

Dispositional Factors

Dispositional factors mentioned by the interviewees included having significant people in their lives, possessing a positive attitude, preferring to work alone at school, and feeling successful.

i) Significant person. As with the survey findings, the interview data also indicated that the presence of at least one significant person in the lives of the learner greatly supported learning. In the open response section of the survey, the support by friends and family was the most often cited support to learning and the interview data agrees with these findings. All of the interviewees mentioned a significant person in their life who positively affects the learning environment. The interviewees who are parents mentioned their children as being significant to the learning process for providing the inspiration to return to school and to be successful in school. These significant people provide support financially, emotionally, or in other ways, such as providing childcare.

Tim: *“My Dad is supporting me right now and allows me to focus on school.”*

Hazel: *“My Aunt is very supportive; she is one of my babysitters. She never got a chance to finish her education.”*

ii) Positive attitude. Consistent with the findings from the survey, the interview data reveal a positive attitude towards education in general; all of the interviewees said that they realized they needed more education for a better future and all but one of the interviewees had plans for post-secondary education with a definite job or career in mind. Post-secondary plans included nursing, science, lab technology, teaching, and carpentry.

Donna: *“I grew up on welfare and I wanted better for my kids. I’m tired of doing without.”*

Joe: *“The jobs that I wanted weren’t the ones that were calling me back; I realized I needed more education.”*

iii) Loner at current school. A common characteristic of the interviewees was that many of them described themselves as being loners at the school. They preferred to do

work on their own and would ask a teacher when they needed help but did not feel comfortable asking peers.

Donna: *“I’m a shy person. I keep to myself. I’m not here to make friends; I’m here to get an education.”*

Joe: *“I try to work on my own. I don’t like discussing my work with others.”*

iv) Feelings of success. The survey findings indicated that 80% of the respondents felt successful in school and 69% felt successful in mathematics. The interview data agree with these findings but provide more detail to these feelings of success. Most of the interviewees said that they felt successful in school, but success means different things to different learners. Some define success as trying their best, others define success by high marks and still others define success in terms of attendance. One student felt that he is not as successful as he wants to be and attributes this to his lack of attendance. Attendance was mentioned by more than one interviewee as affecting learning. They expressed the view that good attendance is linked to successful grades and lack of attendance is linked to falling behind, making it difficult to catch up and therefore succeed

Four of the interviewees stated that they liked school because they loved learning or because it was necessary to improving their lives. Five of them also said that they like mathematics; the reasons given for liking mathematics were that they knew what the teacher wanted and that mathematics was straightforward.

Two of the interviewees had attended this school previously but dropped out after a short time. One interviewee returned after approximately five years:

Joe: *“At the time, it wasn’t where my head was. I came back because it was pretty good to me then.”*

Institutional Factors

Institutional factors mentioned by the participants as being supportive to learning were the support of the teachers and specific aspects of the school itself. Culture, language and the Consumer mathematics course will also be discussed in this section.

i) Teacher and school. An overwhelming sentiment expressed by all of the interviewees was one of appreciation for both the school and the teachers. This finding was consistent with the survey findings, which listed the teacher as the second biggest support to learning, after family and friends. All of the interviewees also responded favourably to the timetable and the class sizes. The school itself is large, contributing to large class sizes at the start of a new term but this was not regarded as a problem by the interviewees.

Philip: *“I tried an adult learning centre but it was too cramped [i.e., claustrophobic]. There were only 12 or 13 students to one teacher.”*

Hazel: *“I liked the large class size at the beginning; it felt like we were really going to do something.”* (Interpreted to mean that the energy and size of the large group caused excitement and anticipation).

The interview data agree with the survey data regarding the learners’ attitudes towards the teachers. The survey data indicates that 78% of the respondents felt that they understood the teacher in mathematics class, and the teacher was cited as the second biggest support to success (after friends and family) in the open response section. In the

interviews, the teachers received positive comments regarding their availability, competence, and willingness to help.

Sarah: *"Everything is OK at the school. I'm very happy that the teachers are so helpful."*

Nelly: *"If students want help, they can get it here."*

Connie: *"The teachers that are here seem to have more of an understanding of where I'm coming from. I'm not unique but I'm just out of the ordinary because of how I grew up."*

Philip: *"At this school, the teachers know what they are doing. They do it well."*

Tim: *"It's an adult environment that encourages learning. I've got a lot of positive reinforcement here."*

Most said that there have been times when they did not understand exactly what the teacher wanted but said that they would approach the teacher for further explanation and that is usually enough support for them. This corresponds with the survey data where 78% of the participants stated that they understood the teacher and almost the same percentage indicated that they knew where to get help if they did not understand something. In both the interviews and the open response section of the survey, there were no specific negative comments made regarding the teachers.

Four of the interviewees regularly use the Resource Room, where they receive support from teachers with understanding concepts and completing homework. Statistically, this corresponds almost exactly with the survey results, where 41% reported that they use the Resource Room

ii) Culture and language. The interviewees were also asked about culture and language. None of the interviewees thought that the inclusion of their culture was an important factor in their learning environment; the two more recent immigrants stated that they were in Canada now and it is important to learn Canadian ways. Regarding language, these two interviewees did express difficulties with language and learning in biology and English classes. The other foreign born learner came to Canada when he was seven; he is now 28 but says he still finds it difficult to interact with others in a classroom setting due to his inhibitions to speak English. These findings are consistent with the survey findings, which showed that although approximately one third, of the respondents (n =64) were foreign born, only seven of them, or 11%, identified language as a problem. Almost all of the survey respondents felt either that their culture was honoured or that it was a non-issue for them. This was corroborated by the interview data.

