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# Latina/O High School Students' Standpoint On Environmental Justice In A Border Community: A Phenomenological Study

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LATIN@ HIGH SCHOOL STUDENTS' STANDPOINT ON  
ENVIRONMENTAL JUSTICE IN A BORDER COMMUNITY:  
A PHENOMENOLOGICAL STUDY

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## **Dedication**

This is dedicated to my family. To my parents Ricardo and Cecilia and my second parents, my in-laws Joe and Irma...I thank you for your endless support, love, and encouragement. To my brothers and sisters, to the many Tias and Tios, cousins, and beautiful family friends. Thank you for being patient while I was absent for the parties, the cookouts, and the fun! Thank you for your love and encouragement. Most importantly to my beautiful daughters, you were just three and five years old when mommy decided to go back to school. I hope I have taught you what it means to be a dedicated and committed Latina who was determined to get the work done, even when it was challenging. Dream big and never give up on your goals, always push forward. You have so much ahead of you and I hope you know that no matter what, you can make a difference in this world. Do whatever your little hearts desire; this is your world, rock it! And to my husband, thank you for everything you have done for me I couldn't have done this without you. I share this honor and joy with you because you earned it too! I love each of you!

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ENVIRONMENTAL JUSTICE IN A BORDER COMMUNITY:  
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by

CYNTHIA CHRISTINA ONTIVEROS B.S., M.S.

DISSERTATION

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## Abstract

This qualitative research is a transcendental phenomenology seeking to understand Latin@ high school students' perceptions and standpoints as they participated lessons that addressed border environmental justice issues in an underrepresented, marginalized community. Seven students from Borderland High School, enrolled in a senior level course, Environmental Science, participated in the study which focused on their experiences in an environmental justice air quality thematic unit built around the complex issues surrounding a local refinery, American Smelting and Refining Company (ASARCO). The study analyzed the meaning students made and their standpoints regarding the impact of the factory and its one-hundred year history polluting the community's air shed. Data collection included Seidman (2006) interviews, focus groups, and participant observations. The data was coded using van Manen's (1990) emergent analysis.

The theory that underlies the study draws from Latina Critical Race Theory (LatCrit) and Standpoint Feminist Theory. LatCrit's key tenets include production of knowledge, advancement of transformation, the expansion and connection of struggles, and cultivation of community and coalition (Valdes, 1997); whereas Standpoint Theory addressed the "double consciousness" (Wood, 2010, p. 62) that many individuals in oppressive relationships understand as they consider their position in relation to the dominant's position. The intersections of these theories guided the interpretation of the students' perceptions of race, class, poverty, and location in reference to environment justice.

The findings suggest that students developed to some extent: 1) an awareness of *obligated exposure*, 2) sense of place, 3) transformative thinking, and 4) taking personal action and advocating for others. The students expressed various standpoints in relation to power and authority and regarded their personal position when reflecting on the factory workers and underrepresented community members who were exposed to environmental harm in relation to their geographic and social positions. Various standpoints were evident in student discussions about how age and time influenced their perceptions and also hindered their ability to respond and take action. Students identified intersections of race, class, poverty and location in reference to environmental justice, through a LatCrit lens of critical reflexivity.

The study demonstrates the value of providing a culturally responsive curricula in schools, one that honors students' identity, culture, history, and environment as a starting point for engaging in meaningful lessons that ultimately foster and sustain proenvironmental behaviors and civic responsibility. Teaching from a critical pedagogical perspective is challenging and requires ongoing teacher support and assessment of the quality and impact. This study is particularly important as the literature in this field is woefully weak in addressing student voices in environmental education and social justice experiences, especially studies from the standpoint of high-school Latin@ students.

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## **Chapter 1: Introduction**

While pollution does not discriminate, the process of localizing entities that are known to emit hazardous toxins in high poverty, underrepresented communities is discriminatory. Bullard (1994) uses the term environmental racism to refer to the act of placing locally unwanted land uses (LULUs) in communities whose residents are predominantly people of color living in modest, or in some cases, deplorable conditions in terms of healthy and hazard-free environments. Clearly documented patterns exist between the geographical location of these harmful exposure sites and areas associated with high minority, marginalized communities (Downey & Hawkins, 2008). Though there are several reasons why the distributional injustices (Fredericks, 2011) occur, the voices of those living among the environmental inequities are left out of the decision-making process that determines placement of such entities (Arnold, 2007). For some families, daily activities are focused on meeting the financial responsibilities of the household, thus moving to a new location may not be feasible or a viable option. In cases such as this, the pollution-emitting entity is seen positively as a financial investment providing a paycheck and other benefits (Sarokin & Schulkin, 1994). “Environmental justice has not been a primary concern” either because the thought of challenging the pollution emitting entity seems like an insurmountable task (Milner, 2011, p. 189), or because the individuals affected have other priorities. Regardless, “minorities, poor people, and working class people complain that they have little say in shaping land use plans and policies for their neighborhoods, and that the process discourages their participation” (Arnold, 2007, p. 4).

## **Purpose of the Study**

The environmental justice literature review focused primarily on non-minority students' participation in environmental justice issues from the standpoint of outsiders looking in (Cachelin, Paisley, & Blanchard, 2009), reflecting a White, affluent perspective unaware of the views of those who are directly affected (Bullard, 1994). Excluding the voices of the exposed creates inaccurate views of the issues resulting in misinformed decision-making processes and policies that negatively impact the underrepresented communities. The result is the continued disregard and unjust ideological impositions forced upon the marginalized communities who may not have alternative options for avoiding the injustices.

Hence, the purpose of the study is to expand the literature through the understanding of Latin@ high-school students' experiences in a uniquely situated U.S.-Mexico border community. The study enhances our understanding of minority participation in learning that uncovers environmental justice issues that are local, meaningful, and pressing for many of the students living among the inequities. The study also extends the literature so that other scholars, educators, and policy makers can further comprehend the impact of environmental injustices on low-socioeconomic, high poverty areas that are common to many parts of the world.

## **Background of the Study: How the Study Was Inspired**

This study was inspired by my involvement with an air quality grant that was funded in 2011, by the United States Environmental Protection Agency (EPA) supporting a U.S.-Mexico Border Environmental Education Outreach and Support Program (66.037) entitled *Buen Ambiente, Buena Salud*. The grant was awarded to a local borderland school district and a border university. The goal of the grant was to develop, train, and retain professionals in various disciplines to address air quality issues within the border region. My role during the five-year

period of the project was to facilitate the selection of teachers and to serve as the contact between the university curriculum writers and the high school teachers who designed and piloted the air quality curriculum modules in their classrooms. The modules were developed to align with the North American Association for Environmental Education's (NAAEE) Environmental Education Guidelines for Excellence Framework (2010) (see Appendix A) that served as a guide for developing carefully planned lessons providing opportunities for students and teachers to learn about environmental justice concerns within their local community.

As I participated in the various grant activities I observed teachers, students and the community become engaged in the air quality lessons. Parents and students, especially those affected by asthma, began to monitor high ozone days. Teachers and students identified ways to become energy efficient at home and at school, and a few schools developed no idling zones. Another notable impact was the rescheduling of military practice drills, by one of the largest U.S. Army installations in the nation, in order to reduce the exposure of vehicular emissions at a nearby elementary school.

Overall, the teachers and students enthusiasm intrigued me. I have always been fascinated with environmental science concepts, but my interest intensified when I began to study and learn about the different environmental injustices that occurred in our border community. Thus, my desire to understand how Latin@ high-school students perceive their learning experiences became my passion and the focus for this study.

### **Context of the Study: An Overview of Borderland Issues**

The study took place in a southwestern Texas community situated along the U.S.-Mexico border. The setting was selected because of the environmental issues that are unique to the border community. This border region has an estimated two million people (EPA, 2014a), with

approximately 80% of the total population identified as Hispanic (U.S. Census Bureau, 2010) and serves as a major hub for trade and traffic that goes through the heart of the city. The border area is unique in that it has a long history of air quality concerns that stem from past and current pollution-emitting establishments, including a prominent cross-border trade industry that provided economic growth and development to a low wage, underrepresented, high poverty community. While the establishment of two smelters and three refineries enhanced the economic development in the border community, it also released harmful toxins contaminating the area with dangerous waste products over a one hundred-year span (Pingitore, Espino, Barnes, Gardea-Torresdey, Clague, Mackay, Amaya, Reynoso, Li, Currey, Moss, Delgado, Juarez, Bader, Zevallos, & Herrera, 2005). Pingitore et al. describe how an increase in cross-border trade was initiated by the 1993 signing of the North American Free Trade Agreement (NAFTA) between Mexico, the United States, and Canada. The agreement supported the establishment of hundreds of maquiladoras (foreign factories), which provided low wage employment for individuals on both sides of the border (Varaday, Lankao, & Hankins, 2001). The increased presence of maquiladoras boosted the production and emissions of waste and harmful toxins into the shared border environment, including thousands of trucks and cars idling in border checkpoint lanes (Anderson, 2010; Schulz, 2003).

### **Significance of Incorporating Environment Justice Education**

Often lacking in our schools is a balanced environmental education program that address concepts beyond coverage of facts and information; a program that will move students and their community toward behaviors that reflect civic-mindedness and responsibility (NAAEE, 2010). In 1969, William Stapp who is known as the father of environmental education in the United States, predicted that by the year 1980 more than 80% of the nation's population would live

within the boundaries of an urban community. This outward growth of communities would bring forth complicated environmental issues and education efforts were consequently necessary for addressing the increased urbanization. Stapp presented his vision for the future of environmental education in a concept paper submitted in the first edition of *The Journal of Environmental Education* (1969). He argued that a “lack of comprehensive environmental planning; indiscriminate use of pesticides; community blight; air and water pollution; traffic congestion; and the lack of institutional arrangements needed to cope effectively with environmental problems” (p. 33). An environmental education alone would not be enough to promote the necessary positive pro-environmental behaviors and genuine care for the earth’s natural resources that were essential to preserving and conserving limited resources. In the early 1950s he began incorporating environmental education efforts that reached beyond the school’s curricula, involving the local community by raising awareness and encouraging a citizenry of individuals to protect and conserve environmental resources (Carter & Simmons, 2010).

The expanding and outward growth that was foreseen by Stapp became a reality as many urban cities, over the past fifty years, have experienced substantial changes in the demographics and the schools’ student body makeup. These changes necessitated a redefined or reinvention of educational approaches that would be more inclusive and culturally responsive to the needs of all learners. Banks (2006) urged schools to change their instructional approaches in ways that were multicultural, relevant, and engaging for all learners. The demand for customized instructional approaches that addressed the learning needs of diverse students was not only a challenge for many educators (Arreguin-Anderson & Kennedy, 2013), but was also rarely reported in environmental education related literature (Ardoin et al., 2013).



A critical environmental education moves students beyond superficial coverage of nature and ecological perspectives to a process that requires the learner to critically reflect and take action on environmental problems within a community (Ceaser, 2012; Kyburz-Graber, 1999). The term critical environmental education was first introduced as a process “that allows young people to explore social issues in the real world by questioning values, perceptions, conditions, and opinions” (Kyburz-Graber, 1999, p. 46). Participation in critical environmental education fosters an internal consciousness of the issues in relation to the environmental concern encouraging or generating action against the issues at hand. According to Kyburz-Graber (1999), a critical environmental education, revolves around teachers and students as they:

Reflect on interests, beliefs, values and the basis of knowledge and power. Key issues in such teaching-learning processes seem to be: the construction and critical use of knowledge; the critical analysis of the role of natural science; the interference between natural science and social science and the humanities; and the appropriate pedagogical setting for in-depth discussion and reflection. Developments in our society favor action, facts, visible effects and measurable standards associated with progress. Learning with environmental issues, by contrast, requires thoughtfulness and reflection (pp. 111-112).

When students participate in activities that encourage self-reflection on their role and the impact on their community, students develop behaviors associated with civic responsibility and civic-mindedness (NAAEE, 2010), “environmental stewardship and sense of responsibility” (Venkataraman, 2010, p.9), and prosocial awareness (Battistoni, 2013) all leading toward developing the student as a whole.

In a recent review of the literature on environmental justice education, Ardoin, Clark, and Kelsey (2013) and Nussbaum (2013, 2014) described an apparent gap, and therefore need, for future researchers to address urban and diverse populations in environmental education related studies. Shifts in demographics at the state and national level are changing the traditional makeup of classrooms in urban and rural settings moving from mostly White to mostly Hispanic or Latin@ communities. Demographers predict that by the year 2020, the number of Hispanics living in Texas will meet and exceed the White or Anglo population. Furthermore according to the Pew Research Center, the U.S. Census Bureau projects the Hispanic immigrant population will increase by 86% between 2015 and 2050 (Krogstad, 2014).

The expanded borders turn once rural communities into urbanized, dependent localities invading the physical environment and infiltrating the earth's natural resources. The advancements and progression of these urbanized developments demand that our society becomes well informed of the issues and equipped to address the foreshadowed gloom with tools and resources that only an environmental justice education can provide. The deterioration and destruction of our environment caused by man has impacted the planet at severe levels with global warming patterns becoming more and more evident over the past several years advancing the climate change to, according to Man (2012), a point of no return if changes are not implemented immediately. Disparities and exposure rates of harmful environmental conditions will intensify and compromise the health and well-being of our societies.

Therefore, the catalyst for this study was to explore underrepresented voices as an approach to understand examine the multi-varied perspectives from within a border community, and the role environmental education can play in addressing environmental issues at a deeper

level, ultimately developing civic mindedness and responsibility to address local concerns with global implications.

### **Role of the Researcher**

As previously mentioned, my interest in this topic was inspired through my participation in the development and implementation of the EPA Grant, *Buen Ambiente-Buena Salud: Educational Strategies for Addressing Air Quality on the Border*. Involvement in the grant fueled my interest to explore the topic at greater detail to learn more about how students, specifically Latina@s, experience environmental justice issues in their own community. My role was to design, implement, and analyze the theoretical and methodological processes employed that would address the research questions of this study. The study incorporated a qualitative phenomenological design that purposely selected a master teacher and his students to participate in lessons that address progressive environmental education efforts.

As a curriculum and instructional specialist working in the borderland school district where the study took place, I was extremely cognizant of my role and position and bracketed my personal experiences (Chapter 3) so that I captured the essence behind the Latin@ students' meaning made in the air quality thematic unit addressing environmental injustices. I also worked closely with the participating teacher and his students to develop a culture of trust and rapport so that data collection procedures reflected genuine, real experiences to the extent possible. I identified myself as the researcher and requested permission through the university and school district's Institutional Review Board (IRB) to fully participate in classroom activities including conducting individual student interviews, focus groups, and participant observations.

My role in the study was to observe, document, and record the students' experiences as they participated in the air quality thematic unit that will be further discussed in Chapter 3. It is

important to note that in my capacity with the school district I functioned as a science facilitator providing staff development and curriculum support as needed and was not the direct supervisor of the identified teacher involved in the study. I ensured the research process was free of ethical risks and included procedures to verify that the data collected from students were accurately represented and interpreted. I included multiple data sources such as peer reviews and member checking to safeguard and minimize my assumptions and judgments to avoid impacting the data collection and analysis process. I continuously checked with my participants and brainstormed with other scholars in the field to review and verify the data analysis and interpretations were accurately represented and credible.

### **Researcher's Disposition**

Growing up in the border community I struggled with my identity; was I American, Mexican American, Latin@, Chican@, or Hispanic? In my opinion, each one of these titles was a label given to my culture, not a name I selected. I was born between two worlds with two different languages, eventually losing my ability to speak fluently in Spanish because my parents instilled English as my primary language. My parents had awful experiences growing up in school, and throughout adulthood, as they were castigated for speaking in Spanish. I'm not a first or second generation Mexican American, I'm actually a 1.5-generation because my father was born in Mexico and my mother was born in the United States. Like many of the participants in this study, our backgrounds and experiences come from diverse upbringings, with different emphases on language, mixed nationalities, and clarifying identities. I was conscious of the assumptions and judgments I brought forward and worked internally to set aside my personal experiences to understand the phenomenon of Latin@ students' standpoints as they participated in environmental justice learning experiences.

Understanding and interpreting the students' experiences came with focused preparation and critical discourse through coursework and various experiences that were thought-provoking and engaging. My passion for exploring environmental justice issues was propelled through the doctoral program's course readings and discussions with colleagues and professors, evaluating the role of power relationships (Kozol, 1991); the struggle between dominant and non-dominant populations in school settings (Valenzuela, 1999); oppression and critical consciousness (Anyon, 2006; Freire, 1993; Oakes, 1986a, 1986b) hegemonic influences (Apple, 2004), cultural diversity (Banks, 2006; Ogbu, 1992) and a process for learning (Bruner, 1960). These readings propelled my thinking and supported my desire to want to learn more social justice perspectives from a critical standpoint. I will never forget how I felt when I first read Apple's (2004) work on social and capital reproduction, hegemony, and ideology.

I was uncomfortable when I realized that I too was a part of the society's reproduction scheme because I was teaching knowledge that was handed down, not knowledge that represented me or my students' culture and identity. The readings opened my eyes to the possibilities of a culturally responsive, or sensitive, curriculum that honors students' and their struggles motivating them to achieve using the tools that they bring, the language(s) that they speak, and their experiences, all of which can be incorporated into an environmental justice education.

Throughout my journey, valuable lessons were made. Oppressive relationships and power struggles became apparent either in my life or in the lives of people around me. I had always accepted things "as is" because "that was my role as a woman" or "I'm not supposed to ask questions." I became conscious of the issues and began to question why I had to accept certain things, without ensuring that they represented or aligned to my personal view or my philosophy.

In addition to the coursework and valuable professional learning experiences, life threw a few curve balls that were challenging and tested my will to keep moving forward. During my final year of the dissertation phase, my father became ill. From one day to the next, my family's world was turned upside down. My father went from being an independent strong man to losing his ability to walk due to normal pressure hydrocephalus. His memory became distorted and confused, he was confined to a wheelchair and his ability to take care of his basic needs was compromised. Caring for my father, while holding a full time job and working as a full time student, became overwhelming. I turned to prayer and meditation to help get me through the difficult struggles of numerous doctor visits, brain surgery, and now on to a slow, yet promising recovery. My Latin@ family and community provided the structure that allowed me to keep focused and committed to finishing these final stages of the dissertation.

### **Research Questions**

The research questions were designed to understand high school students' perspectives in general, with a specific focus on the experiences of Latin@ high school students as they participated in environmental justice lessons that addressed local air quality issues. The research questions are:

1. How do Latin@ students interpret local environmental justice issues?
  - a. How do high school students' backgrounds, beliefs, values, and interests inform their understanding of environmental justice issues?
2. How does the place-based component of the lesson, which focuses on a locally relevant event, influence students' understanding of environmental justice issues?
3. How do high school students perceive agency within themselves or others in the border community?

## **Relevant Terms for the Study**

A list of relevant terms that are referred to throughout the study are found in the glossary of this study. The terms and acronyms that were used to describe environmental education and environmental justice are defined and clarified.

## **Limitations and Delimitations**

There are a few limitations and delimitations that are important to disclose upfront to ensure that the study reflects a carefully planned design, addressing ethical procedures and validity. First, the study included literature within the past twenty-five years to provide an overview of the most recent empirical studies implemented in the field. The second delimitation concerned the participants of the study. The specific target population, Latin@ high school students, was selected over other populations to understand how this underrepresented diverse student group perceived their learning of environmental justice border issues. The actual demographic breakdown is presented in Chapter 3. One student whose ethnicity fell outside of the Latin@ population was included in the study. In the end, I felt that it was better to achieve inclusiveness in order to understand how high school students in general think about environmental justice issues, than to exclude a willing party who wanted to participate in the study.

Although the methodological procedures were carefully considered when the study was developed, modifications were made during the data collection process, specifically during Seidman's (1996) three-step interview, to accommodate the needs of the participants. For instance, Seidman recommended 90-minute interview sessions with a two-week interval between interviews. However, the recommended timeframe did not meet the needs of the students and was therefore modified to support data collection that was relevant and appropriate for the age

group.

The length of time students participated in the environmental justice air quality thematic unit was limited to four weeks due to the predetermined syllabus of the course. The four-week timeframe, of course, restricted students' ability to truly develop a full understanding to inform their perspectives and meaning making of the issues. The findings are based on students' responses during the three interviews, focus groups, and classroom observations and does not generalize that participation in the thematic unit led to specific pro-environmental actions. However, the study did confirm through multiple data collection procedures, approaching saturation, that student responses were consistent. The study was conducted with one teacher's students, in one classroom, at one school, in one border community, and cannot be generalized across all minority, underserved student groups.

### **Organization of the Study**

The study is presented in six chapters. The introductory chapter provides a general overview of the major concepts or issues that are addressed in the study: the purpose of the study, background of the study, a description on how the study was inspired, context of the study, the need for environmental justice education, the role of the researcher, the researcher's disposition, research questions, and the limitations/delimitations of the study.

Chapter 2 provides an overview of the key findings presented in the literature on environmental justice education. The topics addressed in Chapter 2 include: 1) a description of the environmental racism; 2) the history of environmental education and environmental justice movement, 3) teaching and learning perspectives of environmental justice education, 4) participation versus non-participation of minority students in environmental justice education; 5) role of parents, community members, and collaborators; and finally 6) the overall challenges



with environmental justice education efforts. The theoretical frameworks, Latina Critical Theory (LatCrit) and Standpoint Theory, will also be addressed in this section.

Chapter 3 provides the methodological procedures for a qualitative phenomenological approach, including the methodological precedents, setting, data collection procedures, and Institutional Review Board approval for obtaining participant consent and assent. The data collection timeline is presented with a description of the procedures for interpreting the data. The ethical considerations that include the researchers' assumptions, trustworthiness, and credibility will be disclosed. And finally, the chapter will end with a summary of the apparent challenges in the data collection procedures that were encountered during the implementation of the study.

Chapter 4 and 5 present the findings that resulted from the data collection methods described in Chapter 3. A description of the participants' demographics, the setting of the study, and actual rollout of the methodological processes are explained. The chapter focuses on the data analysis procedures including the coding process and the development of categories, subcategories, and themes that emerged in the data. The frequency and source for each theme are identified and summarized with specific examples provided. The results as they relate to the research questions will also be addressed with disconfirming data identified. Strategies for addressing trustworthiness is explained to ensure the data is credible. The profiles of the students are presented in Chapter 5.

Chapter 6 addresses the data analysis process and identifies the key findings of the study including the connection or disconnection to the literature review and theoretical frameworks. The interpretation of the data through the theoretical frameworks of Standpoint Theory and LatCrit Theory are presented. The implications and value of the study are summarized with my reflection and recommendation for next steps.

## **Chapter 2: Literature Review**

The purpose of this chapter is to provide an overview of the literature that addresses environmental injustices with a specific focus on the participation of minority populations, specifically Latin@s, in environmental education and environmental justice related experiences. A review of the literature was conducted using the following key terms: environmental education, environmental justice education and minority populations, with advanced searches including the terms Latin@, Hispanics, and Mexican Americans. The search was limited to the past twenty-five years to capture the most recent events in the history of environmental education and included more than one hundred sources identified in several data bases such as JSTOR, EBSCO, Journal of Environmental Education and Journal of Environmental Justice, and Google Scholar. Although the scope of the study concentrated on diverse, underrepresented populations, such as Latin@s, the literature review included other demographics to gain a better understanding of students' experiences in general, and to increase the number of sources reviewed which was already limited with the narrow search options.

An overview of the history of environmental education and the environmental justice movements provide an update on the events, laws, policies, and committees that emerged in the educational and political arenas. I organized the information into a table (Appendix C) of the events and development of laws, policies, and committees that were initiated on the U.S.-Mexico border area, including alignment with the national focus on environmental education movement. This review of environmental education provides the context on how the field emerged, including an overview of the local and national events that shaped our current understanding of the various laws, policies, and practices.

## **Introduction**

In the writings of Thomas Jefferson, there is room to interpret a broad and inclusive understanding about his view on public education serving all citizens and empowering the people to make decisions about their government and their well-being. Jefferson believed that a democratic public education was obligated to provide its citizens the ability to question and change society. In Jefferson's words, "...whenever the people are well-informed, they can be trusted with their own government; that, whenever things get so far wrong as to attract their notice, they may be relied on to set them right" (as cited in Padover, 1939, p. 88). Today, Jefferson's hope is challenged, and in some cases ignored by the circumstances that have evolved over time in addressing environmental inequities for poor, minoritized, low socioeconomic, communities of color.

## **Environmental Racism**

The Environmental Protection Agency (EPA) provides the following definition of environmental justice:

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work. (EPA, 2014)

The main goal of the EPA is to ensure that everyone is protected and benefits from a clean and risk free environment. However, several scholars and critics argue that this goal is far from the truth with unfair, unjust treatment against the nation's most challenged, fragile communities. The

following examples highlight a few events that have been reported in the literature within the past few decades:

- In 1991, the U.S. Office of Technology Assessment estimated that the United States had as many as 439,000 hazardous waste sites scattered throughout the nation. “Forty-one million people lived within four miles of at least one of the nation’s roughly 1,500 superfund waste sites” (Faber & Krieg, 2003, p. 279).
- Research reported “black children are twice as likely to have lead poisoning compared to white children, irrespective of income” (Sarokin & Schulkin, 1994, p. 127).
- In Massachusetts, 80% of Hispanics, 65% of African Americans, and 57% of Whites live near an area that has failed to meet at least one or more of the Environmental Protection Agency’s standards (Metzger, Delgado, & Herrell, R. 1995).
- In Armonk, New York, a community demanded water quality testing after several of its members became ill, reporting breast and prostate cancer. When the water was tested by government entities, the studies revealed there was no indication of contamination. The community argued otherwise (Sarokin & Schulkin, 1994).
- The West Dallas Coalition for the Environment demanded that a local refinery be identified as a superfund site and be shut down for intentional acts of racism and harm although, several years later, the marginalized community was awarded a \$43 million dollar settlement (Sarokin & Schulkin, 1994).
- Mexican Americans who live along the U.S.-Mexico border are limited in their access to clean water and basic sanitation services and therefore rely heavily on water from a nearby river that has been contaminated by runoff from nearby maquiladoras (Jepson, 2012).

- A total of 18 industrial firms dumped 33 million pounds of toxins in a Vernon, California, community which has also been identified as the dirtiest zip code in the nation (Bullard, 1994).
- Sampson (2012) discovered that there are no federal agencies responsible for evaluating school environmental health; “this lack of policy may contribute to inequities when poorer school districts cannot afford the same environmental health amenities<sup>1</sup> as nearby wealthier districts” (p. 247).

This partial list is evidence of the unfair disparity and harm imposed on poor, marginalized communities - those, who are often further oppressed because their voices are disregarded (Bullard, 2000).

Bullard was one of the first scholars in the field to present empirical research that linked the placement of LULUs with race and income. “Environmental racism” is the term used to describe how minority communities, specifically African Americans and Latinos, were intentionally discriminated against with the placement of LULUs, releasing toxins either through the atmosphere, physical land, or natural waterways. The apparent disregard to the health and livelihood, especially of minority populations, has been documented through discrepancies on exposure rates of hazardous toxins as reported by LULUs to state and national agencies, and reports indicate that information was either omitted or under-reported by the amounts and types of chemicals that have been released by polluting entities (Stevens, Dias, & Ezzati, 2008).

Arnold (2007) posits that, “The concept of environmental justice is about the impacts of environmental and land use policies on low-income communities of color” (p.3). He described how poor planning in land use by those in control was intentional, allowing the placement of

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<sup>1</sup>Exposure to hazardous toxins causes illnesses such as respiratory related diseases that impact students’ behavioral outcomes, mental health, physical activity, and academic performance (Sampson, 2012).

LULUs in needy communities. In addition to the harm caused through the exposure of hazardous toxins, he reports that individuals from affected communities are further oppressed through the process of submitting a claim against the entity. The victim, or individual directly impacted by the environmental harm, bears the burden of providing evidence that linked the LULU to the source of the complaint. Victims must go through the appropriate, mostly cumbersome, channels to advocate for their own rights and provide evidence to prove the entity caused harm. The process is overwhelming and time consuming, and leads to feelings of helplessness and despair (Environmental Education and Training Partnership/EETAP, 1999).

The current environmental protection paradigm has institutionalized unequal enforcement; traded human health for profit; placed the burden of proof on the “victims” rather than the polluting industry; legitimated human exposure to harmful substances; promoted ‘risky’ technologies such as incinerators; exploited the vulnerability of economically and politically disenfranchised communities; subsidized ecological destruction; created an industry around risk assessment; delayed cleanup actions; and failed to develop pollution as the overarching and dominant strategy (Bullard, 1994, p. 10).

### **History of Environmental Education**

This overview is not intended as an in-depth or extant review of the literature; but discusses the key policies and entities that were formed over the past 45 years. A history of environmental education and environmental justice events that ensued are summarized in Appendix B.

Several critical events emerged in the mid-1960s and early 1970s in response to the environmental concerns that surfaced from the increased release of hazardous pollutants and

emissions from industrial and commercial entities. The environmental movement did not occur in isolation; it was fueled alongside the 1960s Civil Rights and Chican@ Movements (Agyeman, 2005; Cole, 2007) and other important movements at the time that focused on protection and concern for the human element. In 1967, the Air Quality Act was passed to enforce restrictions on emissions by region. The law was not strongly backed or enforced and therefore did not have a significant impact (Rogers, 1990). The international focus on environmental education kicked off in 1968, with the United Nations Educational Scientific and Cultural Organization's (UNESCO) Biosphere Reserve Conference held in Paris, France (Kopnina, 2012), followed by the 1970s UNESCO and International Union for Conservation of Nature (IUCN) held in Nevada. Leading environmentalists around the world began to define and develop guiding principles for environmental education and curricular approaches that could be implemented in formal and informal education settings (Biedenweg, Monroe & Wojcik, 2013).

In 1969, William Stapp helped to kick off the first ever Earth Day (Sarokin & Schulkin, 1994) where a large group of individuals gathered in what is described as a "Sit-in" (Cater & Simmons, 2010), as a way to protest or bring attention to issues concerning the earth's natural resources and increased awareness and understanding of the environmental injustices that occurred throughout the world. During that same year, the United States became the first country to initiate a policy that addressed environmental education in schools with the Environmental Education Act of 1970 (Biedenweg et al., 2013). In 1972, the Human Environment Conference took place, followed by the 1975 Belgrade Charter, and finally ended the decade with the 1977 Tbilisi Conference. Each of these events focused on global, or international, approaches for developing and implementing environmental education in schools (Biedenweg, et al., 2013;

Kopnina, 2012), and each was critical in moving the focus forward on protecting and conserving the natural environment.

