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by

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May, 2011

EXAMINATION OF GENDER IN ADVANCED PLACEMENT TESTS

A Doctoral Thesis Presented to the
Faculty of the College of Education
University of Houston

In Partial Fulfillment
Of the Requirements for the Degree

Doctor of Education
In Professional Leadership

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ABSTRACT

Education in schools should be available to all regardless of race, ethnicity, and gender. My personal experiences, along with the beliefs of society, have shaped the framework of this thesis, which focuses on the importance and the promise of equity and equitable opportunities within a classroom. The purpose of the thesis research is to examine the teacher perceptions of gender issues and how that may influence the students to make their decision about which Advanced Placement subjects to take. This mixed methods research study will incorporate archival data of student participation by gender in advance placement tests in different subject areas to answer the following questions: (1) Is there a disparity between the number of female and male students taking the advanced placement tests? (2) Is there a disparity between the number of female and male students taking math, science, language, history and English on the advanced placement tests? (3) What are the teacher perceptions with regards to gender equity in the classroom and in the Advanced Placement Program? (4) How do teachers' perceptions connect to the school's statistical determined from the first two examining gender participation in advanced placement tests? The campus of study is a college preparatory private school, and both quantitative and qualitative approaches will be utilized to investigate each question to determine if issues of gender parity exist.

The quantitative data was gathered from archival data obtained from the AP coordinator and the qualitative data was gathered from an anonymous teacher

questionnaire determining their perceptions with regards to gender in the classroom and the Advanced Placement Program.

The findings of this study indicate that the overall Advanced Placement Program has gender parity but inequity exists in certain subject areas. The teacher questionnaire determined that teachers perceive the campus to be generally equitable with significant underlying issues that need examination.

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Chapter One

Introduction to the Study

Overview

As I recall childhood stories, the image of my paternal grandmother laying down her “*dupatta*” (an Urdu word that means a long scarf) on the hot sand for her children is the most prevalent in my mind. The inner strength of my paternal grandparents was clear in their decision to migrate with their eight children from India to Pakistan in late 1940’s to pursue economic opportunities and a better quality of life for their children. They traveled on a camel for hours and had to cross the remaining distance on foot. The children were barefoot and my grandmother’s “*dupatta*” protected their young feet. My father’s family had lived in a small village in Gujarat as far back as my grandfather could remember. My grandfather had no recollection of his father, who had died before my grandfather was born. The uncle who raised my grandfather, did the best he could, but did not have the resources to send my grandfather to school, and so my grandfather never got the benefit of any formal education or learned to read or write any language. Growing up, he helped out on his uncle’s small farm. At the right time, his uncle arranged his marriage to my grandmother, which was a common custom back in 1930’s in the village in which they lived. After his marriage, my grandfather moved into a small home that had belonged to his father. This home in the village was actually a small hut, and the walls were so fragile they could be knocked down with a gentle shove. In this home he raised a family of eight children. He earned money by selling half of the crop he grew on a small piece of land that had belonged to his father and using the other half

to feed his family. He also milked the cow his father-in-law had given him, and he placed the milk on his head every day, swam across a river and sell it in nearby villages.

The migration of my grandparents from India to Pakistan was more for the economic opportunities and the expected quality of life the new country could provide for the children than for any other reason. In India, they had faced much discrimination during the colonial times which led to the partition of India and Pakistan into different countries, and being able to move to large cities such as Mumbai and setting up a business was difficult for it required permits. These permits were difficult to obtain for Muslims. Pakistan was a Muslim country and the hopes were that Muslims would be able to access the economic opportunities the new country could provide and achieve economic stability. My paternal grandfather worked hard to establish his family in Pakistan. Initially he ran a tea shop outside of office buildings, but after some time with the help and partnership with others, who had also immigrated to Pakistan from India, he opened a small restaurant. He continued to work and grow financially. By the time his oldest son was fifteen, he was fifty percent owner of a restaurant and hotel. Even though he never had the opportunity to attend school, he knew that education was important for the success of his children in future endeavors. Given their relatively narrow perspective due to lack of any formal education, the cultural norms of the village in which my grandparents were raised, a lack of awareness and policies promoting gender equality across the world during those times, and grossly limited resources, spending time and resources to educate a female child was beyond my grandparents' imagination and they were not open to the idea of educating girls. In most villages across Asia during mid 20th century, the belief was that a woman's primary role was that of a wife and mother and

therefore there was no need to spend the already limited resources educating the females. In a sense, this perspective was somewhat similar to the norms in other parts of the world during that era, as evidenced by the fact that the women in the US were granted a right to vote only in 1920 and 90 years later, gender bias is still evident through differences in workplace salaries. In keeping with the cultural norms, my grandfather enrolled his eldest son in school, while his oldest daughter stayed at home and helped her mother. His other sons, including my father, were also enrolled in school but the expectations and focus were solely on the eldest son. This practice of dedicating resources to the education of the eldest son was common in families with limited incomes as resources were very limited and the hope was that the older son would grow up sooner and help out with the family's income that could then support the younger siblings. My eldest uncle was bright and performed well in school, and with great recommendations from his teachers, my grandfather sent his eldest son to England to study at the London Technical Institute with a hope that he could come back and economically uplift the rest of the family. Again, due to limited funds and cultural norms, my grandfather encouraged the other sons to attend school only part-time so that they could work at his restaurant as busboys during the days. Even though my father's eldest brother was educated in London, my father was able to only attain a high school education due to the family's financial circumstances and lack of family support and encouragement. Even during high school, he worked in the mornings in an office as a typist and attended classes in the evenings. After graduating from high school, he had to start helping in the family business full time.

