An authoethnography: Understanding my mathematical learning process to improve my future educator skills

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Acknowledgments

The present thesis is the start of an ongoing self-evaluation. It would not have been possible to do without all the help and knowledge of many people. First, to Sarina Murrell, my wife, my gratitude and love for all your support in this journey is endless. You understand my happiness and fears of why I want to be a good educator and push me when I am weak. Second, to Gilma Mora, my mom, my role model, you always have believed in me even when sometimes I did not believe in myself. You taught me that being positive is the key when pursuing a dream because life is not easy. Finally, to my family, friends and professors who in one way or another are helping me to be a better world citizen.
ABSTRACT

AN AUTOETHNOGRAPHY: UNDERSTANDING MY OWN MATHEMATICAL LEARNING PROCESS TO IMPROVE MY FUTURE EDUCATOR SKILLS
by
Jeanneth Cristina Paredes

There are different challenges in a math classroom. Understanding some of the challenges that obstruct students’ learning could help teachers modify their teaching style to promote more effective learning in the classroom. The ability of teachers to reflect on their own learning process provides insight as to how to encourage their students and help them succeed. The purpose of this thesis is to provide a detailed account of one student’s journey in her process to learn, highlighting key moments in her academic life that have molded her into the prospective educator she is today.

This study has relevance because the self-examination done by the researcher illuminates her to be aware of different possibilities for her future when she becomes a teacher. This study is important because it shows the process of how a student of education wants to be well-prepared before entering a classroom and becoming a math teacher.

The methodology used in this qualitative research study is autoethnographical. An autoethnography is research where the researcher plays a double role as the researcher and as the participant, which makes him/her being involved with the text on a higher level (Denzin & Lincoln, 2000). Interviews, memories and artifacts are supporting data sources to render narratives detailing the findings. The research question guiding this research study are: Who was Jeanneth Paredes as a mathematical learner?, and Who was Jeanneth Paredes as a student in a math classroom? The following sub-questions will also be examined: How does language
influence the quality and understanding of her learning?, What motivated Jeanneth Paredes to engage in mathematical activity and learning?, and In what ways did these change with age?

The findings show that a student’s mathematical learning can be affected due to several factors including teaching style, language, age and experience. The findings also indicate that a student’s learning style can be modified because of different life experiences.

Keywords: autoethnography, math learner, multicultural, mathematics, language, self-reflection
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CHAPTER 1
INTRODUCTION

The first semester in my master’s program, I had the opportunity to write a math practicum as part of a multicultural curriculum class. At that moment, I believed it would be a good idea to develop this practicum and incorporate it later in my thesis research. I based the development of my practicum on my workshop experience with a math organization in Ecuador that specialized in K-5 math games. I wanted to focus my attention on how students learn when games are incorporated in a math classroom. Information related to this topic is very accessible so I knew I wouldn’t have any concern when doing my research. Before I started with my thesis, I wanted to investigate the available resources and assure myself that my thesis work would be supported. I explored material from The Lawrence Hall of Science at the University of California, Berkeley because all of the material used in the organization’s workshops were taken from The Lawrence Hall of Science’s Family Math program and adapted to our needs. It made sense for me to focus on math resources, but also, after living in southern California, to adapt these math resources toward the Latino community.

After I informally made the decision to direct my thesis research toward math games, I enrolled in a Research Methods in Education course. In this class, I learned about quantitative and qualitative research. Both types of research have challenges when exploring and analyzing the data. Quantitative data is mostly numerical and its analysis usually involves statistical procedures. While qualitative data involves narrative or verbal information which could be analyzed by logically matching and answering research questions (Mertler & Charles, 2008). In the middle of this semester, I had an assignment where I had to develop questions related to my research thesis. I found myself doubting my original thought of researching K-5 math through
games with Latino students and their families due to the fact that I was defining myself as more focused on the educational concerns than on the math topics.

Before I answered the questions for my assignment, I thought deeply about why I want to be a math teacher. I thought it is mainly because I like math and I like being around students when they discover how to use numbers. However, I had another question that stood out in my mind: *What kind of teacher do I want to be?* I did not have a concrete answer for this important question. Therefore, I followed my intuition and decided that I wanted to investigate myself. I set out to understand how I can teach to the best of my abilities. In order to find that out, I thought it would be useful to investigate my inquiry from the beginning of my educational journey: from twenty-seven years ago until now.

“Inquiry is the … struggle of human beings for reasonable explanations of phenomena about which they are curious.” (Jarret, 1997, p. 2)

I remember, when I was little, playing “school” with my siblings. My older sister (only by eleven months) was always the teacher. My little brother (5 years younger than I am) and I were the students. My sister enjoyed giving us assignments and homework. She used to correct our homework and give us happy faces when she felt we did a good job. I never ask if I could be the teacher, mainly because that was my sister’s dream when she was little. She wanted to be a teacher and I want to be nurse, architect, singer, everything but a teacher. Yet here I am, over 20 years later, studying to become a math teacher. It took me that long to understand that my true passion is *teaching*.

In 2008, I had the opportunity to be part of a math workshop. In this workshop, I learned various games that can be incorporated into a math class to help teach fundamental math concepts (e.g. fractions, prime numbers, logical reasoning, etc.). I was amazed at how an ideas as
simple as using dice, beans and color papers to explain math concepts, were such an obvious aid for the participants in understanding math. I, myself, benefited tremendously from these activities by reinforcing my math knowledge with fun, meaningful games. I vividly remember understanding fractions for the first time. At 28 years old, I was finally able to encounter fractions without confusion and fear. After this workshop, I decided to volunteer with the organization that sponsored it. My first training workshop was three days long, from 8 am to 5 pm. During that time, I never felt any sort of exhaustion of using math for eight hours straight because I was just playing. Even in 1933, these efforts of making learning playful and meaningful were recognized, as Dewey states, “When things become signs, when they gain a representative capacity as standing for other things, play is transformed from mere physical exuberance into an activity involving a mental factor” (p. 161).

After training, the following month I facilitated my first workshop. I was no longer the student; I became a teacher. I was very nervous the first day when I saw more than forty teachers in the classroom. I had ten teachers with whom I was to work directly, most with more than ten years of teaching experience, and all older that I was. At the end of the day, I was very exhausted because I had being trying to demonstrate to these teachers an alternative teaching method that was completely unlike anything they were familiar with. They were accustomed to following a book with almost no reasoning. However, that day I also realized that with all the stress and hard work, I really enjoyed talking with the teachers and sharing ideas. That day, I decided that I want to be a math teacher.

The problem

Teachers have a responsibility of not just presenting new material, but also of specializing each class for the specific group of students – incorporating social skills and
confidence. Specifically in math classrooms, there exists a need to improve math teaching. Not long ago, teachers were thought to be the givers and students were passive receptacles of information. However, today this role is changing because of advances in educational methodology and the incorporation of technology; students are now more active learners. They collaborate with ideas by asking questions and challenging their teachers. Because of this, mathematic classrooms need to provide more than arithmetic and algorithms. Mathematics teachers need to enable students to share concerns and to try to find solutions that make sense in a world of rational numbers, equations, logarithms, and so on. A teacher’s goal should be to strive for a classroom where students are involved in full inquiry (Jarret, 1997).

I wish to become a math teacher. I am aware of the ongoing concern that a majority of math classrooms lack meaningful learning. In order for me to be the best teacher I can be, I feel it is important to truly understand all aspects of being a student, since that is the purpose of a teacher: to serve the students. As for me and my specific goal, I wish to understand my own ways of learning to implement it in a future classroom so that my students’ ability to be fully involved is priority.

**Purpose of the study**

The aim of this paper is to present my findings through means of autoethnographical discovering and understanding of what influences me in order to have the most productive mathematical learning process. Because the main reason of doing this research study is to understand my own learning process, I will analyze how much teaching style, motivation and language acquisition have affected or encouraged my mathematical learning. I have classified my mathematical learning in two stages: learning as a student and learning to be an educator. Reflecting on problems or dilemmas encountered in my life when learning could help me
improve my practices as a student and as a teacher. I expect with my reflections, to clarify a consecutive structure of memories and analyses, more than just simple memories and ideas (Dewey, 1933).

I have been working as a math workshop facilitator for more than three years now. In all this time, I’ve been thinking out how I can improve my teaching. Richert (1990) recognizes the importance of this sort of reflection for teachers:

“The ability to think about what one does and why—assessing past actions, current situations, and intended outcomes—is vital to intelligent practice, practice that is reflective rather than routine. As the time in the teaching process when teachers stop to think about their work and make sense of it, reflection influences how one grows as a professional by influencing how successfully one is able to learn from one’s experiences” (p. 525).

After being exposed to the area of research of authoethnographies, I felt compelled to perform my own self-research. Even though all teachers were previously students, the connection and history seems to be forgotten when considering implications during lesson development. I hope to understand my learning as a student and relate it to my future career as an education by examining the following research questions: Who was Jeanneth Paredes as a mathematical learner?, and Who was Jeanneth Paredes as a student in a math classroom? The following sub-questions will also be examined: How does language influence the quality and understanding of her learning?, What motivated Jeanneth Paredes to engage in mathematical activity and learning?, and In what ways did these change with age?

**Significance of Study**

My autoethnography is important because, through narrative, I attempt to give a detailed
description of my experiences in school in order to apply my findings for personal growth. Moreover, this study addressed individual examples to clarify findings in my educational history and apply results to my educational future.

The goal of this paper is to identify and come to understand my strengths and weaknesses when learning mathematics, and to discuss how the recognition of these could make me understand my students better when I become a teacher. This self-analysis can help other students and teachers to start a self-reflection and, as a consequence, improve their learning and teaching in practice.

I selected the books and journals to examine prior to the study. Participants in the study were people who are or were very close to me throughout the process of my mathematical learning. A total of six months was the necessary time to conclude my autoethnography. The planning of this study was done in four months (October 2011 – January 2012), while the implementation was done in two months (March and April 2012).

Limitations of the Study

Although this research was carefully prepared, there were some limitations. A challenge that authoethnographers and I faced was alternating between social and cultural aspects of life (Ellis & Bochner, 2000). Memories especially caused some discomfort because they place me in a defenseless situation within myself.

Summary

In conclusion, this autoethnographical thesis study utilizes an analysis of qualitative research based on personal history, interviews, and a literature review. It is an attempt to answer the previously stated research questions in hopes of self-discovery. My educational involvement in the future will benefit from the dedication and findings of this project.
CHAPTER TWO

REVIEW OF THE LITERATURE

Learning, for me, is an individual approach for understanding certain concepts in different settings. In my journey through school, I found myself sometimes buried under all the work that I had to do in order to learn something. But when I had the opportunity to teach, I became overwhelmed by my students, forgetting entirely about my experience as a student. In order to better connect these two roles in my life so they complement each other, I will be analyzing myself.