The 1980s brought about discussions on environmental education that emphasized sustainable development; however, the movement did not move forward as fast as scholars in the field envisioned. Sustainability efforts were first introduced at the international level and documented during several international conferences, garnering attention and energy to address environmental education. Shortly after, national and international interests began to shift from environmental education to education for sustainable development. A definition for education for sustainable development emerged in the 1980s. While scholars were trying to find their place within the new education for sustainable development framework, Gonzalez-Guadianao (2006) described how there was confusion about the direction the field was heading and stated that several scholars questioned if education for sustainable development was to replace environmental education, if it was better than environmental education, or if the two fields could co-exist.

#### **From environmental education to education for sustainable development.**

Stapp's vision for environmental education was based on an inclusive approach of all citizens; he envisioned individuals would take action, address the issues, and provide attainable solutions that would lead to prevention and conservation. He proposed the following,

Man should also have an awareness and understanding of his community and its associated problems. Our communities are being plagued with problems ...While these problems are legitimate concerns of community governmental officials and planners, the responsibility for their solution rests, to a large extent, with citizens (Stapp, 1969, p. 33).



Although he firmly regarded environmental education as an avenue for addressing issues beyond a superficial knowledge base, many educators reverted to teaching from a nature or conservation focus, referred to as traditional environmental education approaches (Cachelin, Paisley, & Blanchard, 2009; Ernst, 2007).

Nevertheless, Stapp's focus on environmental education helped to push the issue forward, and while educators and scholars around the world were beginning to develop and strengthen their understanding of environmental education, education for sustainable development was emerging. The intention behind education for sustainable development was to shift the traditional focus on environmental education from awareness and knowledge toward a process for changing attitudes and behaviors by taking action for a better understanding of environmental education. Education for sustainable development is defined as,

A vision of development that encompasses populations, animals and plant species, ecosystems, natural resources-water, air, energy- and that integrates concerns such as the fight against poverty, gender equality, human rights, education for all, health, human security, intercultural dialogue, etc. (UNESCO, 2005, p. 2).

However, the shift from environmental education to education for sustainable development did not come easy. While the goals were not clear, there was confusion about whether education for sustainable development was seen separately or as an outcome of environmental education, or within the same line, interchangeable with environmental education (Biedenweg et al., 2013; Gonzalez-Gaudio, 2006; Kopnina, 2012; Pavlov, 2013; Shallcross, Robinson, Pace, & Tamoutseli, 2007; Stevenson, 2006). As a result, the environmental and sustainability movements remained stagnant from the early 1980s to the turn of the century with little action pushing the movements forward (Carter & Simmons, 2010). Regardless, Monroe (2012) contended that,

It does not matter what we call it; we need quality education that prepares people to understand multiple ways; to listen and communicate with others; to vision and evaluate options; to collect, synthesize and understand data; to learn how others have balanced contentious elements of an issue; and to be able to adopt actions (p. 43).

### **History of Environmental Laws and Practices: An International, National, and Border Perspective**

As the environmental education movement evolved, so did several policies and regulations to address the increase in pollution around the world. The first federal laws to address environmental concerns emerged in the early 1950s; water pollution in 1948 and air pollution in 1955 (EPA, 1990). The introduction of the Clean Air Act of 1970, which was amended in 1977 and 1990 by Congress, created a national concerted effort to address air pollution.

In 1983, the United States and Mexico joined efforts to address one of the first series of laws focused on the environment with the signing of the La Paz Agreement, which was inspired by the 1972 United Nations Conference on the Human Environment in Stockholm. The conference “called upon nations to collaborate to resolve environmental problems of common concern” (EPA, 1986, para. 3). The United States and Mexico agreed to establish procedures to protect and conserve the shared natural environments in order to uphold the pristine scenic landscapes, on both sides of the border that were beginning to show signs of contamination and destruction caused by industrial pollution. The agreement provided a starting point for the governments to begin setting procedures for regulating emissions so that the natural environments could be protected and enjoyed for generations.

While the effort to combat environmental conditions seemed to be moving in a positive direction, Mexico joined international efforts by signing the General Agreement for Tariffs and

Trade (GATT) Act of 1986 that appeared to reverse the La Paz Agreement of 1983. The GATT loosened the restrictions on taxes and licensing on border-crossing vehicles that was previously required in order to conduct trade and business interactions between the U.S. and Mexico (Anderson, 2010). This meant that the Mexico, who at that time was experiencing a severe devaluation of their peso, had an opportunity to stimulate commerce activities between corporations and industries along the border and provide a slight break for conducting international business with the U.S.. And while this new law increased activity along the border, it was marginal compared to the passage of the 1993 North American Free Trade Agreement (NAFTA), which ultimately removed restrictions, tariffs and licensing on all border-crossing trade.

The 1993 agreement was signed between the North American countries, U.S., Mexico, and Canada, all agreeing to allow free trade in, importing and exporting manufactured goods and services between the countries. By some accounts, NAFTA stimulated the economy on both sides of the border by providing jobs, increasing trade, and luring business and industries to relocate to the border area; but the impact on the physical environment was an afterthought with slight consideration in the legislation (Shultz, 2003). The 9<sup>th</sup> Circuit Court in San Francisco argued that NAFTA was enacted blindly, without a plan in place to study the impact of trade and the environmental effects between the U.S. and Mexico before the law was signed. One of the main concerns was the unregulated and loose laws on vehicles, specifically diesels, traveling from Mexico into the U.S. that would sit idling for hours at border crossings (Shultz, 2003, p.28). This drove border agencies at U.S. checkpoints to enforce tariffs and licenses and therefore did not allow Mexican vehicles to cross the border if they did not have the appropriate paperwork, regardless of NAFTA (Nevins, 2002).

Several border cities initiated policies such as Operation Hold the Line in El Paso, Operation Gate Keeper in San Diego, Operation Safeguard in Arizona, and Operation Rio Grande in South Texas, all in effort to minimize the passage of immigrants through the U.S. border without the appropriate documentation or permits (Nevins, 2002). Nevins described how these actions led to oppressive power struggles, including racial discrimination, as law enforcement agencies along the border harassed and violated the civil rights of several Mexican truck drivers who were detained at border checkpoints and held illegally as a way of limiting the passage into the U.S.. The September 11, 2001, attacks on the nation further aggravated these unjust behaviors, as heightened border security caused increased wait times and idling vehicles, further compromising the health and well-being of the people and the environment surrounding the border communities.

While the injustices that ensued as a result of NAFTA were occurring at the border front, the impact was felt around the nation. Sarokin and Schulkin (1994) described how the 1980s Right-to-Know Laws were launched to encourage the public's access to information that only the government or the industrial organizations could access. However, as activists and grassroots organizations began to examine the injustices at a closer level, the pollution-emitting entities were not being as transparent as reported. The United Church of Christ's Commission on Racial Justice released the 1987 Toxic Waste and Race Report, which provided empirical data to the EPA connecting geographical location of LULUs to communities of poverty and color (Sarokin & Schulkin, 1994). It was during this time that the term "environmental racism" (Agyeman, 2005, p.12) was coined to describe the injustices over "poverty, land values, and home ownership" (Bullard, 2000, p. 556). As a result of the Toxic Waste and Race report, the 1991 First National People of Color Environmental Leadership Summit convened to discuss various

aspects of environmental racism including “procedural equity, geographic equity, and social equity” (EETAP, 1999, p.1; Sarokin & Schulkin, 1994). The First National People of Color Environmental Leadership summit kicked off the environmental justice movement with the organization of several grassroots communities of color who were concerned with the environmental quality and health hazards found in their local neighborhoods (EETAP, 1999). Soon after this event, the EPA established the Office of Environmental Equity to address concerns that emerged from the Toxic Waste and Race report.

At a border level the 1993 Border Environment Cooperation Commission (BECC) was organized to address the increase in trade and release of pollution that resulted from newly established LULUs, including maquiladoras and traffic along the U.S.-Mexico border (Varaday et al., 2001). Two policies were also modified at the national level: (1) the Solid Waste Act was amended with the Environmental Equal Rights Act which prevented LULUs from being located in disadvantaged communities, and (2) the Comprehensive Environmental Response, Compensation, and Liability Act of 1990 which was amended with the Environmental Health and Equity Information Act requiring LULUs to obtain demographic information of individuals living in proximity to the hazardous sites to track contamination and release of chemicals. Although the development and implementation of the various laws, regulations, and policies were intended to be transparent and open to the public, Sarokin and Schulkin (1994) claim that the results were a hidden and data were concealed, and exclusive practices limited access to marginalized communities in the decision-making processes.

As the nation moved into the 21<sup>st</sup> Century, several laws were passed that would significantly reduce emissions of automobiles. In 1999, President Clinton announced a change to the Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements that

required new vehicles to reduce emissions by 77%-95% (EPA, 2014d). In addition, Congress passed the Clean School Bus Act in 2004 that would reduce the exposure of diesel byproducts to children (EPA, 2014c). And in 2012, President Obama passed the nation's first greenhouse gas fuel efficiency standards for trucks and buses in effort to reduce emissions that address climate change. Obama provided this statement in his Presidential Address to the nation:

For the first time in nearly 20 years, America produces more oil here at home than we buy from other countries. Our levels of dangerous carbon pollution that contributes to climate change has actually gone down even as our production has gone up. And one of the reasons why is because we dedicated ourselves to manufacturing new cars and new trucks that go farther on a gallon of gas -- and that saves families money, it cuts down harmful pollution, and it creates new advances in American technology (para. 9)... And that's why, after taking office, my administration worked with automakers, autoworkers, environmental advocates, and states across the country, and we set in motion the first-ever national policy aimed at both increasing gas mileage and decreasing greenhouse gas pollution for all new cars and trucks sold in the United States. And as our automakers retooled and prepared to start making the world's best cars again, we aimed to raise fuel economy standards to 35.5 miles per gallon for a new vehicle by 2016 (Obama, 2014, para. 11).

Two years later in 2014, President Obama passed the Climate Action Plan to reduce the amount of carbon emissions by 30% by the year 2030. On March 27, 2015, Mexico was the first Latin American country committed to reduce greenhouse gas emission by 2026. In addition, the U.S. under President Obama and Mexico under President Enrique Pena, presented policy "to address climate change and promote a clean integrated economy... to deepen coordination on a

variety of fronts to save energy and advance environmental priorities” (White House Council on Environment Quality, 2015). This was one step closer to an international and binational focus to ensure marginalized and disadvantaged communities are provided equitable input on laws and policies that directly impact their access to clean and healthy environments.

### **Pedagogical Approaches that Engage Diverse Students**

A variety of pedagogical approaches that have been implemented when teaching environmental education and environmental justice education in schools, centers, and programs, although literature from minority groups is scarce, specifically studies that include Latin@ students. While the majority of methods for teaching about environmental education in schools were based on ecological approaches (Ernst, 2007; Kushmerick, Young, & Stein, 2007), focusing on the natural world and wildlife, a few scholars (Borden, Perkins, Villarrual, Carlton-Hug, & Keith, 2006; Caesar, 2012) describe how critical pedagogical approaches teach students about their environment through social justice or critical reflection fostering a conceptual understanding of ecological concepts.

**Critical Pedagogical Approaches.** Critical pedagogy is a dialogical exchange in teaching and learning that involves reflection on power, control, and hegemonic influences that “link experiences to the politics of culture and critical democracy” (Freire, 1993, p. 18). Freire encourages a curriculum that allows those who are marginalized, or oppressed, the opportunity to access internal resources in effort to support liberating structures from ideological control. Caesar (2012) used a critical pedagogical approach, also referred to as a critical environmental education with minority high school and college level students to explore environmental justice concepts through a local urban farming program in Louisiana. Students who participated in the urban farming program learned how to grow fresh fruits and vegetables, making healthy food

choices available to communities that were devastated by hurricane Katrina's aftermath. Latin@ and African American students reported gaining more knowledge and experience, raising their awareness level of the benefits of farming and sharing their learnings with other community members who were affected by the storm. Similarly, Kyburz-Graber (1999) conducted a cross-case study at five high-schools that implemented a critical environmental education approach and found that a "critical education allow[ed] young people to explore social issues in the real world questioning values, perceptions, conditions, and opinion" (p. 416). When students are provided opportunities to critically reflect on their experiences, it fosters an internal urgency to communicate or to teach what they have learned through a "humility and hope" approach (Meretsky, 2010, p. 162), and encourages moral and instinctive behaviors to "act for the environment" (Scott & Oulton, 1998, p. 209). Educators should consider how equal access through discussions of environmental justice issues allows students to explore their physical environment, despite their economic, academic, and social background (Cole, 2007), while also considering how power, race, class, gender, and politics influence their learning (Scott & Oulton, 1998).

### **Sense of Place**

Sense of place is a critical component in the development of pro-environmental behaviors and affinity to the environment. Kudryavtsev, Stedman, and Kransy (2012) describe sense of place from an environmental psychology perspective that involves, "a relationship between place attachment, place meaning, pro-environmental behavior[s], and other factors influencing sense of place... through a combination of direct experiences and instruction" (p.239), explored through various approaches that involve "critical theory, anthropology, cultural geography, and other frameworks and studies" (p. 242). From this perspective sense of place is focused around the



emotional meaning individuals make with place (Stedman, 2003), and their attachment to place, including the settings, physical location, and symbolic representations that are socially constructed (Fuller, 2014). Other pedagogical approaches that focus on sense of place, include critical pedagogy of place (Gruenewald, 2003b), critical responsive pedagogy of place (Mannion, Fenwick, & Lynch, 2013), and critical ecological pedagogy (Woothouse & Knapp, 2000), all of which are grounded in social cultural foundations that include culture, meaning, and taking action (Schweizer, Davis, & Thompson, 2013). These pedagogical approaches incorporate place, or present the environment as an opportunity for individuals to connect and develop an affinity of the identified place, thus further propelling a crucial understanding and genuine care for that place.

Gruenewald's (2003a) critical pedagogy of place is a combination of critical pedagogies and pedagogies of place that consider how society plays a role in understanding the natural environment through the production of knowledge in schools. Critical pedagogies of place can occur in multiple ways.

Experiential learning, context-based learning, problem-posing education, outdoor education, environmental/ecological education, bioregional education, natural history, critical pedagogy, service learning, community-based education, Native American education—all of which these approaches to education tend to include engagement with local settings (2003a).

The foundation for critical pedagogies of place are grounded in Marxist and neo-Marxist traditions, that “represent a transformational educational response to institutional and ideological domination” (p. 4), as described by Freire, Giroux, and McLaren where the environment critically intersects with culture and education (Gruenewald, 2003b, p. 10). When educators

explore place in the classroom and school they develop “civic engagement, democratic practices, an ethic of care for others and the environment, and the fostering of values” (p. 13); McNerney, Smyth, and Down (2011) proposed,

Giving students a say in what and how they learn; encouraging young people to engage with the big questions confronting the global community; building relational trust within schools and communities; developing a sense of student ownership, identity, and belongingness; creating spaces for dialogue, reflection and political action; and establishing an ethical commitment to justice” (p. 13)

### **School and Classroom Culture: Meeting the Learning Needs of Diverse Students**

One of the greatest challenges educators face is finding ways to make lessons meaningful and relevant to students’ lives (Kushmerick, Young, & Stein, 2007). School and classroom culture play a critical role in the success or failure of marginalized students. As the demographics in schools are changing, becoming more diverse (Banks, 2006; Borjian & Padilla, 2010), traditional approaches that used to work for teachers in the past with non-minority, dominant populations, may need modifications to work for the increasingly diverse ethnic representation in schools. The findings of the literature review suggest an urgency for teachers to find ways to meet the learning needs of diverse students by providing conducive learning environments (Borjian & Padilla, 2010), by motivating and encouraging students (Bae, Holloway, Li, & Bempechat, 2008) through mentoring and trusting relationships (Borjian & Padilla, 2013; Freire, 1993) so that students know they are respected and cared for by their teachers (Valenzuela, 1999). In one particular study, Valencia and Black (2002) focused on Mexican American students and found that when educators challenged or confronted the status quo, “debunked the myth” that marginalized students can’t learn and eradicated the “deficit thinking mindset”,

students reported that they valued their education and expressed feeling academically successful (p. 83). The study also found that support systems at home, school, and within the community were important for assisting Mexican American students in positively influencing their academic success.

While the teacher plays an important role in providing students the support they needed to successfully maneuver through environmental education (Cachelin, Paisley, & Blanchard, 2009), administrators also play an important role in supporting the vision and moving initiatives forward by ensuring a systemic focus on environmentally integrated concepts from the “top down” (Shallcross et al., 2007, p.75). Administrative support proved to have a lasting or sustained impact on students and the community (Fazio & Karro, 2013). Without these support systems in place, challenges and failure are inevitable. The success of these underrepresented, marginalized groups is further hindered when students’ cultural backgrounds and experiences are not considered in the decision-making process (Borjian & Padilla, 2013).

### **Environmental Education Related Activities: Participation Outcomes**

The literature highlighted various degrees at which minority, or underrepresented, high school students participated in environmental related activities and the outcomes that ensued. In most cases, the literature was scarce and therefore other studies were included to provide deeper understanding of how students participate in environmental education or environmental justice related activities. With that said, participation was dependent on several conditions such as student’s willingness or interest (Carmi, 2014); their connection and awareness of environmental issues (William & Florez 2002); parent and community involvement (Valencia & Black, 2002); and influence by peers (Duvall & Zint, 2007). The reported outcomes of student participation included development of pro-environmental behaviors (Cachelin, Paisley, & Blanchard, 2009)

and increased eco-affinity and eco-awareness of the issues (Larson, Green, and Castelberry, 2011). Participants also reported feeling empowered (Ceasar, 2012) with increased confidence to take action or respond to their learning (Ceasar, 2012; Borden, Perkins, Villarrual, Carlton-Hug, & Keith, 2006). Cachelin, Paisley, and Blanchard's (2009) mixed methods study found that field investigations provided students an opportunity to interact with their environment, stimulating sensory learning that transformed thinking from short term memory to long-lasting learning as they accepted and internalized the concepts on their terms. Environmental justice lessons fostered conceptual understanding of ecological concepts, as well as supported students in developing a "sensitivity" to cross-disciplinary issues making learning significant and long lasting (Ernst, 2009).

Transformative thinking occur when learners critically reassess their current perspective and examine whether their present approach to doing things is right for them. This critical self-reflection helps them look at things in a fundamentally new and different ways, examine actions they can take to change their lives in essential ways, and take action based on new assumptions when making important decisions (Christopher, Dunnagan, Duncan, & Paul, 2001, p. 134).

**Pro-environmental Behaviors.** Pro-environmental behaviors are defined as students' affinity and support for the environment that result from participating in environment education activities. More specifically, pro-environmental behaviors are defined as "behavior[s] that consciously seek to minimize the negative impact of one's actions on the natural and built" environments (Kollmuss & Agyeman, 2002, p. 239). Carmi (2013) conducted a quantitative study using Zimbardo's time perspective inventory (ZTPI) with Israeli students and found that pro-environmental behaviors varied when the environmental impact had a personal or future

impact and when there was a disposition to forgo specific behaviors in favor of the environment; respondents developed pro-environmental behaviors when the benefit was instant and advantageous to the individual.

**Agency and Advocacy.** Students also developed behaviors that involved taking action as they developed an affinity for environmental justice (Schneller, 2008), civic-mindedness, and increased knowledge in governance and current events, all of which would increase the likelihood for individuals to vote and sustain civic knowledge (Cohen & Chaffee, 2013). Such behaviors aligned to prosocial development which, “refers to voluntary commitment, either cognitive or behavioral, to the welfare of other persons or groups (Eisenberg, Cumberland, Guthrie, Murphy, & Shepard, 2005, p. 137) as students participated in service projects that held a personal meaning to them. Fuller (2014) explored how agency depended on social capital and place attachment and found that agency was low in places with blatant environmental injustices, continued oppression, and exposure to environmental harm as individuals felt helpless of their living conditions and therefore, little to no attachment to place because they did not like the environment they were living in. London, Frampton, DeLugan, and Fujimoto (2013) reported that taking action and agency takes time and answers or solutions are not instantly apparent, even in places where several activists and grassroots movements have taken place, such as in the San Joaquin Valley in California where inequitable distribution of harm against the agricultural community continues.

**Resisting behaviors.** Resisting behaviors such as avoidance and disconnect were also reported in several of the studies. Participation levels in minority youth groups was influenced by and depended on peer and family approval (Perkins et al., 2007). In the same study, students reported that their parents restricted or forbade them from participating in the activities due to

safety issues, overriding the students' desires. Cacari-Stone and Avila (2012) reported that students did not participate in environmental related activities because the students lacked trust in governmental agencies. In contrast, William and Florez (2002) described how marginalized individuals felt an automatic trust with those in control, or those with decision-making powers, because after all they were in control and knew what they were doing.

**Structural Influences.** Families, communities, and collaborators played an important role in determining the extent at which diverse students participated in environmental justice related activities. Valencia and Black (2002) found that support systems for students at home, school, and within their community were extremely important for supporting Mexican American students in positively influencing their academic success. For example, Ceasar (2012) found students were more inclined to participate in urban farming because they could see the immediate benefits of the program. These benefits included access to fresh fruits and vegetables and acquiring the knowledge and tools to implement urban farming techniques in their own neighborhood. The learning had a personal impact because it was meaningful and relevant to the students' lives. Another study found a strong connection between positive student outcomes and collaboration between parents and community advocacy groups that focused on the needs of Latin@s (Chen, Milsteian, Anguiano, Sandoval, & Knudsen, 2012).

### **Standards for Teaching Environmental Education**

While the standards implemented in schools for teaching environmental education may vary from state to state, a set of national standards Excellence in Environmental Education: Guidelines for Learning (K-12), are available. The standards were developed in 1998, then revised in 2010 by a group of environmental education experts and sponsored by NAAEE. The revised standards reflect the new era of urban environmental education with the intention of

moving students' cognition of environmental concepts beyond awareness and procedural knowledge toward action and sustainability efforts (Monroe, Wokcik, & Biedenweg, 2013). The revised guidelines support environmental literacy by addressing four critical elements, "(1) questioning and analysis skills, (2) knowledge of environmental processes and systems, (3) skills for understanding and addressing environmental issues, and (4) personal and civic responsibility" (Simmons, Bhagwanji, & Ribe, 2013, p. 74). NAAEE asserts that the Guidelines for Excellence framework can be implemented within any standards-based curriculum.

These guidelines are designed to help educators create meaningful, high quality environmental education programs that nurture environmental literacy and empower program participants with the skills, knowledge, and inclinations to make well-informed choices and exercise the rights and responsibilities of members of a community (Simmons et al., 2013, p. 66).

The NAAEE guidelines provide a framework for addressing environmental concepts in the classroom through a social justice lens, engaging students with relevant environmental issues, bringing in the human aspect by encouraging critical reflection and exploration of civic responsible behaviors: all of which is intended to lead to sustainable actions and living. The NAAEE standards were utilized in this study as a guide during the development of the air quality thematic unit presented in Chapter 3 of this study.

### **Challenges in Environmental Justice Education**

Several challenges have emerged in the literature on the development and implementation of environmental education related activities. A few of the challenges were due in part to access or interest (Stodolska, Shinew, Acevedo, & Izenstark, 2011), the implementation in schools with unskilled teachers (Kyzburg-Graber, 1999), pressures from

standardized testing and accountability measures (Cole, 2007; Ernst, 2007; Gruenewald, 2003a, 2003b; McInerney, Smyth, & Down, 2011).

Stodolska et al. (2011) found that “insufficient access to parks, poor maintenance of the existing parks, crime and safety issues, and interracial conflict and discrimination” (p.103) hindered access of Mexican American and Latin@s to parks; the scholars questioned if “Mexican-American distinctive cultural values, socio-economic status, or residential locations” (p. 106) contributed to the groups minimal participation. On the other side of the spectrum, students who decided not to participate reported that they were too busy, were not interested, did not trust the program, and did not have their parents support or permission to participate (Perkins, Borden, Villarruel, Carlton-Hug, Stone, & Keith, 2007).

Although environmental education is best supported when students are physically exposed to the natural environment, Blanchet-Cohen (2008) found that 63% of students learned about environmental education topics via alternative methods, including television, books, and the internet (p. 264). While outdoor play time with nature is strongly encouraged, the challenge remains in reassuring adults to allow children to play outside instead of remaining indoors, despite the associated risks of unsafe neighborhoods, working parents or guardians, and lack of community organized activities (Blanchet-Cohen, 2008)

In the teaching and learning arena, the progressive approaches that move away from the traditional method of teaching to critical reflective practices are challenging to implement due to teachers’ knowledge and experience with the critical pedagogies and pressure from high stakes testing and accountability mandates. Kyzburg-Graber (1999) reported that teachers struggled to implement a critical reflexive approach because they either lacked the depth of knowledge of local social issues or were not interested in teaching from a social justice perspective. In



addition, the implementation of critical pedagogies is daunting for teachers when the current high stakes accountability and standardized testing requirements pressure teachers to abandon non-traditional instructional practices; therefore, being forced to implement traditional, direct teach methods (Gruenewald, 2003a, 2003b; McInerney, Smyth, & Down, 2011). There has been an overwhelming focus on content standards of science learning versus uncovering the reasons why environmental education matters (Cole, 2007; Ernst, 2007). Although learning about “science” concepts is important, students should be taught to think critically about why and how the issues exist (Cole, 2007); learning is a non-linear progression, children can learn about their environment and understand the implications in spite of their age (Kollmus & Agyeman, 2002). Caring about the environment and caring for those around them is instinctive for children and develops at a very early age.

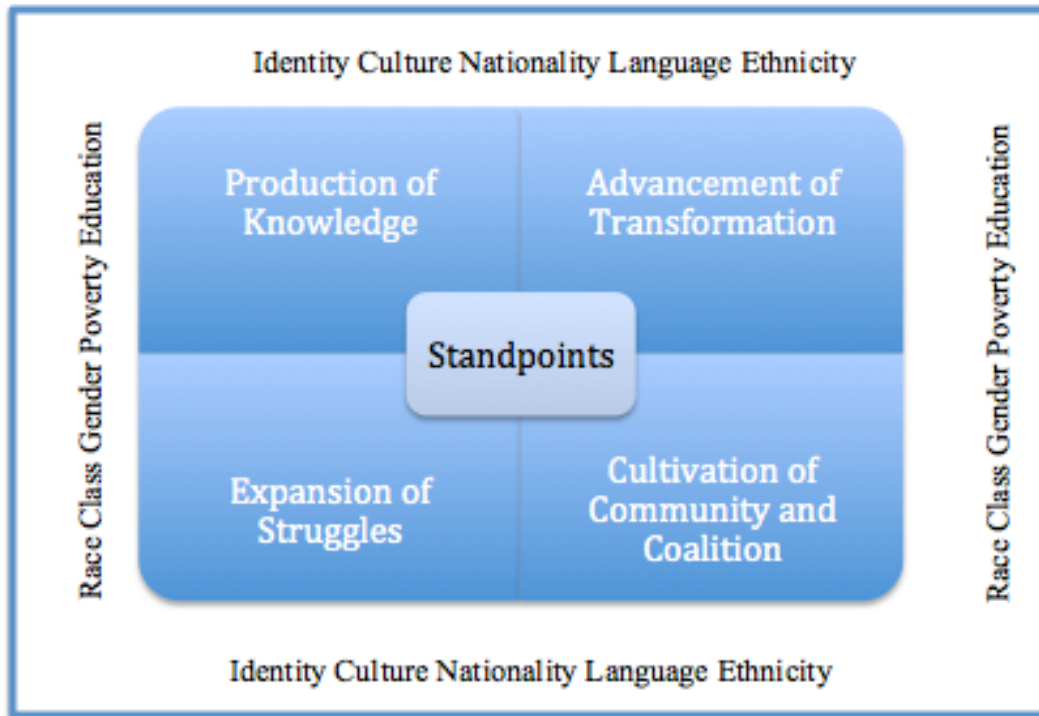
### **Theoretical Frameworks**

Standpoint Theory and Latina Critical Race Theory (LatCrit) were used as a combined theoretical framework to examine the standpoints and perspectives of Latin@ high school students’ as they participated in environmental justice lessons. The theories were selected because they complement each other in terms of understanding unique perspectives, or standpoints, involving power struggles and oppressive relationships between dominant and non-dominant groups. When individuals are in oppressive relationships they have multiple standpoints, their personal standpoint(s) in addition to the standpoint(s) of the oppressor (Harding, 1993). Understanding the different levels of interaction informs the behavior, actions, and thinking processes of the oppressed because they are constantly considering the different perspectives that directly impact their world. Additionally, LatCrit was used for interpreting the various standpoints of Latin@s’ lived experiences, including the intersections that emerge in

reference to race, gender, class, poverty, language, identity, and education, through participation in lessons that address environmental justice issues. As Delgado Bernal demonstrated in her study, LatCrit “give[s] credence to critical raced-gendered epistemologies that recognize students of color as holders and creators of knowledge” (p. 107). The race gendered epistemology “challenges the Eurocentric epistemology and question dominant discursive notions of meritocracy, objectivity, knowledge, and individualism” (Elenes & Delgado Bernal p. 68). Conversely, Bernali (2006) stated the following,

It seems inevitable to draw parallels between feminist pedagogy and environmental justice. Both environmental justice issues and feminist pedagogy address intersections of race, class, gender, sexuality, ability, and nation; both combine theory and practice; both involve radically rethinking deeply held assumptions; and both reveal the ideologies and power dynamics that inform language, policies, and practices (p. 93)

Figure 1.0 provides a visual of how the frameworks was developed to integrated to understand the standpoints and perspectives Latin@ students made as they participated in the study.



Standpoints: Harding (1993); Wood (2010)

LatCrit: Anguiano et al., (2013); Valdes (1996)

Figure 1.0 Standpoint & LatCrit Theoretical Frameworks

**Standpoint Theory.** Standpoint Theory was first introduced in the mid-1980s as a feminist theory to describe how women's location in society produced views that were often disregarded and overlooked compared to man's view. Women's natural abilities and assigned functions set them apart from men and gave them a different social perspective (Harding, 1993); the theory emphasizes how women's social location is shaped by their lives and experiences compared to men, thus making women's perspectives better informed. Wood (2010) points out how a standpoint is shaped by, "critical reflection on power relations and through engaging in the struggle required to construct an oppositional stance" (p. 61).