My maternal grandfather family's immigration to Pakistan from India was easier because he had greater access to funds even though he came from the same area as my paternal grandfather. His father was able to provide him with the funds necessary to buy train tickets for him and his family to move to Hyderabad, Pakistan. Hyderabad is the second largest city in the Sindh province of Pakistan and one hundred sixty three miles from Karachi, a port city. A number of people from their hometown in India were already living there and a supportive ecosystem was already in place. He worked hard and opened a small metal hardware shop to raise his family. His views on female education were slightly different because he was then the father of six daughters and the sons would arrive much later in his life. Given the higher income levels and the resulting exposure, my maternal grandparents encouraged their daughters to complete their undergraduate studies. My maternal grandparents' encouragement in itself reflects a very progressive approach taken by my maternal grandparents during those times. Following her undergraduate education, my mother was accepted into medical school. However, this is when the local norms kicked in as my grandfather did not allow her to attend, for it was far from their home and he questioned what she would do with the degree after she finished. Part of his decision making had to do with the severe lack of infrastructure to support women attending schools far away from home. For example, while there were many affluent families who lived in big cities and whose daughters attended medical school, it was still considered an uncommon practice in smaller cities and towns of Pakistan as these medical schools in larger cities lacked any facilities to house women in dormitories or hostels at that time. Furthermore, as was the case in most countries around the world at that time, it was a common practice in most families for even educated

women to remain homemakers and not be encouraged to work outside of their home.

The only profession that was even remotely acceptable for the common educated woman in Pakistan then was that of a teacher and then too, only if you had no one else to take care of you financially. Given the perspectives of life during that era, my grandfather's upbringing was such that he believed that girls should be married at a certain age and raise families.

Both grandfathers attended the same *Jamat Khana*, a place of worship for Shia Ismaili Muslims, and knew each other well. South Asian culture, at the time believed in only arranged marriages, so my parents were engaged to each other at a young age and were married by the time my father was twenty-three and my mother was nineteen. I came along very quickly after the marriage, and when I was three, we moved to the bustling port city of Karachi, Pakistan. My father's family was doing better financially and they lived a well settled life. A phenomenon observed generationally across the world, both my parents were more literate and educated than their parents. They had a broader perspective on life and wanted to ensure that their only child and daughter had the best possible education they could afford. My father's nieces, daughters of his older brothers, were engaged at very young ages and were married by the age of eighteen. The girls were not encouraged to finish even their undergraduate education, let alone provided an opportunity to build a career for themselves. With the boys, the eldest sons continued to receive preferential treatment and the rest were regarded as second-class members of the family. While this ideology was changing across Pakistan, it was not changing fast enough for my parents, who wanted to make sure that they encouraged me to get the highest level of quality education available at the time. With this in mind, my parents

embarked on journey that was similar to what their parents had done for them decades earlier and decided to immigrate to the United States of America to seek a better quality of life and improved access to higher education for their only child. As my grandparents had made sacrifices for their children, my parents were also making sacrifices for their child, me. They were leaving behind family, friends, a way of life and culture and moving to land different from what they knew. The predominant reason for their migration was to provide their only child, a daughter, with all the educational opportunities the West could offer because they felt that their cultural backgrounds might otherwise limit her possibilities. At the same time, they were also concerned about whether they would be able to instill their traditional values into their only child as well. Back home, she may have been allowed to finish high school and even college and then become married to a man selected for her and raise a family. She would never have the opportunity to pursue higher education or to be a professional in any area she may choose. One of the factors that most impacted their decision to move were the words of His Highness Sir Sultan Mohamed Shah Aga Khan III who, as the hereditary *Imam* (spiritual leader) of Shia Ismaili Muslims, constantly reminded his followers that if they had to ever pick between educating their son or their daughter, they should make sure and educate their daughter first since she would be the person responsible for rearing her own children. The second factor driving my parents towards their goal in educating me was recognition that they themselves had been unable to obtain a higher education, albeit for different reasons. My father was never able to focus on his studies because he was always working full-time while attending school. The family's financial needs did not allow him to just be a kid and go to school. Due to his lack of focus, he did not perform

well and therefore he was not encouraged to seek higher education by his teachers. He still tried to attend college but was discouraged strongly by his family because of the monetary needs of the family. As for my mother, from a young age, she wanted to be a doctor and she worked hard to excel in school. Because of her remarkable performance, her teachers encouraged her to apply to medical school where she was accepted, but again she could not pursue that route because of a pervasive cultural belief that girls do not have professional careers and a general lack of infrastructure that could support such goals, even when desired.

Once my parents moved to the United States, they had to face many challenges to establish themselves in this new land. The foremost concern was how they were going to pay their expenses and enroll me in school. Initially enrollment in public schools was not possible, so my parents found a parochial school that agreed to enroll me as a student, but the cost was extremely high. My father began working as a cashier at a grocery store during the day and found another job as cashier during the evenings at another grocery store. He made enough to pay for living expenses but my mother had to find a job to pay my school tuition. In order for her to work outside of the home, she had to make a major change in her attire and become used to interacting with members of the opposite sex in situations outside relationships with family and friends. At the same time, she always wore a *shalwar kameez*, a long blouse with loose pants with or without a long scarf, or a *sari*. With the *shalwar kameez* she also wore a *dupatta* particularly around the house if other male members were present. Still, my mother never wore pants or dresses. The change in her appearance in the U. S. occurred only for work reasons, but she refused to alter her hairstyle and kept her long hair in a braid or bun. To this day, she will wear

American attire only when she has to but otherwise she adheres to her South Asian clothing tradition. Ever since I was young, I could wear American attire but only in modest forms. Short shorts and blouses without sleeves were totally unacceptable but I was allowed to experiment with hairstyles. As I grew up, I continued to wear American attire as my parents became more accustomed to the West. However, clothes at family events and religious events had to be the traditional *shalwar kameez*. Even today, I do not wear blouses without sleeves when my father is present out of respect for his cultural tradition. As I grew older, I realized how much of an impact this ideology of integrating and maintaining one's culture while continuing to forge ahead in life has had on me and the choices I have made in life. I have adopted my parents' perspectives on education to make choices to attend graduate school, but at the same time, use my inherited cultural values of hard work, respect, and maintaining a balance in life to live a fulfilled and complete life.