Joe: *“Culture doesn’t really matter to me. I noticed that my older cousins stuck with their own culture at school. I didn’t.”*

Sarah: *“Culture is not important to me at school. I’m a member of the school family.”*

Philip: *“I went to CFS when I was little; I was taken in by a foster family and raised in a white area. Culture doesn’t really matter to me; respect does.”*

iii) Mathematics. When asked specifically about why they chose Consumer mathematics, four of the ten interviewees stated that they were either unaware of the different mathematics course or that they were placed into the Consumer mathematics course.

Joe: *“I didn’t even know about the different mathematics courses.”*

Peter: *“I didn’t even know about the other mathematics courses; they just put me in the mathematics class.”*

Teri: *“They recommended Consumer mathematics. I hadn’t taken mathematics for so long; not after Grade 10.”*

Donna: *“They signed me up for Consumer mathematics.”*

One interviewee chose Consumer mathematics because he was vying for scholarships, and he felt he could attain a high mark in it as compared to the other two choices for Grade 12 mathematics. Another interviewee responded that he saw it as the easiest way to obtain a Grade 12 mathematics credit.

Tim: *“I decided to take the mathematics course that would give me a high average.”*

Philip: *“Consumer mathematics is where I saw myself without having to stress out.”*

All interviewees were all positive about the Consumer mathematics course and found it practical and useful for future plans.

Nelly: *“I can use Consumer Mathematics for life.”*

Teri: *“It’s stuff you can use in the real world.”*

Philip: *“You need mathematics and English to get any kind of good job.”*

Teri: *“Overall, I think Consumer mathematics is very knowledgeable; I think its stuff you can use in the real world.”*

The positive attitude towards mathematics is consistent with the survey data, but the survey did not ask the respondents how they ended up selecting the Consumer

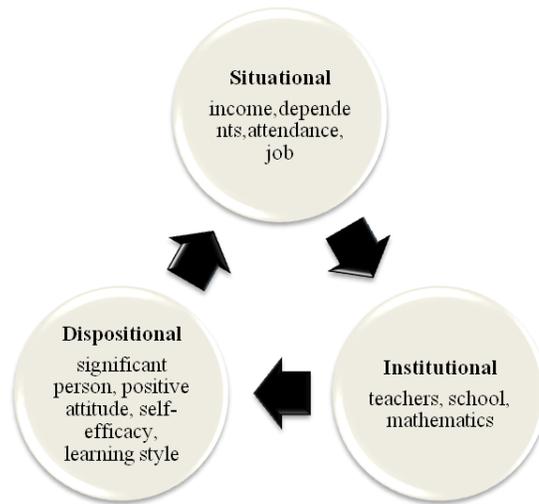
Mathematics course, so it is impossible to compare the two sets of data in this regard. It is informative that four of the interviewees were not aware of the other mathematics pathways; it is difficult to determine if they were in fact told about the other pathways and forgot or if they were indeed just placed in the Consumer Mathematics course without being fully informed of all three mathematics pathways. This issue will be discussed further in the next chapter.

DISCUSSION OF THE FINDINGS

Data was collected from two sources, a survey and an interview process. Both tools were designed to collect information about the learning environment for adult students. The survey gathered broad information about the adult learners and their perspectives on their learning environment while the interviews collected richer data. In both sets of data, the percent of participants who were born in Canada was approximately 70% ; regarding language, those who claimed a mother tongue other than English was 41% among survey respondents and 30% among the interviewees. The gender split cannot be commented on because the survey did not ask the respondents for this information. In both groups, 40% of the participants had children or other dependents living with them. These comparisons indicate that the group of interviewees was a representative subset of the larger group of survey respondents.

After the data from both sources was cross referenced, common themes emerged. Figure 6 shows these themes grouped into the categories that have been used throughout this paper: situational, dispositional, and institutional. I will discuss each of these themes, identified as factors, as they affect the adult learning environment.

Figure 6 Factors Affecting the Adult Learning Environment



Dispositional Factors

Significant Person

When comparing the data from both sources, there are several overlapping findings. The most prominent one is the presence of at least one significant person in the lives of the learner. Having at least one important person in one's life seemed to be a primary motivating factor for either returning to school or staying in school. This person supported the learner either in practical ways, such as financially, or by inspiring the adult learner to improve his or her life circumstances. For many of the learners, these significant people were their children. This suggests that maturity and life experience has a substantial effect on one's attitude towards education. It also supports the findings of Terry's study (2007) which concluded that family and friends were significant factors in both enrolling and staying in school.

Those participants who were parents also mentioned wanting to be role models for their children, implying that, for these learners, being a role model involves obtaining more education. The limited life choices available to the learners due to a lack of education were something that they did not want their children to experience. All but one of those interviewed had specific plans after graduation that involved post-secondary education, supporting Knowles (1990) assumption that adult learners are goal-oriented. This would also seem to imply that having a realistic immediate goal after graduation may support adult learning and increase chances for success.