There are many areas concerning education that affect how a student learns. The three most important areas I have decided to focus both my literature review and my autoethnographical data collection on are those involving teaching styles, language acquisition, and self-motivation. I chose the area of teaching style because I believe that how a teacher presents the material can make a great difference with how (and how well) a student learns the material. I also chose to investigate language acquisition because of me having learned my fundamentals in Spanish and then switching to English for my graduate studies and future teaching career. I wanted to understand how language affects learning, if at all. Finally, the area of motivation is very important for me because I need to understand the why for me to understand the how. Why I want to be a teacher is just as important as the education required for me to get there.

Throughout this autoethnography, I attempt to answer: Who was Jeanneth Paredes as a mathematical learner?, and Who was Jeanneth Paredes as a student in a math classroom? The following sub-questions will also be examined: How does language influence the quality and understanding of her learning?, What motivated Jeanneth Paredes to engage in mathematical
activity and learning?, and In what ways did these change with age?

When I started volunteering in the math foundation, I realized how important teachers are. In my case, I recognized that I was well-prepared to present the math games, but I did not know anything about the participants – who were teachers assuming the role as students. I assumed that those students/teachers knew about basic math. Therefore, I was ready to guide my activities for students who already knew the material. I realized that, to a certain extent, I moulded myself around some of my previous education in earlier years, where it was assumed that everyone in the classroom was on the same level. In my experience as a student in classes like this, there was no evaluation if all students understood. I did not voice my confusion in the class because I did not feel comfortable. If it was assumed that all understood, then I must have been the only one who didn’t understand. I now reflect and wonder what the participants in the workshops thought when I was guiding the activities, assuming a foundation that might not have been present amongst all.

There are many factors that can affect learning in students. Through the following literature being examined, I will focus on three important factors involving learning: teaching style, motivation and language. These topics were chosen primarily because they will help address my research questions involving myself evaluation for my autoethnography.

Teaching Style

Learning is one educational term that is often confused and sometimes misunderstood. It is a word that is mainly related with students and their ability to understand a topic in a classroom setting. Believing that every student must understand in the same way and treating them in the same manner could affect their progress and, in some occasions, their enthusiasm to
learn. On the other hand, providing different approaches to a certain topic could increase the percentage of students learning that topic.

“How a teacher views mathematics and its learning affects that teacher’s teaching practice, which ultimate affects not only what the students learn but how they view themselves as a mathematics learners” (Kilpatrick, p.132).

Becoming a student in pursuit of a teacher credential help me to understand how difficult it is to be a student and how challenging it is to be a teacher. Both students and teachers have different learning styles. Both negotiate norms and rules to create an environment in their classroom. This creation could benefit both or just one side, depending directly on how much teachers let students interact when making decisions. Teachers also need to understand that in a classroom there are varieties of learning styles, so they have to be very creative to gain the students’ attention. When a teacher is using just one style, he/she is focusing just on a certain group of students, while leaving some of the students alone and confused.

My experiences as a student show me that what the teacher thinks about me is very important. I could succeed better when I thought that I had my teachers’ support. Teachers’ attitude toward student’s learning is a paramount in a classroom. The following research confirms my experiences and beliefs about how important it is to show the students that teachers care and believe in them.

Brownlee, Purdie, and Boulton-Lewis (2003) studied twenty-nine student teachers, examining their knowledge and learning, hoping to explain what motivates a student and how well a certain learning concept is retained. Teachers need to understand what are their classroom dynamics and the students’ different learning styles to help introduce ideas so that those specific children will learn and think about the presented topics. “[W]hat teachers know and do, and what
they believe their students are capable of learning, makes a difference” (Nieto, 2010, p. 30). A student feeling compelled to complete an assignment solely to get the desired grade might retain less and the level of self-motivation might be less than if the student knows that by completing the assignment he/she would gain a desired benefit through self-motivation and learn more efficiently. There are many elements that are involved in learning. In their study, Brownlee, et al. (2003) found that “students’ motives and consequent strategy choices would change, depending on the specific learning situation” (p. 112). “Students come to any learning situation with knowledge about learning, as well as prior knowledge in the content area, beliefs, abilities, motivation and personality traits as personal presage factors” (p. 111).

Teaching style strongly affects a student’s ability to learn. Biggs (1987) conducted a research study for over twenty years examining students’ approaches to learning and studying. Factors such as age, sex, language, socioeconomic status, motive to help educator in teaching, and counseling were taken into consideration to help teachers make better professional decisions. The participants were divided into three groups: one group of 420 Canadian university freshmen, and two groups of Australian students in their Diploma in Education with approximately 150 students in both groups. The first group of participants received questionnaires through the mail system, while the second group filled out the same questionnaires in their classes. The third group collected the questionnaires from the study’s office, filled them out on their own time and returned them. The forms contained questions of Learning Process Questionnaire (LPQ) and Study Process Questionnaire (SPQ). Identifying a personal learning process and how to use this knowledge to learn more effectively are some of the questions that LPQ and SPQ tried to answer.

The findings of this study showed that the students’ approach of learning is involved and active interest in the material shows personal understanding (Entwistle, 1997).
states, “both the LPQ and the SPQ show the fact that students deal with stable tendencies, and more to the point, that the approaches to learning that students say they typically use are in the fact relatively stable over time and situation” (Entwistle, 1997, p. 93).

In summary, this research study shows that students’ learning is developed by personal and motivation varies from one student to another. This study provides applications of the teaching model by using the LPQ and SPQ scores when making instructional and referral decisions. “If students are using inappropriate approaches to learning, the teachers’ resource is to change some situational aspect that will either change the students’ approach, or if that cannot be change easily, accommodate to that approach” (p. 109). This interaction indirectly shows students there is an interest from the teacher to help them to learn.

My learning process in school involved different facts that changed with time. For example, in my first years in college I did not enjoy working in groups. I preferred to do a project by myself because I did not like to share my ideas. Now, I like to work in mixed groups and hear others’ opinions. I enjoy sharing approaches with students who understand different procedures in different ways. However this could change depending on the situation. If I feel uncomfortable in a group I cannot be an active student and I would prefer to work individually.

As did Biggs (1987), Zapata (2010) also examined the important role that teachers have and how their style can affect students. However, she insisted that the interaction between teachers and students would be better when teachers showed that they care about the students more than using tests to improve teaching styles. “Knowing pedagogy is also necessary, but if teachers do not develop meaningful relationships with their students of all backgrounds no matter what their own backgrounds are the students simply not succeed” (p. 239). The extent of
how much teachers can positively influence students directly depends on how much they care about them. Consequently, this influence ends up helping students understand and learn.

Farkas (2003) corroborated that success of students depends on, in great part, the participation of the institution and teachers. Traditional classes, where the extent of teacher participation is limited to lectures and bookwork, are now far from being the best place to learn. “Conducting a class with traditional teaching could give an inferior approach and teaching through learning style give great opportunities for students to succeed” (p. 49). Nevertheless, it is fair to say that teachers who use traditional teaching can also guide students to succeed if they believe in the potential of each of those students (Zapata, 2010). “Most teachers are sincerely concerned about their students and want very much to provide them with the best education possible. Nonetheless, because of their own limited experiences and education, they may know very little about the students they teach” (p. 40). Opinions about which aspects of a child’s education are most influential (e.g. traditional vs. non-traditional classroom) vary greatly. However, educators seem to agree more on the fact that an involved teacher makes a difference in a student’s learning.

Teaching through learning style makes students feel confident because they see their background as a tool to learn. Fransson (1977) found differences in the learning outcomes of students, which he attributed to both the amount of effort and the involvement shown during the learning process. These differences in learning help teachers distinguish the students’ different processes to achieve a goal. Teachers are able to assess student progress by noting their involvement and interest, which shows personal understanding. Teachers who create lessons that incorporate the students’ background are encouraging the learning process in their classrooms. This shows interest and care, which also leads to better motivation for the student to succeed.
The recognition of different learning styles in students may help teachers create lessons that better suit students, which leads to improvement and equality in a classroom.

**Motivation**

Motivation for learning varies from student to student. Understanding what such motives are in order to incorporate them into the classroom learning environment is a task that a sizable amount of both past and current research has been focused on when trying to identify success or failure of the students’ learning. Many teachers and parents still maintain the mistaken belief that student motivation is best defined in black or white terms; hence students are either motivated or unmotivated across all learning situations.

Bong (2004) investigated the level of motivational belief of students in multiple academic subject matter domains in Seoul-Korea. The author used one main research question to achieve her goal: “If students exhibit certain motivational beliefs in one academic domain, how likely are they to face other domain with similar beliefs and attitudes?” (p. 287).

The participants of her study were 389 freshmen women of middle to lower-middle income families. During one academic year, a survey was used to obtain data regarding the motivational beliefs of these women across three subject-matter domains: Korean, English and Mathematics. The most important result was that students have different motivational beliefs in each domain; and that these beliefs varied with context. The differences observed depended on the age of students. Further, motivation was found to be different when considering general and specific beliefs. There were different kinds of situations where a student could be motivated and it was not necessarily related with their personality. For example, if students feel that the topic shown in class is relevant to their lives, they will find the motivation to learn it. Another example
of students finding motivation could be from the affect when teachers show they care about
students through their gestures and actions.

Bong (2004) concluded that students have the ability to differentiate task value between
different subjects; the same conclusion made by Wigfield and Eccles (1992). When students
discovered useful subjects they became more interested so they found the motivation to
understand, learn and achieve an activity. Their motivation also has a strong relation with age of
the students which was the same substantial evidence for Bigg (1987): “In terms of motivation,
what seems to be happening is that the material and psychological cost of entering a tertiary
institution tend to increase with age” (p. 67).

Zimmerman, Bandura, and Martinez-Pons (1992) considered whether motivation is
related with previous experiences and if those experiences could influence perception that
students have over efficacy and goal setting. Students, in general, are always discovering
different things in their classes. As part of their journey they are also discovering if they like
some topics. Something that could have been seeing as hard or easy in early classes could change
in the future. For students, these changes make them perceive themselves as capable of
regulating their own activities they feel more confident that they can succeed with high
performance in a school setting.

Within the realm of self-motivation, another big influence is the expectation that parents
have of their children. In other words, the motivations of both parents and children are linked in
academic goals. Zimmerman et al. (1992) describe the relationship between children and parent
motivation:
“Apparently, parents rely on their children’s prior grade accomplishments when they set
goals for their children; however, their children rely on their self-efficacy beliefs as well
as their parents’ aspirations for them when setting their goals” (p. 672).

There are two settings where a child could be monitored: in school and at home. At home,
parents observe and supervise their children. However, this monitoring is incomplete because
they do not know first-hand how their children are performing in school (Zimmerman et al.,
1992). This gap between school and home could be reduced when parents and teachers talk and
establish a link between the two environments. Both parents and teachers then continue to
encouraging their children and those students re-enforce their motives to learn.

Zimmerman et al. (1992) deduced that in cases where the positive expectations of the
parents for their children match those of the teacher for their students, students may feel more
compelled to achieve their goals. The lack of one or both of these positive regulators could end
up as an obstacle or maybe even a failure for the students.

The formerly discussed studies by Zimmerman et al. (1992), Bigg (1987), and Bong
(2004) are important because they show that motivation plays a determined role in the students’
school life and challenges previous assumptions about what is motivation. A classroom where
teachers apply different styles to teach, and motivate and encourage their students, provides an
environment that allows students to believe in themselves and to excel. There is another factor,
however, that is not dependent on the students’ motivation or the teacher’s classroom
involvement: language.