The South Asian Diaspora in the US during the 80s followed the same cultural norms that were practiced in the smaller towns and villages of India and Pakistan when the members of the community emigrated from their respective countries. That is to say, some of the cultural norms and outlooks of the Diaspora stayed the same even while they were evolving in the countries of origin. In contrast, it is worth mentioning that my parents had an opportunity to get basic education unlike most of their compatriots, and this allowed them to modify their perspectives on life with the passing of time. The expectation of the larger group of people was to hold on to as many of the traditions and norms as possible. Any time a member broke with tradition the story would travel back to the relatives in the home country concerning how their children had not held on to

traditions and had changed since coming to the United States. This created unnecessary stress on the South Asians living in the US to make sure that their children did not adopt too many of the cultural values of the West. In light of these perspectives and the resulting peer pressure on my parents, I had to negotiate with them for months before I obtained permission to attend my senior prom and succeeded only after I had agreed to be chaperoned by my slightly older cousin. Many within the community communicated with each other about the challenges they were facing while trying to raise a girl in the United States in a traditionally accepted way. In order to stay connected to the traditional wisdom and values of our culture, many families made sure that their children were able to read and write in their native languages. I spoke to my mother in *Gujrati* and my father in *Urdu*. *Gujrati* is the regional language of the state in India from which my grandparents had emigrated whereas *Urdu* is the national language of Pakistan. My mother made sure that I always spoke with respect to the elders of the community even if we were not related. Being a girl made it imperative that I knew how to cook, especially the South Asian cuisine like biryani or kadhai chicken. As more family members started to move to the United States, I learned that some of my female cousins were not comfortable voicing their opinions in a large family setting. Over the years, my parents were repeatedly reminded by elders that my behavior was not acceptable as I was too vocal with my views and ideology. Also, I expected male members of the family to help with chores around the house and to listen to my opinions and take them seriously. On many occasions, I was ignored when trying to speak or asked to remain quiet because I was a girl. For reasons that I now appreciate, my father not only never stopped me from voicing my opinions, but actually encouraged me to be independent in my views,

resulting in my mother having to bear with criticism from others. In traditional culture in which my parents were raised, a child who misbehaved or broke away from tradition was perceived to be a result of poor parenting and ultimately a mother's fault for not rearing the child properly. This underscores the associated gender issue that I highlighted earlier, in which women were considered to be homemakers and primary caregivers in the household. Any adult can reprimand a child in public even if they are not part of their family. Family members or close family friends always monitor and criticize the behaviors of other adults and the young that were not acceptable to the larger community. The close South Asian friends and families of my parents in the US, who did not share the same perspective as my parents, tried very hard to curtail my mother's adoption of certain western values. My mother faced disdain when she started to work outside the home, initially as a cashier. Many looked down on her because her husband did not make enough to support his family. Others ridiculed her because her work environment required interactions with males other than her husband or family members. She was considered irresponsible for leaving her child unsupervised at home for a few hours during the day. Some men believed that she would start taking her husband for granted because she was earning her own living and was assuming the roles acceptable only for a man. Unlike most South Asian men, my father never made decisions without consulting my mother. To some people, he was not strong enough to handle a wife so he had to listen to his wife before making decisions. I have heard many comments from others that my father's behaviors were being controlled by my mother. Disregarding the views of others, he also began helping my mother with the household chores. This practice of helping the wife out in the kitchen or in the cleaning the house was not common practice

during the 1980s and is still rare in many families. Many struggles had to be faced in order for our family to settle in the West. Revisiting my childhood at this point in life tells me how the need of just fundamental education, which my parents had, was important to be able to integrate and tap into the opportunities which would help shape my career and life. While all of my wider family members and family friends suggested or said things that they fundamentally believed to be good for my family and me, it shows that even the best of intentions, a lack of perspective on life can actually damage someone's future. For example, if my mother had not worked, our family income would have been low and would have prevented my benefitting from the summer classes and other opportunities I was afforded when I was growing up.

Initially, my mother's work outside of the home began because of financial necessity but became unnecessary as we gained legal status. She wanted to continue working and my father supported her wholeheartedly and even fended off criticism from family members. But others within the South Asian community felt that my father's thought process was such because he liked the extra income that came into the family. Not only did she continue to work as a cashier but created opportunities to add to her skill set. She advanced to a manager position for a large grocery store and, with encouragement from my father, requested an internship with the grocery store's accountant. She specifically worked the evening shifts so that she could spend a few hours with the accountant during the day learning how to file different types of taxes associated with businesses. These skills helped her increase her earning capacity tremendously as well as her self-confidence. Along with being a manager for the grocery store, she started doing the taxes for small businesses on the side. My father had

ventured out from his cashier job as well and bought a small gas station with a partner using the family savings along with a small business loan. This first gas station became one of the many as my father expanded and grew his business. As he acquired more and more locations, my mother began doing the taxes for all the different locations. She not only did the accounts for the family businesses but others within the South Asian community began to seek her services. My mother's work helped the family's finances significantly over the years. All the while, my father continued to support her decision to work and grow as a productive individual.

My father is a firm believer in independence for women in all facets of life while holding on to certain cultural norms. During his youth, he was vocal in his support for his sisters as well as his sisters-in-law. Whenever possible, he defended my mother's actions and decisions that went against cultural norms. Family decisions were made by the both of them and not solely by my father. Before any investment, he discussed the pros and cons of the venture with her and they came to a consensus about the course of action. Any decisions concerning my future were mutually agreed upon. He encouraged my mother to support her family as much as she supported his family and respected her parents and family members, again a practice very contradictory to the common practice in the ultra traditional observances of the South Asian culture. Even after living in the United States for many years, my parents had to fend off multiple incidents of family pressure to limit my education. When I turned thirteen, my parents caved in to pressure from the elders in the family and followed through on setting up an arranged marriage for when I was older. While the elders, with their limited perspectives on modern life, felt that they were doing for me only what their elders had done for them over centuries, they

didn't appreciate the issues related to betrothing their granddaughter at a tender age. I was told that when I grew up I would be expected to marry this person. I accepted it because this was how I was raised. I think my father agreed because the young man was from a decent family and was being educated, many unlike other boys within the Diaspora at the time. Following this short discussion, I was allowed to be my young teenage self and my parents kept instilling in me the importance and benefits of a good education.