Positive Attitude

The findings revealed that the participants were very positive about their experiences as adult learners. It must be mentioned that this positive attitude could also be attributed to the fact that the participants were completing a survey for a teacher in their school and therefore wanted to please her by providing favourable responses. Although the participants were informed that there would be no negative consequence for withdrawing from the study, some still may have felt compelled to participate and to submit positive feedback, especially those participants from cultures where teachers are regarded in high esteem. The positive attitudes of the learners could also be attributed to the fact that students who are not so positive towards education have already dropped out and are therefore not reflected in the study data. For that reason, some of the data collected may have a more favourable slant to it than what may be actually true.

The positive attitude displayed towards almost all aspects of the participants' learning environment is somewhat surprising since many of the adult learners had not

only dropped out of school previously but also had negative attitudes towards school when they were younger. The literature review states that adult learners may also be vulnerable due to low self-esteem resulting from previous negative experiences with school (Mullinex & Comings, 1994, p. 6). The findings of the study seem to reflect the opposite: the adult participants, many of whom had prior negative experiences at school, seem able to make a fresh start with a positive outlook. Another notable finding was the accountability that the participants assumed for their life circumstances. Although acknowledging that many factors in their lives may hinder learning, the learners did not seem to feel that this would prevent them from educational success. They also did not engage in self-pity or in blaming others for possible obstacles to learning. A few also expressed the opinion that if you want something bad enough you will find ways to succeed. It is difficult to determine from the collected data if the participants have always had this attitude, if it comes with life experience and maturity or if it evolves after some positive experiences with school. It is also unknown if all of those who participated in the study will actually finish high school and receive their diploma. It would be insightful to track these learners' academic progress through school to see if they retain this positive attitude, whether they graduate or not.

An important finding was the statement made by both of the recent immigrant students who reported that it is important to conform to Canadian customs. This may illustrate what Brookfield (2007) spoke of when he stated that minority students are predisposed to prefer mainstream viewpoints over minority viewpoints. Marginalized people often conform to the status quo as a survival mechanism, which is an understandable reaction. This becomes disturbing, however, if minority viewpoints are

never heard or valued; it also illustrates the difficulty that educators face when trying to bring different viewpoints into the classroom if the learners themselves are not open to alternative understandings or willing to share their experiences and cultures. The willingness or preference to conform to the dominant view also provides an example of the difficulty of implementing a transformative education when learners themselves may be resistant to it. This may also illustrate what Freire is referring to when he states that oppressed people may have a fear of freedom, because freedom requires autonomy and responsibility, an unfamiliar and frightening prospect for some (2006, p. 47). Those from non-dominant classes may feel incapable of handling a newfound autonomy, which may also explain a resistance to change among marginalized people.

Another explanation for the positive attitudes displayed by the participants is that the environment of an adult high school is very different from that of regular high schools. In this school, adult learners have some input into their timetables and course selections. Also, because adult learners need only eight credits to earn a high school diploma under the mature student status, they have more of a choice in how they will earn their credits. This also results in a shorter day for most adult learners; many of them take two or three classes a day, due to their other responsibilities and commitments. The shortened day and the shorter time spent in attaining a high school diploma may result in the adult learners having less time to get dissatisfied with school and teachers, resulting in a more positive attitude overall. Adult learners are also not legally required to attend school, like younger learners are. Punitive action is not taken for non-attendance; adults can choose to drop a class or drop out of school completely, returning when it is possible for them to do so. This illustrates the importance of a school with a flexible re-entry

policy, one that allows adult learners who leave school to resume their education when they are ready to do so.

Finally, as mentioned previously, this positive attitude may be attributed to an eagerness to please the researcher, who is a teacher at the school and thus represents an authority figure to many of the learners. The participants of the study may have found it more helpful in the past to please those in positions of authority and it is this thinking which may have resulted in supplying the researcher with responses that put the school and the teachers in a favourable light.

Self-Efficacy

The term self-efficacy, as used in this paper, is defined as the belief in ones' ability to succeed in certain situations and to reach goals (Bandura, 1977, p. 193). The findings showed that the positive attitudes displayed by the participants towards the school and the teachers also extended to the regard they held for their own ability to learn and succeed. The majority of the learners described themselves as both successful students and successful in mathematics. This belief in their own abilities may be the reason that they are still in school and have not dropped out. The study took place halfway through the school year which meant that some of the learners, perhaps those who are not as positive about school or confident in their abilities, had already left school. As referred to in the literature review, adults stay in learning programs if they have an expectation of positive consequences which must also outweigh any negative consequences (Ross-Gordon, 1990, p.10). A belief in one's abilities and an expectation of positive results may be important traits to consider when studying adult learner retention.

Learning Style

Another finding that emerged from the interview part of the study was that seven of the interviewees described themselves as preferring to work on their own at school. This preference to work alone may be a natural learning style, a learned behaviour, or it may simply be more efficient for adult learners to work on their own; it reduces socializing, which can interrupt and disrupt work periods.

The interview data revealed a certain reticence on the part of adult learners to participate in classroom discussions or activities. Adult learners typically find themselves among a group of strangers at the start of a new course; there is a lack of community that develops among students who have been together for a number of years, like in a regular high school. It is also difficult for teachers to establish classroom communities when some of the classes are only ten weeks in duration. Both of these reasons may contribute to the reason that some of the learners described themselves as preferring to work alone. It may be difficult for learners, especially those more introverted, to make connections in a large school with large classes. This may also explain why the Resource Room is popular with many of the students. Since many of the adult learners interviewed were not comfortable asking questions in class, the Resource Room is a valuable support for learners who need more help outside the classroom. It is a place to receive assistance from teachers without being judged by classmates. This is especially relevant for adult learners who come from backgrounds where they were not permitted or encouraged to ask questions in class and have not adapted to a more casual learning environment.