Language Acquisition

Another aspect effecting education for some learners is language. Differences in
language could result in differences in learning opportunity, motivation and success. Many
factors influence students that study in countries where the language used at school is not their mother tongue. Teachers are concerned about these students and, in order to help them, they have to identify and understand the process of learning in these students.

A study by O’Malley (1985) revealed that students have different kinds of learning strategies, and teachers are not aware of those strategies. This study was conducted in three different high schools in the United States. Seventy students of high-school age and twenty-two teachers participated in this study. Most of these students were language learners in beginning or intermediate English level. The purpose of this study was to identify learning strategies of teachers and language-learning students with different levels of language. Interviews and observations were used to collect data. Almost 2000 types of learning were found from the students and teachers, and were thence classified according to a previous research conducted by Brown (1982) where 26 metacognitive and cognitive strategies were found. “For example, repetition could be classified either as memorization or practice, and contextualization could be either practice or production tricks” (O’Malley, 1985, p. 32). O’Malley (1985) also found that metacognitive and cognitive strategies are used by intermediate level students while intermediate students used just metacognitive strategies” (p. 37).

While O’Malley’s (1985) study considered learning strategies, the study lacked validity in the sense that he only analyzed non-native English speakers, instead of comparing them against language acquisition for native English speakers. Biggs (1987), on the other hand, considered language acquisition, concluding that once students are able to understand language they would achieve better than if they have not mastered it. This is saying that after students understand their new language, they will excel in their classrooms. However, this assumption does not include other variables that influence learning, such as teachers’ style and/or student
motivation. Contradictory to Biggs (1987), Gorgoria and Planas (2001) found in their *Teaching Mathematics in Multilingual Classrooms* study that even when students mastered a second language they still may have a lack of communication. In this case specifically, even if mathematics is thought of as universal, language is not. Words may have different meanings in students’ mother tongues and could provide a contradictory learning experience in a classroom. Language is a topic in classrooms that can be sensitive to approach because of the teacher’s preparation and training regarding certain language obstacles.

**Summary**

The literature review discussed in this chapter provides specific details of what three specific areas of learning entail. As presented by Brownlee, et al. (2003), student motivation is dependent on specific learning environments, which, ultimately, are created by the teacher. We see here how motivation and teaching style are intertwined. The research question concerning who Jeanneth Paredes was as a student in a math classroom can be analyzed knowing the relationship between a teacher’s approach and a student’s mindset.

It is important to understand that the two principal settings in which a child is active daily are the home and the school. Zimmerman et al. (1992) addresses the concern of not only teacher involvement to promote student motivation, but also parental involvement. The sub-question for this autoethnography regarding what motivates Jeanneth Paredes to engage in mathematical learning will be assessed not only involving personal and academic influences, but also parental.

The final area of analysis, language acquisition, is summarized by Biggs’ (1987) study which found evidence that once students are able to understand language they would achieve better than if they have not mastered it. The research sub-question which invites the analysis of
how language influences quality and understanding of my learning can be better analyzed
knowing the implications of mastery and confidence of a language to prove competency.

Teaching style and involvement, along with student motivation and language are
interdependent aspects of a student’s learning success. The research questions for this
autoethnography were the bases for these topics and will be analyzed with the information from
this literary analysis along with further data collected from memory recollection and interviews.
The following chapter discusses the research design and process that is used to analyze and
interpret the data.
CHAPTER 3

RESEARCH METHODOLOGY

Being able to recognize the challenges presented to me while in my role as a student will help me with my role as an educator to better guide my students. Rachel Lotan from The Stanford University School of Education Conceptual Framework for Professional Education (Vanides & Morgret, 2002) said:

[P]owerful education requires that teachers and principals be able to analyze and reflect on their practice. Individually and with others, they need to assess the effects of their work and to refine and improve their practice” (p. 5).

My recently developed eagerness for being a math teacher encouraged me to look retrospectively and analyze my learning process—specifically, my mathematical learning process. I wondered, “Who am I as mathematical learner?”, and “Who was I as a student in a math classroom?” These questions can be understood better through analyzing the inquiries of what has motivated me to engage in mathematical activity and learning, how language influences the quality and understanding of my learning, and in what ways these concepts have changed with age.

Qualitative Research

As an authoethnography, this study was qualitative in design. The data was almost exclusively narrative, coming from interviews, journals, archival records of my mathematical activity, and my own memories. In qualitative research, data are mostly verbal, and involve an interpretative approach. The general purpose of such research is to obtain data in order to analyze the views and experiences of participants from their own perspectives. It is assumed that the meaning given to any situation in this world is provided by the individual(s) involved in it. As
such, the qualitative researcher is not just an observer (Denzin & Lincoln, 2000); instead he/she is an active participant producing data from the social world where s/he is present. The collection of data when approaching qualitative research involves a variety of empirical materials, such as interviews, artifacts, life stories, personal experiences and meaning in individuals’ lives. In the process of collecting data, the role of the researcher demands attention to detail, even to the extent of attending to and interpreting body language (Janesick, 2000).

**Autoethnography**

The research approach of an autoethnography refers to methodology that encompasses ethnographic research, writing, and method that connect the autobiographical and personal to the cultural, social, and political. Personal narrative emotions and interpersonal relationships are the focus aspects when creating an autoethnography. The researcher plays a double role as both subject and interpreter of his/ her own data. Then this data is consciously studied to produce and analyze information to obtain conclusions that help the researcher improve certain area (Given, 2008). The qualitative researcher typically triangulates data by collecting multiple kinds of information. In the present study, the data used were interviews, memories, and artifacts. By triangulating the results from these data, I could be more confident that the voices of the participants were captured.

All research is interpretative; it is guided by a set of beliefs and feelings about the world and how it should be understood and studied (Denzin & Lincoln, 2000). The research here involved my world, which is always changing. My perceptions of why certain processes occur in life were quite different at the beginning of my life than how I perceive the world now. Different experiences and understandings can allow processing and reasoning to occur in different ways (Gubrium & Holstein, 2000). I believe that after understand my learning process, the conclusions
I draw can help me to be a better math teacher in the future, specifically in the sense of been more aware of my future students’ learning processes.

I attempt to present my personal history to later analyze and draw conclusions related to my research questions. In this autobiographical genre of writing and research, personal, cultural, and multiple layer of consciousness are connected to provoke interest in the audience (Ellis & Bochner, 2000). In autoethnography, the author is intimately involved within the text. Tierney (2000) stated that words that are written are an effect of the personal reality lived by the author in a specific world. And so, the typical use of first person when reporting in an autoethnography is meant to connect with the reader in which the author makes himself/ herself the object of research and thus breaks the conventional separation of researcher and subject (Ellis & Bochner, 2000). This positions the researcher in a vulnerable situation. There is a sensitive aspect associated with examining one’s life through a qualitative analysis. Some conflicts could appear in the eagerness of analyzing one’s self. In the feminine narrative, for example, conflicts are often marked between the personal and the professional (Tedlock, 2000).

Scholars traditionally have attached importance to the life story for any number of reasons: nostalgia, to develop ideological images, or to re-create symbolic virtue in a world that is primarily structured around quantitative analysis (Tierney, 2000). Accordingly, qualitative researchers deploy a wide range of interconnected interpretive practices, hoping always to get a better understanding of the subject matter at hand. The subject matter, in this case, was myself. In order to have a better view of my practices as a math learner I decided to look back on my past and see my evolution inside and outside a classroom. There were paradigms in my life that I addressed (Denzin & Lincoln, 2000). Using interviews, journals and artifacts I attempted to answer, *Who was Jeanneth Paredes as a mathematical learner?*, and *Who was Jeanneth Paredes*
as a student in a math classroom? The following sub-questions were also examined: How did language influence the quality and understanding of her learning?, What motivated Jeanneth Paredes to engage in mathematical activity and learning?, and In what ways did these change with age? These questions were addressed cautiously because the explanations and interpretations could be vulnerable and contain much bias. The challenge is to respond to these questions in ways that are empirically and conceptually consonant with qualitative inquiry’s traditional concerns (Holstein, 2000).

**Participant**

Because I serve as the main participant and the researcher, it is important to lay out personal facts about me. I am a 32-year-old Ecuadorian woman. I was born in Quito, Ecuador and lived there my entire life, aside from my studies in the United States. I attended various elementary, middle, and high schools in the capital city of Quito, Ecuador. After finishing high school at nineteen years old, I went on to three different universities, changing my major at each new educational institute. While in my undergraduate career, I studied abroad in Lincoln, Nebraska for one year. I graduated with my B.A. in Computer Systems and Networking from the University San Francisco of Quito. After graduating, I worked with a math organization in Ecuador that held workshops to promote early math education through games. I began my Master’s program in education at California State University, San Marcos in January of 2011. During my program, I have had the opportunity to assist in statistical analysis for educational research, along with work as a learning assistant at a basic math course at a community college. My goal after finishing with my Master’s program is to obtain a California single-subject credential in math and to continue on to teaching math in a school system.
Data Collection

The collection of data for this analysis is based on my personal recollections of specific mathematical learning environments, along with interviews and the literary analysis. Memories are the basis of all data analyzed and, as mentioned earlier, can be seen as a limitation. All data, however, were assessed and analyzed with as little bias as possible for findings and conclusions to be most meaningful.

Interviews

In qualitative research, the construction of relationships is the base of data used to be analyzed. For instance, interviews, universal mode of systematic relationship inquiry, are used to obtain qualitative data (Fontana & James, 2000). I used interviews to answer questions that stress how my social experiences were created and given meaning (Denzin & Lincoln, 2000). Many people are very familiar with the notion of an interview because they are used or viewed in many aspects of a person’s day. However, this routine sometimes makes the interview unnoticed (Fontana & James, 2000). There are few people who are willing to be part of an interview unless they understand the reasoning behind conducting it. To alleviate this lack of understanding, a brief overview of the research proposal, along with the consent form, was provided the interviewees, explaining risks involved in their participation and the purpose of their selection for the interview.

My personal construction of who I am as a learner was not the only informant for this research. Certain select individuals, who played important roles in my life and saw me in some stage of mathematical learning, were interviewed for this study. These were people who help me interpret my world sharing understandings, practices, and language (Schwandt, 2000).
Intertwined memories of my personal life, along with journals and artifacts, filled in the interview data to add to my final realizations.

I conducted five interviews with people who either were or currently are involved in my mathematical education. The use of pseudonyms was necessary in order to protect the identity of my participants. The following people were interviewed: my mother; my wife, Nina; my friend, Mariana; the director of the math foundation, Juanita; and a math professor for whom I worked as a learning assistant, Susana. My mother was directly involved in my educational history from early education up until high school. I have known all other participants during my university years (both undergraduate and graduate studies). Both Nina and Mariana were also involved as volunteer facilitators in the same math foundation in Ecuador of which Juanita is the director.