Upon graduating from my high school, I was accepted to the University of Texas at Austin and this opportunity created more troubles for my parents. One was convincing the elders in the family that I should be allowed to pursue higher education rather than marrying immediately. Second was the resistance from some elders in the family about my need to attend a University so far away from home. In many ways, this was no different from many parents encouraging their children to attend school closer to their home even today. What I find inspiring about my parents is that they not only did not succumb to the peer pressure, but, to ensure that my access to tertiary education did not get stifled by such norms, they sold their businesses in Houston and moved to Austin so they could be with their only child and her school of choice. This action on their part was unprecedented and commendable and makes me appreciate the sacrifices my parents made to ensure that their daughter had continuing access to better education in spite of certain archaic cultural norms, which have since been eliminated altogether. As I began attending university, my parents encouraged me to interact with many of the South Asian students. In that process, I made new friends, one of whom eventually became my spouse. Initially, my spouse and I were only good friends. All of my friends knew that I

was engaged to be married, because it was common knowledge. Two years into my undergraduate work, the arranged engagement became an issue. The young man's family wanted us to marry and I was extremely displeased. I was not sure if I would be able to continue my education afterwards and I voiced these concerns to my parents. My father communicated with the boy's family and found that the boy's family wanted me to discontinue my education and they were extremely unhappy with my plans to attend graduate school. They told my parents that they questioned whether I could be a professional and take care of their son and their son's home. My parents agreed with me that I needed to not only finish my undergraduate work before marriage but also needed to complete graduate school, so they supported my decision to break off the engagement. The family pressure was tremendous from both of my parents' families. However, my parents continued to support me and protected me from any misgivings from the traditional family members while facing their misgivings all alone. They broke off my betrothal, which had been arranged several years earlier, and informed the elders that future marriage plans would simply be decided amongst the three of us.

The struggles with regards to my marriage plans were not over for my parents. As I came close to finishing my undergraduate degree the friendship between my husband and me mutually grew into something greater and stronger. Meanwhile, pressure was building for my parents to find an appropriate husband for their daughter. When they asked my opinion, I told them about my husband and our relationship. While my husband was of the same faith, his family was from a different region and sub-culture in India. This was relayed to the elders in the family and then began the storm. In traditional South Asian cultures, especially in India, not only do you marry someone of

the same faith but the family backgrounds also have to be the same. In light of this practice, my father's parents and most of his brothers were extremely angry about the decision I had made as they believed it to be in my best interest to marry someone from a similar cultural background. Additionally, they also believed now that I had broken my earlier engagement so that I could marry my husband. But the truth of the matter was that my romantic relationship with my husband did not begin until a significant time after the other relationship had ended, and I had more in common, intellectually, socially, and emotionally, with my husband than with anyone else I had met. Again, my mother had to bear the brunt of this storm as the perception was that her non-traditional behaviors had created a non-traditional daughter. A daughter who dares to decide who she will marry was considered totally unacceptable, especially as this may create precedents for my younger cousins, many of whom might not even know what is best for them like the elders in the family. My father's parents, who were in their late 70s at the time and quite set in their ways, chose not to talk to me, reneging my engagement or attend my marriage two years later. For many years within the larger family, I served as an example of someone who broke ranks, married outside of the smaller community and defied the elders. With passing of time, my whole family has come around and has chosen to use my parents and me as role models to educate my younger cousins and allow them the flexibility to choose their calling in life. To his credit, my grandfather showered his total love and affection on my children, my husband, and the rest of his family until his passing at the age of 96 in 2008. I believe that with time, my grandparents began to see my parents' struggle to give me a better life as no different from what they had bravely done for their eight children more than half a century earlier.

Looking back at my childhood, I came to certain conclusions as to why people in my greater family behaved the way they did. My parents, having received some basic formal education, had gained a broader perspective on life, which influenced their decision making in raising me and what they perceived would be important for my future. My aunts and grandparents had not had the opportunity to receive any education and thus, while they all loved me dearly and meant the best for me, were making decisions based on the worldview and value systems in which they participated. Unfortunately, given their lack of education, they were unable to keep up with the changes and demands of life and thus kept promoting ideas and decisions that had worked in the past under the banner of culture and traditions. However, I believe that my parents were able to maintain and give me those same cultural values in a way that would help me in life, and not hurt me, and this was all because of making the right decisions due to their education. My husband and his family who are also educated share the same faith and are also South Asians. They too have maintained cultural values and adapted them when necessary to suit the current needs of times. Therefore, going back to the recommendations of Sir Sultan Mohammed Shah, I have come to an important realization about why it is important for a woman to be educated; it is because no matter in which country she lives, she will help in making wise decisions for future family members while attempting to maintain the values of culture.

All of these experiences of my childhood and growing days have left a significant mark on my development and on my current beliefs. Most significantly, the mark that my parents left on my psyche was the need for equality regardless of gender. And this strongly held belief is not necessarily limited to the gender of the child. I have seen

families in which the second son was ignored for the first son and the daughter held no value whatsoever. At the same time, I was exposed to images in the West where equality was valued as a constitutional right that found expression in institutions, the workplace, and in family units. I began to question my father during my teenage years about why our cultural norms were the way they were and what could be done. His answer to me was that changes can only be accomplished through education. Having studied history, I can see that the South Asian culture to which I was exposed evolved in an environment where resources were critically limited and sons needed to be fed first so they could work with their fathers in the fields and help provide for the rest of the family. Just like it has in the US and in other western countries around the world, the prosperity of the nation and its citizens is, over time, evolving our views on gender and race equality – as was the case with the women's suffrage movement and the civil rights movement in the USA over the past century. As I began my college experience, the idea of equality was reinforced for me after I was exposed to multiple disciplines and their unique vantage points on the college campus. I do not consider myself a complete feminist, but I strongly believe the ideology of equality between men and women because that was how I was raised by my parents. Early on, I was expected to perform all the chores at home for there were no tasks that were gender specific. Before I could learn how to drive, I was expected to learn how to change a flat tire and take care of a car. I was raised with the expectation that I could hold on to my certain traditions while adopting the positive aspects of the Western culture. The traditions that I was to adhere to included the respect for elders, and being able to speak the language, but I was also expected to complete my education and be a contributing member within the community. This strong commitment

to education was infused within the family and I sincerely appreciate that my parents, aunts, and uncles, taking cues from my grandparents before them, had moved to other cities, countries, and even continents to ensure a greater access to education and a better quality of life for their children and the fact that such moves do not ever come without significant sacrifices. Together with this appreciation came the firm belief that I could pursue any career I desired, thanks to the confidence my parents instilled in me. For these reasons and many more, gender equity and accessibility interests sit at the core of my being and have been practiced in my personal and professional life.