Standpoint Theory considers the oppressed or marginalized voices and their perspective on the injustices and power relations imposed upon them. Subordinate, or marginalized

individuals have a “double consciousness” (p. 62) where they understand their world and the dominant culture’s world (Woods, 2010). This relationship is referred to as the outer-within privileged epistemological position, as individuals who are outside of the dominant group interact within group and therefore have an understanding of both views and have more knowledge compared to the one-sided dominant view (Woods, 2010). Standpoints are also based on political struggles that create separation between oppressive relationships, and through this struggle oppressed groups have a voice (Edmonds-Cady, 2009). There are six key features of standpoint theory: (Woods, 2010):

- 1) Distinct levels of power or structure separate dominant from non-dominant groups.
- 2) Members from non-dominant groups have a better understanding and consciousness of their own social location and the social location of the oppressor.
- 3) Members from non-dominant groups have a “privilege epistemological position because it entails double consciousness, being at once outside from the dominant group and intimately within that group in ways that allow observation and understanding of that group” (p. 62).
- 4) Members from non-dominant groups must be able to assess how political, social, locational, and cultural factors create relational conflict and separation ultimately influencing their social status and perspective.
- 5) Members from non-dominant groups can have several perspectives or standpoints that are influenced by gender, social class, economics, racial, and sexual preference.

While an individual can have several standpoints based on race, gender, sexual orientation, and socio-economic status, there is a need to understand how multiple standpoints overlap. Some critics challenge the notion that non-dominant individuals can have more than one viewpoint and have more knowledge compared to the dominant group (Michaelian, 2008). One example which serves as the basis for the theory includes Hegel's reflection on the master-slave relationship which describes how within the oppressive relationship between a slave and the master, the slave has a greater vantage point in understanding the two sides of the relationship. The slave understands their own story on what it means to be a slave and also understands the master's side of dominant and control. The slave therefore has more knowledge about the relationship compared to the master; the master only understands his world and will never fully understand the slave's world. The masters' entire being is based on the dominant view of control and does not consider the life of the slave (Harding, 1993, p. 53). In addition, "subordinate social locations are more likely than privileged social locations to generate knowledge that is 'more accurate' or 'less false'.... This is because members of privilege groups have a vested interest in not seeing oppression and inequity that accompany and indeed, makes possible their privilege" (Wood, 2010, p. 61).

**Latina Critical Race Theory.** Latina Critical Race Theory (LatCrit) an extension of Critical Race Theory (CRT), was specifically developed by a group of lawyers to address the diverse needs of the Latin@ population. CRT was first introduced in the field of law as civil rights issues emerged; the theory provided a basis for arguing against racial discrimination and prejudice acts between White and African Americans. Several scholars (Bell, 1993; Delgado, Stefancic & Harris, 2001; Ladson-Billings, 1995; Tate, 1994) have contributed to the theory moving between legal and educational processes for understanding relationships within schools

and school systems. “CRT challenges the traditional claims that educational institutions make toward objectivity, meritocracy, colorblindness, race neutrality, and equal opportunity” (Solorzano, 2002, p. 26). In the United States, the basic principles of CRT are based on the notion of race related inequities, the role of property rights, and the relationship between race and property (Ladson-Billing & Tate, 1995). More specifically, grounded on these three principles, CRT in the field of education is based on five central tenants: the centrality of race and racism and their intersectionality with other forms of subordination; the challenge to dominant ideology; the commitment to social justice; the centrality of experiential knowledge; and transdisciplinary perspective (Solorzano, 2002; Yosso, Villalpando, Delgado Bernal, & Solorzano, 2001).

While CRT was initially developed specifically to address the struggles and tensions of race, racism, and power that have historically occurred between African American and White populations (Delgado & Stefancic, 2012), other minority groups such as indigenous populations, Latinas, and Asians found it difficult to identify with the theory because of the specific focus on Black and White populations. Thus, LatCrit emerged following the same basic tenets of CRT in terms of race, racism, and power, “stemming from critical theory to provide scholars with a lens that consciously addresses the oppression of Latin@s across our intersecting identities” (Flores & Garcia, 2009, p. 164). LatCrit organizes the various Latin American populations: Hispanics, Mexican Americans, Mexicans and Chicanas, etc. (Valdes, 1997), into one common group raising consciousness of the inequities and fostering agency and advocacy (Anguiano et al., 2012). In addition to CRT’s exploration of race and property, LatCrit encompasses “intersections of oppression that come from multiple parts of identity, including ethnicity, culture, nationality, and language issues” (Anguiano et al., 2012, p. 128); accent and sexual orientation (Yosso et al.,

2001); and phenotype (Delgado Bernal, 2002). In addition, LatCrit was utilized to determine how students' experiences and perspectives related to the production of knowledge, advancement of transformation, the expansion and connection of struggles, and cultivation of community and coalition (Valdes, 1997, p. 1093-1094). LatCrit research is commonly expressed through *testimonias* (testimonies) (Garcia & Flores, 2002); stories, counterstories, and narratives (Fernandez, 2002); legends, *corridos* (Mexican music), and storytelling (Delgado Bernal, 2002); and from the voices of the marginalized and underrepresented (Fernandez, 2002).

**Standpoint and LatCrit Theories in environmental justice research.** As previously mentioned, these theories were selected because of the complementary nature of interpreting various viewpoints and categorizing them into one or more of the different LatCrit tenants (See Figure 1.0). A review of the literature was conducted with the following key terms: LatCrit, Standpoint Theory, and environmental justice were searched through several databases (JSTOR, Google Scholar, EBSCO, Environmental Justice, and Environmental Education). There were no studies found in the literature that incorporated a combined theoretical framework of LatCrit and Standpoint Theory in environmental justice education with Latin@ students. While several studies are available outside of the field of environmental education, those studies were not included in the literature review for the purposes of delimiting the search for specifically addressing environmental justice research. Studies that address LatCrit and environmental justice research alone, or Standpoint Theory and environmental justice research alone, were found. The following section will review how the theoretical frameworks have been applied in the field of environmental justice education.

The following studies incorporated LatCrit in the theoretical frameworks and analysis process. Anguiano et al. (2012) and Arreguin-Anderson and Kennedy (2012) both applied the

CRT/LatCrit Race Theory as a lens to explore environmental inequities. Anguiano et al. (2012) explored collaborative planning at a local level to inform policy development on land rights issues in New Mexico, while Arreguin-Anderson and Kennedy (2012) analyzed the role of language in environmental education programs to support a curriculum that was inclusive and met the linguistic needs of students. Ceasar (2012) used a local grocery store and the process of gardening to explore environmental hazards with African American high school and college students. Ceasar's study focused on the victims of the Katrina hurricane aftermath to develop healthy living skills through urban farming, and environmental awareness that demonstrated proenvironmental life-long behaviors and choices. Cermak (2012) used hip-hop rap music as method for teaching students about going "green" and exploring environmental injustices with secondary African American and Latino students. Music provided students an opportunity to develop and express their identity in settings where their voice is typically disregarded or silenced. The studies available on Standpoint Theory and environmental justice education were also scarce. One study conducted by Loftus (2007), applied Standpoint Theory to understand the various perspectives of the production of nature to understand change that was occurring in South Africa.

**Combining frameworks through intersectionality.** While there is limited research in the area of environmental justice research that incorporates Standpoint theory and LatCrit, several scholars (Corbado, 2013; Crenshaw, 1989; Harris, 1989; & Nash, 2008) have made parallels between the intersections of gender and race through feminist theories and race theories to analyze oppressive relationships. Crenshaw (1989) introduced the term intersectionality from a law perspective that deconstructs the intersections between race and gender highlighting the varied identities that women of color experience for being non-white and for being a woman.



Crenshaw's (1989) proposed how a "demarginalizing intersectionality" considers how Black women are marginalized, and therefore oppressed, on multiple levels because of their race and gender. Like Standpoint theory, Crenshaw's intersectionality describes how one individual can have multiple perspectives or identities where each identity alone is considered a repressive characteristic, yet when combined, the situation is compounded further. Corbado (2013) adds that the intersections of these identities and characteristics must be considered as a whole not just based on race and gender, but also acknowledge that there are multiple identities (location, language, culture, sexism, and class) that must be considered when analyzing oppressive relationships. Corbado provides the same analysis for gay rights advocacy, where homosexuals, gays, lesbians, and bi-sexuals are oppressed for having multiple identities, which are also compounded by race and gender.

The notion of intersectionality exists between race and gender, and other characteristics for that matter, that heightens our understanding of the different points of view that shape an individual who is marginalized (Nash, 2008). The same is true for standpoint theory in that those who are marginalized have multiple perspectives, experiences, and knowledge compared to privilege, non-marginalized individuals who may never consider the standpoint of those below them. The intersections of these identities make the individual who they are and how society in a sense perceives them, discriminates against them, and marginalizes them further from the dominant group. LatCrit, like CRT, when combined with Standpoint Theory will provide an opportunity to understand these intersections as spaces where diverse identities merge, combining multiple perspectives from the voices of Latin@s.

**Challenges with Theoretical Frameworks.** Although several scholars argue that non-dominant groups are capable of having more knowledge compared to non-dominant groups,

other scholars find it hard to believe that the subordinate can have more knowledge. For example, minority groups who come from low-socio-economic standpoints can potentially have a gender, race, class, and even structure level perspective or standpoint. The argument scholars present can be summarized in the following excerpt:

Standpoint theory may rank as one of the most contentious theories to have been proposed and debated in the twenty-five-to-thirty year history of second-wave feminist thinking about knowledge and science. Its advocates as much as its critics disagree vehemently about its parentage, its status as a theory, and crucially, its relevance to current thinking about knowledge (Harding, 2004, p. 27).

Making the connection to environmental justice issues, the non-dominant or affected population therefore has multiple standpoints and perspectives compared to their counterparts in defining their experience in living and being exposed to environmental hazards. Standpoint Theory in conjunction with LatCrit, served as the theoretical framework for understanding Latin@ students' experiences.

### **Summary of Literature Review and Theoretical Frameworks**

The literature review has provided several critical studies that have addressed both environmental issues within the context of environmental injustices. The chapter begins with a discussion about environmental racism as the driving force and reason for conducting this study. It is important to identify these critical issues, within the border community, to understand further how others perceive or understand the issues so that the reproductive cycles of hegemonic and ideological control can be broken and eventually minimized. Examples of the incidences of inequitable exposure rates among minority or marginalized populations are provided to demonstrate the severity and realistic views that plague many communities around the world.

The historical perspective of the environmental education and environment justice movement was important in demonstrating how theories and practices evolved over the years. A description of the teaching and learning implications within the field of environmental justice education was presented, along with a description of the co-evolution of environmental education and education for sustained development. The critical learning needs of Latin@s were also presented including the role of the school and classroom culture. The level of participation was also identified with a description of proenvironmental and resisting behaviors reported by Latin@s. The role of parents, family, and collaboration was also an important finding presented in the literature. How sense of place is critical in developing not only awareness, but lasting proenvironmental behaviors. A discussion of the challenges with implementing environmental justice education with the selected target group was also presented and a description of the theoretical frameworks that were applied in the study were also presented.

Hart and Nolan (1999) emphasized the need to explore “critical” “feministic” and “postmodern challenges” (p. 41). Standpoint Theory and LatCrit theoretical frameworks were combined to better understanding Latin@ students’ experiences as they participate in lessons that focus on environmental justice issues. Standpoint Theory captured the various perspectives presented from race, gender, social class, experience, location, and socio-economic status. LatCrit explored the role of race, location, language, culture, and ethnicity specifically play in the students’ experiences. Dillon and Wals (2006) described that there is no perfect methodological approach; what matters is that the “research methods align to the intended situation” (p. 553). The selected theoretical frameworks tightly align to the research questions and methods. As previously mentioned, the study is unique in its setting, the combined theoretical frameworks, and methods were different from other studies presented in the literature.

The knowledge gained from the study adds valuable knowledge to the limited understanding of how the diverse group of Latin@s participate in research that focuses on border environmental justice issues.

## **Chapter 3: Methodology**

The chapter provides an overview of the methodological procedures implemented in the study that included a qualitative research design using phenomenology to understand the lived experiences of high school students' participation in an air quality thematic unit that addressed environmental justice issues. The primary data collection included Seidman's (2006) three-step interviews, focus groups, and participant observations.

This chapter provides an overview of the phenomenological studies, the methodological precedents that coincide with the research methods utilized in the study, along with a review of the research questions presented in Chapter 1. I bracketed my personal experiences with environmental justice issues as a way of setting aside my experiences so that I would be open to the students' perspectives as I maneuvered through the data, removing or limiting any biasness, assumptions, and judgments. The research setting was described in terms of the border context, the borderland high school, the teacher, and his classroom. An outline of the thematic unit and activities are reviewed, including the background information of the environmental science course.

An overview of the participants including the demographic information and recruitment procedures and the process used for obtaining consent and assent through the IRB are identified. The data collection timeline and overview of the data analysis procedures that were implemented in the study are presented. And finally, a description of the trustworthiness, credibility, and ethical considerations are explained along with the challenges of the methodological procedures implemented in the study.

### **Phenomenological Study**

Phenomenological studies focus on shared experiences of individuals as a result of participating, or being exposed to, a common event (Creswell, 2013). The phenomenon of focus in this study is on Latin@ students' standpoints, perceptions, and experiences of participating in

an air quality thematic unit. The thematic unit consisted of a series of activities that were developed under the EPA grant, described in Chapter 1. The thematic unit was designed to move students' cognition beyond coverage of knowledge and facts, as presented in the state standards for the course, to a deeper understanding of environmental justice concepts as described in the NAAEE guidelines. A description of the TEKS and NAAEE guidelines will be discussed in this chapter to provide a deeper understanding of the context of the study. The standards can be found in Appendix A and B.

Data, which are typically collected in the form of interviews, are interpreted in one of two phenomenological approaches. The first approach is called hermeneutical phenomenology, where the researcher considers his or her experiences to make meaning of the lived experiences. The second approach is called transcendental or psychological phenomenology, where the researcher brackets his or her experiences before making any interpretation so that the meaning of the phenomenon is bias free and based on the participants' experiences. While a deep understanding of the phenomena is achieved, the difference between the two processes occurs during the interpretation of data where the researcher is conscious of his or her own experience and either brackets personal experiences, "transcendental", or makes personal connections, "hermeneutical" in the interpretation process (p. 81).

This study used a transcendental phenomenological approach to understand the lived experiences of high school students participating in lessons designed to address environmental justice issues. I bracketed my personal experiences to remain neutral as I made meaning and interpreted the data collected from students as they participated in the thematic unit. The purpose for bracketing my personal experiences was to explore the phenomenon as a new experience,

allowing me to learn from the participants' experiences without imposing preconceived notions or understandings (Creswell, 2013).

### **Methodological Precedents**

The purpose of this section is to review methodological precedents in studies that explored approaches similar to the procedures implemented in this study. A review was conducted on the literature by entering the following keywords: phenomenology, environmental education, and Seidman. JSTOR, Google Scholar, Journal of Environmental Education, and the Journal of Environmental Justice, were selected to identify the different types of studies presented in the literature. The rationale for selecting the key terms was based on the methodological approaches implemented in the study. Focus groups and participant observations are secondary data collection methods and were therefore, not included in the search. Limiting the results to the past twenty years narrowed the methodological review further, to include the most progressive methods for implementing environmental education efforts (Ardoin et al., 2013). Table 1.0 shows the search results using the identified keywords.

Table 1.0 Review of Methodological Precedents

Type	Total Sources Reviewed	Total Sources Considered Relevant
JSTOR	86	0
Google Scholar	93	7*
Journal of Environmental Education	1	1*
Journal of Environmental Justice	0	0

\*Relevant studies included in the methodological review.

The search produced less than two hundred combined sources. Sources outside of environmental education were removed from the list, leaving seven relevant publications to review.

The methodological review demonstrated a lack of ethnic diversity or representation of diverse populations in environmental education studies. The majority of the studies included participants that were identified as White or Anglo, with only two of the identified studies were conducted in international settings with non-white, non-dominant populations which included a study conducted in Canada (Nazir, 2013) and a study conducted in Israel (Zur & Eisikovits, 2011); neither study included Latin@s as the target population.

The search confirmed with Ardoin et al.'s (2013) findings that there was an apparent gap in the representation of diverse populations in environmental education studies. Therefore, the methodological review presented confirmed the gap and limited access of Latin@ populations to environmental education focused studies. The methodological precedents provide a general overview of the different approaches presented within the field of environmental education over the past twenty years. Although the search is not a comprehensive review, it provides an understanding of the different approaches for implementing similar data collection methods.

### **Research Questions**

The research questions are provided below to reframe the focus of the study.

- 1) How do Latin@ students from an international border community in the U.S. interpret local environmental justice issues?
- 2) How does the place-based component—the standpoint of the curriculum--influence students' understanding of environmental justice issues?
- 3) How do high school students' backgrounds, beliefs, values, and interests inform their understanding of environmental justice issues?
- 4) How do high school students perceive agency within themselves or others in the border community?



## **Researcher's Bracketing: My Experiences with Environmental Injustices**

Marshall and Rossman (2011) recommend that researchers bracket their personal views, assumptions, and attitudes so that the data collected throughout the process accurately represents the context of the study. As mentioned in chapter 1, I implemented a transcendental phenomenological approach that required bracketing techniques in effort to reduce my assumptions, judgments, and biasness in the attempt to experience the data through the students' eyes. I isolated my own history and experiences so that I could be open-minded to the students' perspectives. I was aware of the importance of maintaining neutrality when interacting with the participants, and tried not to lead or impact the research. I did not apply preconceived themes to the data, I allowed the data to emerge as I read and re-read the transcriptions to ensure I had an in-depth understanding of the phenomenon. The following is how I bracketed my experiences with environmental injustices:

Growing up in the border community I observed first-hand the various environmental injustices that my family and I were exposed to on a daily basis. Although at the time, I didn't think there was anything wrong with the environmental risks, I just thought it was a part of life. The diesels, army tanks, and army utility vehicles that drove behind my house was a normal event. I lived in the northeast side of town, far from the busy interstates and freeways, but behind my house was an identified hazardous cargo road that was busy with traffic. Little did I know the possibility that the vehicles were transporting hazardous toxins. The road was about one to two hundred feet from my house; we were surrounded by desert and a few warehouses. Next to the hazardous cargo road, approximately fifty feet away, were two parallel railroad tracks with a switching lane. We could hear the train coming miles away; their horn would wake us up in the

middle of the night and warn wildlife or people who may be crossing the track. As a child, we often played by the railroad track jumping on and off the trains as they slowly drove by. We didn't know what the trains were transporting, but we sure had fun in the empty cars.

The army used the road behind my house and the dirt road next to the railroad tracks to drive in and out of town when they practiced their drills in the far desert. I remember being scared by the loud noises of the helicopters, C3, and C4 airplanes that would come in for "touch and go" landing techniques. The noise traumatized me, I still shriek when I hear low flying aircraft and fear that a plane will fall on me. I remember having nightmares, I still do to this day, about planes, helicopters falling in my childhood neighborhood even though it has been over fifteen years since I moved from the area. The noise from the planes and trains were intense, the pollution was visible enough to turn the blue mountainous horizon, grey. The dust storms didn't help either, the windiest months produced brown skies, but we were used to it.

I was in elementary school when I first heard that the ozone layer was beginning to deplete because of the Chlorofluorocarbons (CFCs) from products like aerosol cans. I watched the evening news and the reporter described how there were holes in the ozone layer. This news traumatized me. I remember crying to my mother, thinking that we were doomed because how were we going to be protected from the sun? How would my future children and their children escape the inevitable? My mom laughed at me and told me not to worry about it, nothing was going to happen in our lifetime. I must have been in the

fifth grade, but I still remember the worry and stress I felt being consumed over the environment and the impact we, as humans, posed.

I have always been conscious of my environment and knew the little things that I could do with my family to prevent further destruction. Although a citywide recycling program in our community recently emerged within the past ten years, my family was always cautious about recycling our waste. My father loved gardening, he had compost of which he would recycle organic material. My mom was very thrifty and found ways to reuse old containers and other materials that would have been seen as waste or trash in other people's eyes. We used egg cartons to separate our jewelry; we reused the plastic gallon milk containers to make juice or tea or to store water; and we reused the coffee, butter, sour cream and other containers to serve as our humble Tupperware. We didn't have water bottles back then so we used refillable bottles. My father was the only one who worked and so my mom was creative in making ends meet month to month. She recycled as she saw fit; although we collected a lot of material overtime, she always found a way to make something useful for the house. These were the little things I remember we did as a family and some I continue with my family.

As a child, my family and I drove over to Juarez many times throughout the year. We would visit my extended family, shop at the local grocery stores, go to doctor and dentist visits, and eat at numerous restaurants. Although I loved visiting my family, I remember how frustrated we were to sit in traffic that sometimes lasted 30 minutes to a few hours. I remember smelling the car exhaust from the eight to ten car lanes lined with different types of vehicles. My father would turn his car on and off, to not idle, as we moved through the line, but other cars didn't. I remember seeing many cars break down

or run out of gas on the bridge. Fixing the cars, or even pushing the cars made it challenging since the bridge was at an incline going up, and coming down, as it rose over the Rio Grande River.

I remember driving by ASARCO growing up, and seeing the tall towers. They were amazing. I didn't really know what the factory did, I just remember seeing, smelling, and tasting the byproducts as we drove through the west side of town, or when we went to the Borderland University football games. ASARCO was just a few feet away from the university and busy main street that had shops, restaurants, several nearby communities, and neighborhood parks. When I was a student in college we walked around the campus with our nose and mouth covered because we could taste the sulfur in the air. Now I know that I smelled sulfur, as it was created as a byproduct in the copper smelting process. We all knew that it was terrible, but nobody really did anything about it. I can't remember anyone, at least in my sphere, thinking that it was bad. It was just there and it happened.

During my senior year in college I worked at a toxicology lab. We collected air samples from around the city, with specific points of interest near ASARCO and several spots in Juarez. We found several heavy metals, lead and arsenic, in the samples including PAHs (polycyclic aromatic hydrocarbons) that we determined through the literature posed several cancer risks. My eyes were opened! This was when I started realizing how pollution had a direct impact on our health and even though it was a large corporation that had been established in our city... it was not right that it was poisoning many people on a daily basis. This is when my environmental justice radar turned on...

I saw these events as just a normal part of life. I didn't see the inequities of being a border town because this was all I knew. I didn't know the research on environmental racism and unfair distribution of toxins/pollution. I see that now, I understand it through the EPA grant we explored with teachers and students, and I see it through my course work, and now through my journey in developing this dissertation.

I understand that every student will bring their own perspectives, so I will work diligently to set aside my perspectives and assumptions so that I can understand the experiences from the students' standpoint.

## **Research Setting**

The settings of the study will be described beginning with the borderland community, the borderland campus, the identified teacher and a description of his classroom.

**Context of the Study: Environmental issues in the borderland.** The study was conducted within a border community plagued with several environmental concerns exposing the shared natural environments of air, water, and land to hazardous waste and toxins moving freely between the international borders. Many of the toxins are trapped within the natural air shed that is formed as a result of the unique geologically features, including a basin and mountain range located between the two countries. The airshed has been studied by scholars in the area (Arrieta, Ontiveros, Li, Garcia, Denison, McDonald, Burchiel & Washburn, 2003; Barnes, Pingitore, and Mackay, 2005; & Espino, Pingitore, Gardea-Torresdey, & Reynoso, 2005) who were interested in the impact of pollution from an environmental toxicology and public health perspective. The air toxins present in the border community resulted from several environmental concerns that stem from past and current locally unwanted land uses (LULUs) such as a copper smelter, oil refineries, local dumps, recycling plant, large military base, and heavy air traffic thorough ways.

Other sources of pollution include the “burning of non-standard materials in fireplaces and stoves for residential heating” including the burning of trash and tires that releases high levels of particulate matter and metals (Espino, Pingitore, Gardea-Torresdey, & Reynoso, 2005, p. 144). In addition, Barnes, Pingitore, and Mackay (2005) described how two metal smelters, one metal refinery were built in the area well before the municipalities were completely established in the early 19<sup>th</sup> century. The entities attracted low-wage laborers who migrated to the border community in search of financial and economic support.

While the pollution emitting entities brought financial support to the border region over a century, recent events revealed controversial mishandling of the elimination of hazardous toxins within the border community. The public became enraged when community members learned that the smelter factory, American Smelting and Refining Company (ASARCO), illegally treated and disposed of toxic wastes, releasing unknown amounts of hazards within the Paso del Norte Airshed (Blumenthal, 2006). In addition to ASARCO, the air quality issues became complicated as trade between the United States and Mexico increased with the signing NAFTA in 1993.

NAFTA provided access to industrial and economic opportunities across the U.S., Mexico, and Canadian international borders, stimulating the economic development and flow of goods and services in and out of Mexico. Shultz (2003) and Varady, Lankao, and Hankins (2001) describe how the number of maquiladoras, or foreign owned factories, increased from 600 to 1200 within a matter of years after NAFTA was signed. Although the agreement seemed lucrative for business and industrial corporations on both sides of the border, Anderson (2010) argued that the agreement generated environmental concerns that were loosely regulated or monitored. The free trade agreement supported the movement of several products, many considered hazardous or toxic, ultimately increasing the susceptibility of environmental risk and

harm to the physical environment on both sides of the border. Varady et al. (2001) reported that the establishment of these maquiladoras and the movement of traffic on both sides of the border increased the exposure of “persistent, bioaccumulative, and toxic chemicals (PBTs), synthetic and natural chemicals and heavy metals found in pesticides, industrial waste, and mining byproducts” (p. 24). Varady et al. also reported that the hazardous materials were “imported, generated, and transported in ways that have proven difficult to control, and their presence has been noted in water supplies, food, and air” (p. 24). Although direct correlations between the exposure of hazardous pollutants from maquiladoras and the occurrence of medical ailments reported from individuals living near the toxic sites cannot be confirmed, the border communities directly affected by LULUs continue to see increased numbers of congenital birth defects and immune disorders, including cancer and respiratory conditions (Varaday et al., 2001).

Several factors contributed to the current environmental risks or concerns in the border region. Exposure to harmful toxins over time impacted the overall health and wellbeing of those living within the immediate surroundings. And while there are more examples of environmental injustices within the border community, the study will solely focus on the students’ experiences learning about air quality issues related to the ASARCO smelter factory.

**Borderland High School.** Borderland High School resides within the largest school district in the area. The campus was selected because of one particular master teacher who participated in the EPA grant activities described in Chapter 1. The teacher exemplified best practices, knowledge of local environmental issues, and taught from a social justice perspective.

Borderland High School, located on the northeast side of town, is approximately fifteen miles from the U.S.-Mexico border. The campus was characterized by a predominantly large Latino student population and included the largest African American student populations in the

district. The student demographics for the campus were pulled from the state's database, Texas Education Agency (TEA); approximately 73.2% of students were Latino, 12.2% African American, 10.5% Anglo/White, and 4.0% were identified from other ethnic groups (2014e). Sixty percent of students were identified as economically disadvantaged, which means they qualified for the free or reduced lunch program. In addition, 54.1% of students were identified as at-risk, meeting one or more of the thirteen TEA's at-risk indicators (TEA, 2014e). Examples of the at-risk indicators include being identified as a Limited English Proficient (LEP) student, pregnant or is a parent, had been held back or retrained for more than two years, failed one or more of the state mandated exams, failed two or more of their course subjects, and have been expelled or placed in alternative education (TEA, 2014b). The majority of the students enrolled in the campus were identified as Hispanic, which is the label the Census Bureau provides to group Mexican-Americans, Puerto Ricans, Guatemalans and other Latino groups. Only 4% of the campus enrollment was identified as English Language Learner (ELLs) or Limited English Proficient (LEP) which was comparable to 24.6% at the regional level (TEA, 2014e).

As previously mentioned, many of the students who live in the border community commute back and forth from Mexico to attend schools in the United States. This practice is evident in the student mobility rate of 17.2% reported at Borderland High School, compared to 17.1% at the state level (TEA, 2014e). Mobility refers to the amount of time students are enrolled in schools; if a student was enrolled for less than 83% of the time they were considered mobile. Mobility was tracked when students left one campus and enrolled in a different school, either within or outside of the district (TEA, 2014a). As an educator in the border region, I observed students move in and out of schools for many reasons. One primary reason for mobility was attributed to the large number of military families temporarily stationed in the border



community that moved in and out of the region. In addition, many of the students who lived in the border area commuted back and forth from Mexico.

The demographic makeup of teachers at Borderland High School mirrored the diverse student population at the campus. There were a total of 52.5% Latino teachers, 29.4% Anglo/White teachers, 10.8% African American teachers, and 7.2% of teachers identified as other ethnic group (TEA, 2014e). Students and teachers came from similar backgrounds and language experiences.

For several years, the campus was known for gang violence, bullying, and clashes between diverse student populations. However, recently the campus implemented a widespread focus on developing a culture of respect for diversity, preventing and diffusing bullying and racial clashes between student groups. An indication of improvements was the noted increase level of student and teacher participation in extracurricular activities and most recent advancement of the varsity basketball team to participate in the 2014-2015 state playoffs.

The campus is nestled in a quiet neighborhood located in the north east side of town. It was built in 1961 and was named after a local attorney who served as President of the Borderland School District's Board of Education. Initially, the campus housed fifth to ninth grade students then moved to serving ninth through twelfth grades with a total enrollment of 1,800 students. The campus offered the most dual credit courses in the district as a traditional high school, with a total 21 dual credit courses offered in the areas of History, Economics, Government, Geology, Astronomy, Biology, Chemistry, Pre-Calculus, and various English courses. Dual credit courses provide students the opportunity to earn high school and college credit concurrently.

The campus was also known for the number of scholarships its students received; during

the 2013-2014 school year a total of \$2,237,218 were awarded for athletic scholarships and \$1,560,970 for military scholarships. During that same year, the borderland campus was ranked first in state for varsity basketball, second in the district for football, boys and girls soccer area champions, ranked second in girls softball, qualified for district ranking in girls volleyball, and had numerous students qualify for wrestling at the state level. Other sports offered at the campus include: baseball, cross-country, golf, swimming, tennis, and track and field, The campus also provides several clubs for students to participate that include: Anime, Black American History, Choir and Piano, Dance, Debate, French, Honor Society, Law Enforcement, Military Leadership, Science, and Student Council. Parents and community members are also invited to join the football, band, and basketball booster clubs, the Parent Teacher Association (PTA), and Alumni Association clubs to stay active in their children's education.