The people interviewed agreed to participate after being explained the basis of the study and the purpose of the interview. Interviews were conducted through online phone conversations (via Skype) and recorded (after given consent) to later be analyzed. The following questions have been developed to ask during each interview:

1. How do you know JCP? For how long have you known her? What parts of her educational life have you been a part of?

2. What do you think are some of the main motivations for JCP’s learning?

3. How do you think the differences in language (Spanish-native, English-nonnative) influence(d?) her ability to learn?

4. How do you think JCP’s learning developed with age? What could be some of the reasons for these changes?

5. Why do you think JCP has chosen to focus her learning/teaching career in the mathematical field?
When interviewing people the researcher was careful to be casual and friendly, but also directive and impersonal; this provided balance in the interview process between both the interviewer and the interviewed, so that responses weren’t skewed and were as least biased as possible (Fontana & James, 2000). The interviewer strove to be flexible, and improvised when necessary, leaving the scripted interview questions. None of the interviews were the same, even though the researcher followed the same script. As Gorden (1992) stated, “Interviewing skills are not simple motor skills like riding a bicycle: rather, they involve a high-order combination of observation, empathic sensitivity, and intellectual judgment” (p.7).

**Data Analysis**

After having conducted all of the interviews, all of the information provided was then analyzed to develop findings and conclusions. The data collected from the recorded interviews was transcribed and translated (for the interview that occurred in a language other than English), organized, and studied before any analysis could take place.

All interviews took place on a web-placed phone call via Skype (except for that of my wife, which occurred in our house), and were audio-recorded using a LiveScribe pen. After each interview, I transcribed the entire conversation into text onto my laptop. After all interviews were transcribed, I then organized all responses under the corresponding interview question to look for themes.

The same event recalled by different people can be represented in different variations of memory. Even so, reoccurring themes for specific memories were able to be deduced after analyzing the data. Because my literary analysis was organized into three main areas for learning, I also classified the responses for my interviews into these same responses to then compare them to the original research questions.
Method

“A critical approach to teaching must include reflection on teaching in the social context in which learning occurs” (Kincheloe, 1992, p.35). Once the interviews were completed, triangulation and reflexivity must occur (Fine, Weis, Weseen, & Wong, 2000). Triangulation recognizes that the researcher needs to be open to more than one way of looking at things, and encourages her to do so. “A corollary to this insight is that purity of method is less important than dedication to relevant and useful information” (Patton, 1990, p. 193). Triangulation has been generally considered a process of using multiple perceptions to clarify meaning, verifying the repeatability of an observation or interpretation (Stake, 2000). It is necessary in the sense of using a method that permits analysis of the data and making sense of it. Interviews, memories, and artifacts were examined to discover roots that provide the best point of view of my world. Reflecting on the information obtained is very important because implies that the researcher is illuminating the information with his/ her own experiences (Ellis & Bochner, 2000).

Reporting

While transferring my life story, I could easily fall into the assumption that the readers will automatically understand the situation I am describing. In private and personal ways, ideas are constructed, highlighted, subordinated, connected, embedded in context, embedded with illustration, laced with favor and doubt (Stake, 2000). In order to provide a close understanding of my findings, I tried to write them with an effort to take nothing in my life for granted.

Conclusion

Autoethnographies are written with an ethics of responsibility, not only for personal, friend, and family reference, but for the hope to write in ways that contribute to a reshaping of the “common sense” (Fine, Weis, Weseen, & Wong, 2000). I wrote this autoethnography for
self-improvement and in future classes as a math teacher. Additionally, I wrote it because I hope that anyone reading my journey may want to discover his/her own journeys. The next chapter provides some of my most important life experiences, an autoethnographical examination of the mathematical learning of me, Jeanneth Paredes. To accomplish this study, I invited some people who were closest to me during my math learning processes to help me make sense of those experiences.
CHAPTER 4
THIS IS ME

The following chapter is a presentation of the autoethnography, the self-study that I have composed that will assist me with my data analysis. As the methods explain the importance of triangulation, using multiple perceptions is important to clarify meaning, which verifies the ability to repeat of an observation or interpretation (Stake, 2000).

I am not writing this autoethnography to relate with just one specific audience. I am writing this because I believe it is important to understand who you are in order to help anyone and everyone. For now, the challenge in a world that we view as constructed on multiple levels by multiple parties is to seek some sense of voice and agency that enables action (Tierney, 2000).

Who is Jeanneth Paredes? It is hard to describe myself, not because I do not know who I am, but because I am many things in this world of classification. The basic me is a 32-year-old women from Ecuador studying in a master’s program in the United States. The more elaborate me is a woman who wants to be a math teacher and because of that immigrated to US to obtain a degree in education. The complex Jeanneth is a lesbian woman who is in a relationship of almost five years, who decided to immigrate to this country to follow her love and to learn more about education. Jeanneth loves her wife. Jeanneth is from Quito, the capital city of Ecuador in South America. She lived there for about twenty-six years until she went abroad to Nebraska. Jeanneth is 32 years old but looks more like a 20-year-old. Jeanneth is 32 years old but sometimes acts like a 10-year-old. She speaks Spanish and English and understands Portuguese, Italian and French—mainly because they are similar to Spanish, not because she studied any of those languages. She is the second of 4 siblings; she is the aunt of three nieces and one nephew. She has studied business, marketing and computer science. She wants to be a math teacher.
Additional details about Jeanneth include her love of country and pop music, she owns a pink beach cruiser bike, shaved her hair because she wanted to experience life through the perspective of a woman with no hair. Sometimes people, at first glance, mistake her for a man. She does not care. She likes rainy days but lives in California where almost every day is sunny. She likes to talk with people about math. She sees fractions everywhere. She is all of this and more.

Classifications do not describe people in their entirety; they can only highlight one area. At the end of this little summary about myself I would like to be classified simply as a citizen of the world.

I remember when I decided that I want to be a math teacher. But I also remember some of the process of why I decided to be a math teacher. After finishing my bachelor’s in computer science and working in the computer field, I decided that it was time to do something else. This was why I decided to apply for a job in a volunteer organization. In this organization, I interacted with volunteers that came to my country to help people in need. I started participating in different activities and in no time I was so passionate about my role there; I felt overwhelmed. It was so different from my past work environment when I was sitting in front of a computer with little human interaction. This new environment was full of people and personal necessities. It was challenging, but I liked it. However, because of budget cuts and financial instability, I was laid off. I did not know what to do; I knew because of my background in computer sciences, I would not have any problem finding a job if I desired a computer-related job. But something in my head told me that that is not what I wanted to do.

A couple of month later I receive an email from a teacher asking for students who wanted to help as volunteers with a math foundation. I never thought that I was good in math but I knew I was not bad either. So, I decided to go. The volunteer workshop took place the next week or so.
I enjoyed almost all of the activities and felt happy and not tired at all even when I was doing math for more than six continuous hours. The last day of the workshop was the day that changed my life. I learned how to do fractions. It was because of strips of different colors, scissor and markers that fractions finally made sense for me. Numbers like five-thirds and 1 ½—I had been aware of since elementary school, but never understood them until that day. Seeing the purpose of a math concept that for so long was intangible and nonsensical is what ultimately drove me into seeking a profession in education.

For more than three years now, I have now been involved in that very same math foundation as a workshop facilitator. In every workshop, I learn something different and I try to improve my teaching. However, being a teacher or a person who is leading is very challenging. Comparing myself to a singer-songwriter, this is my first attempt to write lyrics that catch the attention of my audience. When writing my song, I need to use life experiences to express my feelings to share with the world, as will I when creating a lesson. I will work with my team: the manager (i.e. the principal), the musicians (i.e. my colleagues), the producers (i.e. my lessons) and the end product will be presenting my song to my audience (i.e. the students). As a singer-songwriter, I know that not everyone will like my song (i.e. different examples or explanations of any topic). But, that is why I will write more than one song. While I can adapt my style, it still encompasses my beliefs.

There are many factors that can affect learners. Factors that teachers can manage that are part of the class and others that teachers cannot control because they are external situations. In order for me to incorporate this into my teaching abilities, I went go back in my history and discovered those factors. Understanding what made me succeed or fail in my math learning process could help me understand how students learn in different ways. An understanding of
what it means to be a student in relation to the world view is critical to our interpretation of
knowledge (Kincheloe, 1992, p.55)

**Simply Student**

In elementary school, I used to believe that a student was a nameless being sitting in a
classroom, not required to think, just to produce work. I was “Number 23.” In a classroom of
forty or more students, falling in the middle with my last name, Paredes, caused me to be
forgotten with the crowd. Now, pondering the classification system of referring to students by
numbers may be because of too many students or not enough time or care to waste on
remembering names. The teacher would start with roll call: “One,” and the corresponding
student would reply, “Present;” “Two,” “Present;” “Three,” “Present”… “Twenty-three,” and I
would reply, “Present.” While in all actuality my body was present, I am not sure if I, as a whole,
ever actually was. In those days, I preferred to sit close to the walls and far from the teacher. I
avoided eye contact and responded with a short and simple “Yes” whenever asked, “Do you
understand?” I also thought students’ roles were to be passive beings, simply waiting for the next
set of instructions from the teacher. The best students in my classes, as so praised by the teachers,
were those who never asked questions, students that never moved from their chairs and also, of
course, who always had good grades. I was not part of those students. My classification was
neither good student nor bad student. I was simply, “student.”

“Hi, mom.” “Hello, my darling.” “How is everything, mom? Are you ready for the
interview?” “Yes, I am. These questions are very simple; I guess they must be tricky.” I laughed
and agree with her. “Mom, what part of my educational life have you been part of?” “Mostly…
elementary school. In your high school I saw you were solid in your knowledge and I needed to
work. However, it is not that I was not helping you, I was there.” “Mom, do you remember if I
liked math when I was little?” “Well, yes. I can say that you’ve always really liked math. 

*Because of my job that I’ve always had* (making children party supplies), *I remember when you were little when you came home school, the first thing you did was count the party hats. You really liked to organize them and you counted them many times. You organized in groups of five and then you counted, ‘five, ten, fifteen’ and so on.*”

In middle school I then realized that being a student meant to be like my sister. She was, and still is, very dedicated to her studies. She did her homework every day and she studied until late if she had a test. Because of this, I had to hear almost every day in school, “*Miss Paredes, why aren’t you more like your sister?*” I felt uncomfortable but I never said anything even when I just wanted to say, or scream, “*Because I am NOT her!*” In spite of such bothersome comparisons, I managed to pass middle school with almost no problems.

In Ecuador, students in high school have to choose a major to focus the bulk of their classes around. You could choose from different career paths, such as business administration, science, chemistry, history, physics, etc. After middle school, I convinced my parents to allow me to change to another school. I wanted to study physics and the school where I was at that time did not offer that major. So, I transfer to another institute, which was quite fortunate for me, or so I thought.