During my college experience, my volunteer work sparked an interest in teaching, as a profession, and making an impact on young people's lives. I was already teaching at the religious education center in our *Jamat Khana* and, through this experience, I realized that I liked teaching teenagers. My husband, friend at the time, had watched me teach and observed my passion for imparting knowledge. At the same time, in one my physics classes, I learned about an organization on campus that encouraged college students to volunteer their time in science classrooms at the middle school level. The aim of the organization was to spark interest in science in the minds of young people. Because I was majoring in biochemistry and I liked working with young people, I decided to become a part of the organization. Plus, at that time, I thought it would look great on my application to medical school. I started to visit classrooms twice a month at different middle schools and presented different science lessons. My husband knew I was hooked and encouraged me to pursue teaching as a profession. However, it took me a while to convince my parents who wanted me to become a physician. With tremendous amount of encouragement and support from my fiancé (who is now my spouse), I started working

on my teaching certification while completing my undergraduate degree. From my first position onwards, I was enthused by the idea of teaching science and incorporating ideas of equity within the classroom. This strongly held belief in the importance of equity within the classroom led me to the questions that frame my thesis study, which I will conduct in my current school setting.

The purpose of my thesis research is to examine the teacher perceptions of gender equity within the classroom and the Advanced Placement Program and the number of students taking different advanced placement tests based on gender to determine if gender disparities exist in different subject areas. To accomplish the purpose, the study will address a number of questions. One, is there a disparity between the number of female and male students taking the advanced placement tests and the topic itself? Two, is there a discrepancy in the number of female and male students taking math, science, language, history and English on the advanced placement tests? Three, what are the teacher perceptions with regards to gender equity in the classroom and in the Advanced Placement Program? Finally, how do teachers' perceptions connect to the school's statistical record determined from the first two objectives by examining gender participation in advanced placement tests? The study of examining whether a disparity exists between the number of female and the number of male students taking the advanced placement tests in different subject areas and the teachers' perceptions with regards to gender will have tremendous impact on the campus in which I currently teach because the question of gender equity in advanced placement courses has not been examined nor have teachers' perceptions been solicited and analyzed with the intent of uncovering underlying themes.

Chapter Two

Review of the Literature

The exploration of gender in advanced placement course work will be based on qualitative data and quantitative data. The qualitative piece will entail an anonymous questionnaire completed by teachers on their perceptions of student experiences and the curriculum presented within the secondary school with regard to gender and Advanced Placement Program. The quantitative piece will correlate student participation in advanced placement coursework in different subject areas in relation to gender and examine levels of equitable participation. In order to give direction to the study, multiple research perspectives will need to be examined to have a better understanding of the need for the study. The literature review will begin with the history of education from the beginning of recorded time with the focus on U. S. history of education and then leading into private schools. From the discussion of private schools, the review will lead to an examination of gender in education and moving on to equity in education and ending with the development and challenges of the Advanced Placement Program.

History of Education

World history of education. The process of educating human beings has been present from the beginning of recorded time to the present but has gone through numerous changes and developments. Before the development of formal education, children were taught by parents the skills and qualities required to function well as adults

in the societies in which they lived. In general, the focus was that boys were trained by the fathers and the girls by the mothers to fulfill the roles and duties expected within the culture, country and religion. The first school, known based on historical records, was during 1800 B. C. during the Babylonian times called the tablet house. The curriculum involved math, writing and reading but records do not show how students were selected to attend the school for it was not for all children (Sharpes, 2002). Across the globe, in China, the schools in the 1700 B. C. were teaching rituals associated with daily life (Sharpes, 2002), and the Egyptians from 1600 B. C. onwards had temple schools teaching boys to write because the aristocrats had to be trained to take over and the other affluent boys required skills for official careers within the society (Frost, 1947), none of the schools involved the educating of girls.

In the western civilization, the Greeks are considered to be the parents (Binder, 1970) and the first real educators (Castle, 1961). Within Greece, due to geographical location, different cities had varying approaches to education. The Spartans, around 6th century B. C., had an educational system geared towards military efficacy. Boys from the ages of 7 to 11 were trained partially at home and the rest in classes for games and physical training; and as they got older, the military training would begin with adults' having complete and absolute authority. Boys were encouraged to enter into altercations with one another to become tough and learn to endure difficult circumstances. The Spartans' focus was military action, and the conquered people from acts of war in Sparta were absorbed not as part of the community but as serfs. Spartan education did not have an aesthetic or a literary tradition, and the purpose was to maintain order and discipline in the society in which the state controls the child body and soul, but girls were still not part

of the picture, and for them the focus was the home. Literacy was taught only to serve a purpose not to achieve higher learning. Traditions in Athens, during the same time period, were a direct contrast and the educational system prepared boys for citizenship and self – reliance. Most boys went to school from the ages of 7-14, and then poor boys began work and the upper class continued to receive instruction (Castle, 1961).

The third century B. C., in Greece, brought forth more changes. The school life was divided into three stages, primary education for 7 to 14-year-old boys, secondary from the 15 to 18-year-old boys and the higher education for 18 to 20-year-old boys. The later two stages were for the affluent families who could afford the tuition as well the loss of income, and the third stage was reserved for only the intellectually capable. But during this time, girls were admitted to primary schools if the family wished. During the 132 B. C. to 100 A.D. in Rome, the secondary school system, called the Latin Grammar School, was perfected.

In England, Roman Christianity, was pushed out by the Saxons but reestablished by the end of the 9th century A. D. The schools in these times were in monasteries and the focus was to train clerics, men, in all of Western Europe. The 9th century saw the monasteries adding liberal arts and sciences along with religion to the curriculum, but the core focus was still religion. In the 10th and 11th century libraries developed but by the end of the 11th century, monastery schools declined. The aristocrats had schools within their courts to train boys for civil administration, program that included training for girls to manage households but not beyond. The 12th century brought the Latin Grammar School from the Greek tradition for the burgher class and the commercial class, but still the majority of the schools were run by the churches; and very few private schools

existed even during the 13th century. By the late 13th century, the church monopoly on schools had ended and private schools were on the rise with municipal support. With the Renaissance in the 14th century came the Humanistic Schools, in which the complete citizen was educated. So the curriculum included religion, Latin, Greek, math, physics, astronomy, music, history, ethics and physical education. Women received elementary education but the emphasis was on home schools and not many attended secondary schools and it continued to remain available only for the ruling class and the affluent (Frost, 1947).