The Borderland High School facility was set up in pods, with building placed around the perimeter of a rectangular shaped courtyard that was approximately 100 feet long. Six, two-story buildings enclosed the perimeter of the raised courtyard. Each building housed different content areas, or disciplines, with the library, gym, field, and several other portables located outside of the six centered buildings. The detached buildings each have stairwells that open to the outside of the building, students have to walk outdoors in order to get from one building to another. The courtyard, which was also known as the "quad", was covered with grass and a few trees, bushes, and benches. The courtyard was a usual hangout for students before and after school and during lunch. Students constantly arrived late during transitions in between classes because they had to walk outside no matter the weather conditions.

**Borderland Teacher: Mr. Patrick.** As previously mentioned, the teacher identified to participate in the study was purposely selected because of his participation in the EPA grant

described in Chapter 1. As a participant in the EPA grant, Mr. Patrick developed and implemented an air quality curriculum module over the past four years. Mr. Patrick's teaching philosophy is grounded in Paulo Freire's work, which he was introduced to while in college as a track. He described how he learned some of his greatest lessons in life as he reflected on how the texts connected with his life on a personal level. Instead of becoming a pit geologist, Mr. Patrick decided he could make a greater difference working with students as an educator; overall, Mr. Patrick has twenty-five years teaching experience, spanning middle and high school grade levels.

Mr. Patrick describes how relates to his students because of his background growing up in a poor, disadvantaged family of low wage laborers working in the coalmines of Colorado. He grew up in a mostly African American community experiencing first hand many of the racial struggles and oppressive relationships imposed upon him and his community. Mr. Patrick is cognizant of the border issues the students face at Borderland High School and encourages to think of solutions or options that would positively impact lives. Mr. Patrick explained how his goal is to empower his students to think critically and to explore questions or topics that the students find interesting, regardless of pressures from high stakes testing and standards-based curriculum. Mr. Patrick stated that the standards-based approach to teaching often dismisses rich cultures and experiences. He sought ways to engage his students in lessons that allow students to explore relevant providing a culturally responsive curriculum. One specific example was the ASARCO case study that addressed a locally relevant pollution emitting entity that released hazardous of toxins into the border community over the span of a century. This study examined the student impact of the air quality module Mr. Patrick developed that focused on a local environmental injustice history.

**Mr. Patrick's classroom.** The campus and class section that was selected to participate in this study was based on Mr. Patrick's participation. One of his three environmental science course sections, I randomly selected one class to participate in the study. The campus was on a block schedule where the eight period day was divided in two, students would see periods one through four on an "A" day and periods five through eight on a "B" day. The classes were 90 minutes length. The identified class, Environmental Science, was a senior level course that was typically chosen as a fourth year of science.

Mr. Patrick's classroom was located on the second floor of the science building with approximately twenty classrooms. Three fixed lab tables were located on each side of the classroom, accommodating approximately four students per table. A total of twelve individual student desks were placed in two long columns between the lab tables. During instruction students sit at the lab tables or in the individual desks then would move their seating arrangements for collaborative grouping during projects and group work.

An old fume hood was located in the back of the classroom near the entrance to the classroom. Mr. Patrick stored chemicals or recent reactions that were visible through the stained glass window. On the opposite side of the fume hood was a long table that had six large boxes. Each box held the students' notebooks for each of his class sections. The students knew the routine to come in, grab their notebook at the beginning of the classroom and return it at the end of class.

Located around the room, on shelves and cabinets, were antique science equipment and materials that Mr. Patrick had collected over the years. Equipment such as old microscopes, generators, radios, projectors, van der graph machines, and other vintage science instruments were placed strategically around the room. Students were constantly asking Mr. Patrick about

specific items in the room, he would pull the item down, show them how it worked and have a discussion about how society has progressed; how our world has changed; and a reflection on what we would do without the technologies. I observed Mr. Patrick pose questions that would get students to think about as they discussed various topics. Mr. Patrick used humor in his classroom to diffuse controversial topics or discussions that would heat up as students discussed critical social and environmental justice issues. He would remind the class that there was no right or wrong answer, and encouraged students to understand the different sides of the issues.

Mr. Patrick's rules and expectations regarding classroom interactions were developed at the beginning of the school year. Mr. Patrick expressed how important it was to set the norms for interacting so that every student, despite their background, would feel safe in the classroom. Although there were visible clichés in the room, Mr. Patrick would shake things up by having his students work in different groups or positioning different seating arrangements throughout the year. Mr. Patrick's message was that the world would be mixed and students would have to know how to work with different, diverse, people. Students worked mostly in groups either conducting research on laptops, working on group or team projects, conducted labs, and some students work independently. Outside the classroom, along the tiled walls were student artwork, posters, mobiles, and other instructional materials that were displayed outside for others to see and provided evidence of the work that had been conducted in the classroom.

A typical day in Mr. Patrick's classroom involved either a quick video, reading, or quote that would set the tone for the day's activities; either a PowerPoint with questions and a few notes; or hands-on activities that included group or team work. He conducted lab experiments on a regular basis, taking students outside of the classroom to conduct fieldwork several times

throughout the year. (The field notes in Chapter 5 provide a description of a field experience that occurred early during one of my visits with the classroom.)

**Air Quality Thematic Unit: ASARCO case study.** Stevenson (2011) described how researchers in the field of environmental education should explore the “meaning[s] people construct related to environmental issues and encourage researchers to think pedagogically from the student/learner perspective” in relation to their home, school, and work (p. 501). The ASARCO case study was a relevant example of a local border issue that plagued the border community for over a century. While the students may have been too young to remember when the factory was in full operation, their parents, family members, and community remember the impact it had on the border.

ASARCO was located within a few feet from the U.S.-Mexico border. The smelter began operation in the late 1880s through the early 1990s and was responsible for emitting 1,012 metric tons of lead between 1969 and 1971 (Blumenthal, 2006). ASARCO not only refined precious metals such as copper, silver, and gold, the company also refined toxic heavy metals like arsenic and lead. Particulate matter released through the refining process accumulated on the land surrounding the smelter, directly affecting communities on both sides of the border (El Paso & Juarez). In 2010, an interview conducted by the National Public Radio (NPR) described a personal account with the mayor of the El Paso, who documented that the smelter increased production in the evenings, especially when the wind direction would blow the emissions south, across of the border (Burnett, 2010). This meant that the particulate matter would be blown away from El Paso and in the direction of Ciudad Juárez, in the Mexican state of Chihuahua, as well as the neighboring city of Sunland Park, New Mexico. Burnett claimed that this deliberate act of pollution was a disregard of human rights and international regulations (2010).

The students who participated in the study investigated several environmental justice concerns associated with ASARCO's case study, such as the release of hazardous toxins into the international air shed, the diseases and illnesses that ensue, the oppressive relationships at the factory, and the different work and living conditions for the employees and nearby community. The ASARCO case study was implemented for approximately four weeks in the fall 2014 semester. The study was based on students' experiences through the case study. The data collection process occurred in conjunction with the implementation of the air quality thematic unit.

The learning experiences were based on a document, *Smelter in the City: Using the History of an Industry as a Case Study to Examine the Situational Complexities in Environmental Education*, available on the Border Air Quality Curriculum webpage (BAQed.utep.edu), which was based in the research report by Anne Fischel and Lin Nelson, *Their Mines, Our Stories*, available at [www.theirminesourstories.org](http://www.theirminesourstories.org). Students participated in a series of lessons that reviewed the history of ASARCO through shared reading and discussions of the document. Students culminated their learning by preparing a poster and podcast that could be utilized as a community awareness project. The ultimate goal of the air quality thematic unit was to support students in developing an awareness of the environmental justice issues, but also an understanding of conducting civic engagement projects that extend beyond the students' classroom, school, and home.

Neither the teacher, Mr. Patrick, nor the air quality lessons were evaluated in any way. The research focused on the high school students' experiences and understandings as they participated in the air quality thematic unit. The unique focus of this study was an in-depth examination of student understanding in the environmental science curriculum module.

## **Participants**

**Sampling and Student Recruitment.** Of the 28 students enrolled in the course, a total of 23 students were eligible to participate in the study because they met the criterion for sampling that was determined before conducting the study. The criterion required that students:

- 1) Be in good academic standing and meet the 90% attendance rule
- 2) Maintain a G.P.A. of 2.5 or better
- 3) Parental approval provided through consent and assent forms

Of the 23 students who were eligible, seven students volunteered to participate in the study. Mr. Patrick verified that students met the G.P.A. and attendance requirements. As the researcher, I verified that the assent and consent forms were signed and approved by the student and their parents. Although eighteen years is considered a legal consenting age, students were required to provide permission from their parents to ensure they were aware of their child's involvement in the study.

**Obtaining consent and assent.** After my third day visiting and sitting in with the class, I introduced myself to the students. I explained how I was a graduate student at the borderland university in my final stages of course work and was getting ready to conduct my study. I also explained my role with the district as a science facilitator working very closely with the teachers at borderland high school and other campuses throughout the borderland district. The students had seen me in the classroom before as I worked closely with teachers throughout the year, such as the annual Physics Expo fieldtrip to the borderland university I organized each year, or the Biology Circus I participated in as we reviewed content in time for the Biology End of Course Exam.



By the time I had formally introduced myself to the students, Mr. Patrick had already begun to teach the air quality thematic unit with his students. I explained how I wanted to know their thoughts and perceptions about what they were learning related to the unit. I explained to the students that there was a gap in the literature and how the voice of Latin@, African American students, and other diverse student populations were rarely reported in the literature. I presented the assent and consent forms to the class and provided a brief overview of the research process; I read through each of the IRB documents and answered questions from students. I then walked around the room and formally introduced myself to each student. I asked if they required a form in English or in Spanish. I told the students that I would be in Mr. Patrick's class over the next few days so they could return the signed forms if they decided they wanted to participate in the study. The study was based on a volunteer basis. I explained the criterion that students would have to meet and that I would verify beforehand if they met the program requirements before they took the forms home to their parents. Seven students met the criterion and therefore, I did not have to turn any student away. I was not asked to speak to any parent to clarify the data collection process or the role of their child in the study. I reiterated to the students that I was available to speak to parents or guardians, at any time, if they had any questions. I provided my contact information; however, I was never contacted by any of the students' parents.

**Demographic Distribution.** The demographic breakdown for the study is provided in Table 4.0 listed below. Although the focus of the study was primarily on Latin@ students, students outside of the identified demographic group, who volunteered and met the established criterion, were not excluded from the study. The study included one student with a non-Latin@ demographic background.

Table 2.0: High School Student Demographic Information.

Student	Gender	Ethnicity	Indicators	Age
Kristen	Female	2 <sup>nd</sup> Generation Mexican-American	None	17
Sarah	Female	1 <sup>st</sup> Generation Mexican American	None	17
Carol	Female	Anglo	Economically Disadvantaged Free & Reduced Lunch	17
Mark	Male	1 <sup>st</sup> Generation Mexican American/ African American	At-Risk Economically Disadvantaged	17
Richard	Male	2 <sup>nd</sup> Generation Mexican American	At-Risk	18
Terry	Female	Puerto Rican	None	16
Desiree	Female	1 <sup>st</sup> Generation Mexican American	Free & Reduced Lunch	18

### Data Collection Procedures

The primary data collection methods included Seidman's (2006) three-step interview process, two focus groups, and participant observations. The data collection spanned a total of two months, with follow-up through member checking, and peer review during the third through sixth months of the study. The total timeframe of the study was seven months beginning in September 2014 and culminated in April 2015.

Creswell and Plano (2011) state that participants should be "purposefully chosen to be different in the first place, then their views will reflect this difference and provide a good qualitative study in which the intent is to provide a complex picture of the phenomenon" (p. 174). The data collection supported this phenomenological approach by utilizing individual student interviews as the primary data source, supported with student focus groups and participant observations to establish a deeper understanding of the phenomenon of students who

volunteered to participate. Other than meeting the attendance and GPA requirement, I wanted to know how students in general, specifically Latin@ students, interpret their learnings.

As described in Chapter 1, the air quality thematic unit was a component of *Border Air Quality Curriculum*, a collaboration between Borderland school district and Borderland University's Center for Environmental Resource Management, funded by Environmental Protection Agency, US-Mexico Border Environmental Education, Outreach and Support Program, 66.037. 2011 – 2014. There were two focus areas of the grant—providing internships to university students so they may be better prepared for environmental careers and creating a set of curricular experiences that address air quality in the border context. The curriculum was created and implemented in the district in grades three through high school. Each of the high school units focused on local air quality issues and included aspects of the ASARCO case study. The units then made connections to the specific course content. The environmental science course addressed air quality issues and the impact of humans on the environment.

**Seidman's Three-Step Interview Process.** The study utilized Seidman's (2006) three-step interview process with a total of seven students from the identified class. Each interview took place before or after school hours to allow extended time for students to reflect and discuss their learning experiences. Although Seidman (2006) recommends that each interview should last approximately 90 minutes, the interviews were adjusted to meet the needs of the students.

The three-step interview process is highlighted in Table 2.0. The first interview focused on the life histories of the participants, the second interview focused on the details of the experience, and the third interview focused on the reflection or meaning making of the participants' experience (Seidman, 2006, pp. 17-18). Seidman (2013) described the "major task is to build upon and explore their participants responses to the questions" (p. 14). Seidman's

(2006) three-step interview included an open-ended questioning process that is shaped by the interviewee. The role of the interviewer is to ask prompting open-ended questions that provide a deeper, insightful description of their life history, experience, and reflection of the essence or meaning-making of the experience and to never ask questions that may lead the participants. Seidman described three levels of listening that supports a deeper understanding of the phenomenon. The interviewer must actively listen (p. 78), seek the interviewee's inner voice (p. 78), and finally listen to navigate the process (p. 79). The interviewer must be able to adjust the conversation while at the same time know how to gauge the interview to move in a different direction in order to explore a deeper understanding of the phenomenon. Seidman cautions the interviewer to focus on the personal experience and not on opinions by asking questions that get to the essence of the phenomenon. In order to keep the conversation centered on the significance, the interviewer must also ask follow-up and clarifying questions to hear more about the topic. Seidman suggests encouraging the interviewee to role-play and to tell a story to help the interviewer feel comfortable with the goal of providing greater details. The interviewer must also avoid asking leading questions and reinforcing responses. The interviewer should also explore laughter, while at the same time be comfortable with silence. Seidman described how silence allows the interviewee to think of their response before providing an answer. Overall Seidman cautions the interviewer to use judgment and tact when conducting interviews because there is no set or absolute way for interviewing.

Although Roulston (2010) recommends using a protocol for interviewing as a tool to ensure best practices are followed during the interview process, Seidman argues that a protocol limits responses. Seidman's approach is open-ended with the use of a few prompting questions to support the interviewee to build upon their responses.

Table 2.1: Seidman's (2006) Three-Step Interview Process

	Activity	Time Frame
Interview 1	Life History	90 Minutes
Interview 2	Experience	90 Minutes
Interview 3	Meaning-Making/Reflection	90 Minutes

Although Seidman recommends fidelity to the interview process, the process for interviewing students in this study was modified to meet the unique needs of the high school students. The interviews were conducted approximately one month apart from each other, spanning two months from October 2014 to December 2014. Seidman (2006) proposes a two-week time frame between interviews, the interview schedule in the study was modified from two weeks to four weeks to allow students additional time between interviews to participate in the environmental justice lessons. The length of each interview varied from thirty minutes to approximately one hour and was based on the students' willingness to talk and to share their feelings and perceptions on what they were learning.

A total of twenty-one interviews were conducted. Due to scheduling conflicts, one student had their second and third interview in one sitting in order to complete the interview cycle. Each interview was transcribed, read and re-read, the audio was re-played to ensure the students' words were transcribed and accurately captured.

**Focus Groups.** In addition to student interviews, seven students were invited to participate in one of two focus groups. The sampling technique implemented for focus groups was determined through student self-selection as they volunteered and selected an afternoon or morning focus group based on their schedule. The number of focus groups ultimately depended on the number of students who agreed or volunteered to participate in the study, which was

seven students in total. The morning focus group consisted of four students and the afternoon focus group, which intended to have the remaining three students ended up with only two students due to a scheduling conflict for one student. The focus groups took place at the end of the fall 2014 semester, after the implementation of the air quality thematic unit and after the third individual Seidman interview session with students. Each focus group session took lasted approximately 30 to 45 minutes. The format for the focus group consisted of open-ended questions and prompts, similar to the Seidman's interview process, to support students in elaborating on their life history, experiences, and reflecting on their meaning-making as a group.

The purpose for mirroring the focus group sessions to the individual student interview sessions was to triangulate the data. The focus groups setting facilitated students' open discussions (Kamberelis & Dimitriadis, 2011) of contentious topics (Breunig, Murtell, Russel, and Howard, 2014), thus provided a comfortable environment in effort to support students in sharing their experiences and perceptions. Therefore, before each focus group session the students introduced themselves and stated one or two interests as an icebreaker. Although many of the students already knew each other, the icebreaker made them feel comfortable and eased them into a discussion where they shared their perceptions and views concerning their participation in local air quality thematic unit. The focus group setting allowed students to brainstorm and bounce ideas back and forth, encouraging deep discussions while raising topics that were not reported during the individual interviews. (See Appendix F). Focus group sessions were audio recorded and transcribed for the data analysis process.

**Participant Observation.** During the study I was a participant observer with frequent classroom visits to develop a deeper understanding of the phenomenon. Each observation lasted approximately 45 to 90 minutes. Patton (1990) described how participant observations are useful

in the data collection process by examining first hand the direct experiences of the participants. In essence Patton (1990) described how participant observations allowed the researcher to better understand and interpret the setting or environment surrounding the phenomena in question.

I visited with Mr. Patrick and his students during and after the implementation of the air quality thematic unit to observe students' interactions and experiences. The purpose of my visits after the implementation of the air quality thematic unit was to triangulate interview responses and dialogue during focus group sessions. I did not interfere or provide any coaching support to modify or support Mr. Patrick's instructional approaches.

I documented the experiences through condensed and expanded field notes, including memo writing to capture the students' experiences (See Appendix G). Rossman and Rallis (2012) described how participant observations involve "formal and informal interviews, interpretation of artifacts, and the researcher's own experience of events and processes" (p. 93). However, Erickson (2013) cautions researchers who implement participant observations to be conscious of their own experiences and perceptions in the power relationships so that the researcher remains neutral in recording and interpreting data. This awareness allowed me as the researcher to tell the story from the participants' perspective.

### **Institutional Review Board (IRB) Procedures**

The documentation to request the opportunity to conduct research with students was submitted and approved by the borderland district and university. The IRB helped to ensure that the study was conducted in an ethical manner, minimizing the risk and harm to the teacher and his students. Since the participants were minors ranging in age from 16 – 19 years, the IRB required both consent and assent prior to participation in the study. A total of seven students who met the established criterion, volunteered to participate in the individual interview process and

focus groups. Six of the seven students participated in the focus groups. The detail of the students' roles, the duration of the study, and the data collection and handling procedures including audio recording of interview sessions, focus groups, and field notes were mentioned and explained to the students prior to the conducting the study. The audio recordings were transcribed to capture the students' learning experiences and perceptions.

I visited with the identified class and personally invited the students to participate in the study. I used student-friendly language so that students understand the purpose, goals, and process of the study. It was important that students understood their role in the study, so that they could inform their parents or guardians when seeking approval. Although I made myself available to answer any questions or concerns from parents or guardians regarding their child's participation in the study, not one parent or guardian contacted me with concerns or questions regarding their child's involvement in the study. The approved IRB documentation is included in Appendix H.

### **Data Collection Timeline**

The proposed study took place over a period of seven months beginning in September 2014 and ended in the April 2015. Table 3.0 Data Collection and Dissertation Timeline provides an overview study with the data collection activities. The calendar helped to keep the research on tract and was modified, as needed, to meet the students' needs and classroom dynamics.



Table 3.0: Data Collection and Dissertation Timeline

Activities by Month												
	June 2014	July 2014	Aug. 2014	Sept. 2014	Oct. 2014	Nov. 2014	Dec. 2014	Jan. 2015	Feb. 2015	March 2015	April 2015	May 2015
Present Proposal to Dissertation Committee	X											
Submit IRB to university and school district				X								
Recruit teacher & students	X				X							
Implement IRB consent & assent					X							
Individual Student Interviews					X	X	X					
Student Focus Group Interviews							X					
Classroom Observations			X	X	X	X	X	X	X	X	X	
Data Analysis				X	X	X	X	X	X	X	X	
Member Check						X	X	X	X	X	X	
Peer Review							X	X	X	X	X	X
Present Findings												X

### Data Analysis

Creswell and Plano Clark (2011) describe the components of a good research study include “validity of the data, results, and their interpretation” (p. 210). The data analysis utilized a combination of coding procedures that were driven by van Manen’s (1990) procedures for phenomenological studies. The analysis and interpretation of the data were conducted through a reflection on the essence of the students’ lived experiences by identifying focused, rich themes and phrases that emerged in the data that accurately reflected the meaning of the phenomenon.

First, each of the interviews and focus group transcripts were read holistically, then individually to grasp the full meaning of the experience. The transcripts were read and re-read several times to fully immerse myself in the data. The transcriptions were then initially coded

using open coding techniques through sentence-by-sentence, or line-by-line analysis, that allowed the data to emerge from the students' perspective, without imposing predetermined themes (Charmaz, 2006; Emerson, Fretz, & Shaw, 2011). "Qualitative coding does not start from pre-established or fixed analytic categories but, rather, proceed inductively by creating analytic categories that reflect the significance of events and experiences to those in the setting" (p. 175). The interviews were first coded individually, then horizontally across the interview set (for example 1<sup>st</sup> Interviews only), and finally vertically within the interview series (one through three) (Seidman, 2006). This process allowed me to get to know the data, to understand the different perspectives students presented, and to ultimately understand the "concept or phenomena that several individuals shared" (Marshall & Rossman, 2011, p. 148). This process also allowed me to understand the central meaning paying careful attention to the student's physical/mental presence, space, notion of time, and relationships (van Manen, 1990). Throughout this process I wrote several memos to support my thinking including understanding of the events and data analysis processes.

Approximately, twenty to thirty different clusters of data emerged throughout the interviews as common themes, of which I refined and grouped based on similar codes and patterns. Once the data was categorized I looked for key codings, or focus codes, that represented the data set as a whole. I then reread and recoded the codings using the identified focused codes (Charmaz, 2006). Focused coding was conducted to narrow the scope and to capture the collective experiences that begin to "make an argument, or tell a story" that specifically focused on environmental justice from Latin@s high school students' perspectives and experiences (Emerson, Fretz, & Shaw, 2011, p. 192).

Four major themes emerged in the data analysis process. The themes and subthemes are presented in Chapter 5. Coding techniques helped to “crystallize participants’ experience” (Charmaz, 2006, p. 54); thereby providing a well defined and well developed project that not only uses triangulation but is able to see through the participants from multiple perspectives. In this study the multiple perspectives were derived from interviews, focus groups, and participant observations. Emerson, Fretz, and Shaw (2011) explained the importance of capturing the codes effectively by describing how a “perceptive author looks for excerpts-especially those rich in talk and action—that reveal members’ different views and concerns as well as consequential moments in interactions” (p. 207). While frequency of selected codes is important when making claims in research, the goal of qualitative research is not representativeness but “seeks to identify patterns and variations in relationships and in the ways that members understand and respond to conditions and contingencies in the social settings” (p. 193). In this study, key phrases and rich descriptions were addressed that represent the students’ essence as a whole while at the same time, acknowledging differences by individual students.

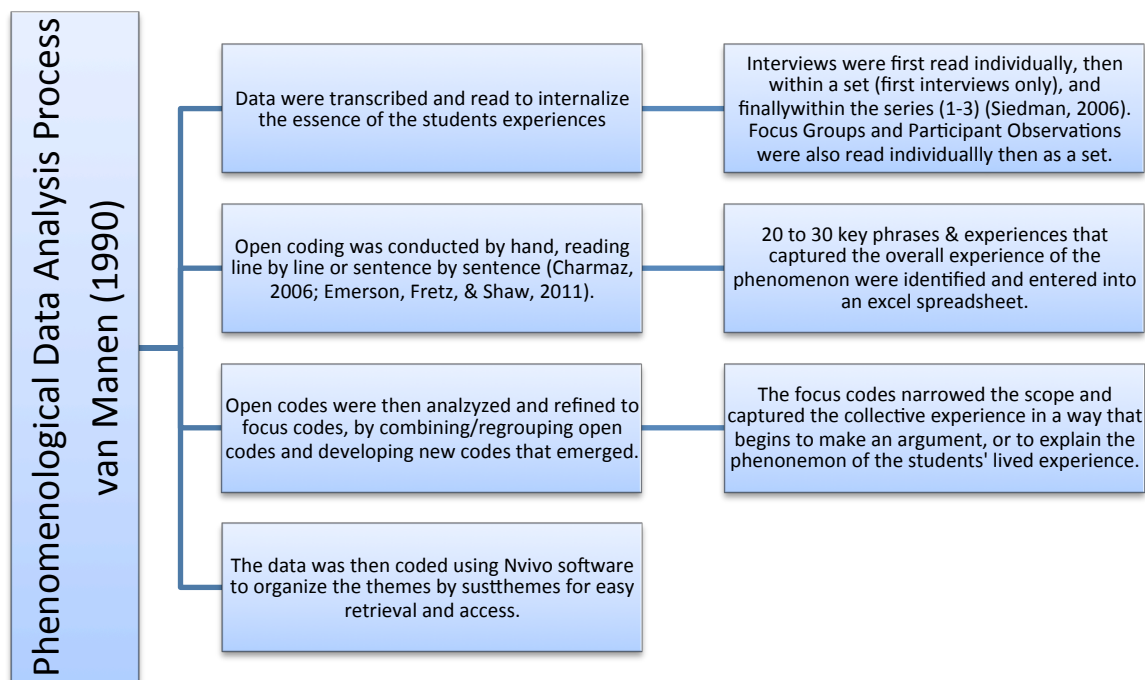


Figure 3.1 Phenomenological Data Analysis Process (van Manen; 1990)

**NVivo Software Assistance.** Before the data was entered into the computer software program NVivo, I followed Seidman's recommendation for data analysis and conducted the initial coding by hand, using paper and pencil. I wrote on the margins of my paper/transcripts, identifying themes, organizing patterns, highlighting key phrases and rich text, and writing quick memos to help me think through the data analysis process.

After several reads and rereads, the data were transferred to NVivo. I then used the program to identify patterns and themes that were essential. The software program supported sorting and filtering techniques by file, by code, and by theme. A code book was also developed to keep track of the different patterns and themes that emerge in the students' data (Creswell & Plano Clark, 2011, p. 205); I used an excel spreadsheet initially to begin the process. Other data

analysis strategies included organizing qualitative data into charts/tables, re-reading the transcribed data, and coding and/or re-labeling patterns or themes as they emerged.

**Interpretive process leading to findings.** The data analysis process of the Latin@s high school students' standpoint of learning identified several themes and subthemes, which will be presented in Chapter 5. The focus codes helped to capture the essential meaning students developed as they participated in environmental justice experiences. This data was therefore informed using LatCrit and Standpoint Theory lenses in addition to the literature review presented in Chapter 2, such as sense of place and critical pedagogy.

As described in Chapter 2, Standpoint Theory addresses the notion that the subordinate, or marginalized populations have a double consciousness or outer-within privilege, where individuals who are outside of the dominant groups have a deeper understanding and greater knowledge than the dominant view (Woods, 2010). LatCrit Theory will also be utilized to determine how students' identities and perspectives relate to the production of knowledge, advancement of transformation, the expansion and connection of struggles, and cultivation of community and coalition (Valdes, 1997, p. 1093-1094). Intersections between race, class, and poverty will also be examined.

### **Trustworthiness and Credibility Approaches**

Creswell and Plano Clark (2011) describe how research studies should ensure a validity process for minimizing mistakes in the data collection process. A method for minimizing mistakes or unethical data collection procedures will be strategically planned and embedded throughout the design and analysis process. The proposed study included measures such as triangulation, member checking, data saturation, and peer reviews to support validity in the

design. Figure 3.0 provides an overview of the data analysis techniques to address trustworthiness and credibility of the data

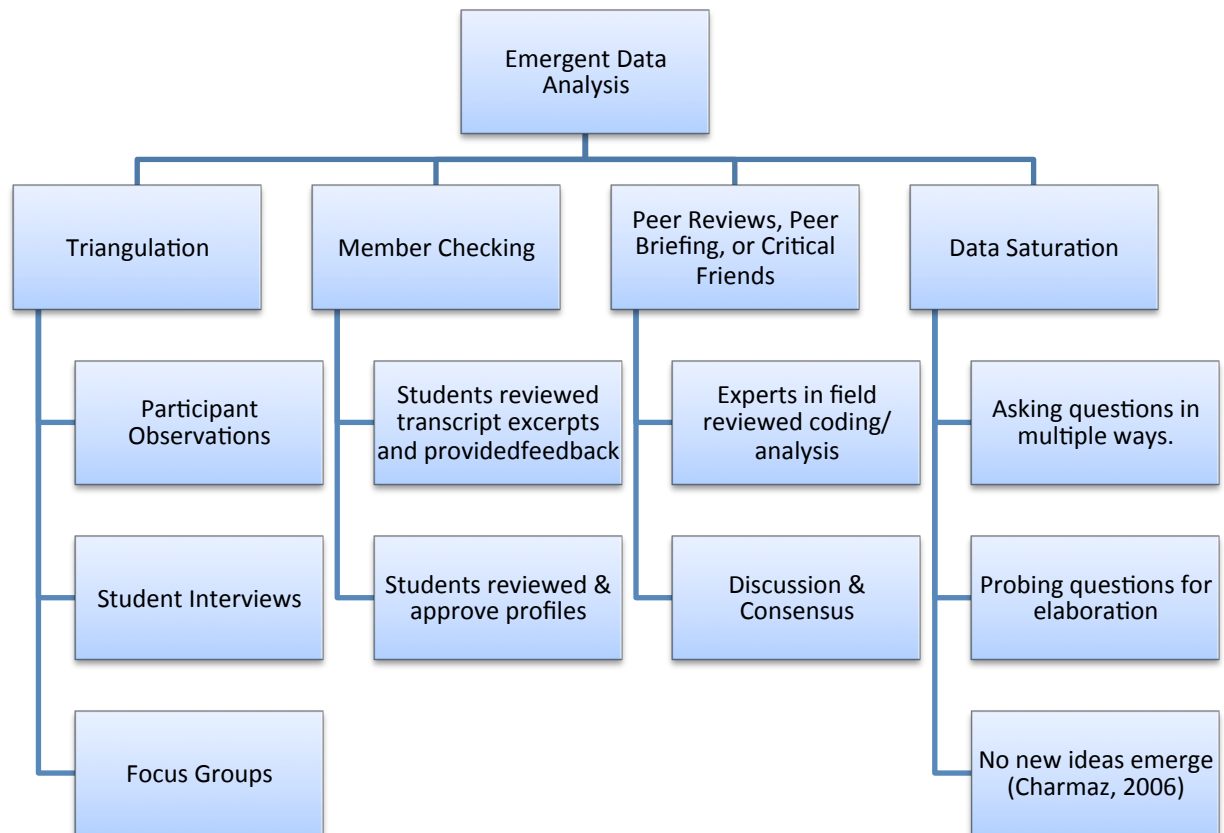


Figure 3.0 Procedures for Trustworthiness and Credibility

**Triangulation.** Triangulation was conducted during the student interviews, focus groups, and participant observations to see and hear the data through multiple formats (Creswell, 2013). This allowed me to understand the students' experiences, as they shared their perspectives on their learning of environmental justice issues. I was able to see how the data connected and in some cases disconnected within the same individual. These differences will be noted in the findings.