Far away from my sister, I thought “*I can prove that I am a good student.*” Again, to reinforce my stance, it was not that I wasn’t good or bad, but I was not good enough for my teachers because they had my sister to compare me to. Anyway, I liked my new school but still did not feel comfortable to sit amid the first rows. That was just for smart students—students who liked to answer questions and also had questions to ask.
At the beginning of high school I was involved in extra-curricular activities. I was part of the school band, I played drums, and I was in the chemistry club. My chemistry teacher encouraged me to participate in that club because he saw that I was good at it. I started dreaming about my future. I dreamed that I could apply to Zamorano. This is a university in Honduras, an agricultural university. Dreaming about it was my main motive to study at that moment. I pictured myself in a classroom wearing brown pants and a khaki blouse. That was the uniform of that university.

I had no problems in my physics classes. Physics made more sense for me than math, maybe because I was solving word problems that told a story. I participated in a Physics fair and, with my father’s help, I built a gas tower. It was amazing because it worked so perfectly and I could prove how to extract gas or water from the soil. I did not win anything but I enjoyed the opportunities to work with my father, and to see the other students’ experiments.

“Mom, do you think my teachers played an important role in my life?” “Definitely, and that is definitely. When a teacher wants his/her students’ to succeed, s/he puts all of his/her energy in assuring that happens. I think that people who are studying to be teachers have a 100% responsibility of the successful or failure of students. But, this is a shared responsibility with the students’ parents.”

The first year in my high school was pleasant. I felt supported by my chemistry and physics teachers, and was starting to develop a sense of belonging. But then, I had some issues in history and philosophy classes understanding the purpose of those classes. As a result, I failed those classes. Then I started failing more classes because I stopped seeing the point altogether. The last three years of my high school career became five. I was so confused with my life and scared to confront something that I had been hiding since I was five years old.
I am gay. This fact of life could not be exposed due to many reasons, but mainly because of the fear of acceptance. Ecuador is predominantly Catholic, as was my family throughout my childhood. Homosexuality is rarely discussed because of its social negativity and classification of religious sin. I was very lucky to have survived carrying around such a big weight all those years. Consequently, I could not focus in classes, which is where I spent a majority of my time. I was always thinking what would happen if somebody discovered this secret. The educational support from my parents and teachers was not enough to allow me to excel in school. My thoughts about being a good student were put aside and I focused my attention on hiding my secret—my personal hell.

Nobody understood what was happening within me. My personality changed; I was bitter and I became apathetic. I could not talk with anybody about it. There were no LGBT resources or information available, or if there were, it was well hidden. I failed tenth and eleventh grade, and so I decided to quit school. I did not want to study. I lost any sort of hope or focus on future dreams or goals. Fortunately, there was somebody always pushing me. My mom focused all her time in making me finish high school. She believed in me; she believes in me.

“Mom, what do you think are my motivations to learn?” “Since you were little, I was always encouraging you. I said, ‘You can do it. You are a very intelligent little girl. Never say I cannot do it, never.’ I think I built in you an important value, which is being positive.” “Mom, are you saying that my main motive to learn was feeling that you were motivating me?”

“Mmhmm. Many times you came home sad and you said to me, “Mom, I cannot do this assignment.” And I said, “What? Baby, this is easy,” and I guided you. Then I asked you, “Can you do it or not?” And you said, “Yes, mom, I can.”
“Mom, why do you think I failed tenth and eleventh grade?” “You felt like your little wings were strong enough and you could fly by yourself. I think that was because your dad and I... we both were having issues. We couldn’t give you all the support that you needed at that time. So, you were insecure and you could not go ahead.”

When I was seventeen years old, my mom somewhat knew about my gay tendencies. She paid little attention, regarding it as a teenage phase, nothing serious. Subsequently, she neither confronted nor ignored the matter, but was indifferent, which, I believe, helped her focus her energy on my graduating. She was very persistent for me to finish high school. In the end, I did it. I graduated from high school.

I felt motivated having finished high school and moved on right away to the university. Once in college, I decided to do things differently. I chose business administration as my major mainly because my mom liked it. Yet I was confused about what I wanted to do with my studies. Regardless of my discomfort, I sat in the front row for the first time. I remember my marketing teacher; he was a remarkable teacher. He taught the material by making real-life connections. What I did not like was my accounting class. The teacher showed favoritism and did not care about all of his students. In some regard, this may be worse than a teacher who is equally unconcerned. In that class, I was ridiculed every day by him—mainly because I did not have an accounting background; I had a physics background. The teacher did not want to explain anything unless the student already knew about the material. I did not know the material, so I had a lot of questions. Even with all of my efforts, I still failed the class. It was semester after semester of having to retake classes that I failed and not getting anywhere. After three years in accounting, I decided to quit that program at that school. I knew I went into accounting to please my mother, but it just wasn’t for me. I enrolled in a different university right away and began to
study marketing. I was studying marketing for two years when I decided that it was not what I wanted to do either.

**Third time’s a charm**

Before I decided to give studying another chance, I began working in an Internet café. I had never been very close to computers before, but because of that job I had to learn not only how to operate them, but how to troubleshoot. I learned quickly, and because I excelled at maintaining the network, my boss decided to pay for my training in IT. I learned how to fix computers, how to install operating systems and how to solve problems related to networking. I remember being the only woman in that class, but that was never an impediment for me. I was a good student—asking a lot of questions, and I sat again in first row. I was happy to be there fixing computers and installing programs because I understood the process. It was because of this experience that I decided to enroll in a four-year university under the major of computer science. At that point, my educational life was completely different than anything I had before in school. It all made sense and I enjoyed my classes.

“Mariana, do you think my learning changed or developed with age?” “I think you’ve changed a lot with regards to how to learn because of experience. I think experiences, not just academic experiences, but life experiences as well, make you learn different. When you have experience you are able to open your mind and learn differently.”

“What about you, Mom, do you think that my learning has changed with my age?” “Age is very important. People are more mature with age and realize what they want. You learned differently because you had more experience in different areas.”

During the first semester at my new university, I was taking only networking classes and, once again, I was the only woman. One of my teachers reminded me of my accountant teacher in
my first university. I am not sure if he cared about the students or not, but I was not learning anything. I was not going to stand for another unfortunate learning environment yet again. I asked the other students if they wanted to do something about this and they told me that they supported me in anything that I wanted to do. I did not feel their “support” but I thought, “This is my education.” So, I fought for my rights: my right to have a good teacher, my right to learn. I fought with university administration, explicitly identifying their right to assure their students were well-educated. I fought until one day we had a new teacher at the front of the room. This endeavor caused some disquiet throughout the university and my reputation was being defined. I think some of my teachers felt nervous around me because they knew that I was the person who ultimately led the dean to fire a teacher. It turns out fighting for my rights for a good education was a beneficial in the long run as well, because my teachers in years to follow were very good.

One year before finishing my bachelor’s degree in computer science, I had the opportunity to study abroad in Lincoln, Nebraska. In Nebraska I was forced to face a new fear: language. The first three months were very stressful, adjusting to cultural differences and educational differences. Being a student was very challenging, but I was enjoying the journey. I also started a new relationship with Nina, who is now my wife. She helped me and supported me the entire time abroad. I think I was lucky to be with her at that time because it was like being a student with a private tutor.

“How do you know me and what part of my educational life have you been part of?” “I am your wife, your life partner. I originally met you 5 years ago when I went to Ecuador to study abroad. When I met you, you were doing your undergraduate studies in computer science, but I did not know too much about your education. Then when you went to Nebraska, after three months of dating, I observed your motivations and how important education was for you.”
After that year, I went back to Ecuador and continued with my final classes that were necessary to finish with my degree. Out of all of the students with whom I began my program, I was the only one to graduate from my class. Finally, nine years after I graduated high school, I finished my bachelor’s degree.

**I needed more interaction with people**

Before going to Nebraska, I was working in my university in Ecuador in the computer systems department. Even though I enjoyed working with computers, when I returned from Nebraska, I decided to not return to my job. I felt that something was missing. I felt the necessity to interact with people. Fortunately, I received an email from a math teacher in the university about a math foundation that was looking for volunteers.

“Juanita, how long have you known me?” “I was introduced to you through a faculty member of your university in Ecuador four years ago.” “Do you think I developed my learning in these four years working with the math foundation?” “I think you became more sensitive to differences in students that you are working with. We started with the students in Cotopaxi (an indigenous city in the highlands of Ecuador) and then worked with pretty sophisticated teachers in Quito (the capital of Ecuador) and you seemed to be quite well equipped adapting your strategies to adjust the kind of students you are working with. And I think that has certainly improved. I think you are more patient maybe that you were at the beginning. (She laughs) I like the way you integrate humor in your teaching style. Maybe it is because later you were working with people who are more like you or maybe you felt more comfortable and more confident. I think certainly you are more comfortable and confident obviously that in the beginning.”
My best friend Mariana and I both were looking for jobs. I talked to her about this opportunity of the math organization and she was a little nervous about this because it was math. But I convinced her and we went to the first workshop.

“Hello, Mariana.” “Hello, wallsi. (a nickname that she invented, based on my last name, Paredes, translated into English, walls, and a little bit of Ecuadorian flavor) “Do you remember how we met?” “I meet you playing soccer around eight years ago, right? Then we were friends. At one stage, we both worked for the same foundation doing math workshops in bilingual schools. I always felt scared of math and believed that I was bad at it. You always encouraged me to learn. For example, if we had to divide a restaurant bill, you helped me to understand step by step. So, I learned that math is not hard. I just need to understand it little by little.”

It was fun being part of the foundation. I felt as if I was learning something new every time. I suppose I was because not only was I learning different math techniques through games, I was also learning about educating and learning. I was a student again, but this time I was allowed to play and question and make sense of numbers. I used a variety of concrete materials (e.g. beans, colored papers, dice, etc.) to understand. This experience was complemented with the company of my best friend and my wife.

“After you went to the math workshop you came back home and told me, ‘You have to go with me and see how they teach math with games.’ For the first time, I saw something in you; it was like a light was turn on inside of you. Of course I wanted to go, because you were so excited and it felt contagious and I was excited, too.”

The game that blew me away was fractions. My past understanding of fractions was a little blurry; I knew how to do it but I was not clear or sure about my results. I doubted my knowledge, especially if I had to explain the differences between fractions, and fear filled me
when anything involved vocabulary words such as “mixed fractions” or “improper fractions.”

The example below shows my previous understanding about fractions.

*Which fraction is bigger than 1/2? 2/3, 2/4, or 2/7?*

Four years ago, I would have chosen 2/3 but I could not explain why. If asked to double or compare all three, I doubt I could have successfully completed such a task.

Now, my understanding of fractions is higher developed because of the use of concrete material and reinforcement with word problems. In the math organization, we worked with fractions using colored papers that are cut and compared. The use of colors aids in memory retention.

Now, this is how I make sense the same fraction problem.

I draw a line or a rectangle and I use that as my “whole” or “one”

```
  1
```

Then I split the whole using the denominator number. Because the denominator is telling me in how many parts I have to split the entire (the whole).

First I construct the halves

```
1/2   1/2
```

Second, the thirds

```
1/3   1/3   1/3
```
The next fraction is \( \frac{1}{4} \)

\[
\begin{array}{cccccc}
\frac{1}{4} & \frac{1}{4} & \frac{1}{4} & \frac{1}{4} & \frac{1}{4}
\end{array}
\]

The last fraction is \( \frac{1}{7} \)

\[
\begin{array}{cccccc}
\frac{1}{7} & \frac{1}{7} & \frac{1}{7} & \frac{1}{7} & \frac{1}{7} & \frac{1}{7} & \frac{1}{7}
\end{array}
\]

I now have representations of a whole for all the different types of fractions necessary to make my comparison to the original problem.