U. S. history of education. The end of the 15th century brought the discovery of the Americas, and colonization began. During the 15th, 16th and 17th century, the colonization was slow but as more people colonized the Americas different types of schools emerged and continued to develop into the 18th century. In 1642, a law was passed instructing towns to establish schools for the education of children (Frost, 1947), requiring towns of more than fifty families to have a primary school and towns with a hundred families to have a secondary school (Melvin, 1946). The wealthy families had tutors or sent their children to private schools. To accommodate the few who wanted to continue with higher education beyond the secondary level, schools such as Harvard University in 1636, William and Mary College in 1693 and Yale University in 1701 were instituted through philanthropic donations and government assistance but none of which admitted women until much later in the 19th century and some in the 20th century. In the later part of the 18th century, academies were opening up like Andover in 1778 and

Exeter in 1783 for the Latin Grammar Schools were not meeting the academic needs of individuals. There were some separate academies for girls but very few were coed.

At the end of the 18th century, the United States adopted its constitution, but it contained no powers given to the federal government with regards to education. The 10th amendment gave such powers to the states. For that reason, the US has never developed a national education system and the control of schools has generally belonged in the hands of the state with more specific control given to local communities. The establishment of schools from grades one to twelve created a phenomenon of free public secondary education for all (Melvin, 1946); but this did not mean that attendance was compulsory, for that did not come until much later in the 20th century. In 1918, only one third of the students enrolled in first year elementary schools reached high school and only one in nine graduated (Binder, 1970). This ideology changed during the time of the depression when jobs were lacking so the young boys and girls flooded the high schools. The high school's focus began shifting from college preparation because economic selection did not function as before (Goldin, 1999). The high schools were approaching the full enrollment of the youth in the country (Goldin, 1999).

The public education system in the US was roughly 150 years old by the middle of the 20th century but parents failed to take advantage of the opportunities available. Within different part of the US, compulsory laws were in place but not implemented. Massachusetts, in 1852, passed a law requiring the age at which boys, not girls, should start attending school and how many days; and by 1890, fifty percent of the states had laws with regards to compulsory attendance on the books. After World War I, all states had compulsory attendance laws (Rust, 1977), but compliance was not monitored. From

1870 – 1890, about three percent of 17 year olds were high school graduates and the numbers increased from six percent in the 1900 to twenty nine percent in the 1930s (Rust 1977). By 1917, women made up the majority of high school students (Seller, 1978) but only nineteen percent of females earned undergraduate degrees in the early 20th century (Women's History in America (WHA), 1994).

In India, the concept of educating girls became part of the women's movement in the 1920s and 1930s and did not become the norm until later part of the century. As in other parts of the world, some girls who belonged to the elite families had an opportunity for education (Patel, 1998). The gender disparity is a result of financial and social constraints and a boy's education is seen as an investment in the family's future (Desai, 2007). The preference of boys in Asian families is widespread for they carry on the family name and inherit family property (Pande & Astone, 2007) and undoubtedly the eldest is the successor (Pitta, 2003).

Private Schools

Before the literature review can progress, the private school system needs to be examined because the study will be conducted on a kindergarten through twelfth grade campus. Private-school education has been in existence since ancient times when education was a privilege, and over time nations have deemed it necessary for all citizens to obtain at least a secondary level education. As free public schools gained a strong hold in the US during the 19th and 20th century, the number of private schools declined. The elite preparatory high schools like Andover and Exeter continued to flourish and another section of private schools, Catholic schools, began to appear in the late 19th century. The

Catholic Church strongly opposed the attendance of its parishioner's children at state – run schools, for they believed these schools to be infused with Protestant ideology. The US Catholic Church mandated all of its parishes in 1884 to open schools infused with Catholic doctrine within two years and encouraged its parents to send their children to these schools. By 1980, the enrollment at Catholic elementary and secondary schools accounted for 80 percent of the students attending private school (West & Woessmann, 2009). Non denominational schools have opened to provide parents with alternatives. Approximately 6 percent of fifteen-year-olds attend private schools in the US (West & Woessmann, 2009), and private schools educate about twelve percent of school age population in the US (Conway, 1992).

Conway (1992) states private schools function well for three main reasons, and these reasons are partly responsible for parents' choosing private over public. The leadership at these schools is one of the reasons for its achievement and success. In most private schools, the heads of the schools are not only administrators and fundraisers but academic leaders as well. The effective leadership involves letting teachers teach the children and treating them with respect and dignity and as Russo (2004) states in his article, giving them the opportunity to develop the curriculum. The second reason that allows private schools to be effective is the small school size. Classrooms with thirty adolescents is not be conducive to learning, and the class size of thirteen to seventeen in private schools allows teachers to maintain appropriate learning environments and maintain higher academic standards (Snelling, 1989). The final reason for private schools' growth and achievement is the parental involvement. Because parents pay for these institutions and choose to send their children to these schools, they tend to be more

involved and approving of its program. Private schools spend great effort in educating parents as much as their children so that they are involved in their children's lives and work to assist in the efforts of the school for student achievement (Toth, 2005).

Gender

Education from prehistoric times has had to deal with gender and its impact on the educational process. Men and women both make up approximately fifty percent of the population but the participation and excellence of the genders has been unequal in many arenas. In ancient times, women were engaged in household tasks and their education lacked breath and tremendous value was given to men. Mothers were responsible for managing their households and raising the young but schools in those times were only for affluent boys (Castle, 1961). Girls from wealthy families were given an opportunity to learn to read and write but the majority of the education was focused on the home. Some references have been made where girls were allowed to attend elementary schools, but further education was restricted; and again this was available for those from affluent families. Not until the 18th century in the US were secondary schools available for girls to attend but again limited by economic ability (Frost, 1947). The first higher education institution in the US to admit women was Oberlin College, but that did not happen until 1832 (Sharpes, 2002). Child labor laws and state compulsory laws have made it where all are required to attend school, but girls' participation in schools was guided by societal expectations. Up to the 1930s parents were hesitant to allow their children to attend secondary schools for two possible reasons. One was the giving up the control they had

in their children's lives to the state, and two was the loss of income; but the depression of 1929 changed the makeup of American high schools (Melvin, 1946).