**Member checking.** Member checking was conducted throughout the study; it involves a process of sharing data and interpretations with students to ensure that the data is credible and accurate (Marshall & Rossman, 2011). After each interview, the recordings were transcribed, notes and memos were written on what I observed or heard during the sessions. Each interview session began with a summary of the previous interviews revisiting what was discussed, reviewing specific sections of transcripts to ensure that I accurately captured their perspectives, and asked probing questions for clarity. After I developed the student profiles I returned to the campus so that the students could read the profiles. I asked the students to offer suggestions for changes or additions as they saw fit. The students provided feedback on correct name spelling and other minor details that I had incorrectly documented. After they provided their suggestions and agreed to what I had written, each student signed and dated their profile to document that member checking did take place.

**Peer Reviews, Peer Briefing, and Critical Friends.** Each of these terms refers to the process of sharing the data interpretation with other experts in the field to review and discuss the findings, and ensure that the “analysis is grounded in the data” (Marshall & Rossman, 2011, p. 40). Initially I conducted data analysis individually, then confirmed with two experts who conducted their data analysis independently, then together as group. We discussed and determined the major themes that emerged in the data and used the focused codes to revisit the data and recode according to the essential themes identified. This process ensured that my data interpretation analysis was accurate and captured the essence of the students’ lived experiences to inform the phenomenon of the study.

**Data saturation.** Although it is difficult to determine if data saturation actually occurred in the short amount of time I spent with the students, the interview process found that students’

responses repeated and no new ideas emerged, thus leading toward data saturation. Throughout the entire interview process I asked students probing questions in multiple ways to dig deeper into our conversation. I asked the students to reiterate topics we discussed in earlier interviews, asking them to explain, once more, how they perceived their learning. Since I only met with students for approximately 1.5 hours to 3 hours in total. I looked for opportunities to further discuss the topics students presented and let go, or move on, when students signaled that there was nothing new they could say, or no new themes emerged. “Categories are saturated when gathering fresh data no longer sparks new theoretical insights nor reveals new properties to your core theoretical categories” (Charmaz, 2006, p. 113).

## **Challenges**

Creswell and Plano Clark (2011) recommend that scholars take the necessary precautions, from the beginning of a study design plan, to minimize unforeseen circumstances that could impact or interfere with the progress of the study. For example, the researcher discloses any information upfront that may be questionable, limiting, or challenging. Many times events take place that is out of the researcher’s control. With that said, as part of being ethical and ensuring trustworthiness and credibility in the data a few items must be disclosed:

- 1) It is important to note that the study does not claim that students developed a deep understanding of environmental justice issues as a result of participation in the study. The data presented in this chapter is a reflection of the learning that occurred over a two-month time frame, where students learned about local environmental justice issues. Therefore, the findings presented report students’ perceptions during the time of the study and do not guarantee that the student actually developed sustaining or persistent behaviors.



- 2) The interviews with students also varied in terms of length of time. Working with young adults is extremely unpredictable because their schedules are controlled by factors outside of their control, such as by their parents' schedules; extracurricular activities; and homework or school load. Interview sessions and focus groups were planned in advanced; however last minute changes occurred such as: students leaving early from school, a student was absent due to illness, or the student had to take care of his/her siblings, I simply rescheduled the interview session to a day and time that met their schedule.
- 3) Access to participants is challenging. It was critical that I developed rapport in a prompt manner because our time was limited. During the interview process I allowed students to talk about whatever came to their mind. When conversations strayed from the focus, I used probing questions to refocus the dialogue, but did not cut students off in their conversation. I allowed the students to speak their mind.

### **Ethical Considerations**

Throughout the study, I was cognizant of the potential ethical issues that could have materialized and had a plan for addressing any concerns or issues as they developed. As the primary researcher I participated as a participant observer and lead the individual interviews and focused groups. I was also aware of my role as a curriculum and instruction specialist employed by the Borderland School District working with the Borderland High School campus. I ensured that my participants understand their role in the study and had the option to drop, or remove themselves from the study at any time. I ensured that the data collected throughout the process was kept confidential, providing pseudonyms and removing personal identifiers. All data was kept under lock and key in the researcher's personal office. Any unused data will be destroyed and

removed from the database within one year from the study. As stated in the IRB project approval, there were no foreseen ethical issues or risks/harm that will affect students who participated in the study.

### **Summary**

The four weeks of class time spent on the unit was not sufficient to understand the complexities surrounding the complex issue; however, activities offered a reflective process for understanding the historical, social, and environmental justice issues including opportunities for students to connect their learning to present day matters. The findings therefore, were based on students' perceptions of their learning. The timing of the study was limited and therefore captured students' comments and responses during interviews, focus groups, and participant observations. Data saturation was implemented to the extent possible to address the limitations and to ascertain that the students' perceptions and responses were consistent. Charmaz (2006) describes how data saturation supports trustworthiness and credibility. Differences and inconsistencies in the students' responses were noted and will be disclosed in the findings.

## **Chapter 4: Student Profiles**

Profiles were created for each participant to provide an overview of the students' demographics, histories, and backgrounds in order to get to know the student on a deeper level. Seidman (2006) recommends using the participants' voice when developing profiles so that the lived experience or phenomenological perspective comes to life. The students' words were kept in tact, with exceptions held for grammatical errors. The purpose of the profiles were to create an essence of the students and to tell the story from the students' perspective. The profiles were based primarily on the first interview as student's described their history and experiences. Information from the second and third interviews are also included as the conversation evolved.

## Participant 1: Kristen

*“Why do we need a passport? I’m from the earth! The earth belongs to everyone” (Kristen, 3rd Interview).*

Kristen walks into the room holding a water bottle in one hand and her cell phone and notebooks in the other hand. She wears a light grey knitted beanie placed carefully so that her green and blue highlights that frame her face are visible. Although it’s winter, she finds a way to accessorize her summer attire wearing leggings under her blue jean shorts and knit gloves that are cut at her knuckles. She sits in the back of the room with her usual group of three to four teenage boys who save a seat for her every day. Kristen describes how she is connected to the earth and the universe. She believes that any harm done to the earth is harm we are actually imposing on ourselves. She is grateful for participating in the course because she believes it has opened her eyes and helped her to reflect on how she has personally impacted the environment. She believes that even one person can make a difference in this world.

*My name is Kristen. I’m 17 years old. I live with my mother, grandmother, aunt, and cousin. I was born and raised in El Paso. My family is small, yet extended. Although my dad and mom are still married, it may not seem like it because he doesn’t live with us, but that’s intentional. My dad lives with and cares for his father and my mom lives with and cares for her mother. It all works out. He comes over to my grandmother’s house for dinner when he’s not working and we see him on weekends.*

*We live with my grandmother. My mom doesn’t want to leave my grandmother alone because she’s ill. We take her to her doctor’s appointments and keep her company. Sometimes*

*my mom stresses out because she's worried about my grandmother's health. At one point my mom thought about putting my grandmother into a nursing home so that we could follow my dad to a job outside of El Paso, but my grandmother got really upset, so we decided that El Paso is our home and it is our responsibility to take care of grandma.*

*About a year ago, I made a decision that I felt would impact my life in a positive way. You see I am a vegetarian by choice. I read about the benefits of removing meat from my diet. My family and friends flipped out when they found out. They couldn't believe I had made such a drastic change. I was, and still am, determined that this would help me start a new, fresh life so that I could enjoy an even longer life on earth. Eventually my parents supported me in this transition. They thought, 'okay, if you're going to do this we have to make sure you're getting the appropriate nutrition'. So I see a doctor on a regular basis to make sure I'm getting everything I need. At first, my grandmother criticized me because she thought I was on a diet, but she finally has come around and realizes that I'm doing this to be healthy, not to be skinny. Now she helps to prepare the meals that I like.*

*My father tries to eat healthy too. He tries to stay away from unhealthy foods because he had cancer a few years ago. We took care of my dad when he was sick; he's in remission now. One thing about my father is that he has always let me be my own person. He decided to wait on having me baptized so that I could make my own decision about the religion I wanted to pursue. Ever since I was able to talk, he told me that I should have my own opinion and be able to speak my mind. My mom and I are getting closer and building a stronger relationship every day, she has accepting my idiosyncrasies. I know that I'm not the best daughter, but I'm also not that terribly bad. I'm a good kid that does stupid things and that's what people need to understand.*

*People think that life's about getting an education, going to college, going to work, getting some money, and having a family to support. I always felt that yes, it's a part of life, but to me... not to sound corny or cheesy, life is about peace, love, and happiness. You have to find peace within yourself, and you have find happiness amongst everything not just with people but also with the earth. I know that people were put on this earth for specific reasons. I will be happy with a job that can give me enough money to support myself and continue this journey of finding myself spiritually. Even if it's not the best job ever, but as long as I can support myself and I have a roof over my head, I'm pretty content with just the little things. I don't know... I feel that people always try for bigger and better things, but bigger is not always better.*

*I know that school is a big part of everybody's life, but I honestly think that 13 years of school, if you count pre-k, is a waste of time because year after year it's the same thing all over again. I feel like teachers and schools in general, are just feeding us brain candy to keep us busy. When I got to high school I expected to learn something about growing up, like paying bills and taxes. I still don't know how to do my own taxes. The most they teach us is how to make a resume and that will get you a start, but I need more. I don't know... but I would like to learn more about the real world. Right now I'm just a kid in everyone's eye, but when I turn 18 and graduate that's when I'm supposed to turn into an adult? They tell us about jobs, that's all they focus on is jobs but how about everything else? Like I want you to teach me how to get a job and maintain it. How do I keep myself responsible? How do I react to people? I just feel like I have been a socially awkward mess since I got my own opinion and it's even harder for me to approach people because I get shy or I don't know how to react.*

*I used to be really insecure, I know a lot of people who are insecure too. I learned that when you're in touch with yourself, you should care less about things like that. Writing and meditation*

*has helped me in this process. There are things you may not like about your body, but I'm not going to sit here and start worrying about parts of my body. It's your body, you're going to have it forever. You should learn to love yourself first. You can't expect someone to love you if you don't love yourself. I know that no one is perfect. There's good and bad in everyone, I would question someone who says they are perfect.*

## Participant 2: Sarah

*“Since I was a freshman I slowly pulled myself away from people who I felt were fake and not real with me. I want someone to be with me because they like me, not the idea of me. I’m done with the drama” (Sarah, 1<sup>st</sup> Interview).*

Sarah pulls at her bangs, brushing them away from her eyes attempting to pull them behind her ear, her bangs swing right back to their original spot and lay on top of her glasses. She has long wavy hair that is usually pulled back into a pony tail. She sits quietly in the back of the classroom with a group of girls. Although she typically engages in conversations with students sitting at her lab table she likes to debate with other students in the room whom have contrasting views, holding her ground on issues that matter and arguing her case making sure she has the last word. She giggles when she tells me about how she is easily annoyed by people.

*My name is Sarah; I’m seventeen years old. My dad was born and raised in Ciudad Juarez, Mexico, and my mom is from El Paso. I’m the youngest of three sisters and one half-brother. I live with my parents, two sisters, and nephew. I’m currently a senior at Borderland High School. I have lived here in the same house, in the same neighborhood all my life. I have a pretty big family when you count the extended family on my mom and dad’s side. Our family is very close; we are extremely blessed.*

*I am the youngest of four sisters; I’m about ten years apart from my older sister. I always felt that my sisters didn’t understand me. They try to give me advice on life, love, and school, but I just don’t want to hear it. My story is different; they don’t know what I have gone through.*



*They tell me to stop crying and to get over it, but they just don't understand me. I'm constantly trying to prove myself to them that my problems are different. I'm not a little girl anymore; my feelings are also valid. My sister, who is four years older than me, is just starting to understand me. She told me that I should go ahead and move out of El Paso for college because I'll regret staying here like she does.*

*I just got accepted to Johnson & Wales College in Denver, Colorado. I'm excited, but very nervous at the same time to leave home. We made arrangements so that I could live with my aunt. Thank God I have family over there too! My mom doesn't want me to go away because she's afraid that I won't be able to do it on my own. She says that I'm very spoiled and that I depend on them for everything, but in the end she knows that it's the best thing for me to do. My dad is also nervous about me going, but he knows that I'll be okay.*

*I selected Johnson & Wales University because of their culinary arts program. I have always wanted to become a chef and run my own restaurant. My dad is my inspiration; I loved watching him cook. He says that he wants me to open a restaurant with him when I'm ready. I remember how my dad would pull me aside and teach me how to cook. I think I was seven years old when I first started cooking on my own. I would help around the house making meals for my family, especially when my father became ill. My father had prostate cancer; he got really sick. He was scared that he would leave us at such a young age. He needs us and we need him. We are grateful that he is doing much better now; the cancer is in remission. We still worry that the cancer might come back. It's weird because my grandfather, his dad, also had cancer. My father was really close to his dad. He took it really hard when my grandfather passed away a few years ago. It put him in a deep depression.*

*My dad started cooking and taking care of his family at a very early age. My dad is the oldest of his family. He was born and raised in Ciudad Juarez, Mexico, and moved to the United States when he was 20 years old. He met my mom here in El Paso, they fell in love and got married. He tells us about how he had to drop out of school when he was in the 8<sup>th</sup> grade and had to work as a butcher in my grandfather's grocery store in Juarez so that his younger siblings could go to school. Since he was the oldest sibling he knew it was his responsibility to take care of his brothers and sisters, and to this day he doesn't regret it.*

### **Participant 3: Mark**

*“I’m learning that people would rather get more likes on Integra and Facebook instead, searching for something else. Instead of using their time wisely, they waste it! And maybe to them it feels like, ‘oh man, I’m living up my life, I’m getting likes on social networking’, but in reality you’re looking at your phone instead of opening up your eyes to what’s actually going on in the world you’re living in” (Mark, 3<sup>rd</sup> Interview).*

It’s 8:40am, Mark walks into the classroom with his backpack strapped onto one shoulder and ear buds still in his ears from the morning ride to school, listening to the new set of lyrics he created with his older brother. His tall, slender frame and quiet demeanor maneuvers between the lab tables and cluttered lab stools. He sends a gentle nod to another female student sitting at his table and settles into his assigned seat. He sets his duffle bag down onto the floor, pulls the lab stool to his side, sits, and opens his science notebook to the next blank page ready for instruction to begin.

*My name is Mark, I’m a senior at Borderland High School. I consider myself lucky to come from two distinct, yet diverse cultures. You see my mom is from Durango, Mexico, and my father is from Tucson, Arizona. My parents’ families are huge on both sides. My mom and her family came over to the United States when she was in elementary school. My parents met when they were in high school.*

*I’m half-Mexican and half-Black; growing up I embraced my mom’s Mexican culture and my dad’s African American upbringings. At a very young age I realized that my family was different; I participated in two different churches, experiencing the two different ceremonies. I*

*can't remember when I began to question why if two different people believe in different things why did one have to be wrong, why couldn't they both be right? I think that's when I gained the tool to put things into perspective. I wouldn't say that it was like an epiphany or anything, but it was like, 'wow I can question things like this'. You have that power within yourself; my brother says questioning things around you is an evolutionary right that we're all entitled to, no one is perfect and no one is better. That's my perspective.*

*My family means a lot to me; I respect my mom and dad for everything they have done for us. I'm blessed to still have my grandparents alive and well. My grandmother on my dad's side was an elementary teacher, she taught at an elementary school on the same side of town where I grew up. My grandfather on my dad's side had to drop out of school at an early age to help support his family. He says he worked on a farm as a child, picking watermelons and other fruits and vegetables. My grandparents on my mother's side are polar opposites. They don't really question or have deep conversations like my dad's family does, but they do share their stories and influence me in different ways. There's no other way to state it, but my family is polar opposites! My grandparents wanted a different life for their children. As a result, both of my parents are educated and have a college degree.*

*Because of my parents I have a lot of different interests. I play golf and like to make music with my brother. On top of all of this I work part-time at a local grocery store when I'm not in school. I try to keep my life balanced and try to do things in moderation so that I don't over do it in any one aspect. Making rap music helps me sort through my brain and helps me to reflect on things that matter. My brother taught me to question everything around me. He is my mentor; He teaches me to think about things in different ways.*

*I can distinctly remember one time when I was probably 11 years old, he would tell me things that would make me think. One night I was playing a video game and I was excited because I got to the 29<sup>th</sup> level. He said, 'what are you excited about? You just wasted 29 levels of your life.' I was like WHAT? I thought he was being mean, but really he was helping me to realize that some of the things we do in life are unnecessary and there's so much more to live for.*

*My parents have always instilled strong morals, values, and work ethics as they raised us. I really love them; they are extremely supportive. The way they raised us, I feel it's right because a lot of parents try to pressure their kids into doing things they don't want to do. My parents made sure we are aware of what's right and what we should be achieving in life and they don't pressure us to do anything, we just kind of do it. They're constantly putting the decision in our hands. Like if I get a "C" in a class they don't get mad, they just say that I could do better. By them saying it in such a calm manner, it helps me to achieve things calmly instead of being stressed out. Instead I think, okay I'll do it when I do it and I'm going to do it as soon as possible.*

*My parents think that the education system has changed since they were in school. They compare our education and make me realize how advanced our schools are today. One difference that I see is that we have standards and standardized tests that measure our ability. These tests make it really hard to guess, you really have to know the information to do well. At first, I struggled with the exams, but I quickly figured it out and was able to meet all the graduation requirements. When I graduate from high school I plan on pursuing a career as an environmental engineer. My brother is working on an evolutionary biology degree, he says that his next degree will be a doctorate in physics. I want to be just like him; I love how he pushes me to see beyond the surface.*

#### **Participant 4: Richard**

*“By the time I reached Borderland High School I attended six different schools. My family moved around quite a bit. Sometimes we stayed with family members, like my aunts and uncles, and other times we had our own place. Each move meant starting over and making new friends. Wrestling helped me through this transition. The team made me feel like family. At times wrestling was the most consistent aspect of my life” (Richard, 1<sup>st</sup> Interview).*

Ten minutes after the morning bell rings, Richard walks into the classroom, signs in at the attendance roster located at the front of the classroom then walks to the back table to pick up his science notebook. He makes his way back up to the front of the room and takes his seat. Mr. Patrick waves at Richard and continues his instruction without skipping a beat. He knows Richard runs a little late each morning and waits for him to arrive before submitting the attendance to the office. Richard’s mornings are hectic as he takes on big brother responsibilities to ensure his younger siblings wake up on time, eat breakfast, and rush off to school. Four days out of the week, Richard and his older cousin take full charge of the house until his father’s return from his truck-driving route.

*My name is Richard; I was born and raised in El Paso, Texas. My parents are divorced. I live with my father, younger brother who is fifteen, younger sister who is fourteen, and an older cousin. I have a big family; my dad has twelve brothers and sisters and my mom has seven brothers and sisters. My father was eighteen years old when I was born. Ever since I can remember he worked as a truck driver running different shifts and driving different routes to*

*support my family. When he's on a run, my older cousin stays with us and helps to watch the house. My dad leaves on Tuesdays and gets back on Saturdays.*

*My brother and sister look up to me as a role model because I have been taking care of them for a while. We each have chores to do at home and we take turns making dinner for each other. My little sister loves spaghetti; we eat that at least once a week. When she makes it I eat something else. My little brother likes hamburger helper. When I'm too tired to cook I say, 'Just eat whatever you want.'*

*My sister is really smart; she helps my brother with his math and reading homework. They come to me if they get stuck and we'll figure it out together. We all get along really well. Sunday's are for the family; my dad will cook out for us and we sit and watch football games. Monday comes around, then my dad leaves on Tuesdays and we're back to our routine. We're used to it.*

*My mom lives in Dallas with my stepfather and half-brother who is nine years old and half-sister who is four years old. We see them during the holidays and during the summer break; we either go visit them or they come visit us. My stepfather helped to raise us. He's the one responsible for getting me interested in wrestling; I thank him for that. Wrestling has always been a major motivator for me and has been one of the most consistent aspects in my life. From elementary to high school, I moved in and out of six different schools. Making friends was tough at first, but I quickly found a home with the wrestling team.*

*I just recently applied for a part-time job at a local fast food restaurant so that I can help around the house. Last year I worked at Dairy Queen but it only lasted six months. I got a taste of the real life. Unfortunately, the work started interfering with my grades. My dad told me, it's*

*either you're going to go to school or you're going to work. So I decided to quit work so that I could focus on my school.*

*Ever since I could remember, I dreamed of joining the Air Force and becoming a pilot. The thing that I remember the most is my mom telling me that I couldn't be a pilot because I wore glasses. My mom told me that I might have to choose a different career. I thought about it for a while, the next best thing to becoming a pilot is to actually fix planes. I just got accepted to an aviation school in Denver, Colorado, in the Air Frame & Power Plant program. My father and I met with a recruiter and we figured out just how much the school would be. Luckily I have family in Denver so I won't have to worry about housing expenses. I'm ready to move on.*



## Participant 5: Carol

*“People irritate me when they don’t know what they’re saying but they still try to give their input in something that they shouldn’t” (Carol, 1<sup>st</sup> Interview).*

Carol walks into the room, tosses her duffle bag on the floor. She wears a comfortable jogging suit. Her bag is tightly packed with her tennis shoes hanging off to the side, tied to one of the straps. She walks to the front of the room to take away a lab stool from another student, who is not present in class yet, and brings the stool back to her spot so she has somewhere to sit. She says, “I hate school, I don’t want to be here”! People around her laugh, they watch her every move. She sits in the back of the room, slouched in her seat with one hand covering her face. No matter where Carol sits her voice carries and people stop to listen to hear what she has to say.

*My name is Carol; I’m a senior this year so that means I have to make a decision pretty quickly about what I’ll be doing after I graduate. Honestly, I don’t feel like I’m good at school. The only subjects I find interesting are art and ROTC (Reserve Officers’ Training Corps). I’m an officer in the ROTC class, so I basically run the class. I love art because you can express yourself and no one really judges you. All the others subjects bore me. My teammates and coach help get me through my courses, they’re constantly tutoring me. I need to stay eligible for track, so I make it work.*

*I was thinking about joining the military when I graduate. A great deal of my family is in the military. They tell me that the military is not really fit for girls, but I think differently. My stepfather has been the one to really motivate me to pursue whatever goals I have, even if it is*

*the military. When it's all said and done, I think I'll go to school first then join the reserves so that the army can pay for my college. I want to be either a military police officer or a nurse. My dad always tells me, "You're my retirement plan" and I'm like, "No I'm not"! My brothers and I tell my parents that we're going to put them in the old folks home and they get mad. We tell them that we're only playing, we wouldn't do that to them.*

*I have a brother who is a freshmen and another brother who is also a senior, we all go to Borderland High School. People think my older brother and I are twins, but we're actually nine months apart. When I turn eighteen I'm going to go visit my stepbrothers and stepsisters on my dad's side. We have been separated and not allowed to talk to each other because our parents don't get along. My other siblings live with my grandma in Killeen, Texas. When I was in the fifth grade we moved to El Paso. Since then we kind of disconnected ourselves from my mom's family too. We only talk to my grandma, on my mother's side, and our family that lives in North Carolina.*

*Right now I'm living with my mom and step dad, but I really don't consider him to be my stepfather, I consider him to be my real father. He has been there for us, through thick and thin. If it wasn't for him we wouldn't be here living in the house that we were living in and I wouldn't have the clothes on my back, so I'm really thankful. My dad is a contractor for the military. He's constantly deployed; it sucks! He just got back from a deployment in Kuwait. It was supposed to be for six months, but he ended up staying for two years before he came home. I think about how he's out there for us and how he sticks it out for us because he knows that he's helping us out in the end.*

*My mom is a bartender. She basically works all week and has a couple days off. When she was younger she had to take care of her two brothers. She basically raised them. I really*

*don't talk to my mom about my future plans because we don't have close relationship. I feel more comfortable talking to my father. My father is always asking me, 'Okay, what are your plans?' My mom doesn't have time to sit down and talk to all of us because she's always at work and when she's home she just wants to be left alone because she's tired or exhausted. I understand. She works a lot of hours and I know she's busting her butt for us.*

## Participant 6: Terry

*“In Puerto Rico we were very low. The military gave us so many things... they give you a house, money, and they give you furniture. In a way, I felt very rich; I had all these things! I started to realize that I could go to a good school and I could actually have a good life: that’s when I started accepting it. I was like, ‘I’m getting all these things practically for free?’ That’s when I started getting into the mindset to just accept it, go with it, and call it a day” (Terry, 1<sup>st</sup> Interview).*

Terry stands outside of the classroom, arms crossed over her chest, with one knee propped up, she leans against the lockers in the hallway in attempt to catch one last minute of relaxation before Mr. Patrick arrives and opens the classroom door. She looks straight towards the classroom door in a sort of daze, looking beyond a group of students who are talking and laughing loudly. Everyone in the hall can hear the conversation but Terry doesn’t budge she doesn’t respond to the conversation. She knows that her friends will arrive soon and she’ll get chance to catch up with them too. This morning Terry woke up early to get ready. Her long, thin golden brown hair is perfectly parted to one side and pulled behind her ears and falling slightly above her petite waste line. Her freshly painted pink nails match her pink button-up blouse and lip-gloss.

*I can start by telling you that I’m from Puerto Rico. I was born and raised there and moved to the states when I was just six years old because my father joined the United States military; his decision to join the army forever changed our lives. We went from a two-bedroom humble home to a home that was pretty much free with all the furnishings and we had our own*

rooms! When we lived in Puerto Rico my brother and I, who is two years older, had to share a room. We had bunk beds and only one television in our house. We would both sit on the couch snuggled next to each other and watch our shows. Now we each have our own rooms with our own televisions. Ironically, we're not as close anymore because we have our space. I miss the relationship we had.

Why would anyone complain about the military life? We have everything we want; we get housing, college, and benefits! What else could we want? We know that the military has been a blessing to our family, but we also know that these luxuries are not free, they come with a price. My dad sacrifices his life to provide us with everything we need. He knew that he wasn't going to go anywhere if he stayed in Puerto Rico. His decision to move changed our trajectory for the better. My brother and I are extremely appreciative of everything my parents have done for us. Both of my parents have a college degree. My dad is a Warren Officer with the army and mom stays at home to take care of us, including my grandfather who just recently arrived from Puerto Rico. Her reason for not working has to do with her speaking in English. She's embarrassed that she doesn't speak English correctly. I tell her that she just has to try it and she'll learn it in no time.

At home I go in and out of speaking in Spanish to English and back to Spanish. My mom gets mad at me when I do that. I'm proud to say that I learned English in four months; I had to fast track my transition. For a while there I struggled with reading and comprehension, what am I saying... I still struggle! Vocabulary has always been difficult for me. My brain wants to understand it in Spanish, but the schools are forcing it in English. I still struggle with vocabulary to this day, especially in this science class. The words are foreign to me. Why do we have to use

*such complicated vocabulary? Why can't we just say it in a way where I can understand it? That's why I feel like I'm behind my grade level and always have to be one up on everyone.*

*I'm a junior right now at Borderland High School. My dad signed a letter with the Army that would guarantee that we would not be relocated so that I can stay in one place and graduate. I'm nervous because I haven't stayed in any one place for more than four years. The trend has been 3 to 4 years and then we're off to a new place. Moving is sometimes hectic, but it allows you to have a fresh start. Maybe things didn't go too well with the last move, so this next move will be better! I have learned that when you're the new kid, you have to have an open-mind and be willing to accept anything and anyone that comes your way. You can't be picky, you just have to go with it and try new things.*

*Since I have moved to about seven different places, I have been able to develop an interesting perspective on education here in the United States and abroad. Borderland High School is nothing like a DODEA school. The teachers are different, the curriculum is different, and the overall school culture is different. I'm not saying that it's bad here, it's just different and I'm getting used to it. You won't find the kids you see here, hanging out across the street at a DODEA school. Don't get me wrong; they're probably good kids, but the word is that they may be up to no good. I don't judge them, but I surely stay away and do my thing.*

*I decided to take this course because it was a senior level class. I actually double up on my science courses so that I could get ahead. Like I said earlier, I have always felt that I have to be 'one up' on everyone else because I feel like I'm so far behind because of my English. I was surprised to hear that I could take a senior course, even though I'm not a senior! At first I was so intimidated by this course because I'm in a room with a bunch of seniors. I thought it would be a real challenge trying to keep up with the material and meet the level of the older students in*

*class. I'm surprised that I'm able to do as good as the best students in here; I actually have an "A". I figured this class out! And now I don't feel challenged anymore. I can't wait to move on and go to college.*

## Participant 7: Desiree

*“I had to grow up really fast. That’s why my brothers take care of me now, because ever since I was little I took care of them. By the time I was eight years old I was washing clothes and cooking dinner for my family. Now I’m taking care of my mom because she needs me.” (Desiree, 1<sup>st</sup> Interview).*

It’s 7:45 a.m., we’re in the middle of our first interview then we hear...“Ring, Ring, Ring”, Desiree’s phone starts to ring. I tell her to go ahead and answer her phone. She responds, “Oh no, it’s just my alarm. It’s time to wake my brothers up.” Desiree describes how she relies heavily on her phone to keep her life structured. She says that she schedules everything into her phone to help push her and to keep her going. Every day Desiree wears a sixties-style wide hair band with the bow pulled to the side, straps hanging down over her right ear. She wears bright red lipstick with perfectly defined eyebrows that are visible through her black-framed glasses. Desiree’s life is complicated; she cares for her mother and also takes care of her four brothers. Even though everything around her is crazy, she finds calmness in up-cycling her vintage style clothes, combining fabrics to make blouses with matching headbands all made by hand.