After putting all fractions under the whole I separate the fractions that I need from every whole and I compared each fraction against \( \frac{1}{2} \).

\[
\begin{array}{cc}
\frac{1}{2}
\end{array}
\]

\[
\begin{array}{cc}
\frac{1}{3} & \frac{1}{3}
\end{array}
\]

\[
\begin{array}{cc}
\frac{1}{4} & \frac{1}{4}
\end{array}
\]

\[
\begin{array}{cc}
\frac{1}{7} & \frac{1}{7}
\end{array}
\]

So, \( \frac{2}{3} \) are bigger than \( \frac{1}{2} \), \( \frac{2}{4} \) are the same as \( \frac{1}{2} \), and \( \frac{2}{7} \) are less than \( \frac{1}{2} \). The right answer for the question, “which fraction is bigger than \( \frac{1}{2} \)?” is \( \frac{2}{3} \). Such deductions at this stage
are based purely on sight comparison. A more in-depth comparison that establishes that \(1/2\) is precisely equal to \(2/4\) is not necessarily established at this level.

I also realized that fractions are the same as division, so I can divide each of those fractions and compare them against \(1/2\) as well, like this:

- Original fraction to compare \(1/2\) = 0.50
- \(2/3\) = 0.667 (Approximate equality because of rounding for a repeating decimal)
- \(2/4\) = 0.5
- \(2/7\) = 0.285714 (Approximate equality because of rounding for a repeating decimal)

These answers indicate that \(2/3\) are bigger than \(1/2\).

My involvement in the math organization has provided me with very useful tools for my math confidence in my everyday life as well as integration of their games in the school system. They taught me different games for different grades. I had the opportunity to participate in different workshops as a facilitator for bilingual teachers. And, most importantly, I learned about the reality of my country and the challenges that teachers are facing every day. Somehow, this concept of being involved in education became more and more attractive to me and motivated me to continue learning.

Nina: “I was with you in this process. At the beginning you were learning and you were not confident about how to guide the games. We were observing, listening and having our own conclusions. We were talking with different people about education, about how to say ‘I do not know math’ is so accepted. I guess that was part of your development, thinking about what math is in this world. After a while you felt more comfortable guiding the math games and also you were promoting how to think. You asked questions instead of showing how to do a game.”
“Mariana, do you think that after being in the foundation and observing math through games I felt more motivated to learn?” “Yes, I think that was something that triggered your interest in math. I remember that before we were doing the workshops you did not talk a lot about math. It is not that you did not like it, but it was not too present in your life. But after seeing a different way of learning math through games, you felt motivated to learn more about math. And you want to learn more to help other people to not feel scared or to accept the stereotype that math is like a monster. At the beginning of our friendship you were different, not open-minded and with a narrow vision. And the experiences in the math workshops, seeing some teachers that weren’t able to add, were very strong. Different realities make you learn differently and probably also provides other kinds of motivations to learn.”

“Juanita, what do you think are some of the main motivations for my learning?” “To improve your own intellectual skills. You seem very interested in math and how math is taught and creative ways of teaching students. Teaching students in math and, I hope you are also motivated because you feel that your skills could be useful in Ecuador. To improve the education in your own country.”

I have been working with the math organization over three years now. I am still helping them with workshops but since last year, I am only assisting during the summers. This is because now I am following my dream of being a math teacher. I decided to do a Master of Arts in Mathematics Education in the United States.

Nina: “You came to this country to study a master’s in education not knowing anything about the theory of education, just knowing that you like to guide math games. You learned different things and facts about education and sometimes you felt overwhelmed. At the beginning, you were scared and hesitated many times if being a teacher was really what you want to do.”
Many days you came back home saying, ‘I am not sure if I want to do this.’ It was very hard for you to realize that being a teacher is a big responsibility.”

I feel this passion in my veins to be a teacher. Sometimes I am reduced to tears at the power of influence a teacher holds over a child—which can either make or break him/her. But this frustration is what is pushing me to continue.

All the reading and lectures in my classes were very open-minded. My teachers presented different types of information related with education in a way that, for me as a student, made me think. I was challenged every week with in-depth questions: What is the best way of teaching? What are some issues in our education system? Why don’t all students graduate? I am learning what education is in this country and I am always thinking if this is the reality in my country.

Nina: “Even though it was hard to confront the reality of education in the United States and not even knowing the reality in Ecuador you decided to continue because you like to feel challenged. It is a challenge to manage all the situations in a classroom and still guide the students so they appreciate what you are doing and understand that you care about them. You are always dreaming about having your class.”

After a while, I felt stronger in the sense of no matter what challenge I have to face I will continue with this journey. Some of my challenges when learning mathematics are language and procedures. The former is unique for in some occasions, I can guess the translation based on the similarities of English vs. Spanish. However, occasionally I am learning or hearing words that are completely different in my mother language. For example, the word “fractions” in English is translated into “fracciones” in Spanish, which is quite similar. On the contrary, the word “remainder” translates into the word “residuo” in Spanish, which is less similar, and probably couldn’t be inferred from guessing.
“Mom, do you think that a difference in language influences my learning?” “Not at all! The fact that you learned English and you are almost perfect [in it] shows me that you have no problem learning anything.” I love the fact that even when my mom was never close to me when I learned English and yet she feels so confident to say that I have no problem leaning in another language.

“Mariana, do you think that language influences my ability to learn?” “Are you saying learning math in English, here [in the US]?” “Yes.” “Well, I do not know how English affects your learning because I am not your classmate and I am not seeing how you learn. But I guess you have some difficulties learning in English. For example sometimes we are talking about something, not necessarily about math, but let’s say about education, and neither you nor I know the meaning of some words in Spanish. That is because we have English vocabulary for that topic. When you learn something, in this case math, you are learning not just process and concepts, but also vocabulary. So, I guess because of vocabulary sometimes you could be at a disadvantage when learning.”

Susana: “In terms of your ability to learn...you are constantly forced to understand in another language so I would imagine that would make somebody more aware in becoming a better instructor...it gives you more perspective. Doing this [studying] in another language is an asset because you have to think beyond. I don’t have that. English is my first language; I haven’t had to try to teach in another language. ...A lot of people think, “Oh, math is universal. You do not have to deal with speaking.” But as a math educator, you are not showing people just how to do stuff in a number system. I mean, you are trying to make [the lessons] real in life and meaningful. So I think the language becomes extremely important. I think our math education system, in general, doesn’t necessarily try to do that anyway. I know you are trying to reach a
higher bar and obviously the language is messing up a little bit. But then on the other hand most teachers don’t try to reach that higher bar, so in my opinion what you to offer us is probably better than most classrooms anyway.”

Juanita: “I think your English language skills are certainly good enough that, I think in most cases, you pick things up as quickly as a native speaker. You know there are maybe a few cases where you could not pick up immediately the meaning, but I would say that’s minimum. I would say that it’s something that you can I guess there is some process, vocabulary differences. But I would assume that mostly the concepts are the same is just how they are verbalized.”

“Nina, do you think that language is an obstacle for me to learn?” “I think it is a challenge. Obstacles are different than challenges because obstacles are seen as negative and challenges are just seen as something that might require a little different thinking process or a different type of effort. I think in math is different. You can learn the terminology, prime numbers/números primos, but actual processing happens in Spanish for you. Because Spanish and English are so similar vocabulary is not an issue. You learn a math concept, your processing in your head is initially in Spanish, and then in English. So maybe it is better because you are doing more processing and so the idea makes more sense to you. A challenge that I can see is you expressing your math ideas in English. This is more cultural (for example, [the method to solve] long division). So it is not about language, it’s about cultural realizations.”

Also, the latter skill mentioned of procedures involves reading, cognitive processing and understanding. If I am reading a math word problem occasionally I am a little slow because I might not understand at first glance what the problem is asking. It is not as simple as just seeing numbers. When I am presented with a word problem and no formulas, I am at a loss for where to
start. If I am not in an environment where I feel comfortable asking questions, then I do not
know how to proceed.

To clarify this issue I want to use a long division example.

Here in the United States, the problem of fifty-five divided by four would be solved as
such:

\[
\begin{array}{c}
  13 \\
  4 \overline{55} \\
- 4 \rightarrow \\
15 \\
- 12 \\
3
\end{array}
\]

The first time that I saw long division in this country (the United States), I was so
confused. I did not understand the procedure. I thought, “Which one is the dividend and which
one is the divisor? “Why are there numbers above the number and why are there other numbers
below?”

In Ecuador, we were taught in this method:

First I place the dividend in the right side 55
Second the divisor in the left side 55 4
Third I draw the division lines 55 4
And finally I do the procedure 55 4
15 13
3

My answer is 13 with a remainder of 3.

For me, the number on the right side is the dividend and the number in the left side is the
divisor. In this procedure, all numbers go down. After a couple months I was able to understand
the US procedure and it made sense. But it took me a while; I can do it now but I have to focus my attention when writing the dividend and the divisor. Procedural differences based on cultural differences are important for me to understand because even if the answer is the same, the process of getting to that answer is completely different. If I am explaining something to my students, I need to know what they are familiar with instead of just assuming my procedure will make sense to them. Of course, the best way to improve my understanding is practicing, which is why I am a now a Learning Assistant. The instructor at XYZ College under whom I teach is Susana.

“Hello, Susana. Could you tell me how do you know me?” “I have known you for less than a year. I work with you at XYZ College as part of the Learning Assistant Program, and you are helping me organize information.”

Being a learning assistant provides me another point of view in between what is being a teacher and what is being a student. I have the opportunity to prep the class activities with the teacher. I talk with the students not like a teacher, but also not like a student, maybe more like a mentor or tutor. Because my job is to be of direct service to the students, I circulate through the class. I hear when they are tired or when they enjoy an activity. The information that I receive from the students helps the teacher to improve her class or to change a lesson.

Susana: “You are someone who gives ideas based in seeing students in the class. Given a feeling of where the students are and having a conversation afterwards about the current students and their experiences, hopefully makes it better for them in terms of learning.”

I like this class because I feel that the teacher really cares about my input and critiques. I like how she includes me and the other Learning Assistant (this class has two Learning Assistants) with the preparation of a lesson so we can help her develop or improve the lesson.
This is my second semester as a Learning Assistant for this class. I have a little more experience about how to present the information to the students. For example, if a student asks me, “Am I right?” I never say “yes” or “no.” Instead, I encourage them to show me their procedures to arriving to that answer. If they are confused about how to do it I asked them questions that could help them to find the right answer.

Being in educational classes as well as being in a math class gives me a broad view of what the teaching profession entails. A math teacher does more than simply present information related to math. A math teacher presents information that relates the students’ lives to the lesson and challenges the students. One day, Susana, the other Learning Assistant, and I were talking about how to present Venn diagrams in a way that would make sense for the students. I suggested comparing similar items from magazines because I realized that we use Venn diagrams when we are comparing two items. If we need to buy a cell phone or a car, we compare categories and find shared features to get the best deal. An activity that relates real-life objects in the math world might make the lesson more meaningful to the students.