Institutional Factors

Teachers

A significant finding from both sources of data was the overall positive feeling expressed towards teachers at the school and an appreciation for the support they offered adult learners. This is an interesting observation since many of the interviewees stated that they did not like school when they were young and many spoke of feeling disrespected by their teachers. This shift in attitude could be a result of maturity and a realization that education is a way to improve their lives. It is also possible that the teachers do in fact behave differently from the teachers of their youth. First, the interaction between a teacher and an adult learner is different from the interaction between a teacher and a young learner. Also, the school is staffed by experienced teachers who are specialists in their content areas and who have generally been working at the school for a number of years. As mentioned, the teachers have Resource Room time scheduled into their timetables, which significantly increases potential contact time with students. This extra contact time, combined with the experience and knowledge levels of the teachers, seem to contribute to the positive feelings displayed by the learners towards the teachers. This also seems to imply that personal connections between the teacher and the learners are supportive to learning.

School & Resources

The school is centrally located, so it is easily accessible for students living in the middle of the urban area or by public transportation. Although many of the students live within walking distance of the school, which is located in an urban area with a high crime

rate, none of the learners commented on the dangers of living in this area. The learners appreciated that the school was close to their homes, to their children's schools, and to their support systems. Another important fact is that the school is tuition free for all adult learners who live in the catchment area. Both its physical location and its lack of tuition fees make the school accessible, both financially and physically, to most of the adult learners in the catchment area.

The learners also identified the school itself as being supportive to their learning. Many of the learners said that they liked the school because it was different from other high schools. Some of the other studies cited in the literature review found that many adult learners prefer a smaller, more intimate setting (Terry, 2007; Isserlis, 2008). Others prefer larger classroom environments because they felt that individualized learning plans led too easily to students being ignored (Sparks, 1998). The majority of the interview participants in this study seem to prefer a large school with more choices available than some smaller learning centres can offer. Also, a large school allows learners to be relatively anonymous, which would support the description that some of the learners used to describe themselves; they are at school to get an education, not to socialize or make friends. The school is large enough to provide anonymity but it still offers one-on-one supports like the Resource Room, which has been identified previously as a support to learning. The school seems to offer a good compromise of a large setting with opportunities for individualized interaction. The timetable and the course offerings are also regarded as being supportive to learning by the participants. The school offers a full range of programming and instruction for adult learners, including art, physical education, physics, chemistry, biology, and all levels and pathways for senior high

mathematics. The timetable was identified by a large majority of the learners as being conducive to their needs. Due to its large size, the school is able to offer multiple sections of popular courses. For example, the Grade 12 Consumer Mathematics course is offered five times per day which gives students several choices when selecting a time slot. When students enrol at the school, they meet with a counsellor on an individual basis to make up a timetable that will be compatible with their other life commitments; this individualized attention shows a respect for the learners and an acknowledgement of their lives outside school.

Although Crowther (2000, p. 488) states that adult learners may resist mainstream education if they have had prior negative experience, the data seem to indicate that this resistance can be overcome. The positive attitude displayed by the learners in this study seems to indicate that the school is offering a good balance of structure and alternative programming which appeals to adult learners who may previously have been resistant to school.

The culture of the school is also identified by learners as being supportive to their learning environment. The school in the study is often referred to as a school of second chances, but for many of the learners, it is actually their first legitimate chance of attaining an education. For others, it represents more of a third or fourth chance. The school is accepting of all learners and understands that it may take more than one attempt to complete high school requirements. One of the participants commented that he had enrolled at the school previously but circumstances did not work out, so he withdrew, only to re-enrol five years later.

One of the underlying themes that emerged from this study was a general feeling of appreciation for the school. The learners were glad that the school was there for them, in some cases waiting for them until they were ready. By recognizing the fact that adult learners may need more than one attempt to attain a diploma and by allowing them to re-enter makes the school accessible and non-threatening. It seems that for many adult learners, taking an extended period of time to earn their diploma is a necessity.

However, information that is missing from this study is the feedback from those who may have already left school by the time the study was underway. It would be informative to know if the school was not meeting their needs or if other factors that affected the learning environment proved too difficult to surmount. Historically, it seems that some of these learners do end up returning to school.

There was no criticism of the school from any of the learners; this can be interpreted two ways. It can be seen as a strong reinforcement for the school and its resources or, examining this finding from a critical perspective, it could also be interpreted that the participants are not aware that they can critique the school or are in a position to offer suggestions for improvement. The literature review noted that many adult learners may feel inadequate as critical thinkers and are therefore hesitant to participate in a critical dialogue (Brookfield, 2005, p. 50). This would seem to reflect what has been said about marginalized learners in the literature review; hegemony acts to suppress a conscious awareness of even being oppressed (Freire, 2006, p. 51).

Mathematics

Although this study was undertaken to explore the learning environment of adult learners enrolled in a mathematics course, there was almost no negative feedback regarding the learning of mathematics and no overall sense of inadequacy regarding mathematics. Most of the comments the learners expressed about mathematics were positive; the learners felt that mathematics is relevant and practical and that they felt successful in the course. Although the assumption is that the comments are sincere, it is difficult to determine if they are perhaps learned responses resulting from our cultural and societal practice of elevating the importance of mathematics and treating it as a high status subject.