*My name is Desiree, I’m eighteen years old. I live with my mom and four brothers. My mom just recently adopted one of my brother’s close friends because his parents were going to be deported back to Mexico. My younger brother has been playing soccer with adopted brother for a few years. When my mom heard that his parents were going to be deported, she volunteered to take him into our home so that he could finish school. My brother was happy, and my adopted*



*brother couldn't thank my mom enough for allowing him to stay with us. His parents were sad, but they knew that this would be the best decision for him and for his future.*

*So in addition to a newly adopted brother, I have three other brothers. I also have more sisters and brothers on my father's side that I haven't met. My siblings, on my father's side, live in Juarez. I actually just met one of my sisters a couple of weeks ago. They know about me and we talk on Facebook. We're making plans to see each other soon.*

*I have family that lives on both sides of the border. My grandparents had sixteen children and our family keeps on growing. My grandparents are originally from Juarez, but they moved over here to find work. I'm very close to my grandparents, they have both helped to raise my brothers and I since my mom became ill. My mom has been battling cancer for the past few years. Although my grandparents are both retired and in fairly good health, I still take care of them. I check on them daily to make sure they're okay. They say that I'm going to get all of their possessions when they pass, because I'm the only who takes care of them. I see them as my parents; they helped my mom raise us. Although I want to become a veterinarian, I'm considering a nearby school so that I can be close to home if I'm needed. Going away for college sounds great, it's just not for me right now. I'm fine here close to home.*

*School has been a breeze for me. I like school. Over the past few years I took a few courses to get ahead. Now that I'm a senior I have an "out" period in the afternoons that I use for taking my mom, grandparents, or myself to doctor appointments. I like my schedule; it actually saves me from being absent all the time. My mom and I requested an "out" period with my school counselor since I was ahead with my credits.*

*I'm taking this class as an elective because I already have my four science credits. I like what we're learning. I'm also in a theatre production class. We're currently working on a couple*

*of short plays. Last year I was the lead in a few of the plays. It was nerve wrecking but you get used to it. You can't really see the people when you're on stage. I tell myself to just focus on my lines; it's like a rehearsal...you have to keep poise, confidence and know how to fix your lines when you mess up.*

## **Chapter 5: Findings**

### **Introduction**

The methodology implemented in this phenomenological study was designed to support a deeper understanding of Latin@ high school students' perceptions and experiences of participating in a relevant, environmental justice thematic unit. Four themes emerged in the data that embodied the essence of the students' experiences. The four themes include: Obligated Exposure, Sense of Place, From Conforming to Transforming Thinking, and Taking Action for Self and Others.

### **Theme One: Obligated Exposure**

Several references were made regarding students' understanding and awareness of local and global environmental justice issues as they participated in the air quality thematic unit. Students commented on the impact the local factory had on the workers and nearby community including the tensions that resulted from being situated in an underrepresented, marginalized location. The students felt that while there were clear benefits of working at the factory, there was an apparent disregard to their overall health that no one could escape. According to the students, the unique circumstances of the community made the factory workers feel as though they had no other option but to accept the harm and continue to be exposed to the hazardous conditions. While the students understood the significance of the impact, they explained that given the circumstances, they understood why a few workers possibly viewed the situation as beneficial. Working at the factory, being employed, outweighed the risks associated with exposure, and therefore the factory was viewed as a positive influence providing financial support and an investment in a community that would have otherwise been disregarded.

As I reflected on the data, I struggled to find the right words that would capture this feeling that students described. The students felt that the factory workers and community members had no other choice but to live among the environmental inequities. The students explained that while some factory workers and community members may have felt that the exposure was harmful and unjust, they had to accept it because they were not going to find other employment opportunities that would provide the same pay and benefits, especially as a minority with little education. In a sense, the students described how the individuals directly impacted by the events at the local factory were stuck in the situation. As I brainstormed the essence of their experience that could be expressed as a theme, I wrote a memo to help me reflect on the meaning students made based on their learning and understanding of the issue:

As I reflect on the students' responses, I hear Bullard's (1999) reference of environmental racism... even though the students have not specifically mentioned this term, their perceptions of the issue fall right in line with the injustices associated with being a poor community exposed to environmental harm. Many students have also touched on the fact that our community is mostly an underrepresented population of Mexican/Mexican Americans. Are the students describing the impact as a victimization? Is the border community victimized? While I feel that the population is victimized, the term is too strong of a word. The students' responses mention how there was an overall awareness or consciousness of the exposure, for the most part, the exposure was not welcomed yet it is accepted. Why would anyone accept harm? There is something else here that moves away from a simple awareness and from being a victim... Perhaps they feel they are obligated to be exposed because they have no other choice but to live here, this is their home and this is where they work. How can they move their family and find a job that

will pay the same? Are the circumstances associated with ‘place’? Is their situation unique to ‘place’ on the border community? A place that allowed the advancement of an underrepresented community, regardless of the harm imposed? In essence, the community and factory workers have an obligation to be exposed. While the workers and community are aware of the issues, it did not necessarily prevent them from being exposed nor did they approve or accept the exposure whole-heartedly; they had no other choice, they were obligated to live among the injustices because of their location and situation.

Finally after reviewing the literature and going back and forth on the essence of this sentiment, I determined that an *Obligated Exposure* was the phrase that captured the essence that students referred to as they grappled with their understanding of environmental justice issues in the border community. The students recognized that exposure, for the most part, was inevitable and could not be avoided because of the circumstances and characteristics of living in a low socio economic, high poverty, underserved area. The factory workers and community at large felt obligated to be exposed simply because they, for the most part, could not just pick up and relocate their family, or quit their job and find another well-paying employment opportunity in their community - it didn’t exist. The students recognized that those opportunities were scarce especially for individuals without a college education; they were obligated to be exposed, to sacrifice their well-being as a trade-off to clean healthy living conditions.

van Manen (1990) argues that researchers should find the rich and quintessential meanings presented in the data to better understand the lived experiences of the participants; Obligated exposure was by far the richest most encompassing phrase that captured the meaning students made as they wrestled with their understanding of the issues. This theme alone,

consisted of several grouped and regrouped themes with a total of 77 references made to the theme alone, where the other themes had 22 references for Sense of Place; 62 for Transformative Thinking; and 52 for Taking Action. Table 5.0 shows the breakdown of the theme including the individual references, number of student contributions, and sample quotes taken directly from the student interviews and focus groups.

Table 5.0: Obligated Exposure

Definition: Students awareness of local, national, and global issues; causes and effects of environmental injustices; and their perceptions/standpoints regarding various social and environmental justice issues that may be due to social location that cannot be avoided regardless of the harm.				
Subthemes	Codes	References	Source	Sample Comments
<b>Awareness of the environmental injustices</b> -at the local, national, and global level - understanding of the risks associated with environmental exposure - human impact on the environment	14	55	7 of 7	<i>I'm from North East El Paso, I know ghetto. That's not too surprising for me, but to see that the area [area near factory] was mainly Mexicans, it is very stereotypical (Richard, 3<sup>rd</sup> Interview)</i>
<b>Standpoints, or perspectives, surrounding social and environmental justice issues</b> - the role of race, class, social location, physical location, border relations/politics, immigration, education, and social media - oppressive relationships including	10	22	6 of 7	<i>The situation that people were getting put into, they kind of had no other option other than going to work... that's the way your family is getting money and so you kind of have to go to work...[they] had to stick through it" (Terry, 2nd Interview).</i>

**Awareness of the local, national, and global environmental injustices.** Throughout the study, students identified several environmental justice issues that were prominent within their community and those that impacted society at a national or global level. Each student expressed that they recognized the activity of LULUs and the potential risk associated with simply living near a toxic site. A total of 19 references were made in this subtheme with contributions from each of the seven students. The following are examples of the comments made regarding students' awareness of environmental issues:

So if I'm going by a factory and I see smoke coming up, I should be wondering at the back of my mind, not to where it overwhelms me, but it could be toxic (Mark, 2<sup>nd</sup> Interview).

I just drove down the valley the other day... I saw the smoke or steam, or whatever they want to say it is... I know I smelled something bad (Richard, 2<sup>nd</sup> Interview).

Do you know where the [name of factory] is? I don't know what it refines, but it's under a grandfather clause.... My uncle told me how unhealthy it is because of what they are burning out there... You shouldn't be able to use the grandfather clause in this modern age. They don't even know what they are doing to people (Mark, 1<sup>st</sup> Interview).

One student in particular reflected on her personal experience of growing up as a child and driving across the border to visit her family in Juarez, Mexico. She remembered driving through the different neighborhoods and smelling a strong odor of sewage that was prominent

simply because some neighborhoods did not have access to waste management services. She also remembered the constant burning of tires and trash from local brick kilns and nearby homes that used trash as a source of energy. And while a strong binational effort has reduced this type of pollution over time, for Sarah it was an injustice she personally observed. She described how her aunt decided to move away from the continued exposure because they were getting sick. I wrote a memo to reflect on the experience specifically focusing on the internal factors that motivated the family to move and avoid further exposure to risk:

Sarah talked about the ASARCO experience and how she began to reflect on the impact of the factory. She described how she became upset when she learned about the impact; she was reminded of her personal experience when she visited her family in Juarez. She talked about her aunt who lived close to a site that would burn several items like tires, plastics, and trash. Her family was getting sick, so her aunt decided to move away from the factory. Many of the other students described how the families and factory workers had no other choice but to live with the inequities. How was it that Sarah's aunt was able to move her family? The students reported that many of the factory workers and community members were forced to live in the undesired situation. I wondered about the reasons that helped Sarah's aunt come to understand that her family was in danger and make a decision to move them out. What motivated her thinking? What did she know about environmental hazards?

One of the strategies implemented during the interview process was to probe deeper into students' responses by asking them to put themselves in someone else's shoes. Role-playing supported students to consider how they would feel if they faced a similar situation as: (1) a child living near the injustices; (2) a child of a factory worker; or (3) an employee of the factory. In



each of the cases, students were asked to express their views regarding what they would anticipate from each of the different situations. LatCrit methodology utilizes storytelling, counterstorytelling, and narratives to magnify the silent, marginalized voices (Fernandez, 2002). These methods provide opportunities for the underrepresented to present their thinking and perspectives, which are commonly suppressed or minimized because of their standpoint. Each of the seven students expressed that the factory workers were forced to maintain a job, to make money, and to support their family, regardless of the risk.

While students reflected on the factory workers' experiences, they tried to put themselves in their shoes. The students expressed that if given the same situation, they would have moved their family away from the harmful environmental exposure; however, they also explained that it would have been challenging financially to physically relocate their family because of their limited resources. In other words, while they wished the circumstances were different, they recognized that some families were forced and obligated to be exposed to environmental harm; they had no other choice. As previously mentioned, this feeling of obligation aligns to the literature on environmental racism that establishes environmental inequity and unjust distribution of injustices associated with race, class, poverty, and geographical location (Bullard 1994, Downey & Hawkins, 2008). Each of the seven students reported that the families who were exposed in the ASARCO study had no other choice but to accept the hazardous living conditions.

As long as people are making money, they are not going to stop what they are doing.

They are going to continue doing whatever it is they have to do to make money (Sarah,

2<sup>nd</sup> Interview)

Back then they didn't really care much because they didn't know what was going to happen... they were probably like, 'we're okay now. I mean, I'm sure we'll be okay later' (Richard, 2<sup>nd</sup> Interview)

Another aspect presented was the notion of care and education. The students questioned if the workers knew about the specific hazards of being exposed to the emissions and proposed possible reasons why the workers were unaware of the issues or did not see the situation as directly affecting their health.

Honestly, I don't know why they didn't leave... maybe they just liked the work that they did and they didn't want to leave it. I'm pretty sure that they knew the consequences of it, they just didn't care" (Carol, 2<sup>nd</sup>-3<sup>rd</sup> Interview).

I guess that's kind of a cultural thing because people like to turn a blind eye because that's how they think of the world (Mark, 3<sup>rd</sup> Interview).

Back then... a lot of people didn't know what was going on so they didn't challenge or question the issues. They needed to make money, so the safety wasn't their primary concern" (Desiree, 2<sup>nd</sup> Interview).

One student presented the story from the factory's perspective. She understood the reasons why the factory polluted, but did not dismiss the intentional harm caused to the environment and to the community.

I wouldn't have a problem with factories if they learned what they were doing like before they started. I get it, we need whatever the factories are making, but once the environment is gone, what other resources do we have? So I guess they should focus on learning how to dispose of waste properly. Learn how to ...it's hard when it hurts us. I guess that proves our point of ignorance (Kristen, 3<sup>rd</sup> Interview).

Terry on the other hand recognized that the factory was imposing harm on the community and factory workers, but questioned why the injustices persisted. She could not understand why the factory owners, or those in control, would continue to impose risk to their employees.

Why wouldn't you take care of them, I don't know like medical finances or give them some help, not necessarily shut down the whole factory because that's the main reason why they were getting their money (Terry, 2<sup>nd</sup> Interview).

Once again the notion of obligated exposure persisted as students reflected on the situation. Terry's plea acknowledges the inevitable harm imposed by the factory and recommended that the factory compensated their workers and families living in the nearby community with medical assistance to address any health risks that should arise. Although Terry understood that the impact was inevitable, there was no way to escape or prevent further harm and exposure. Terry questioned why the factory wouldn't provide support to the individuals directly affected?

The factory is closed, the towers demolished, and questions remain. The students explained how the community is still apprehensive about future land development on the site where the factory once stood and question whether the property is still contaminated.

Right now I think it is still affecting families because they want to build stuff on top of that land where they were, but they are not sure if the land is safe, or if there are still chemicals there (Desiree, 2<sup>nd</sup> Interview).

When he [teacher] started talking about the ASARCO story, he [teacher] started explaining about how bad it was with them, when she said that there are still things going on now it made me think about you know what kind of problems are people still facing that they faced back then like do they still live in bad conditions or are they still trying to find jobs (Terry, Focus Group 2).

**Students' Perspective/Standpoint.** Four of the seven students referenced their perspective on the different intersections between social location, race, culture, and border issues in relation to exposure and environmental risk. Richard's comment resonated with the theme Obligated Exposure in that a child may not have a choice as to where he or she lives. The child had no other choice but to follow their family.

There are parts of the world where you're stuck living like that... not even your unborn children are protected or safe (Richard, 2<sup>nd</sup> Interview).

Students also referenced the role border politics played in the exposure of the community. Several students expressed that along with the factory, the local government shared responsibility for the injustices the factory workers and the border community experienced.

The city wasn't doing anything about it. They were kind of like, 'oh, they're getting sick, well they better have some babies because I need someone to work for me.' You know, that was kind of their mindset. And I was kind of surprised at that... these are your citizens, these are your people! This is the reason why you still have a town, why

wouldn't you take care of them? The only way things would change was because of the head of the city. If the city wanted to do something for you, well okay then you'll work out, you'll live, and your family will be healthy. But if they didn't, oh well, like you had no power over it unless you all got together and everyone did something about it (Terry, 2<sup>nd</sup> Interview)

So I think that's my mindset right now -- that they [government] are just waiting. They have the money for it [to support the families impacted by the exposure and clean up the contamination], they're still going on plane rides, driving their limos and things like that and they don't care about it until it affects them and they start getting sick and then they'll be like okay let's get to work now (Terry, 3<sup>rd</sup> Interview)

Students felt that the issues were oftentimes overlooked or ignored because of their social location of being situated on a border community with an underrepresented population. The following excerpts exemplify their claim:

I do see a lot of pollution towards Mexico. If you're polluting over there, it's not like they can come back and sue. Because it's happening on the U.S. side, but the wind is blowing that way too. I mean we know it's happening everywhere even on the U.S. side, but I doubt that they cared (Richard, 2<sup>nd</sup> Interview).

Like our border is man-made but the environment is there, so whatever is there it gets thrown into the environment, like all of the environment not just one part of it...So kind of like ASARCO, just because there was a border doesn't mean that only the kids from El

Paso are being exposed. I'm pretty sure that kids from Mexico got sick and obviously a border doesn't change anything (Kristen, 3<sup>rd</sup> Interview).

Mexico is just a different country. Everyone thinks that it's the same, but if you actually think about it, it's a whole different country they have different laws and ways even if it's just across the street (Desiree, 3<sup>rd</sup> Interview).

It means a lot because it affects us around here maybe these refineries and all these places don't really care about us as a border town you know? It's because we are close to Mexico and we are close to Juarez and so hey, you know let's build it [factory] right here (Richard, 3<sup>rd</sup> Interview).

The students' comments resonated with environmental racism and aligned to several of the basic tenets of LatCrit, specifically when understanding how ethnicity, culture, nationality, location, class, and socioeconomic level impact the lives of Latin@s (Valdes, 1998). In a sense, the students felt that they were stuck and forced to accept the conditions because they were born here, their family is from here, and it is not like they can get up and go. The next statement identifies the tension one student felt as he reflected on inequities in relation to race:

Most of the bad things that people don't want to be around usually has to do something with colored people, not only Blacks but Mexicans" (Richard, 3<sup>rd</sup> Interview).

The students' unique situation of living adjacent to a third world country was a reality that many of their own family members reportedly faced as they migrated to the United States to escape the challenging living conditions in Mexico. There was an underlying message that

complemented Standpoint Theory as students described their ability to see their own perspective or standpoint in relation to those living among the inequities.

Terry: Right across the border, twenty minutes away, you see like a complete change how they are living... (Terry & Sarah, Focus Group #2).

Sarah: It is such a poor community over there and over here we think that we are a poor community, but because we are not seeing other things. (Terry & Sarah, Focus Group #2)

The people are constantly exposed, and it happens everywhere, but people who are poor have a higher change of being exposed (Sarah, 2<sup>nd</sup> Interview)

Richard described his personal standpoint during the final interview where he reflected on his experience and during the focus group with his peers. His comments address his standpoint in reference to his social location in the community and the difference he has observed, Richard stated:

I've never been on like the rich side. I don't live in the North Hills (middle class neighborhood), I have always been moving around no matter what. So, I think everyone's point of view on what happens and what's going on is very different from people who are like me, the lower class I guess (Richard, 3<sup>rd</sup> Interview).

I mean...other people learn different stuff from where they live. I'm not going to know what someone knows from East L.A. or Compton. They are not going to see everything

the way we see it here in El Paso, so everyone's point of view is different no matter who you are... (Richard, 3<sup>rd</sup> Interview).

I think it is different, because if you're not from here you won't understand what we see. Like I wouldn't understand what someone in Monahans or Laredo sees... I wouldn't understand what they go through. Living in two different places we see two different things, two different perspectives so the views would be very different" (Richard, Focus Group 1).

Students also made several references to the notion of power and control that were apparent factors in the exposure described in the air quality thematic unit. The students described how those in power, either at the factory, city, or government level, were in control of the situation and ultimately determined the exposure for those who either worked for the factory or those who lived near the hazardous site.

They just didn't care. Maybe it wasn't like their family working there (Carol, Focus Group 1).

It could have been that it was hidden from them or they knew it but didn't care, or they were trying to fight back... you never know (Mark, 2<sup>nd</sup> Interview).

I'm sure that they had people who would monitor it. But I just don't think they cared (Richard, 2<sup>nd</sup> Interview)



I learned about the impact that it had on the people who lived on the other side. We essentially make Juarez, and Juarez makes El Paso too. I guess they couldn't do more about it because it was a different country. And since it was here, only the people from here could do something about it. So the people in Juarez may have felt pretty helpless about the situation...They just have different rules and laws over there since it's actually a different country (Desiree, 2<sup>nd</sup> Interview).

The students' understanding of the different standpoints in relation to oppressive relationships was evident in their responses when they referred to the factory owners as having the power and control to continue imposing the injustices on the workers and on the border community. The oppressed, in oppressive relationships, feel overwhelmed and helpless that they have no salvation or no way out and are forced to accept the conditions (Freire, 1993). The only way to be freed from an oppressive relationship is to reflect and liberate oneself, in other words the individual is the only person who can free him or herself from the situation by personally reflecting and recognizing that there are other options available, as Sarah's aunt experienced in her decision to move her family away from harm. This realization is personal; it involves reflexivity and moving towards a state of awareness that encompasses acting and changing their trajectory. However, for the oppressed this realization is not that simple. The students felt that the factory workers and community were obligated to accept the exposure to hazardous toxins and were limited in their options to escape or remove themselves from the inequities, there was no way out even if they didn't accept the circumstances.

## Theme Two: Sense of Place

Sense of Place, as described by Kudryavtsev, Stedman, and Kransy (2012), refers to the affinity individuals have in regards to a specific location, whether it is a physical or figurative location, in terms of place meaning and place attachment. A total of 22 separate responses were identified connecting to students' sense of place. Table 5.1 identifies the sense of place subthemes that were referred to by students as they made meaning of environmental injustices.

Table 5.1: Sense of Place

Definition: An affinity to the environment that stems for place meaning and place attachment; when individuals feel connected to the environment. There is an urgency to protect, care for, and conserve the environment.			
Subthemes	References	Source	Sample Comments
Becoming one with the Earth!	3	1 of 7	<i>I just felt at one with everything. I had roots in the earth. (Kristen, 1<sup>st</sup> Interview).</i>
El Paso is My Hometown	12	5 of 7	<i>I have always lived in the same area. My sisters and I all went to Borderland High School...My sister came back from college because she missed being home. (Sarah, 1<sup>st</sup> Interview).</i>
<i>Not in my Backyard</i>	3	1 of 7	<i>Well this is different because it happened right here in our backyard (Richard, 2<sup>nd</sup> Interview)</i>
Place in Other Places	4	2 of 7	<i>I see that poster that is right there (points to poster of local factory on wall in classroom) and that's the first thing I saw when I walked in... I was like oh that's a factory and it pollutes, we have that over there in Puerto Rico too (Terry, 2<sup>nd</sup> Interview).</i>

Place-based education, is grounded in learning about the local environment, which is tightly aligned with the goals of improving education outcomes and achieving a sustainable society by developing a sense of connectedness to where individuals live (Meichtry & Smith, 2007, p. 15). Sense of place is a process for connecting and understanding the limits of the natural world (Applegate, 2010; Sanders, 2010). Sanders argues that without a sense of place, humans would

continue to partake in activities that interfere with pro-environmental behaviors such as conservation and protection.

**Becoming one with the earth.** Kristen clearly exemplified a strong connection with her environment, the earth, and the universe. She felt a personal bond to nature in general and explained how this relationship helped her to see the issues through a different lens or perspective.

I feel like I am one with the universe (Kristen, 1<sup>st</sup> Interview).

It just felt amazing. At that one moment, I know there are a lot of people in the universe, but there is only one universe and there is only one earth... I feel the earth is different for every person. I feel like you are the universe and the universe is you (Kristen, 1<sup>st</sup> Interview).

I don't know I really love the environment, and I love the earth and I don't think that it's right that people are harming the earth this way because this is their only home. Ya, we have buildings that we live in, but the environment is our home. Like without it we have nothing and it can be destroyed so easily and we are just stomping on it and destroying it even more and I don't think that's right... some people say, 'oh you're hippy or your just weird'. I don't care; the earth is my home. I look up to the universe and the stars (Kristen, 2<sup>nd</sup> Interview).

**El Paso is my hometown.** Sarah, Richard, and Mark each indicated that their families were deeply rooted in the border community. Sarah's father was born and raised in Mexico and

her family still lives in Juarez. She was very familiar with the community on both sides of the border. She discussed how her sisters have left for college, but have returned to El Paso, because El Paso is their home. In this case, sense of place is tied to the meaning made through family and community -- integral in developing ownership and a close relationship with the environment.

Although Richard's family has moved around quite a bit, the borderland was his home. Moving around the city allowed him to develop roots in the community and different perspectives or dynamics of the city. Mark also described having roots in the border community. He explained how his father's family was deeply embedded in the northeast side of town, where he grew up. He uncles and aunts each attended the Borderland High School. Even though Mark was born in San Antonio, he moved to the border community when he was just two years old. He sees the border community as home and is open to raising his family here in the future. His older brother decided to attend college in the border community so he also expects to attend the Borderland University himself, making this place his home for his children.

Kristen also made reference to border community being her home, but her comments resonated with place attachment to the local and physical connection to the landscape of the El Paso environment.

I guess what I admire about El Paso is the desert. I guess I have always found that unique about El Paso, because no one ever admires the desert. But if you look under the surface I'm sure you can find many more than what you see on top of it. Like even the plants, like the cacti or whatever" (Kristen, 3<sup>rd</sup> Interview).

Kristen's responses emphasized her sense of belonging and genuine concern for the earth's natural resources, while other students described their affinity and loyalty to the border community by stating how El Paso was their home.

**Not in my backyard!** The notion of place attachment was constructed in Richard's response about the symbolism of the towers and how the towers represented home and the border community. Students described how they went home to talk to their family members about the events that took place at ASARCO and questioned if they remembered the issue. Richard described how his father was upset when the two smokestacks were demolished. His father felt that the towers represented El Paso; it was a nationally recognized landmark. However, after learning about the injustices associated with the factory, Richard described how he thought that his father would change his mind if he knew the actual significance behind the towers. For Richard, learning about the injustices the factory brought was appalling because his home was directly affected.

Well this is different because it happened right here in our backyard... Growing up and seeing that this type of stuff happens every day, somewhere else, here, anywhere it can happen. That this affects us, it affects how long we can stay on our earth and how long we will survive (Richard 2<sup>nd</sup> Interview).

In addition, Mark commented how sense of place was falsely developed through complacency. Mark explained how some individuals were so used to seeing certain objects, or symbolic representations, that they automatically correlated these symbols or landmarks to place, to home, without truly understanding the significance behind the representations. For example, he explained the following:

If you think about how the ASARCO towers were built and how it actually grew with the people because of how far back it was built. So people were just born and the towers were there, like seeing it every day. It's like seeing the Wal-Mart close to your house or something like that and seeing it every day. So people probably didn't look at it like that, they were born with it. It has been in their family their dad worked there, their grandfather worked there. Because it was probably a whole community based around that and a few other things. So I can see that as just being something they can deal with. They didn't see it as such a sacrifice, they saw it as a more of a it was helping them. But the fact is it was really harming them (Mark, 2<sup>nd</sup> Interview)

**Place in a different place.** For some students, sense of place was in another place not in the border community. For example, Terry made several references to her hometown in Puerto Rico, where she was born and raised until she was six years old. Within a nine-year span, Terry's family moved in and out of seven different locations throughout the United States and abroad. Every two to three years Terry found herself in a new place, making new friends, and learning about the new culture(s). She explained how she had to be flexible and open to the change. While she described developing a concern for the environmental injustices she was learning about during the air quality thematic unit, the issues in the border community were not relevant to her or to her family because it happened a long time ago and didn't personally impact her family.

So when we first came in here [in the classroom], the first thing we started learning about was ASARCO. And I'm going to be completely honest, when he talked about it... it didn't affect me at all. Because it was so long ago (Terry, 3<sup>rd</sup> Interview)

The learning that occurred in class was tied back to her personal experience growing up in Puerto Rico. She explained how the issues the border community experienced were similar to issues her family faced in her hometown.

I see that the poster that is right there [points to poster of local factory on wall in classroom] and that's the first thing I saw when I walked in... I was like oh that's a factory and it pollutes, we have that over there in Puerto Rico too (Terry, 2<sup>nd</sup> Interview).

Additionally, Carol who moved to the border community seven years ago explained that her home was back in east Texas where she was born. She expressed that there were limited things to do in El Paso and that she wasn't too fond of the city. Like Terry, Carol moved to the border community because her father's military placement. She was uprooted from her home, from her extended family, and from her community. She felt that there was nothing to do here in the border community, especially on the side of town where she lived. She believed that the west side of town had more activities because according to her perspective, that is where the money was located. She had no family here, it was just her mom, dad, and brothers. Carol's personal connection to place was through the meaning of family and community, all of which was missing her in the border community.

Gruenewald (2003) described the role of sense of place as it, "expand[s] socio-cultural analyses and agendas for transformation to include an examination of the interactions between cultures and ecosystems" (p. 5). For many students the presentation of the thematic unit and the opportunity to reflect on the issues, as an integrated approach embedded in the design of the activities, provided them a new way of learning, a way to transform their thinking about their

world and about the issues which they traditionally learned through textbooks or dittos. In this case, students were exposed to a critical pedagogical approach that encouraged them to grapple with their understanding of the issues in order to make personal connections and lasting learning.

### Theme Three: From Conforming to Transforming Thinking

The next theme describes how students reported a change in their thinking over the course of the study, moving from conforming and accepting, to thinking that was transformed and reinvented. The students described how they actually changed their behaviors or considered doing things in an environmentally conscious manner even though the unit was only four weeks long. They reported that the discussions during interview sessions encouraged them to consider and think about issues in ways they have never considered. Table 5.2 provides a breakdown of the subthemes, the references made by students and the number of students who provided comments in this area.

Table 5.2: From Conforming to Transforming Thinking

Definition: References that relate to students' identified changes in thinking or new actions that they developed as a result of their new knowledge.			
Subthemes	References	Source	Sample Comments
Pro-environmental Behaviors	15	5 of 7	Honestly, I think that our purpose as humans, we are here to help the world. This world takes care of us. We get all of our resources for this world and we shouldn't abuse it (Mark, 3 <sup>rd</sup> Interview).
Reasons to Conform	33	7 of 7	<i>Because it is less work for us to not do anything, it is more convenience to just live the way we are living because we don't have to really work on it or put too much thought into it. I don't know... we are lazy as human beings (Sarah, 3<sup>rd</sup>)</i>
The Role of Education	14	7 of 7	<i>This class opened my eyes to something, to something, I think okay I can change that easily, I just need to be determined to change it. I don't know I think this class ... is sometimes depressing but it is a good</i>



**Pro-environmental Behaviors.** Five of the seven students described how they developed pro-environmental behaviors or a personal desire to care for the environment just by participating in the environmental science course and through reflection of environmental justice issues. Kristen described how she stopped purchasing plastic water bottles and instead began to use a water bottle from home that she refilled every day, “those water bottles can be thrown and they typically end up in our environment, so while we think we are recycling we really aren’t” (3<sup>rd</sup> Interview).