These two advertisements are related with cars but what are these telling me?
Now, with this information we can create and use a Venn diagram. I want to label each car ad with the letters A and B, respectively. After comparing these two cars, students can use the information to create a Venn diagram. This is a different sort of visual representation to view the similarities and differences, as opposed to a chart where duplicate and varying responses need to be reviewed.

![Venn Diagram](image)

**Information from two car advertisements placed in a Venn Diagram**

Susana actually incorporated this into her lesson. It went well, but there are modifications that can now take place after reflection. Now, I am trying to develop more this idea so we can use it to explain the concept of compliments (A’).
Susana: “I think you genuinely care about people. And just try to make meaning for them. I think because you care about people, you do not want them to waste their time. And, you see value in learning. Therefore, you are going to try to make connections or you are going to try to have them make connections. You value people; therefore, you want each moment to be a value for them.”

Because of my questioning of “What does math mean to me?” started when I was 28 years old, my perspective of how to teach is different. My initial thinking goes out to the students: how to incorporate them into the curriculum; how to present ideas that make them think about life and what math means to each of them. I want to provide a safe environment where they can share their ideas, especially because of my personal experiences as a student. I want the students to feel that they can always ask questions and that every question is a valid question that nobody is wrong. I would like the students to be actively participating because I do not believe in a lecture-type classroom. Once all of these requirements are established, I want to guide them through math.

Nina: “Being a teacher is not just opening a book and giving a worksheet and a test. I think for you, being a math teacher is not going to be just math, first of all. Like you mention a lot, you want to do the job-project for the students to look at different jobs and salaries and money—that is math. Real-life applications. You just said today, ‘Folding origami and asking the geometry students for the area of the crane?’ And then you unfold it and you have all these squares and triangles. So, I really do not think being a math teacher is just looking at this formula, look at numbers, and that’s it. It’s all about integration. Let’s look at math in history let’s look at math in science let’s look at math in TV and everything.”
“Susana, do you think that learning where you provide the information and learning where you receive the information are different type of learning?” “Yes, and I think it’s because of the way that our system is structured. I think the role in our current system, the learner is passive. And I think that is one of the things we are trying to do—make them more active and learning. Whereas from the educational point of view, we are actively involved in the learning process because we are controlling what is happening. And obviously, the people who control what is happening are learning the most. I think that is how you put a learner in charge of their learning.”

It sounds simple enough. I remember once Susana gave me and the other Learning Assistant the opportunity to guide an activity in her class. I was preparing the material and practicing how to say it. In my mind it was perfect and made sense. The day that I had to present the information I was talking with the other Learning Assistant and I realized that I did not have to present all the material. It was made known that a couple of weeks earlier, I had agreed to just do the first half of the lesson. Realizing that, one hour before the class started, I was forced to change everything in my mind. When I was presenting my part to the students, I felt awkward and unprepared because of the last-minute changes I made. I could not make any of the connections as I had planned.

Susana: “I would imagine in our head we have ideas, and in theory, we want things to happen in a certain way. But in reality, they do not necessarily happen the way we expect. For example, you may have a class and you set up an activity or an idea. You think, ‘This is okay. This is going to be good. It is going to work.’ And then, for some reason, it just does not work out the way you expected. And you have to adjust. I think that’s just part of working with different people and different personalities of the students. That is a learning experience for the both of us.”
For you, especially, because I think in your head you have how you want it to be done and then either I do not implement it the way you expected to be implemented or it just does not go the way you had it expected to. So, for the next time it is looking at what we are going to do.”

I value the opportunity of being part of a math class as a Learning Assistant. I do not want to confuse my students and I definitely do not want to seem confused when explaining any material. I have the opportunity to observe my teachers and also my classmates, who, in most cases, are teachers themselves. All of them have shared their experiences in the classroom, especially their challenges. While hearing of such difficulties might obstruct my desires to be a teacher, I push forth and continue on this journey nevertheless.

“Nina, why do you think I want to be a math teacher?” “Well, I think it make sense. Just with your passion for helping others and education and making people appreciate their learning. Also, you always have had some kind of fascination with numbers. It was very interesting for me to learn than when you are stressed or when you do not want to think about something, you count in your head. I do not do that. I draw or I sing to relieve stress, but you count. You are very meticulous with drawing shapes, getting the angles perfect and the circles. You know how to measure things with estimations or a guess that could be very precise. And so, all those factors kind of show that you have a mathematical brain or that you are very logically-mathematically inclined.”

Mariana: “I think it is because of two factors. The first one is because this is a way to share with people something that you like and you feel comfortable doing. And the second one, I felt this directly with me, is to break stereotypes: that math is hard; that math is not for everyone; that women are bad in math and boys are better.”
“Susana, why do you think I chose to focus my learning/teaching career in the mathematical field?” “I should know that. I guess you see the connections of what you are doing and you are able to make meaning of it and many people don’t. So maybe you see that is your talent and maybe you see this is the talent you have to offer. Saying it is not just something to do in a classroom, but building on something to the world around us. And it is life and it is important. Because I see in a lot of the conversations that we have you always try to connect with something in your life. So I think maybe that’s something you have to offer, which I agree.”

Juanita: “You always seem to be quite deep in math, talented in math, quite interested in math. You seem to have fun with math. I would just conclude that you really enjoy working with the math program and focusing on math. And that experience working with teachers and students kind of made you change your focus from computers science to math.”

“Mom, why do you think I chose to be a math teacher?” “Because you like it! I think math is what you practice the most....I do not know. You chose it because you like it.”
CHAPTER 5
CONCLUSIONS

I have been in a classroom for more than 20 years, most of the time as a passive learner. Throughout all of these years, the roles that my family, my friends, and my teachers played were very important to my learning, along with the experiences in different educational settings. The data obtained from this research, along with the literature review, revealed important facets in my life that helped me to answer the two main research questions: Who was Jeanneth Paredes as a mathematical learner?, and Who was Jeanneth Paredes as a student in a math classroom?

While addressing these two main research questions, I used the third-person in my findings because this helped me to write about myself with less nostalgia and bias, and also because it is a unique experience to feel as if I have a double personality, serving as both researcher and participant.

Jeanneth Paredes started favoring her mathematical side at a young age. By organizing party hats, she showed her mother how much she enjoyed counting numbers. This may or may not have been a result of a supportive classroom experience with a math teacher. Jeanneth did not have many problems in elementary school and passed her math classes with decent grades. However, her teachers in those early ages did not serve an important role or at least did not greatly impact her learning.

At the age of fifteen, in the 10th grade, Jeanneth decided to choose Physics as her concentration for her last three years in high school. During this time, her teachers supported and helped her to excel in her specialized chemistry and physics classes. As reinforced by the literature of Brownlee, et al. (2003), student motivation is dependent on specific learning environments, which, ultimately, are created by the teacher. She learned a lot, especially in these
two favorite subjects of her, because the material made sense for her. Despite the support from her teachers and all the meaningful findings in physics and chemistry, it was not enough for her to succeed. Jeanneth failed 10th and 11th grade. This upset in her academic career was not due to the fact that she did not understand the material being presented. She was concentrated more on confusion in her personal life. As a result of not being able to sort out identity and social acceptance issues, she was thought of as a bad student. As Zimmerman et al. (1992) highlights, the concern of student success and motivation is not only dependent on teacher involvement, but also parental involvement. Her mom supported her at that moment and in the end she graduated high school.

The academic situation for Jeanneth was completely different in college. She felt confident about her knowledge. Unfortunately, she originally began in a field that did not compliment her interests and strengths and ultimately did not help her to succeed. Consecutive wrong choices for major made her feel somewhat helpless, until she found peace in numbers and computers. Her learning was different in comparison with all previous years. Jeanneth felt that she deserved a good education so the best way to affirm this was making sure her teachers understood her determination and perseverance. Being in a classroom where every student was male except for her was not an obstacle. Instead, she felt supported by her friends. She was being proactive and responsible for her education.

Another important experience for Jeanneth was making the decision to study abroad in Nebraska. While in Nebraska, however, she had to adjust her learning. From being in classes where language was never a concern related to learning, to language being the main concern of functionality, she felt as if she was starting over again. Biggs’ (1987) addressed this concern in his study; which found evidence that students are able to achieve better once they understand
language. She had to learn how to study for a test and how to take notes, skills that she never quite developed before this point. This new environment also helped her to learn that different cultures have different ways of seeing things. All learning from elementary school until college graduation was preparing Jeanneth for the most important discovery in her life.

Going from a computer-focused environment to a teacher environment opened new territories. Through working in a math foundation she discovered the realm of possibilities of connecting math to real-life experiences. She started teaching by playing and using concrete material. Every time she taught a workshop she found different approaches to a math activity. Jeanneth focused all her attention on how her students explained a math process. This helped her to explain any activity in more than one way. She was so happy because she never felt she was teaching all the time she thought the students were teaching her. So, she learned that listening to the students, she was provided with wonderful ideas. But she knew she needed to learn more about education because just to know about math was not enough. Jeanneth made a decision to study a Masters in Education in California, USA.

Once in California, Jeanneth realized she did not have much of a knowledge base on education. Her proceeding multicultural and math education classes helped her understand how students learn. Thus, she started to build her teaching philosophy. Teaching for Jeanneth was not simply showing how to do a mathematical process. Teaching was listening to the students; teaching was providing a safe environment; teaching was showing that she believes in the students. She learned that mathematics goes beyond numbers.

Jeanneth served as a Learning Assistant in a math class. Through this experience she learned that no matter how much a teacher prepares materials to explain a topic, there will always be challenges to face. If students are tired or lazy, if they have problems in their lives, if
they are thinking about economic situations, if there was an earthquake, any possible scenario could change the trajectory of the class. Therefore, Jeanneth has learned that in order to be a good teacher she has to be very flexible and creative.

Jeanneth went from a passive student to an active student. Her journey continues and she is certain she will continue changing both her learning and teaching styles, adapting from one scenario to another. As for now, she takes away from this study certain aspects that she, as a future math teacher, should envelop. Jeanneth, as a math teacher, should always keep in mind to promote positive attitudes. Also, she needs to be aware of being all-inclusive of different learning styles and integrating families in the learning process. She understands now that motivation is influenced by understanding. Also, intertwining other aspects like language and culture will make a more meaningful learning experience for her students. For Jeanneth, it is impossible to focus in a mathematics-only learning environment, because in life everything is connected.