The study also exposed a significant finding regarding the mathematics choices available to students. As mentioned previously, four of those interviewed in the Consumer mathematics course said that they were unaware that other mathematics options were available to them. While the Consumer mathematics course may well have been the best option for these learners, this finding must be explored to determine why the learners were unaware of other mathematics options. Apple (2004) states that mainstream education is a practitioner of hegemony by reinforcing the status quo. Discovering that some of the adult learners were not aware of all of their educational options seems to support his claim. Because these learners were not aware of all their mathematics options, they are also unaware of the role that mathematics plays as a gatekeeper (Southwood, 2011) or how it operates as cultural capital (Nesbit, 1995). Many of the adult learners are also parents, which would also mean that they are unaware of the future implications of the three mathematics pathways for their children. The literature

review stated that many adult learners do not question knowledge or the providers of knowledge (Crowther 2000); (Ahl 2006) and this finding not only reinforces this statement but also identifies the need for a critical pedagogy that would question existing assumptions and beliefs. The findings of this study suggest that the adult participants have either not developed the critical thinking skills necessary to question the existing status quo or do not feel confident questioning authority, even when it might be detrimental to their future. Marginalized people may have adapted to the structure of the domination in which they are immersed and have become resigned to it (Freire, 2006, p. 47). Further to this, Analyzing the politics and origins of socio-economic class stratification is of secondary importance for adult learners engaged in the daily task of just trying to survive.

Situational Factors

The significant situational factors identified by the participants as affecting the learning environment were financial constraints, having children to take care of, and non-attendance. These seem to be the factors that have the most potential to negatively affect the learning environment, but the adult learners did not regard them in this way. In both the survey data and the interview data, these factors were acknowledged by the participants as affecting learning but not acting as a barrier to it. The situational factors are also the most interrelated factors affecting the learning environment. A lack of money may necessitate getting a job, which may lead to lack of attendance. Lack of childcare or illness of their children may also affect attendance. The learners acknowledged that at times situational factors could prevent them from attending school, but felt that it was

their responsibility to deal with the repercussions from missing school. They were emphatic in their statements that nothing could prevent them from succeeding; this aligns with the positive attitude towards learning and the self-efficacy that was displayed by the participants throughout the study. It also makes one question the adult learners who are not able to deal with the many situational factors that may affect the learning environment. Situational factors may be too numerous for some learners to deal with at certain times in their lives or perhaps these learners have not developed the resiliency and positive attitude that seem to be important characteristics in terms of adult learner retention.

LIMITATIONS OF THE STUDY

This study adds to the understanding of the challenges facing adult learners in general and adult learners of mathematics in particular in a large formal educational institution. In total, 69 students in four classes of Grade 12 Consumer mathematics were invited to participate in the study; 64 returned a survey and ten of these were interviewed at a later date. The study was designed to obtain data from a diverse group of students but in the end, four of the participants who agreed to be interviewed were of Aboriginal ancestry and three were foreign born (two immigrated as adults, one immigrated as a child). The study may not fully reflect the experiences of all adult learners at the school.

Another limitation of the study is the fact that only Consumer Mathematics students were asked to participate. The perspectives of learners enrolled in the other two pathways of mathematics would offer different and valuable information.

A further limitation to be considered is the timing of the study. The Grade 12 Consumer Mathematics course took place from September 2011 through January 2012, but the survey and the interviews began at the school at the end of November 2011. By the time the study got underway, the course was near the end of its duration. Because of this, those students who have already left the course, or even the program, would not be part of the study, affecting and limiting the findings of this study.

Despite these limitations, this research adds to an understanding of the challenges facing adult learners in an urban Canadian adult education context. More importantly, it provides a voice to a group of people who in many ways remain underrepresented.

IMPLICATIONS

The implications of the study will be discussed in terms of the learners, mathematics education, and my classroom.

Learners

The major theme that emerged from this study regarding the learners is the high level of positivity, self-efficacy, and resiliency displayed by the participants. This theme is worth exploring further. It is difficult to determine if the adult participants were still enrolled in school at the time of the study because they possessed these qualities, or if their success in school enhanced these qualities. Are these characteristics necessary to success for adult learners? As well, we must consider the learners who did not participate in the study because they had already dropped out. Did they leave school because they lacked positive attitudes, self-efficacy and resiliency or did other factors cause their departure from school? Will these learners be successful if they return to school in the future? My study was not designed to specifically answer these questions but has rather provided support for the relevance of these questions in regards to their effect on understanding the success and non-success of adult learners. An answer to these questions may be found in future research.

This study also seems to imply that many adult learners need more than one attempt to achieve a high school diploma. This may have implications for funding purposes since many adult learners rely on financial support to attend school. It should be acknowledged that adult learners may need more than one attempt at school. Therefore, funding

agencies could perhaps defer funding if an adult learner must leave school for a period of time. It is also important that adult education remain tuition free; the findings of the study suggest that most of the participants could not have afforded to attend school if tuition was charged.