Kristen also explained how she reuses paper towels “until it gets dirty” to avoid wasting. The course helped Sarah monitor her personal use of water and electricity in effort to be more mindful of conservation efforts. She explained how she realized that her habits of taking “long showers and leaving the lights on” was wasteful. She reported feeling depressed to think that it took her this long to realize how she could make a difference. She stated that she knew even if it was one person changing their habits, one more person could lead others to a heightened consciousness focused on the environment’s natural resources. Similarly, Carol and Mark both realized how critical it was to begin protecting the earth’s resources by not littering and not abusing the environment. Carol described how her parents made her and her siblings walk around the neighborhood to pick up trash if they were caught littering. Sarah’s comment below provides evidence of the internal reflection and change in her thinking that emerged as she participated in the course.

People upset me sometimes because we don’t think about the things we do until after we are told and even so we still don’t think about the things we do. I don’t know what’s why

I want to try and change things, but it is really hard. But I want to try because I'm learning about what all this stuff does and how it is destroying our living space and we know about it and we don't do anything to change it. I know it is hard, but I kind of what to try to make it different (Sarah, 3<sup>rd</sup> Interview)

Like Sarah, each of the students described how the course had a personal impact on their outlook on the environment, opening their eyes and encouraging them to consider how their actions can make a difference. A few of the students expressed how education, was key in helping individuals to understand why it was important to care for the environment. Pro-environmental behaviors and genuine care are related to a personal, immediate connection. If students struggle to see the relevance or do not see the immediate reinforcement, then the likelihood to develop pro-environmental tendencies and civic responsibility diminishes.

According to Paulo Freire (1993), critical pedagogy is a dialogical exchange in teaching and learning that involves reflection on power, control, and hegemonic influences that “link experiences to the politics of culture and critical democracy” (p. 18). Freire encourages a curriculum that allows those who are marginalized, or oppressed, the opportunity to access internal resources in effort to support liberating structures from the ideological control. A critical pedagogy moves beyond conventional teaching allowing students the opportunity to make sense of the world around them. A critical pedagogy offers students the opportunity to question the origins of knowledge in order to come to terms with their own definition and understanding of concepts and fosters the development of pro-environmental behaviors that transforms thinking and leads to action related behaviors.

**Reasons to conform.** Several reasons were presented that related to reasons why the factory workers at the time, and community members who lived near the factory would conform

and accept the harm imposed onto them. Once again the findings were related to money and maintaining employment to support their family.

I'm really glad that they got shut down, but that really sucks for those people who got unemployed and that kind of thing, because what if they are trying to support their family? But I know there are other jobs out there, maybe you could get a little more pay than what you were getting there (Carol, 2<sup>nd</sup> -3<sup>rd</sup> Interview).

Back then, people didn't know what was going on so they didn't challenge, they were just there for a job. So it wasn't like a big effect on them. They needed to make money, so the safety wasn't their primary concern (Desiree, 2<sup>nd</sup> Interview).

Like I don't know, I felt like it was really hard at that time for people to be able to try and change something because I feel like, even still if it was like you were being able to support your family and benefited you guys, you wouldn't want to change it because then you would be out of a job. SO I just feel like it was hard on both ends. I feel like it would be mostly because of the money. That's why people are working there because they needed the money and an easy job. I feel like if my dad was working there and he wanted to stay it's because he had to find a way to support us and that would be easiest way to do it. I fell like that's what a lot of other families had to go through (Sarah, 3<sup>rd</sup> Interview).

**Role of education.** Access to knowledge that was culturally specific is important in supporting marginalized or oppressed individuals to not only document their own history, but to understand the cultural origins for developing a sense of belonging, identity, and transformative or action related behaviors that allow the individuals to take charge of their learning. Take for

example Mark who mentioned how an education was crucial in helping individuals to begin to question why certain things were happening. He states that questioning was an evolutionary right that everyone is born with and that we should question the world around us to help us see things differently. Terry also chimed in on the education topic by stating that through an education we can learn from our mistakes, or the mistakes from our predecessors, to prevent certain cycles of unproductive behaviors or actions from happening over and over again. And finally, Kristen described how an education provides “an opportunity, it’s a window... it can take you somewhere, it can take you to places you didn’t even know existed and some people are seeing things the way they are instead of seeing them the way it could be because there are so many possibilities.”

Sleeter (2005) describes three main elements of transformative education. The first element is the notion that knowledge has been “historically marginalized or subjugated” (p. 83) for specific underrepresented populations and therefore has been deliberate in oppressing or limiting cultural specific knowledge that support minority populations’ identity. Second, such explorations of coveted knowledge allow those who are oppressed the opportunity to liberate themselves by arming them with cultural knowledge. And, a transformative education brings to light the work of scholars who make information available that is fact-based and documented historically so that other individuals, including those who are oppressed, can make informed decisions and have access to knowledge that is real and representative of their struggles.

The reproduction of knowledge the students made as they constructed their own perceptions and learning is also described by Valdes’s (1997) basic tenets of LatCrit in the production of knowledge. Like the students in the study, Valdes explained how Latin@s begin to

produce their own way of knowing, one that is culturally relevant and meaningful in understanding their role(s) and views in society are significant.

#### **Theme Four: Taking Action for Self and Others**

The final theme is presented in terms of student development of agency and advocacy leading toward action-related behaviors. This theme is composed of three subthemes that include students' statements on how they personally have developed agency and envisioned advocating for their family and community and other silent voices in effort to address the unjust conditions that impact their personal livelihood.

Table 5.3: Taking Action for Self and Others

Definition: References made to students developing agency or advocacy, taking action for self and others.			
Subthemes	References	Source	Sample Comments
Agency and Advocacy	11	7 of 7	<p><i>I know we have to do something as a people because we rule the laws it's a democracy but sometimes we are fooled to believe that our voice has no, like it can't change anything. Like one voice, well one single voice can spark many voices (Mark, 3<sup>rd</sup> Interview)</i></p> <p><i>We need to get people with power because if you go to let's say Washington or something like that, they are not going to listen to one person from a little town. They are going to need a representative... someone with power for things to actually get done (Terry, 3<sup>rd</sup> Interview)</i></p>
Motivating Factors	26	5 of 7	<p><i>If that was me now, I would try and get out of there as fast as possible. I mean, I couldn't help it if I was born there or if I was a child obviously, but if it's me at my age where I am right now... I would try and get away from it as far as I could. I would try to get it shut down, I would try and talk to someone because I wouldn't want that... all that happened, the cancer</i></p>

**Agency and Advocacy.** Terry and Bohnenberger (2003), report that students generate outcomes such as student agency, genuine care for community, and civic responsibility by participating in service based learning activities that are designed to foster action oriented behaviors. Agency is defined as a personal commitment to take action in effort to improve conditions by making change; an advocate is someone who takes on the responsibility to take action or to fight for the rights of others. While each of the seven students mentioned either developing agency and/or becoming an advocate for others, to some degree, the potential for developing action related behaviors that move toward civic mindedness, in terms of civic agency, could be foreshadowed down the road in the students' lives. Activities such as service learning projects connect students to the larger community and its concerns, thus engendering in students an appreciation for, and understand of community norms and civic responsibility (Battistoni, 2013, p. 112) Civic identity is formed through the collaboration and interaction with others in which service learning represents and serves, thus leads an individual to take action (Battistoni, p. 114)

**Personal agency.** Person agency was described by four of the seven students as identified outcomes of their learning and participation in the air quality thematic unit. Sarah and Kristen both described how they would take personal action to address the environmental injustices in their border community. Kristen, Mark and Sarah commented:

I'm trying to change like for the better of the environment. It made me realize, 'come on now', if you want change, it's not going to happen, you have to do it even if its one person doing it by themselves (Kristen, 3<sup>rd</sup> Interview).

I just think that it's up to us at the end of the day, it's up to us, the individual voices, people who really want change, and people who actually realize that it's necessary and they are not just sitting there (Mark, 3<sup>rd</sup> Interview).

I think it's just like a chain type of thing. Like it starts with one person, then multiple people, then higher ranked people. I feel like people don't understand that, because they're one person and they feel like they have such a small voice against everyone else in this world, but I mean if it is really something you are willing to do... it can happen (Sarah, Focus Group 2)

For many of the students the thought of taking action alone was challenged by their current position as young and naïve students. Terry felt that she needed more schooling behind her to support her in taking actions and knowing the issues in-depth. She mentioned taking it to a "higher level" by talking to the campus principal, the head of the city, or even university professors who would lead in taking action for others.

So I think it would be better for all of us students to come together, students show the principal and I guess that would give her more motivation to go find someone else. Because if it's just one little student, she [principal] is going to probably going to forget about it, but if we do something that involves the whole school... it would be more memorable and I think it would be something that would get up a lot faster because people are so motivated like, 'oh these kids are really serious about this, its not just one student, they are really serious'. (Terry, 3<sup>rd</sup> Interview)

On the other Sarah felt that taking action could be propelled if other businesses or large companies in the community took a stand and modeled pro-environmental behaviors, then the masses would follow.

I think to get people to understand is to get companies on board. For example, if Wal-Mart were to start using nothing but solar panels for electricity, I feel like that would be huge! Wal-Mart is huge and is everywhere. It would have to start with small things like that then eventually it would develop into something much bigger (Sarah, 3<sup>rd</sup> Interview)

Venkataraman (2010) argued that educators can support students like Terry by raising their awareness and consciousness of critical issues, supporting advocacy, and providing tools for making informed decisions, thus, potentially impacting the community and producing lasting and sustainable results.

**Motivating Factors.** The students described how family and working along-side others who shared similar beliefs and goals served as motivating factors to push forward and take action. Four of the seven students also found strength and motivation when working alongside family and other mentors whom they felt could lead the way. Mark described how he had no problem following his brother and taking action; he stated how his brother would lead, and he would follow. Sarah had the same sentiment she described how her sister boycotted certain places, like zoos and aquariums that hold animals against their own will. She wanted to have the same confidence and passion her sister had and stated that she would try to influence others around her. Family played a critical role in students feeling empowered or confident to stand with them and fight for a cause.



I thought about it, ‘Oh my! What if this was my family?’ and like things like that affects me in a way where if that was my family, and knowing how we are... we wouldn’t have just sat there... We would have actually tried to do something, we would have gotten towns together to protest or something. So that’s how I see it, but honestly if now if that were to happen, its like it would be completely different because people are so opinionated and prideful. They wouldn’t want to carry that [guilt]. So I guess people now would have done something to work with the actual company as a whole to change something (Terry, 3<sup>rd</sup> Interview).

I would try and make a difference for my family and my community. You never know if those others have family around (Carol, 2<sup>nd</sup> – 3<sup>rd</sup> Interview).

These comments connect with one of Valdes’ (1997) LatCrit tenets that deals with the expansion of struggles. Expansion of struggles involves gathering a community or group of people who have similar struggles and finding ways to move them forward to address the needs together as a group. Students also mentioned how their decision to take action was based on whether others would join them in the cause. The notion of power by numbers was described by the students as a process for taking action together with group of people together who have the same concerns or problems in attempt to work collectively to address, in this case, environmental inequities. Together as a team they could tackle the work so that their united voice is heard.

It would take more than one or two people to change things, it would probably take a whole community living there to change something like that, or if like something drastic were to happen. I feel like it would take more than just me to make a change. I feel like if

I can get more people to be open-minded about things and then from there as a group we can make change. But it's just a lot to take on, I feel like it would take years to be noticed if it was just me. But I think anyone can make change if they really wanted to. I mean you just have to be determined and actually want what you say you want (Sarah, 3<sup>rd</sup> Interview)

In previous statements Sarah described how she would do things on her own, because one voice was important and things can get done with one person. However, after reflecting on her thinking, she stated that she would need more than one person, she would need a group of people to help get her message across.

### **Summary**

The four themes that emerged from the data captured the essence of the students' perspectives and standpoints. The data provides evidence that students held various levels of standpoints as they considered the different issues that the factory presented in terms of environmental harm and risk to the community, the workers, and the environment. LatCrit was also evident in students' responses as they contemplated race, poverty, and social class issues within their personal sphere of living and knowing or applying their knowledge to the greater good of humanity.

## **Chapter 6: Discussion**

### **Introduction and Overview of the Study**

For too long the histories, experiences, cultures, and languages of students of color have been devalued, misinterpreted, or omitted within formal educational settings (Delgado Bernal, 2002). The thematic unit presented in the environmental science course provided students an opportunity to learn about local meaningful environmental justice events that directly impacted the border community by embracing the difference described by Delgado Bernal. Students were provided opportunities to reflect on the events that took place and to formulate their own thinking, perspectives, and standpoints after considering the different aspects of the issues presented in the air quality thematic unit. Four themes emerged in the study including: Obligated Exposure, Sense of Place, From Conforming to Transforming Thinking, and Taking Action For Self and Others.

### **Interpretations of the Study**

As the students mentioned, the opportunity to learn about local environmental justice issues was eye opening in that they were learning about a topic that was meaningful to their lives and relevant to their community. And while the study was based on a snapshot of a four-week air quality thematic unit, it must be noted that the time frame may not have been a sufficient length of time to confirm the reported development of pro-environmental behaviors and genuine care for the environment.

While the study's primary focus was to highlight the Latin@ students' standpoint on environmental justice issues, the study also highlighted a representative sample of the borderland community by not excluding non-Latin@ members. The inclusiveness of the study adds value to the literature which is limited in the representation of two important groups: (1) minority,

underrepresented Latin@ students, and (2) high school students in general. The findings provide a deeper understanding of how Latin@ high school students think and interpret their learnings while participating in the thematic unit that presented complex local environmental justice issues. The students' voices, including their perceptions, are essential in understanding how this minoritized, underrepresented student group thinks and responds to the critical issues.

Revisiting the research questions presented in the study, I examined closely the students' responses as they reflected on the impact the local factory had on the community, including the meaning students made that was shaped not only by their interest in the topic, but by their current understanding of the issue(s), their background experiences, and their cultural awareness and beliefs. Each of these components played a critical role in addressing the first research question: How do Latin@ students interpret local environmental justice issues?

As the students learned about the environmental justice issues that plagued their community they expressed, if given the same situation, they would take different steps to ensure their families were safe and protected from the environmental harm. Family was an important motivating factor that propelled the students to take action to either limit or eliminate their exposure. However, at first glance the students explained how exposure to environmental harm, from the standpoint of the factory workers, as an obligation that was necessary in order to survive and make a living. The students debated whether or not those directly impacted by the exposure (including the factory workers, their families, and nearby community) were aware of the impact that existed from the exposure of hazardous toxins. The students questioned if the level of education and overall awareness of the issues played a role in the factory workers' acceptance (both willing and unwilling) of the continued exposure to hazardous toxins while the factory was in full operation. While some students mentioned the role the Hispanic/Mexican

culture in accepting the conditions without questioning “why”, the students also expressed how some families may have felt that they had no other choice but to accept the conditions. The students acknowledged that the factory, which was situated in a poor, underrepresented border community, provided a financial investment and medical benefits which at the time could not be denied nor turned down. They debated if the benefits of working at the factory outweighed the risks associated with the exposure of harmful toxins, including the benefits it provided to the border community. In the end, students decided that it may have been worth the exposure. One student in particular, Kristen, questioned why the individuals accepted the unjust harm, but also why the injustices persisted. Sarah also described how her aunt, who lived on the Mexican side of the border, moved her family away from further exposure and harm. What motivated her aunt to move? It would be interesting to see what propelled Sarah’s aunt to move, are there other examples of removing oneself from harm? This is one example where an individual did not feel “obligated” and conform. While the students expressed, through their voice(s), how the factory workers and community were in a sense obligated to the exposure because of their circumstances, they questioned why city or government officials would allow the unjust practices to continue?

In addressing the second research question: How does the place-based component of the lesson, which focuses on a locally relevant event, influence students’ understanding of environmental justice issues? The notion of “Sense of Place”, which was the second theme that emerged in the study, captured the connection and affinity the students’ described to their border community, their home, and the urgency to protect, care for, and conserve their environmental resources from further harm. Five of the seven students expressed a genuine concern for the border community because they themselves were born and raised here along with their parents

and grandparents. The students expressed how they were surprised when they uncovered the harm the factory imposed on the community. While two of the seven students did not define this genuine connection as the native El Pasoans described, the two students made connections to their hometown where they grew up as a child and made correlations to other source point pollution emitting sources in their community. The place-based component was critical in helping students make personal connections to their home, their place, as they participated in the thematic unit. While the events may have been different for the students, their understanding of why the injustices occurred was crucial in meeting the goals of the lesson (how does place-based component influence students' understanding of environmental justice issues?). The students understood the impact of environmental justice issues through their home or place-based connections.

The third question focused on students' perceived agency in the community: How do high school students perceive agency within themselves or others in the border community? The answer to this question was evident as students described becoming advocates for themselves and others in order to protect their family and community from further harm. While five of the seven students felt they would take action on their own, two students described taking action alongside other individuals in the community; individuals with high status and power. For example, Terry felt that the campus principal could influence their cause by gaining support from city officials. Each of the students also mentioned how they felt encouraged to stand up and take action, however they felt reassured by the thought of working alongside a group of people, through power by numbers, focusing on the same mission and addressing the cause in a collective voice. Therefore, while the students described becoming an advocate, they felt comfort in knowing other border residents would join them.

The next section provides yet another perspective of the findings by making connections to the theoretical frameworks that were used as a lens for analyzing the data and interpreting the findings.

### **Standpoint Theory Connections**

There were several examples within the students' responses that provided evidence that students had developed personal standpoints on the various issues. A standpoint, for the purposes of this study, is an understanding of one's personal location in society and how that standpoint is connected to oppressive relationships such as power and control and other intersections of difference that are evidenced through socioeconomics, class, race, culture among other separating features.

Wood's (2010) key principles of Standpoint Theory were applied to the students' responses and a few examples were provided to exemplify the connections students made that coincide with this framework. Frist, Woods (2010) describes how there are distinct levels of power or structure that separate dominant from non-dominant groups. Several of the students understood that there were clear separations between those in dominant positions, those in power and control, and the non-dominant groups of which they related to and identified with. Terry explained how the city and government, or school authority figures like the principal, were the only entities capable of addressing the injustices because they had the power and the knowledge to make changes. Therefore, Terry's perceptions of agency was through those who were in higher ranking positions within the border community. She did not feel that she could evoke change through her young adult voice, she knew she needed prominent representation in the community in order to tackle the issues at hand.

Second, members from non-dominant groups have a better understanding and consciousness of their own social location and the social location of the oppressor (Woods, 201). Students expressed how the social location of the oppressor, those in control, was above everyone, specifically above the factory workers and the exposed community. Richard and Terry made reference to their personal social location as low or poor, or coming from humble upbringings. The students were cognizant of their financial status and viewed those in leadership positions like the campus principal, the factory owners, the head of the city, and the government as individuals with high status – those in control. The factory owners' location or place was at a high social location where they were personally disconnected and removed from understanding their employees' situation. In the same light, Terry commented on the factory workers' social location by stating, "Unless it's your family getting sick, you're not going to care."

Third, members from non-dominant groups have a "privilege epistemological position because it entails double consciousness, being at once outside from the dominant group and intimately within that group in ways that allow observation and understanding of that group" (p. 62). Terry and Kristen visited multiple perspectives as they spoke about the workers' need to keep a job and to bring money home to their family (Obligated Exposure), while at the same time they mentioned the factory owners' need to make money and they had every right to that privilege. Terry defended the factory owners by comparing her understanding of power and privilege to her upbringing in Puerto Rico. Terry explained how most of the people she knew living in Puerto Rico came from humble upbringings, they were poor and had to carpool or use the local transportation, like buses, to get around; those individuals who had an education or well-paying job worked hard for their status and should therefore be able to enjoy the privilege of owning their vehicle.



It's not a bad thing to use buses because you are carpooling and that's the best way you can go, but being that people do need to get to and from work faster than everybody else you know late days and things like that... them having the money, it is easier for them, easier for them to get transported, but hurtful for the environment because there are more cars on the road. People who are rich are not going to go on a bus... they have money for that. They have worked hard for their money. They are going to want to have a nice car, they are going to want to go somewhere and come back without having to figure out, 'okay what route do I have to take, how much do I have to walk' you know?

So while she recognized the harm caused by pollution from traffic, she also felt that the individuals who could afford their own car, typically from higher socio-economic standpoints, and were entitled because they worked for it and therefore earned that privilege.

Fourth, members from non-dominant groups must be able to assess how political, social, locational, and cultural factors create relational conflict and separation ultimately influencing their social status and perspective. This principle was addressed in the students' discussion on the politics associated with being a border city. The students recognized that there were differences in the public's perception of imposing environmental harm south of the border. In the ASARCO case study students learned that the factory cranked up production when the winds blow south, because the southerly winds blew pollution south of the border into neighboring Mexico. Several of the students questioned why that action was acceptable. Students also discussed how the figurative notion of a border did not prevent the pollution from going either direction. Instead of looking at the issues from a border perspective, Kristen voiced her concern from a humanitarian view in doing good for the environment and taking care of the earth. To her,

it did not matter that our community had borders, what mattered was how we were protecting the people on both sides of the border.

And finally, members from non-dominant groups can have several perspectives or standpoints that are influenced by social class, economics, and race. Richard made several references to position in terms of his race, social class, and status as a border resident. He described how he experienced racism as he attended sporting competitions outside of El Paso, how he was offended when he was assumed to be involved in the violence and controversy that was a reality for the border community. Richard commented about his social and economic location in the border city. He explained how his personal experience with race was associated with discrimination and made several connections to the injustices that related to environmental racism in the border community. He also mentioned how he was able to see different standpoints by comparing his status of being poor to those who are more affluent, or to those who live in different parts of the United States. He commented on how his views would be different from someone living in New York or Los Angeles.

Terry also adjusted her life from living in poverty to living in the military where she felt “rich” because of the many resources the military provided for her family. Each of the students at some point in their life had to situate themselves politically, culturally, and socially in response to their interactions with society.

Throughout the study the students presented their perspective of belonging to a minority, underrepresented population and were aware of their position or standpoint compared to other positions and levels. The students acknowledged the struggles the workers were engaged with while at the same time provided reasons or perspectives on behalf of the factory owners who controlled the situation. Harding (1993) and Michaelian (2008) affirmed that the knowledge of

individuals with low positionality is far more advanced because of their understanding of difference. With that said, this study adds value to the literature on standpoint theory by affirming that marginalized, underrepresented students have more knowledge of environmental justice issues by living in a border community and observing the differences between dominant and non-dominant groups.

### **LatCrit Theory Connections**

Several connections were made regarding the intersectionalities of LatCrit and the students' perceptions and standpoints on environmental justice issues. While the framework was originally designed around the Critical Race Theory tenets, LatCrit stemmed from a legal standpoint and has been interpreted in the field of education (Solorzano, 2002; Yosso et al., 2001). Valdes' (1997) proposed four overarching principles that include the production of knowledge, advancement of transformation, the expansion and connection of struggles, and cultivation of community and coalition.

In this study, the first principle, production of knowledge, was addressed as students reflected and reported on their overall learning in the course. The students expressed how they felt what they were learning was meaningful and relevant and they were glad they were enrolled in the course. Kristen specifically stated that she was glad that she was finally learning about something important, about something that mattered to her personally. She mentioned how she felt the school system had failed her by forcing a rigid educational program that focused solely on math, science, and literature. She wanted to learn more, she wanted to learn life skills. She was happy when Mr. Patrick began teaching about the environment through a critical lens because she felt the new knowledge was important to her. She was excited that she was finally learning something useful and finally able to express her herself among her peers.

Mark also expressed how he viewed things differently now that he embraced this new knowledge. He commented about how his new knowledge inspired and empowered him to create rap music, where he was able to express himself now that he had a deeper understanding of the issues.

Sense of place was also evident as students developed their own knowledge or production of knowledge. Student who had a strong sense of place were able to reflect on how they adjusted their behaviors and actions in support of pro-environmental intentions. Recognizing the need to be energy efficient and reduce the amount of waste was new knowledge that may not have emerged in a traditional setting. Overall, knowledge production was evident in the students' responses when they made reference to learning about their environment that moved away from traditional teachings. The students not only appreciated what they were learning, but how they were learning the content because it encouraged them to think about issues that mattered to their lives and to their community.

The production of knowledge also leads to the second LatCrit principle, advancement of transformation, which was the third theme that emerged in this study. Each of the seven students expressed how their thinking regarding the environmental justice issues changed and how they were beginning to see things differently. Students described how they essentially constructed new knowledge related to environmental justice awareness and considered taking action for themselves and others in response to their learnings about the factory. Each of the seven students attributed their desire to take action, either for themselves or for others, to the new knowledge they learned during the thematic unit and attributed their new perspective to the course and to the teacher.

The third and fourth LatCrit tenets, cultivation of community coalition and expansion of struggles, are closely related in that one impacts and inspires the other. Expansion of struggles was described as the process by which individuals who face similar oppressive circumstances are gathered, or unified, through the experience of common struggles and therefore create a community coalition in order to support each other because they are all in the same situation. The students felt that their course of taking action would be expedited if there were more people fighting for the same cause. I refer to this notion in my study as power by numbers; the students felt that there was a greater chance that their cause would be addressed if more than one person gathered and rallied together to focus on the issues in one collective voice, a voice that represented the masses. The students felt that working as a team, in a large group would have a greater impact compared to one individual voice acting alone. This collective process naturally transitions and garners others within the community to support a “cause” in solidarity, cultivating community and coalition. Individuals working collectively to support issues of difference from all aspects, including diverse populations is key in building a coalition of community members. Sarah commented on the power in getting a group of individuals, specifically mentioning the importance of including higher-ranking individuals, such as the principal or head of the city, who are considered credible community resources that could help move the focus forward.

*I think it's just like a chain type of thing. Like it starts with one person, then multiple people, then higher ranked people. I feel like people don't understand that, because they're one person and they feel like they have such a small voice against everyone else in this world, but I mean if it is really something you are willing to do... it can happen*

(Sarah, Focus Group 2)

These tenets were evident in students' responses as they discussed how they developed personal agency and the urgency to advocate for themselves and others. Seven of the seven students described, to some degree, how they were inspired to take action even if it they were leading the cause. For example Kristen and Sarah described how it was important for them to take action to address environmental injustices that impacted their border community, the earth, and most importantly their family. They explained how even one person can have an impact. Richard and Desiree were slightly reluctant to take action on their own. They reported how they would feel empowered assisting a group of individuals who were taking action and did not feel comfortable or confident taking action on their own.

At one time, Sarah and Mark demonstrated this confidence as they described their desire to lead others. However, later in the interview and focus group process they expressed that they were hesitant to lead a movement on their own. This sentiment coincides with the LatCrit tenet of expansion of struggles in that Latin@s are able to connect with others who have similar concerns or are experiencing similar injustices. It is through this expansion of struggles that Latin@s find comfort in working alongside others who share similar views. Terry specifically mentioned organizing a cause with her peers using the principal as the main focus, who would speak on their behalf to address the inequities. Terry described how she felt the principal was seen as a high status individual in the community who could organize with city or government officials to addresses the inequities. For Terry, and other students, they saw those in power as those who had all the answers and were capable of making change. They felt it was unrealistic to expect adults to even consider their views as students to be honorable or justified.

Another theme that emerged in the study was the notion of acting for family, where family was seen a motivating factor to lead a cause or to take a stand against the injustices. The

students described how they would protect their family and community by taking action in order to prevent or eliminate harm, thus further cultivating a community coalition against the injustices. Each of the seven students expressed the importance of family and did not understand how or why the factory workers or community allowed the continued exposure of hazardous toxins but accepted the exposure as an obligation. While LatCrit supports individuals to come together in solidarity to fight for a common cause, in the case of the border community the students learned that the factory workers accepted the harm because they needed a job to support their family.

In summary, LatCrit is grounded in raising awareness, and giving a voice to those whose voice would have been disregarded or minimized (Delgado Bernal, 2002). This study allowed students the opportunity to address environmental injustices that were relevant and meaningful to their lives. Hearing the different perspectives and standpoints through the students' voice is powerful. The interview process allowed students an opportunity to reflect on critical issues that are typically ignored in a mainstream class. Richard expressed how participating in the study helped to transform his thinking because he would have never taken the time to reflect on these critical events on his own if he had not participated in the interview process. While the interview process may have supported students to reach higher levels of consciousness of the issues presented in class, compared to a tradition textbook or ditto lessons, the findings suggests that interviews or critical dialogue can be used as an instructional tool to support students' development and understanding of issues compared to skimming the surface through conversations for the sake of covering content. LatCrit can be used as an instructional tool for uncovering and discovering controversial topics/issues that are meaningful and relevant to the lives of underrepresented, minority Latin@ students.

## **Implications of the Study: Recommendations for the Classroom**

As noted in the previous section there is a need to present curriculum that allows students an opportunity to explore controversial concepts that support a critical dialogue between students and their teachers. The implications of this study add value to our current understanding of the literature and field of environment justice research, which is currently scarce in the representation of diverse student populations, namely Latin@s. The following implications emerged in the study as critical points to consider for future applications:

- 1) The use of critical pedagogical approaches in the classroom through service learning projects that incorporate environmental education standards; the history of environment education; and the need for developing sustainable pro-environmental behaviors in citizens.
- 2) Teacher training on critical pedagogical approaches/service learning.
- 3) The use of LatCrit methodologies for raising awareness among minoritized and underrepresented populations that allow students' to have a voice on environmental justice issues.

The literature on environmental justice education emphasizes the need for critical pedagogical approaches that encourage reflexivity on the students' part that personally connects and motivates them to reach desired levels of pro-environmental behaviors. Dewey presented this vision of meaningful and relevant curriculum in the field of education as early as 1916, describing relevant, in the field, hands-on experiences connecting theory to practice. Several of Dewey's followers, like Piaget and Bruner, also believed in the importance of meaningful experiences that would foster curiosity and genuine interest in learning -- overall, a critical pedagogical approach that utilized hands-on, minds-on lessons focused on locally relevant



issues, engages students to participate in the environmental (Fazio and Karrow, 2013), socially and morally (Brandenberger, 2013).