**Reflections**

Looking back on my past as a student and as a learner required a certain strength in me. I found myself doubting my memories, which, consequently, made me have doubts about my identity. My perception of what happened in some stages of my life is different from others’ who also experienced that same moment. After reviewing every interview, my brain started making connections with my history. I was analyzing myself from an outside perspective and, in some instances, I became so intrigued by what I was hearing—a shared memory with a different interpretation—it felt as if I was dreaming. Word by word, I started making sense of what I was looking for to discover my learning construction.
I realized that through this research study, if had I invested more time I would have been able to be more thorough in my findings. Six months provided me enough time to focus on my math learning; however, I could expand this autoethnography to include my learning as a whole instead of specific subject-focused. I also felt limited with time to conduct my interviews, which is why I only chose five people. It could be interpreted that the only influential people in my life (to have been selected to be interviewed) are all women. This assumption would be incorrect because there are male figures in my life that play an important role in my learning, but I was unable to interview them, for one reason or another.

All of the effort that teachers and parents do to encourage their students or their children is supposedly supposed to help the students excel. However, specific individual concerns might exist that obstruct the ability for a student to excel, regardless if the support exists or not. In my case, I always felt that mom was present, even throughout difficult stages in my life. Nevertheless, I never felt I was able to communicate that there was something different in me. I was too little to understand that carrying the weight of my secret would have consequences in not only my personal life, but also my academic life.

Looking back on how I experienced life throughout my middle and high school years, in such turmoil and confusion, I find myself questioning what life would have been like for me if I had confronted my secret and revealed it long before: would I have been a better student and not have failed my classes? This idea will always be hypothetical because I cannot change the past, but I do know the relief I felt after coming out and wondering why I never did it earlier.

After finishing high school, I made it a point to pay more attention to my feelings and I decide that accepting who I am was the best thing for my own well-being. This acceptance helped me academically by taking responsibility for my success and feeling motivated. I also
was able to understand some of the unjust actions that I experienced were due to the power of the teacher. It was at this moment in my life when I realized that I deserve a meaningful education.

I also realized that in order for me to find my passion in life, it was a long journey to discover that I want to be a math teacher. I realize this difficult was due to the fact that I do enjoy certain aspects of many fields. However, if I had stopped and asked myself, “Do I really want to be doing this for the rest of my life?,” I would have been able to see sooner that the specific course of study I was in was not for me. My conclusions about this personal experience allow me to take this with me when I am a teacher and encourage students to challenge themselves to really discover what moves them.

There are so many things that can affect motivation and learning, that it is almost impossible for me as a teacher to be aware of every factor that is influencing my students. What I can do, however, is provide a safe environment in which students can truly express themselves and ask questions, not only involved with math but with all aspects of life.

Presumptions that all students come in with the same level of understanding for different concepts will result an uncomfortable environment for those who are at a lower level than assumed. Teachers, rather than showing frustration that some students are not demonstrating mastery of certain fundamental ideas, should promote a positive attitude by making an effort for them to learn comfortably through peer support and non-condescending language.

I believe that age and experiences are related to learning. My research has revealed that my learning has morphed because of my experiences. My motivation and quality of learning evolves with new life events that shape my thinking and self-perspective.
When I am learning something math related and I can see the connections with what I already know and the world around me, then I am excited to learn more. My motivation is influenced by my understanding.

I discovered that I need to work on how I receive suggestions. Whether I choose to act on constructive criticism does not matter. What does matter, rather, is that people care about my improvement. I also understand how easy is to forget the fact that I was once an inexperienced student and all that implies.

Having more teaching experiences would give me a better understanding of what my future students require in order to learn better. One of the main purposes of conducting this thesis was because I was unable to clearly define why I want to be a teacher. I believe it is important for me to define this before I am a teacher so I can reference it and reflect on my evolutionary process that goes along with having experience.

Some people viewed my motivation as simply related to the fact that I like math. Their perspectives are based on what they know of me and my interaction with them. On the other hand, those who knew me before I decided upon this field of study and career could observe a change in my motivation. But just unifying all their perspectives could give a closer view of why I decided to be a math teacher.

In the end, this is simply an interpretation of my personal learning. It would be quite a challenge to include all the people who have participated in my learning process to assist in giving a closer picture of my life. I realized different areas about my mathematical learning as a student and also as a teacher. But this research study does not stop here. The evidence in this journey has led me to unexpected paths that I will continue to analyze because learning is a never-ending process.
REFERENCES


Australian Council for Educational Research. Radford House, Frederick St., Hawthorn
3122, Australia.

orientations, and attributional beliefs. *The Journal of Educational Research*, 97(6), 287-
297.


& Y. S. Lincoln (Eds.), *The Handbook of Qualitative Research* (pp. 509-535). Thousand

K. Denzin & Y. S. Lincoln (Eds.), *The Handbook of Qualitative Research* (pp. 1-28).


Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the

as subject. In N. K. Denzin & Y. S. Lincoln (Eds.), *The handbook of qualitative research*


Williston: Rethinking Schools.


FRACTIONS FOR FIFTH GRADE TEACHERS

Fractions

In the world, the distribution of goods and money is not equally shared. There are a lot of people who have a lot of extra food that they might throw out because it goes bad. Also, there are a lot of communities that don’t have enough food for everybody to be not hungry.

“Inequalities of wealth are becoming more extreme in the United States. While billionaires double their wealth every 3 to 5 years, we have by far the highest poverty rate in the industrialized world” (Kellog, 2001).

Sometimes we see food that is available that nobody uses, like if a person has an orange tree but doesn’t harvest the oranges to eat. Is there any way we can think how to distribute these oranges so that they don’t go to waste? People who have so much money generally do not care about wasting food.

Mathematic Objective: Introduce or reinforce fractions with concrete materials and games.

Socio-multicultural Objective: Promote creativity through color relations and the stereotypes behind some colors, personal connections, etc. Raise awareness of equal distribution of goods throughout the world.

Keywords: Lengthwise, straightedge, crease, fold, horizontal, vertical,

Materials:

Colored letter paper, cut into 5x30cm strips.

Each participant will receive a packet of 7 strips, all being different colors.

Scissors

Writing utensil (marker, crayon, pen, etc.)
*Make sure all participants have a cleared area about 2’x2’ to work with in front of them

Assessment

Teachers show understanding about the game and manage all the fractions coherent. Educators provide viewpoints about social justice and interchange experience related with their life. They illustrate how to incorporate this game in their curriculum and how to relate with other fields. Teachers can see the impact of their words when they talk in class using positive words.

Proposal to guide this game

The guide presents the audience with the packets of paper strips. Promote the students to start thinking about their perceptions of each color. What do you see here? What does each color make you think of? Do you feel happy or sad because of different colors? What is your favorite color?

Guide grabs the first color in the packet and asks the audience to hold it up, with the longest straightedge facing them. Since this is one whole piece of paper, we are going to write “1 whole” on it. Although we can think about this as being up-and-down (vertical) as well as side-to-side (horizontal) and it doesn’t change the shape, we are going to keep it horizontal just we are all thinking the same way to understand as a group.

Guide shows the next color and has the audience hold it up.

Let’s fold this in half lengthwise, crease, and open cut along the crease.

A whole fold and cut in half

What do we have now? Can we arrange these right under the whole. We can think each of this as 1 piece, but it needs 2 to get back to the whole size. Let’s all write ½ on both parts.
Now, with all of the following pieces, each time we are going to do exactly what we did for the previous color, then one more step. So, with the next step, let’s fold it in half, then cut. Now with one of the halves, we are going to fold it in half and cut along the crease. Ok, now let’s do that with the other half, too. Now, many pieces do we have? How many do we need to be the same size as the half we made before? What do you think we are going to write on these papers? Each one is 1 piece, and how many do we need to get back to the whole? Good, let’s all write $\frac{1}{4}$ on each piece.

Guide continues with the next colors to do $\frac{1}{8}$, $\frac{1}{16}$, and $\frac{1}{32}$, asking the same questions along the way, promoting the audience to come up with imaginative answers. Have the audience arrange all of the different colors with the whole on top, and then descending

Proposal to guide this activity

First day: When students have the strips with different colors ask what they know about that color. For example, if the color is blue you could go outside and leave the students to see all around to find that color in different settings or as part of nature. Do this with every color and be creative. Some kids could relate colors with gender, power, good or bad, and so on. Teachers could discuss about this stereotypes showing images and videos. If a teacher chooses a video, he or she should already watch the video in this way can be able to answer different questions. The next two pictures show pigs in different scenarios. The first one is related with the children’s story “The Three Little Pigs” and the other one is a picture with a real pig. Just like the different
perceptions based on color, these two images can be discussed regarding the impressions and emotions related.

Three little pigs (Kiernan, Shoemaker, & Tompkins, 1998) Pig (Wagman, 2010)

Second day: Start cutting the strips and describe the meaning of equality. For example with the two half obtained from the entire teachers will explain that the two parts are the same. It means that if a student has to choose one s/he could take any one because both have equal size. Put one over the other one to reinforce this example. See the figure belong.

Put one of the halves

One half is covering the other one to prove that both have the same size.
Continue doing the cuts until 1/32. After teachers explain how to write the fractions and the differences between each one, teachers start another activity with all the fractions. In this activity, the educators organize the kids in groups of 4 (this can vary depending on the size of the classrooms). Now, ask the students to write his/her name on every one of their fractions (or a sign that they can recognize later) and they have to choose one partner to be the leader for this game. The leader has to write the next directions for this game.

- Put together all the fractions from each one of your partners.
- Give 4 of the 1/8 to everyone who has white skin color.
- Give 10 of the 1/32 to everyone who has blue and green eyes.
- Give 2 of the 1/32 to everyone.
- Give 2 of the ½ to everyone who has short hair.

This activity shows the students inequality and the bad distribution of the money, land, food, etc. The teacher asks kids if they think that this game is fair and if they had felt this in the past and why. Go deep with their answers and encourage them to find a solution.
 Fractions

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<tr>
<th>Bloom's Taxonomy</th>
<th>Educational Objectives</th>
<th>Examples and Key Words</th>
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| Knowledge        | Recall fractions vocabulary, label and describe constructed material | Example: Fractions with doubles  
Key words: view, write, select, identify, match |
| Comprehension    | Interpret color impressions, predict what the activity might involve | Example: Share different impressions of colors  
Key words: describe, explain, give examples, understand |
| Application      | Construct paper material representations | Example: Different examples of wholes.  
Key words: choose, participate, select, show, solve. |
| Analysis         | Differentiate different vocabulary words and visual representations | Example: Reorganize to see multiple congruencies  
Key words: classify, compare, debate, separate |
| Synthesis        | Produce individual equations, to make up situations of fractions and resources | Example: Differentiate between $\frac{1}{2}$ and $\frac{1}{8}$, etc.  
Key words: compare, organize, rearrange, construct, reinforce, revise |
| Evaluation       | Reframe knowledge of different representations of equal values | Example: Adding and subtracting fraction equations  
Key words: compare and contrast, interpret, select |
CALIFORNIA STATE UNIVERSITY SAN MARCOS

THESIS SIGNATURE PAGE

THESIS SUBMITTED IN PARTIAL FULLFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF ARTS

IN

EDUCATION

THESIS TITLE: Understanding my mathematical learning process to improve my future educator skills

AUTHOR: Jeanneth C. Paredes

DATE OF SUCCESSFUL DEFENSE: May 02, 2012

THE THESIS HAS BEEN ACCEPTED BY THE THESIS COMMITTEE IN
PARTIAL FULLFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
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