Finally, it would be informative to conduct another study with a different group of learners at the same school, perhaps from a different mathematics course, to determine if the learners were equally positive about the school, the teachers, mathematics, and themselves as learners. This may help to establish if the factors identified by these participants as being supportive to adult learning are common to other learners at the school. It would also be informative to find out if the attitude towards mathematics that was displayed by the Consumer Mathematics students is also displayed by mathematics learners in the other two pathways. It would also be instructive to find out why learners choose Pre-Calculus or Applied Mathematics and if they regard these mathematics programs as relevant and useful, like the participants in the study regarded the Consumer Mathematics program.

Mathematics Education

Social justice requires a dedication to equity. In Manitoba, it does not appear that mathematics' role as a critical filter will disappear anytime soon, so it is important that all students are aware of the three mathematical pathways and the implications and limitations of them. Students must therefore have clear mathematics choices; they must be aware of all of their choices and the consequences of each. The findings reveal that

communication must be improved in regards to informing students of the mathematics options available to them.

The numbers of students taking Consumer Mathematics, as compared to the other two pathways of mathematics at the school, should be examined to determine if students are choosing to take Consumer Mathematics because it meets their needs or because they lack information about the other pathways. Many students want to graduate as soon as possible, and Consumer Mathematics seems, for them, to be the most efficient way to earn the mathematics credit necessary for graduation. If the end goal for learners is graduation, then Consumer Mathematics supports this goal. However, Consumer Mathematics does not support the goal of a more equitable society with more opportunities for all.

My Classroom

This study evolved from my experiences as an adult educator at an urban high school. Many of the learners I teach are successful. Others leave shortly after enrolling, and still others leave and return several times before succeeding. Adult learners face many challenges and responsibilities, including families, jobs, mental or physical illness or disability, legal problems, family dysfunction, and language or cultural barriers. All of these add to the stress of being a learner. As a teacher, I am concerned with providing the best possible learning environment for my students, which is why I wanted to explore the factors that may affect their learning environment.

The findings of this study have reinforced some of my previous beliefs about learning, and have also identified areas where I can implement changes that may increase

chances for success for my students. The findings confirmed to me that teachers play an important part in the success or failure of students. This is a responsibility that can be overlooked when teaching at-risk students, where it is easy for teachers to blame lack of learner success on the uncontrollable factors of the students' life circumstances. This is an attitude that can lead to a feeling of helplessness on the part of the teacher, or teacher apathy. However, the participants of this study reported that teachers are a major support to their learning, reinforcing the importance of the role that is played by the teacher in learner success, regardless of other external factors that may affect the learning environment.

This finding also reinforces with the importance of the connections established between the teacher and learners. I believe that it is important to acknowledge my students' lives outside the classroom. I begin each new class by giving students the opportunity to confidentially share with me anything in their lives that may affect their learning environment. This includes jobs, children, illness, etc. I believe that this is important for establishing connections and to validate the learner's identity as not just one of a mathematics student. It also acknowledges the other responsibilities and challenges that they may have in their lives. Since the study indicated that work commitments and childcare issues often keeps adult learners from attending school, communication is extremely important. I maintain a blog for each course that I teach and I post daily activities and assignments on it. Technology has become an increasingly important tool for communication; more students are using smartphones, which allows them to access blogs and communicate with teachers through e-mail, even if they do not

have a computer at home. I have found that technology has become an important tool to maintain connections with my students.

I am committed to equity in my classroom and I will continue to have high expectations for all of my students. As a mathematics teacher, this also means having realistic expectations for my students. Not every student wants or needs to study Pre-Calculus or Applied Mathematics and for those wishing to graduate as soon as possible, Consumer Mathematics may be the best option. Nevertheless, the same opportunities should be made available to all learners. I will continue to ensure that all students in my mathematics classes are informed and aware of all their mathematical choices and the implications of their choices.

The study also rekindled a personal desire to infuse social justice issues into the mathematics curriculum. This involves reviewing the mathematics curriculum through a social justice lens and adjusting content accordingly. I believe that all mathematics students should develop the critical numeracy necessary to thrive and to contribute to meaningful social change.

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APPENDIX 1:

Survey

Please circle the appropriate response:

	Demographic Information	Yes	No
1.	I was born in Canada.	Y	N
2.	I have been in Canada less than two years.	Y	N
3.	English was my first language.	Y	N
4.	I have children who live with me.	Y	N
5.	I have other family members whom I support.	Y	N
6.	I have a job outside of school.	Y	N
7.	I have a job that takes more than 20 hours per week.	Y	N
8.	I have a job that takes more than 30 hours per week.	Y	N
9.	I live within walking distance of the school.	Y	N
10.	This is my first time taking the 40S Consumer Mathematics course.	Y	N

Please use the scale Strongly Disagree to Strongly Agree to respond to the following. Circle the appropriate response:

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	I am successful in this school.	SD	D	N	A	SA
2.	I get enough support at home to succeed in this school.	SD	D	N	A	SA
3.	I know where to get help at this school when I have problems.	SD	D	N	A	SA