The same rings true for this study. First, the findings indicate the importance of minority students' understanding of the various environmental justice issues that were examined through the air quality thematic unit. Students made clear connections to the injustices associated with being an underrepresented, underserved population that was marginalized and discriminated against with the placement of a local factory that polluted and disregarded the health and overall well-being of the border community. A community where race, socioeconomics, class, poverty, education level, language, culture, and nationality are among many other factors, as reported in the literature (Bullard, 2000; Downey & Hawkins, 2008) were taken advantaged of and negatively impacted not only the lives of the factory workers, but also the border community at large.

This instructional approach allows students the opportunity to confront these tensions and make sense of the issues through their perspectives or standpoints according to correlations between the environmental education standards, history of environmental education movements, and connections to locally relevant events. The air quality thematic unit supported students in accessing their cultural and environmental knowledgeable, thus leading to acting for or responding to the environment's needs, for themselves, and for others. Students created their own knowledge in terms that were meaningful and relevant to them. No curriculum module is perfect, and this unit could be improved with modifications such as: 1) relevant point source and non-point pollution sources, and 2) ample time for exploring complex topics throughout the year. Extending the time to engage in critical environmental issues may have increased the already geared pro-environmental behaviors discussed by students.

While there are different ways to implement a critical pedagogy, a recommendation is to use service learning projects as a vehicle that supports students' critical reflection on meaningful topics and also includes a service oriented perspective. Bringle, Clayton, and Hatcher (2013) define service learning as a pedagogical tool that involves several roles including students, faculty member(s), and the community to address issues that are meaningful and make an assumed positive influence in meeting the civic needs of others. Bringle et al. add that service learning, "benefits the community in tangible ways and that incorporates reflection to support the academic, civic, and personal development of students" (p. 338). Service learning to the degree that it leads to such development, then, is not a neutral pedagogy. It engages students in relational and moral contexts and readily lends itself to evoking students' ethical awareness and sense of responsibility (Brandenberger, 2013). Service learning provides the following outcomes:

Self-understanding and autonomy, locus of control, emotional intelligence, character, courage, political efficacy and attitudes, spiritual or religious orientation, attitudes toward social issues, conceptions of fairness and justice, openness to diversity, moral judgment, identity development, sense of integrity and purpose, motivation, interdependent, wisdom, well-being, flourishing, civic orientation, leadership skills, and personal ways of knowing." (Brandenberger, 2013, p. 134)

These outcomes support transformative learning and thinking that will lead to pro-environmental behaviors and civic responsibility.

There is a need for teachers to understand how to implement critical pedagogical approaches in schools. With the rapidly changing demographics in the United States alone Hudson (2001) argued that there is a great need to provide environmental education programs to reach "ethnically and culturally diverse populations" (p. 285). Meichtry and Smith, (2007) found

teachers' pro-environmental understanding, confidence, and content knowledge enhanced during the participation in a watershed summer staff development program where teachers physically explored the Ohio River over six days. Kyburz-Graber (1999) studied critical environmental education and learned that teachers struggled with the implementation of the instructional approach and therefore did not favor the program over all.

Traditional methods disregard students' prior knowledge, cultural backgrounds, and experiences. Banks (2006) states that this type of traditional, teacher directed instruction disengages minority students because it does not connect to their personal lives, culture, and experiences. As Brandenberger's (2005) states, the "power of the pedagogy to cultivate it" (p. 134). Students should be provided a curriculum that enables them to move from a fixed or traditional curriculum to one that challenges the reproduction of knowledge, which is one of the LatCrit tenants presented by Valdes (1996), to develop their own narratives so that their voice is understood and heard. Which leads to the next implication of incorporated LatCrit methodologies that give students voice. When students are allowed to present information from their perspective, or standpoint, there is buy-in because students feel that their voice is heard and honored. LatCrit allows researchers to tell a narrative, a story, a counter story, and *testimonia*, where individuals contemplate their realities in respect to others. LatCrit methodologies support bringing forth minoritized students' voices, which are typically disregarded in the decision-making process that determine environmental justice exposure. With the representation of ethnic culture becoming integrated in our school systems, it is timely for educators to think of ways to ensure students have access to a quality curriculum, a curriculum that is meaningful and relevant to their needs. In this study, students had an opportunity to move from a fixed or traditional

curriculum to a challenging curriculum that allowed for production of knowledge and to develop their own narratives so that their voice is understood and heard.

## **Challenges**

Each of the seven students described the different challenges that were observed or personally experienced during the implementation of the air quality environmental justice thematic unit with a total of 15 references made from students. Some of the challenges stemmed from: (1) students interest and engagement with the topic; (2) the notion of age in being too young and not taken seriously; and finally, (3) the timing of the event.

The first challenge deals with students not being engaged with the topic or content in Mr. Patrick's classroom, which can be indicative of engagement at a broader level. Several of the students explained how some students in the class were simply not interested in the topic; they preferred to interact with social media outlets and had other interests such as sports. Environmental issues were not a priority nor did it personally engage all of the students in the class. Both Mark and Kristen provided their justification as to why the students did not fully participate or find the topic interesting.

Everyone is caught up on Instagram and Facebook and things like that, but they are too lazy to see what's really going on out there. (Mark, 2<sup>nd</sup> Interview)

Some people are just ignorant. They want to be on the phone playing games instead of learning about something that is really important to us...I don't know, I just wish that some of these students need to pay more attention because this is our environment and like just because it didn't happen to you, it can happen to you! You should pay attention (Kristen, 3<sup>rd</sup> Interview).

The next challenge had to do with age; students commented how their age played a role in their ability and confidence to lead others to take action. Desiree stated, “because we are young” as a reason why she felt she would not be taken seriously when leading others to take action. In some cases the students described how they were perceived as being too young to understand the issues, or too young to take action, and therefore would not be taken seriously. In an interview I had with Desiree she mentioned how she wanted to become involved with the local zoo and was interested in conducting volunteer work. However, when she went to inquire with the organization, she was turned away because she wasn’t eighteen years old. Yet, Desiree had been caring for her mother and brothers since she was seven years old. How can we excite our young students to take action and to become involved with their environment when society in general sees them as immature and too young to have an idea? Larson, Green, and Castleberry (2011) described how research with young children is difficult because of time constraints, children’s understanding of surveys, and their ability to distinguish between nature and environmental resources. While this may be true with young children, how can we better support young adults who are mature and ready for taking on such responsibilities?

The last challenge for students has to do with time. Students felt that time played a critical role in students’ understanding of and connection with the topic. Take for example the ASARCO story, while the topic was engaging and students were claiming to develop an increased awareness of the issues, one student felt that it was an old topic and it did not impact her personally nor did it impact her family. Time was seen as immediacy of the event, the student did not connect with the issue because it happened a long time ago. Terry mentioned that the event was in the past and we have to move on. Terry did not articulate the development of

sense of place with the border community. Her sense of place was back home in Puerto Rico, as a military child moving in and out of different locations. This mobility made it difficult for her to put her roots down, so the attachment and meaning of place in the border community had not been established.

### **Researcher's Reflection**

The integration of environmental justice research with Standpoint Theory and LatCrit supported the phenomenological research design to better understand the lived experiences of Latin@s. Overall I learned that students do indeed develop a greater awareness of the issues, a sense of place, transformative thinking, and a desire to take action for self and others. The responses were sophisticated and articulated their awareness of environmental justice issues.

Several connections were made by the students regarding their standpoint in relation to border environmental justice issues and society in general. Students' responses addressed each of the research questions and provided a wealth of information for other scholars to incorporate or expand upon. The findings of this study add value to the limited representation of Latin@s in the literature, including the development of pro-environmental behaviors and genuine care for the environment leading toward taking action either through civic minded or civic responsible behaviors.

### **Future Research**

As previously mentioned, several scholars (Bullard, 2000; Downey & Hawkins, 2008; Mohai & Bryant, 1995) posit how the voices' of minority students are absent or disregarded during the exploration of environmental justice issues in the main stream literature, thus reflecting middle to high, affluent non-minority experiences while learning or participating in environmental justice lessons. This study provided an opportunity to explore this ignored

population and to highlight the students' perspectives and standpoints on the issues. These students' words showed strength and depth of understanding – voices worth listening to, they proved that they do have a voice and their opinion matters. The next steps to expand and continue the work could involve the following:

1. Follow-through with students one year later and determine if pro-environmental behaviors persist after time.
2. Incorporate hands-on service learning experiences that provide genuine field investigations, including a civic action component that incorporates the community in the end product.
3. Incorporate other theoretical frameworks such as Borderland/Borders Theory which has many critical features related to Standpoint and LatCrit Theoretical frameworks, but focuses on sense of place through the notion of place and space, border pedagogy, and the formation of hybrid identities (Elenes & Delgado Bernal, 2010).
4. Include a parent component to determine if a “family approach” to learning about environmental justice issues supports and sustains pro-environmental behaviors and civic responsibility.
5. Further explore “Obligated Exposure” in the field of environmental justice research and other related fields. This theme resonates with me as I reflect on the harm my father assumed as a firefighter, the harm my husband accepts as a police officer, and the harm other first responders, including military personnel, accept as part of their job. There is an obligation to fulfill their duties in spite of the danger or hazards they encounter.

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## Glossary

- **Civic Mindedness/Civic Responsibility**- The North American Association for Environmental Education's (NAAEE) Excellence in Environmental Education: Guidelines for Learning (K-12) refers to civic responsibility as the “understanding societal values and principles”, “recognizing citizens’ rights and responsibilities”, “recognizing efficacy”, and “accepting personal responsibility” (2010).
- **Civic Minded Lessons**: Lessons that develop civic mindedness or civic responsibility as defined in the previous definition of civic mindedness/civic responsibility.
- **Critical Environmental Education** –is defined as the pedagogical approach teachers’ explore with their students when learning about environmental justice issues. Kyburz-Graber (1999) describes the term as a critical education that “allows young people to explore social issues in the real world by questioning values, perceptions, conditions, and opinions” (p. 416).
- **English Language Learner (ELL)**- Students whose primary language is other than English and whose English language skills are such that the student has difficulty performing ordinary classwork in English. (TEA, 2014b) ELLs are also referred to as **Limited English Proficient (LEP) which is defined as**, “A secondary school student, an adult, or an out-of-school young person who has limited ability in speaking, reading, writing, or understanding the English language and whose native language is a language other than English or who lives in a family or community environment in which a language other than English is the dominant language” (TEA, 2014b). In this study, I used the term ELL to describe students whose native language was different from the English language.



- **Environmental education (EE)** focuses on the human interrelationships with the environment using an interdisciplinary problem solving approach that addresses knowledge acquisition that fosters a deep understanding of concepts, develops attitudes and skills that are committed to addressing environmental problems (UNESCO-UNEP, 1983)
- **Education for Sustainable Development (ESD)** is an international definition that describes how everyone in the world has the opportunity to benefit from a quality education and learn the values, behaviors, and lifestyles required for a sustainable future and for positive societal transformation. The ESD is a process of learning how to make decisions that consider the long-term futures of the economy, ecology and the equitable development of all communities... The founding value of ESD is respect: respect for others, respect in the present and for future generations, respect for the planet and what it provides to us (UNESCO, 2009b, p. 1).
- **Environmental Justice** is the “fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies” (EPA, 2014, para. 1).
- **Hispanic:** The definition of Latino or Hispanic is described as, “people who classified themselves in one of the specific Spanish, Hispanic, or Latino categories listed on the Census 2010 questionnaire –‘Mexican’, ‘Puerto Rican’, or ‘Cuban’-as well as those who indicate that they are ‘another Hispanic, Latino, or Spanish origin.’” (U.S. Census Bureau, 2014). The terms Latino and Hispanics and Mexican American will be used throughout the study to align with how other scholars refer to the diverse, underrepresented group living in the border community.

- **Locally Unwanted Land Uses (LULUSs)**- is a term used to describe fixed pollution emitting entities such as, “landfills, incinerators, sewage, treatment plants, lead smelters, refineries, and other noxious facilities” (Bullard, 1994, p. 242). Arnold (2007) adds other examples provided by Been (1994) and Been and Gupa (1997) as, “hazardous waste incinerators, solid waste landfills, and facilities that store, emit, or dispose of toxic substances” (p. 4).
- **Mexican American**- Mexican Americans are U.S. citizens or residents who have Mexican ancestry or where born in Mexico (www.Dictionary Reference.com, 2014).
- **Proenvironmental behaviors** increase sustainability and internalization of environmental consciousness on the students’ part, fostering student agency and genuine care and concern for the environment (Schneller, 2008).
- **Seidman’s Interview Process**- A three-step interview process that was developed by Seidman (2006). The first phase involves capturing the life history or background information of an individual. The second step captures the experience of the phenomenon studied, and the third interview involves meaning making of the experience. The third interview involves a reflective process where individuals describe what the experience means to them. The interviews should last no more than 90 minutes each and are scheduled between three to seven day intervals. There are no set questions for the interview process, the interviewer guides the interview by asking prompting questions that allow the interviewee to elaborate on their responses to develop a deep understanding of the life history, experience, and reflection/meaning making.
- **Traditional Environmental Education (EE)**. This conventional form of environmental education incorporates an ecological approach to learning about the environment, focusing

on nature, awareness, and ecology. The emphasis is on knowledge and information (Cachelin, Paisley, & Blanchard, 2009) rather than critical reflexive process for initiating change in behaviors, which can lead to sustainable actions.>

## **Appendix A-NAAEE Guidelines**

<http://resources.spaces3.com/47edc444-7bd4-4093-918b-7964644cce75.pdf...>

## **Appendix B-Environmental Science Texas Essential Knowledge & Skills**

§112.37. Environmental Systems, Beginning with School Year 2010-2011 (One Credit).

(a) General requirements. Students shall be awarded one credit for successful completion of this course. Suggested prerequisite: one unit high school life science and one unit of high school physical science. This course is recommended for students in Grade 11 or 12.

(b) Introduction.

(1) Environmental Systems. In Environmental Systems, students conduct laboratory and field investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem solving. Students study a variety of topics that include: biotic and abiotic factors in habitats, ecosystems and biomes, interrelationships among resources and an environmental system, sources and flow of energy through an environmental system, relationship between carrying capacity and changes in populations and ecosystems, and changes in environments.

(2) Nature of science. Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.

(3) Scientific inquiry. Scientific inquiry is the planned and deliberate investigation of the natural world. Scientific methods of investigation can be experimental, descriptive, or comparative. The method chosen should be appropriate to the question being asked.

(4) Science and social ethics. Scientific decision making is a way of answering questions about the natural world. Students should be able to distinguish between scientific decision-making methods and ethical and social decisions that involve the application of scientific information.

(5) Scientific systems. A system is a collection of cycles, structures, and processes that interact. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.

(c) Knowledge and skills.

(1) Scientific processes. The student, for at least 40% of instructional time, conducts hands-on laboratory and field investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:

(A) demonstrate safe practices during laboratory and field investigations, including appropriate first aid responses to accidents that could occur in the field such as insect stings, animal bites, overheating, sprains, and breaks; and

(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.

(2) Scientific processes. The student uses scientific methods during laboratory and field investigations. The student is expected to:

(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;

- (B) know that scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;
  - (C) know that scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but may be subject to change as new areas of science and new technologies are developed;
  - (D) distinguish between scientific hypotheses and scientific theories;
  - (E) follow or plan and implement investigative procedures, including making observations, asking questions, formulating testable hypotheses, and selecting equipment and technology;
  - (F) collect data individually or collaboratively, make measurements with precision and accuracy, record values using appropriate units, and calculate statistically relevant quantities to describe data, including mean, median, and range;
  - (G) demonstrate the use of course apparatuses, equipment, techniques, and procedures, including meter sticks, rulers, pipettes, graduated cylinders, triple beam balances, timing devices, pH meters or probes, thermometers, calculators, computers, Internet access, turbidity testing devices, hand magnifiers, work and disposable gloves, compasses, first aid kits, binoculars, field guides, water quality test kits or probes, soil test kits or probes, 100-foot appraiser's tapes, tarps, shovels, trowels, screens, buckets, and rock and mineral samples;
  - (H) use a wide variety of additional course apparatuses, equipment, techniques, materials, and procedures as appropriate such as air quality testing devices, cameras, flow meters, Global Positioning System (GPS) units, Geographic Information System (GIS) software, computer models, densimeters, clinometers, and field journals;
  - (I) organize, analyze, evaluate, build models, make inferences, and predict trends from data;
  - (J) perform calculations using dimensional analysis, significant digits, and scientific notation; and
  - (K) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.
- (3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:
- (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;
  - (B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;
  - (C) draw inferences based on data related to promotional materials for products and services;
  - (D) evaluate the impact of research on scientific thought, society, and the environment;
  - (E) describe the connection between environmental science and future careers; and
  - (F) research and describe the history of environmental science and contributions of scientists.
- (4) Science concepts. The student knows the relationships of biotic and abiotic factors within habitats, ecosystems, and biomes. The student is expected to:
- (A) identify native plants and animals using a dichotomous key;
  - (B) assess the role of native plants and animals within a local ecosystem and compare them to plants and animals in ecosystems within four other biomes;

- (C) diagram abiotic cycles, including the rock, hydrologic, carbon, and nitrogen cycles;
  - (D) make observations and compile data about fluctuations in abiotic cycles and evaluate the effects of abiotic factors on local ecosystems and local biomes;
  - (E) measure the concentration of solute, solvent, and solubility of dissolved substances such as dissolved oxygen, chlorides, and nitrates and describe their impact on an ecosystem;
  - (F) predict how the introduction or removal of an invasive species may alter the food chain and affect existing populations in an ecosystem;
  - (G) predict how species extinction may alter the food chain and affect existing populations in an ecosystem; and
  - (H) research and explain the causes of species diversity and predict changes that may occur in an ecosystem if species and genetic diversity is increased or reduced.
- (5) Science concepts. The student knows the interrelationships among the resources within the local environmental system. The student is expected to:
- (A) summarize methods of land use and management and describe its effects on land fertility;
  - (B) identify source, use, quality, management, and conservation of water;
  - (C) document the use and conservation of both renewable and non-renewable resources as they pertain to sustainability;
  - (D) identify renewable and non-renewable resources that must come from outside an ecosystem such as food, water, lumber, and energy;
  - (E) analyze and evaluate the economic significance and interdependence of resources within the environmental system; and
  - (F) evaluate the impact of waste management methods such as reduction, reuse, recycling, and composting on resource availability.
- (6) Science concepts. The student knows the sources and flow of energy through an environmental system. The student is expected to:
- (A) define and identify the components of the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere and the interactions among them;
  - (B) describe and compare renewable and non-renewable energy derived from natural and alternative sources such as oil, natural gas, coal, nuclear, solar, geothermal, hydroelectric, and wind;
  - (C) explain the flow of energy in an ecosystem, including conduction, convection, and radiation;
  - (D) investigate and explain the effects of energy transformations in terms of the laws of thermodynamics within an ecosystem; and
  - (E) investigate and identify energy interactions in an ecosystem.
- (7) Science concepts. The student knows the relationship between carrying capacity and changes in populations and ecosystems. The student is expected to:
- (A) relate carrying capacity to population dynamics;
  - (B) calculate birth rates and exponential growth of populations;
  - (C) analyze and predict the effects of non-renewable resource depletion; and
  - (D) analyze and make predictions about the impact on populations of geographic locales due to diseases, birth and death rates, urbanization, and natural events such as migration and seasonal changes.
- (8) Science concepts. The student knows that environments change naturally. The student is expected to:

- (A) analyze and describe the effects on areas impacted by natural events such as tectonic movement, volcanic events, fires, tornadoes, hurricanes, flooding, tsunamis, and population growth;
- (B) explain how regional changes in the environment may have a global effect;
- (C) examine how natural processes such as succession and feedback loops restore habitats and ecosystems;
- (D) describe how temperature inversions impact weather conditions, including El Niño and La Niña oscillations; and
- (E) analyze the impact of temperature inversions on global warming, ice cap and glacial melting, and changes in ocean currents and surface temperatures.

(9) Science concepts. The student knows the impact of human activities on the environment.

The student is expected to:

- (A) identify causes of air, soil, and water pollution, including point and nonpoint sources;
- (B) investigate the types of air, soil, and water pollution such as chlorofluorocarbons, carbon dioxide, pH, pesticide runoff, thermal variations, metallic ions, heavy metals, and nuclear waste;
- (C) examine the concentrations of air, soil, and water pollutants using appropriate units;
- (D) describe the effect of pollution on global warming, glacial and ice cap melting, greenhouse effect, ozone layer, and aquatic viability;
- (E) evaluate the effect of human activities, including habitat restoration projects, species preservation efforts, nature conservancy groups, hunting, fishing, ecotourism, all terrain vehicles, and small personal watercraft, on the environment;
- (F) evaluate cost-benefit trade-offs of commercial activities such as municipal development, farming, deforestation, over-harvesting, and mining;
- (G) analyze how ethical beliefs can be used to influence scientific practices such as methods for increasing food production;
- (H) analyze and evaluate different views on the existence of global warming;
- (I) discuss the impact of research and technology on social ethics and legal practices in situations such as the design of new buildings, recycling, or emission standards;
- (J) research the advantages and disadvantages of "going green" such as organic gardening and farming, natural methods of pest control, hydroponics, xeriscaping, energy-efficient homes and appliances, and hybrid cars;
- (K) analyze past and present local, state, and national legislation, including Texas automobile emissions regulations, the National Park Service Act, the Clean Air Act, the Clean Water Act, the Soil and Water Resources Conservation Act, and the Endangered Species Act; and
- (L) analyze past and present international treaties and protocols such as the environmental Antarctic Treaty System, Montreal Protocol, and Kyoto Protocol.

Source: The provisions of this §112.37 adopted to be effective August 4, 2009, 34 TexReg 5063.



## Appendix C History of Environmental Education and Environmental Justice

Date	Event	Description:	Other Info:	Source:
1948	First federal laws presented on water pollution			EPA (1990)
1955	First federal laws presented on air pollution			EPA (1990)
1968	United Nations Educational, Scientific and Cultural Organization (UNESCO) Biosphere Reserve Conference	Introduced concept of environmental education training and awareness in schools		(Biedenweg, Monroe, & Wojcik, 2013, p. 25)
1969	1 <sup>st</sup> Environmental Education Journal published	Stapp (1969) presents concept paper on environmental education		(Biedenweg, Monroe, & Wojcik, 2013, p. 25)
1970	UNESCO and the International Union for Conservation of Nature (IUCN)	Defined Environmental Education	Location: Nevada	(Biedenweg, Monroe, & Wojcik, 2013, p. 25)
1970	Environmental Education Act	U.S. became the first country to develop environmental education policy (p. 14)		(Biedenweg, Monroe, & Wojcik, 2013, p. 25) EETAP (2000)
1970	1 <sup>st</sup> Earth Day	William Stapp helped to coordinate the first Earth Day.		Sarokin & Schulkin (1994) ETTAP (2000)
1970	Clean Air Act	Presented and amended in 1977 and 1990		EPA (1990)
1972	Human Environment Conference	UNESCO an United Nations Environmental Program (UNEP)	Location: Stockholm	(Biedenweg, Monroe, & Wojcik, 2013, p. 25)
1975	Belgrade Charter	Proposed environmental education goals for young children		Agyeman (2005)
1977	Tbilisi Conference	First international conference on environmental education. Developed goals and objective for environmental education.		(Biedenweg, Monroe, & Wojcik, 2013, p. 25)
1980	World Conservation Strategy	Introduces sustainable development		Agyeman (2005)
1981	Mexico-U.S. Binational Commission	Committee designed to discuss bilateral		Garcia (2011)

		talks about issues important to the two countries		
1983	La Paz Agreement	Between Mexico & U.S.-several technical groups developed to deal with environmental hazards.	Also known as the Regan-de la Madrid Accord	Varaday et al. (2001)
1986	Mexico joined the General Agreement for Tariffs and Trade (GATT)	This agreement allowed Mexico to reduce tariffs and reduce license requirements to pass through the borders.	Mexico signed GATT to stimulate economy	Anderson (2010)
1987	Brundtland Report	Defines sustainability	Also referred to as Our Common Future	(Biedenweg, Monroe, & Wojcik, 2013, p. 25)
1987	Tbilisi +10	Focused on evaluating environmental education efforts Became known at environmental literacy (Awareness, Knowledge, Attitudes, Skills, Participation) p. 15	Location: Moscow	(Biedenweg, Monroe, & Wojcik, 2013, p. 25)
1987	United Church of Christ's Commission on Racial Justice	Released report on "Toxic Waste and Race" -Report linked environmental justice issues to race		Sarokin & Schulkin (1994) Agyeman (2005)
1991	First National People of Color Environmental Leadership Summit	Focused on "procedural equity, geographic equity, and social equity" (p. 1)		EETAP (1999) Sarokin & Schulkin (1994)
1992	Earth Summit	Global conference on sustainability Created Agenda 21		(Biedenweg, Monroe, & Wojcik, 2013, p. 25)
1993	North American Free Trade Agreement	Signed between U.S., Mexico, & Canada To increase trade of goods and services between international borders		Anderson (2010)
1993	Border Environment Cooperation Commission (BECC)	Between U.S., Mexico, & Canada by NAFTA-to address NAFTA concerns	1995 enforced stricter laws on transportation of	Varaday et al. (2001) Peach & Adkisson

			toxins	(2000)
1993	Environmental Equal Rights Act of 1993	Developed to amend the solid Waste Act which would prevent further pollution emitting entities to be located in disadvantaged communities	NADB bank provided financial support to projects	Bullard (1994)
1993	Environmental Health Equity Information Act 1993	Developed to amend the Comprehensive Environmental Response, Compensation, and Liability Act of 1990	Requires demographic documentation of individuals living near site	Bullard (1994)
1994	Operation Hold the Line-El Paso Operation Gate Keeper-San Diego Operation Safeguard-Arizona Operation Rio Grande-South Texas	Aimed at stopping entrance of undocumented immigrants into the U.S.		Nevins (2002)
1994	North American Development Bank (NADB)	Developed to address NAFTA concerns. Supported strengthening environmental infrastructure through grants	NADB bank provided financial support to projects	Varaday et al. (2001) Peach & Adkisson (2000)
1994	Waste Export and Import Prohibition Act	Restricted and banned exporting wastes to other countries		Bullard (1994)
1994	Federal Actions to address Environmental Justice in Minority populations and low-income population	Executive order signed by President Clinton.		Bullard (1994)
1995	Land Transportation Standards Subcommittee (LTSS)	Developed to support NAFTA concerns. Developed transportation laws and regulations.		Varaday et al. (2001)
1996	Border XXI Program	Initiated between Mexico & U.S.-Clinton – Zedillo admin. technical groups developed to deal with environmental hazards.	-1999 “consultative mechanism” required disclosure of radioactive waste	Varaday et al. (2001)

			within 100 km of borders	
1996	Transportation Consultative Groups (TCG)	Developed to support NAFTA concerns. Developed to support the communication of transporting toxins across the borders.		Varaday et al. (2001)
2002	Johannesburg Summit	International conference to refine sustainability goals Focus areas: water and sanitation, energy and health, agriculture, biodiversity and ecosystem management (p. 17)		(Biedenweg, Monroe, & Wojcik, 2013, p. 25)
1999	Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements	President Clinton announces new emission standards for new automobiles to meet 77%-95% cleaner		EPA (2014) -milestones
2004	Clean School Bus Program	EPA program to reduce emissions of diesel and exposure of children		EPA (2014c)-school bus
2005-2014	United Nations Decade of Education for Sustainability Development (DESD)	Developed the Millennium Development Goals which addresses issues such as: world poverty and hunger, universal education, gender quality, improved child/maternal health, combat AIDS, sustainability, global partnerships (p. 17)		(Biedenweg, Monroe, & Wojcik, 2013, p. 25)
2007	4 <sup>th</sup> International Conference of Environmental Education	Focused on sustainability	Location: Ahmedabad, India	(Biedenweg, Monroe, & Wojcik, 2013, p. 25)
2009	World Wide Views Project	Conference on climate change awareness	Conducted in five cities in the U.S.	Robelia & Murphy (2012)
2010	Nation's First Greenhouse Gas Fuel Efficiency Standards for Trucks and Buses	President Obama passed first standards for reducing emissions on trucks and buses		EPA (2014)

## **Appendix D-Seidman (2006) Three-Step Interview Process**

The following are example questions that can be used during the 90-minute interview process for each stage. Seidman (2006) cautions the interviewer to actively listen and to hone in on the interviewee's inner voice, verbal and non-verbal cues, in order to capture the essence of the phenomenon. The interviewer should also ask exploring questions that will allow greater detail and depth of their experience.

1. Life Histories: The purpose of this section is for the interviewee to say “as much as possible about himself or herself in light of the topic up to the present time” (p. 17). The purpose of this section is to reconstruct the interviewee’s “early experiences in their families, in school, with friends, in their neighborhood, and at work” (p. 17)
  - a. Tell me about yourself...
2. Experiences: The purpose of this interview is to focus on the “participant’s present lived experiences in the topic area of study” (p. 18).
  - a. Tell me about your experience...
3. Reflection & Meaning Making: The purpose of this interview is for the participant to reflect on the meaning of their experience. This interview should focus on the “intellectual and emotional connections” (p. 19)
  - a. Student:
    - i. What does this experience mean to you...

## **Appendix E-Student Focus Group Questions**

**Student Focus Group Questions-** Following Seidman's (2006) Three-Step Interview process.

Elaboration and clarifying questions will be asked to gain a deeper understanding of the phenomenon.

1. Ice Breaker
  - a. Introduce yourself and tell us what your interested in...
2. Brainstorm:
  - a. Take a few minutes to write down everything you can remember regarding what you are learning in class, specifically around the ASARCO air quality lesson.  
What stands out to you?...
  - b. Popcorn Activity- Go around the group ask students to volunteer their brainstorm list. At this point students do not comment or provide feedback, they are just listening to each other. After the group has exhausted their responses we move on to a discussion
3. What stood out for you in your learning? You can comment on your personal experience or something mentioned by your peers.

What do you want others to know about how you think of these issues? What is your does learning experience(s) mean to you?

## Appendix F-Participant Observation Data Collection Tool

### Observation/Data Collection Tool

Field Notes	
Condensed	Expanded

## **Vita**

Cynthia C. Ontiveros is a science educator working for the largest school district in El Paso. She is currently the Director of PowerUp for the district, previous to this position she was the Facilitator for High School Science in her school district. Her role includes supporting high school science teachers with curriculum support, staff development, and planning. She has participated in several grant writing activities in collaboration with the University of Texas at El Paso, El Paso Community College, Paul L. Foster Medical School, and several other local agencies. She is passionate about her role as a science educator and administrator.

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