Differences in gender are apparent anatomically at birth but appear in other ways after a few months, which may be a result on the differences in the brain. The inferior – parietal lobe (IPL), found in both sides of the brain, is larger in men in than in women. The IPL is designed to process data from senses and aid in attention and perception. The right IPL has been shown to understand spatial relationships and the left IPL is for understanding time, speed and 3-D rotations. The areas in the frontal and temporal lobes associated with language are larger in women. Research has shown that the female brain is more skilled in speech and the male brain has higher spatial ability. These anatomical differences may explain why in ancient times the roles were well defined to make sure species survived. This differentiation of the brain is a result of hormonal levels during embryo development, for the presence of androgens produces a “male” brain and the lack of results in a “female” brain. This idea is supported by research that states girls who were exposed to androgens in the womb due to abnormalities had better spatial awareness than other girls (Sabbatini, 2010). Greater grey matter in men and white matter in women is correlated to higher IQ's and intellectual functioning respectively (Glazer, 2005). These anatomical differences do not mean that one gender is superior or inferior to the other but allows educators a better understanding of their functionalities.

Both genders when they enter school are enthusiastic about learning but may approach it varying ways (Marinak & Gambrell, 2010). Girls learn by understanding the why and boys enjoying plugging numbers into the equation (Glazer, 2005). Content taught in class is more meaningful for girls and they perform better on reading and

writing tests. Performance on standardized tests and math and science problems not tied to the classroom curriculum is greater for boys. In general, girls are more methodical in their learning where as boys are more likely to take leaps and risks in their learning. Competitive environments promote male learning; in contrast girls prefer cooperative groups. Boys are more capable in navigating through space, and girls are better at recalling objects and landmarks (Glazer, 2005). These learning variances can be accounted for in teaching methodologies to provide meaningful experiences for boys and girls.

Men's and women's perceptions about what is expected of them in the classroom can have a significant impact on the student's educational outcomes. Gender attitudes in a society with regards to work, family arrangements and cultural expectations can impact the decisions made by the young early in life. The general educational systems' expectations based on gender can also explain their decision making. Study of literature has shown that student achievement and attainment is based on individual expectations. Individual expectations are in part a reflection of family backgrounds. Studies have shown that socioeconomic status of the family is the largest indicator of educational achievement (McDaniel, 2010). Individuals will take different routes to developing their expectations based on the gender differences in expectations (Hanson, 1994). Educational expectations for boys were higher than those for the girls from the 1950s to 1980s, but now, in more recent times, girls' expectations are higher due to increased opportunities for challenging coursework and support from parents (Reynolds & Burge, 2008).

The educational structure in a nation can also impact educational expectations of students. Countries in which the system is highly differentiated, meaning students are tracked at the secondary level, such as England, educational expectations of the boys and girls is much higher than in countries where that is not the case like the US. The expansion of educational systems can provide greater access to disenfranchised groups. Greater funding after the reports, such as the Nation at Risk, has provided the resources necessary for the expansions (McDaniel, 2010). Norms and attitudes within a nation, in terms of gender roles, can influence educational expectations as well. Gender roles vary across societies and cultures which can influence individual actions. In societies in where household chores are more equitable between males and females, females participate more in politics and the work force (Petit & Hook, 2005).

Individual recognize gender roles early in their development and these roles can have an impact on how the person views one self. Girls as early as the age of three are aware of both male and female roles, and boys recognize male roles by then as well (O'Brien, et. al., 2000). Research has shown that preschoolers and elementary age children have a strong understanding of gender roles with regards to occupation, and these perceptions are not much different from those of an adult (Mills & Mills, 1996). The roles become better defined as children grow older (Austin & Thompson, 2010). Variations from traditional roles can lead to social isolation, which develops a poor self image (Sands, 1998); and disparity in treatment of boys and girls is observed to be the case for seventy-five percent of high-school students (Schroder, 1993). The media shapes gender role expectations through its digital messages and at times hampers the happiness of both genders. Research shows that boys prefer a White male or a Black

male as the president of the US before a White female based on the stereotype that women cannot fully control their emotions. Lack of gender role education within the school systems perpetuates the misconceptions of gender stereotypes and fails to promote positive gender awareness. This results in surveys' stating that the decline of the American family is a result of the women's movement. In some cases and situations, the education at home is lacking with regards to gender, so schools must step up to the plate to work towards developing students who are anti-sexist and egalitarian citizens (Austin & Thompson, 2010).

Gender, a genetic and biological trait, can be formulated not only by nature but by cultural values perceptions and practices according to social construct theorists (Hyde, 2004). Traditional career paths that have been slated for women, such as child rearing have been low on the value chain. Children began to prescribe to behaviors and attitudes society deems to be feminine and masculine and develop personal social constructs. Schools, in which children spend a significant portion of their time, are sites of "doing gender" (Deutsch, 2007). Early in their educational careers, girls help teachers and boys usually get into trouble for talking out of turn (Thorne, 2004). Gender stereotypes continue to persist when parents and males, both, express that boys are better in the physical sciences (Lin & Chu, 2010). These practices unknowingly reaffirm gender roles and expectations. Laws such as Title IX and others have been enacted to bring about social change and create more gender balanced environments and undoing the understandings of gender. Prevailing school ideologies are a reflection of the thought process in the larger society. Legal measures have done much to bring about parity by undoing the gender roles of the past generations but, students must be given an

opportunity construct own ideas of gender expectations (Knotts, 2009). The interactions in schools should create and promote an environment that reduces gender differences. Social contexts have created what is considered to be the norm of behavior for genders. These gender norms should be on a continuum in which behaviors are not different but representations of gender. In this continuum an athletic girl or a boy who cooks would fit right in rather than stand out as being “different.”

Gender equity. Educational gender issues are not a clear representation of the economic, social, political, cultural, racial, and religion controlling the educational experiences of boys and girls. The feminist movement of the 1970s brought attention to the economic and political situation of women, which lead to changes in the areas education through program development with greater emphasis on girls (Stromquist & Fischman, 2009). Greater research by Gender and Development in the 1980s brought more analysis to gender issues and acknowledged the differences that led to inequities. These discussions about gender revolved around three general characteristics, one being the debate between feminists and scholars, two the debate talks about gender by putting femininity in contrast to masculinity and vice versa, and three the methods that reproduce gender in societies and ways to deal with the production. As mentioned earlier, the difference is due partially to biology but it cannot account for all the gender distinctions and differences as suggested by Judith Butler (2004) in *Undoing Gender*. The differences cannot be accounted for by simple and definite social markers but by numerous factors. Gender is not an isolated factor that affects individuals but its interactions with race, ethnicity, and religion can create advantages and disadvantages.