4.	I use the Resource Room at this school when I have problems with schoolwork.	SD	D	N	A	SA
5.	I find it hard to come to this school because of work commitments.	SD	D	N	A	SA
6.	I find it hard to come to this school because of childcare issues.	SD	D	N	A	SA
7.	I find it hard to come to this school because of transportation issues.	SD	D	N	A	SA
8.	Language difficulties have caused problems for me with my schoolwork.	SD	D	N	A	SA
9.	Complete only if you have a job: Because of my job, I don't have time for schoolwork.	SD	D	N	A	SA
10.	I feel that my culture is honoured in this school.	SD	D	N	A	SA
11.	The timetable at this school works well for me.	SD	D	N	A	SA
12.	I feel that I am doing well in this mathematics class.	SD	D	N	A	SA
13.	I understand what the teacher is asking me to do in this mathematics class.	SD	D	N	A	SA
14.	I feel that the mathematics I am learning in this school will be useful to me in the future.	SD	D	N	A	SA

Please answer the following with a few words so that I might better understand your experiences as a student:

1. What supports you **the most** to be successful in your learning in the school?

2. What is **the biggest** problem for you (what prevents you from being successful) in your learning in the school?

APPENDIX 2:

Interview Protocol

Interview # ____

PSEUDONYM: _____

DATE: _____

START TIME: _____ END _____

Opening Comments: As you might recall, I am talking you today about the learning conditions for adult learners of mathematics at this school. I will be taping our conversation so that I can transcribe and analyze the comments at a later time. Are you comfortable with this procedure? I will also be taking notes as we talk. Are you ready to begin?

Questions guiding the semi-structured interview:

1. Why did you come to this school?
2. What is it like for you to go to school here?

SITUATIONAL

3. Are there reasons why it is sometimes difficult or impossible for you to come to school?
[Possible follow-up: lack of money, work commitments; lack of childcare; problems with transportation]
4. How would you characterize your cultural background? Does your cultural background play any role in your attending the school?
[Possible follow-up: is your culture represented/honoured in the school? How? Does your cultural background affect your learning in the school? How?]

INSTITUTIONAL

5. How successful do you feel you are in your program? What does “success” mean to you?

6. Can you identify some reasons why you are so successful/have difficulties being successful? [Possible follow-ups: reasons of language; culture; understanding what the teachers want from you; support/lack of support by school/by teacher; relationships to other students; understanding the subjects; timetable; class size]
7. Do you have help in the school/outside of school with being successful in your program? [Possible follow-ups: help by teachers; school in general; other students; community; family]
8. Why are you in the 40S Consumer Mathematics course? Is this the first time you are taking a mathematics course in this school?
[Possible follow-ups: assessment process]
9. How successful do you feel you are in the 40S Consumer Mathematics course? What does “success” mean to you?
10. Can you identify some reasons why you are so successful/have difficulties being successful in the 40S Consumer Mathematics course?
[Possible follow-ups: reasons of language; culture; understanding what the teacher wants from you; support/lack of support by school/ by teacher; relationships to other students; understanding the mathematics; class size; the curriculum]
11. Do you have help in the school/outside of school with being successful in your 40S Consumer Mathematics course?
[Possible follow-ups: help by teachers; school in general; other students, community; family]

DISPOSITIONAL

12. Do you like going to school? What do you like about it? Why did you go back to school?
13. Is learning easy for you? Is being in this school easy for you?
14. When you have problems in this school, what do you do?

APPENDIX 3: FORMS

Form 3.1: Letter of Recruitment



UNIVERSITY
OF MANITOBA

Fort Garry Campus Research Ethics Boards
CTC Building, 208 - 194 Dafoe Road
Winnipeg, MB R3T 2N2
Phone: (204) 474-7122
July 22, 2011

Title of Research Study: Exploring Learning Conditions for Adult Learners of Mathematics in Manitoba from a Critical Perspective

This letter is an invitation to participate in a study I am conducting as part of my Master of Education studies at the University of Manitoba. The focus of this project is to explore the learning conditions of adult learners, specifically regarding the learning of mathematics.

Participation in this study is voluntary. It will involve an interview of approximately one hour in length where I will ask you approximately 20 questions about your experiences as a student. You do not have to answer any question that you do not want to and you may also stop the interview any time you wish, without any penalty. You will also be invited to come to a second, shorter meeting with me where I will share how I interpret what you said in your interview. All information you share will be kept confidential.

If you have any questions regarding this study, or would like any more information to help you in reaching a decision about taking part, please contact me. You can also contact my advisor, Dr. Thomas Falkenberg by email at tfalkenberg@umanitoba.ca or at 204-480-1486.

If you would like to participate in this study, please fill out your name and a phone number where I can reach you (see below). You can leave this form here with your teacher, bring it to me, or bring it to the front desk staff in the school office.

Thank you for your time.

Participant's Name (Please Print)

Phone number where I can reach you

Form 3.2: Letter of Informed Consent for Participants



UNIVERSITY
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Fort Garry Campus Research Ethics Boards
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Winnipeg, MB R3T 2N2
Phone: (204) 474-7122

July 22, 2011

Title of Research Study: Exploring Learning Conditions for Adult Learners of Mathematics in Manitoba from a Critical Perspective

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

This letter is an invitation to participate in a study I am conducting as part of my Master of Education studies at the University of Manitoba.

With this study I want to explore the learning conditions of adult learners, specifically regarding the learning of mathematics. The study will help me learn more about the learning conditions that adult learners face and will provide information that I could use in my teaching practice.

Participation in this study is voluntary. It will involve an interview of approximately one hour in length and will be in a private location at the school. It will be at a time that is convenient for you. You can choose not to answer any interview questions that you don't want to answer. Also, you can withdraw from the study at any time and without penalty by letting me know. With your permission, the interview will be audio-recorded and later transcribed for analysis. All information you provide is considered confidential. Your name or any other personal identifying information (e.g., name of your school) will not appear in the final paper. However, with your permission, quotations may be used along with pseudonyms to protect your identity. Transcriptions and/or tapes collected during this study will be kept in a locked filing cabinet at my house. Only I will have access to the data. Within three years after the study has been completed all transcripts and tapes will be destroyed.

There are minimal risks to you as a participant in this study, but you may benefit from the opportunity to share your experiences and from reading the final results of the study which I will make available to you. There will be no compensation for your participation.

If you have any questions regarding this course project, or would like any additional information to assist you in reaching a decision about participation, please contact me. You can also contact my advisor, Dr. Thomas Falkenberg by email at tfalkenberg@umanitoba.ca or at 204-480-1486.

Your signature on this form shows that you have understood the information regarding taking part in this study and that you are willing to take part in it. In no way does this waive your legal rights nor release the researcher, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time and/or refrain from answering questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent so you should feel free to ask for clarification or new information throughout your participation.

This research has been approved by the Education / Nursing Research Ethics Board of the University of Manitoba. If you have any concerns or complaints about this project you may contact Dr. Robert Macmillan, Dean, Faculty of Education, University of Manitoba at 474-9001 (dean_education@umanitoba.ca) or the Human Ethics Secretariat at 474-7122, or e-mail margaret_bowman@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.

Participant's Name (Please Print)

Participant's Signature

Date

Student Researcher's Signature

Date

Please read the following statements and use a check mark to indicate your response.

I agree to participate in this study.

Yes___

No___

I agree to have my interview tape recorded.

Yes___

No___

I agree to the use of anonymous quotations in the course project paper and poster presentation.

Yes___

No___

A summary report of the research findings will be made available to you if you wish. Please indicate how you would like to receive the findings by checking off the appropriate box and providing your e-mail address if necessary:

Please forward a summary report of the research findings to me by email using the following _____ address:

Please have a final report ready for me to pick up from the school secretary.

Form 3.3: Letter of Informed Consent for School Administrator



UNIVERSITY
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Fort Garry Campus Research Ethics Boards
CTC Building, 208 - 194 Dafoe Road
Winnipeg, MB R3T 2N2
Phone: (204) 474-7122

July 22, 2011

Title of Research Study: Exploring Learning Conditions for Adult Learners of Mathematics in Manitoba from a Critical Perspective

This letter is request to conduct a study in this school. The study is a partial requirement of my Master of Education studies at the University of Manitoba.

With this study I want to explore the learning conditions of adult learners, specifically regarding the learning of mathematics. The study will help me learn more about the learning conditions that adult learners face and will provide information that I could use in my teaching practice.

The study will involve visiting four classes of 40S Consumer Mathematics students and inviting them to participate in this study. I will use two tools for this study. The first tool is a survey of 24 questions involving demographic data and also involving the learning conditions of adult learners. I will distribute these at the beginning of class and ask the teacher to collect the results. The survey will take approximately 10 minutes to complete. At the same time I explain the survey, I will also explain the second part of the study. The second part involves interviewing 10 students to explore their learning conditions in greater depth. I will ask anyone interested in participating in an interview to leave their name with the teacher or the front desk staff at the school. These interviews will take place in a private location at the school at a time convenient to the student. The interviews will be approximately one hour and will be one-on-one. The names of all participants will be kept confidential. The participants will also be invited to come back for a shorter meeting with me where I will share my interpretations of the interviews with each participant (again, one-on-one).

Participation is voluntary and it will be emphasized that participants can refuse to answer any question and can pull out of the study at any time, without negative consequence.

I believe that the findings of this study could be informative and could lead to improved teaching practices.

Your signature on this form indicates that you agree to allow me to undertake the research described above.

Thank you for your consideration.

Administrator's Name (Please Print)

Administrator's Signature

Date

Student Researcher's Signature

Date

Form 3.4: Written Explanation of the Study



UNIVERSITY
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Winnipeg, MB R3T 2N2
Phone: (204) 474-7122

July 22, 2011

Title of Research Study: Exploring Learning Conditions for Adult Learners of Mathematics in Manitoba from a Critical Perspective

This letter provides you with information about a study I am conducting as part of my Master of Education studies at the University of Manitoba. The focus of this study is to explore the learning conditions of adult learners, specifically regarding the learning of mathematics.

I am asking for your participation in completing a survey of 26 quick response questions and two short answer questions regarding your experience as an adult student at this school. Participation in this survey is voluntary. You do not have to answer any question that you do not want to and you may also stop answering at any time you wish, without any penalty. You do **not** have to provide your name with your answers.

Please complete the survey if you wish. You can leave the completed survey with your teacher, bring it to me, or leave it at the front office with the front desk clerk.

Thank you for your time.

Form 3.5: Pledge of Confidentiality



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July 22, 2011

Title of Research Study: Exploring Learning Conditions for Adult Learners of Mathematics in Manitoba from a Critical Perspective

This letter provides you with information about a study I am conducting as part of my Master of Education studies at the University of Manitoba. The focus of this study is to explore the learning conditions of adult learners, specifically regarding the learning of mathematics.

I am asking for your participation in collecting a survey regarding your experience as an adult student at this school. Participation in this survey is voluntary. I am asking that you keep any information obtained about the study confidential.

Thank you for your cooperation.