This broader understanding allows one to examine women's and men's experiences in larger social context (Stromquist & Fischman, 2009).

In order to understand gender in any setting, especially an educational one, the focus cannot be on one gender. If the emphasis is on one, then the problem as well as the solution rests solely on that gender instead of meaningful interactions between boys and girls. The examination and analysis of the circumstances cannot be done in isolation. The interactions between boys and girls are interdependent and for that reason schools cannot first focus on one gender and then move on to the other. Gender parity cannot be accomplished through resolution of single events but rather by constantly dealing with changing dynamics of overlapping conflicts (Fraser, 2008). It is challenging to eliminate differences but not to the point where the identity of the group is lost in the process. Positive gender relations require transformative measures within boys and girls to move away from conventional gender constructs (Stromquist & Fischman, 2009).

In order to develop programs to harness positive gender relations, it requires an analysis of the equity in education with regards to gender. In ancient times the inequities existed and women were not given a chance to even get basic education. Over time intellectual and social growth in societies changed that and by the 18th century, girls were allowed to get primary education. Reform movements advocated more change, and secondary education became available for all by the 20th century. But higher education was still a struggle. Colleges started to open doors to women in the 20th century but women were still encouraged to pursue conventional courses rather than math and science. In the 1950s the number of girls taking science courses was plummeting but the Russian launch of the Sputnik refocused the examination of science education in the US. The

1960s through the 1980s, the women's movement was strong and legal efforts were attempted for equal education. Title IX was passed in 1972 by Congress prohibiting sex discrimination along with Education Amendments. But the struggle was continuing and a 1990s report showed how girls were shortchanged in schools by the American Association of University Women (AAUW) indicating that girls were not accomplishing as much in math and science. This discussion led to the passage of the Gender Education Equity Act of 1994 to work towards eliminating biases against girls in school. The end of the decade showed improvement in the gender gaps in math and science but the 2000s brought a new debate about boys being left behind (Glazer, 2005). In a relationship between gender equity and psychological health, it was determined if students believed the environment to provide gender equity then they were less likely to misbehave (Spencer, Porche & Tolman, 2003) and this would promote student learning. Better understanding of equity for men and women in education requires further examination of the literature.

Educational research on gender achievement has shown that girls have made significant strides due the efforts in past decades. College enrollment for girls from 1971 to 1994 increased from 43 percent to 63 percent and bachelors degrees earned rose from 18 percent to 27 percent. From kindergarten to 12th grades, girls are encouraged to venture into areas of math and science and the number of girls taking math and science courses has grown but they do not plan to study physics or engineering where the female participation numbers are low (Sax, 2008). Studies have shown that girls will enroll in classes such as biology, anatomy and advance mathematics but are not as likely to enroll in advanced physics or computer science (AAUW, 2004), and girls continue to be behind

the overall achievement of boys (AAUW, 2004). Research has indicated that girls do better on reading in different national and international tests from what boys do but not as well as boys in mathematics (Buchmann, DiPrete & McDaniel, 2008). This is just not the case at the secondary level but begins from the elementary level and persists into the higher grades. Scores on the SATs indicate the same pattern but not as strongly even though the number of girls taking the test is higher (Kobrin et al., 2007). Girls throughout their schooling generally have better grades in all major subjects (Perkins et al., 2004). Girls are more likely to enroll in challenging course work based on understanding of the teachers and their comfort level (Dentith, 2008). In the study conducted by Audrey Dentith (2008), girls expressed doubts about their abilities, concern over image and a lack of confidence overall even though they were top achievers in their school as well as state. In the minds of the young girls, earning a B is equated with failure and believe that they have to work harder than boys to show that they are as intelligent and capable based on the conversations in the focus groups of the study (Dentith, 2008).

Girls' experiences with in the classroom vary significantly from those of boys in general with regards to achievement. Findings in research conducted by De Fraine, Van Damme and Onghena (2007) have indicated that girls' self concept tends to decrease more than the self concept of boys, and the social motivation for girls is higher during elementary schools and starts to slip during the secondary level (Lau, 2009). Research in the 1990s indicated that girls receive less attention from teachers than do boys across all levels and subject areas and Sadker and Zittleman (2009) state in their recent book *Still failing at fairness: How gender bias cheats girls and boys in school and what we can do*

about it that not much improvement has been made in that area. Females during hands on activities in the classroom tend to share ideas and equipment whereas boys are not as cooperative (Jones, et. al., 2000). Girls are less vocal during classroom lessons, group work and independent work in contrast to boys (Spencer, Porche & Tolman, 2003). Teachers have indicated in research that girls are more active in their learning by putting forth greater effort and displaying non disruptive classroom behavior (Downey & Vogt Yuan 2005). Self discipline, attentiveness and organizational skills are higher in girls based on studies, which promotes their academic success (Duckworth & Seligman, 2006). In terms of course selection, girls are pushing themselves to take as many challenging math courses as boys (Catsambis, 2005) despite the lack of attention they may receive from educators as suggested by Spencer, Porche and Tolman (2003). Some girls due to their cultural heritages receive mixed messages from parents with regards to gender roles and academic achievement (Chinn, 2002). Girls must balance the behavioral expectations of the culture with those of male-dominated subject areas like science (Chinn, 2002). These interactions and factors have significant outcomes in the educational experiences of girls.

In recent times, numerous studies have been done to look at educational experiences of both genders, and some have determined that boys are lagging in certain areas of achievement. In the book *The war against boys*, Christina Sommers (2000) states the boys are lagging behind girls in literacy, college enrollment and engagement in the classroom. She goes on to talk about how boys also have greater behavioral issues than do girls. Boys in the 12th grade are less likely to do homework than are girls according to the study conducted by Department of Education in 1996. In terms of grades at the

secondary level, which is a predictor of academic success in the future, boys are the ones that earn seventy percent of the Ds and Fs (Mulrine, 2001). Boys are behind girls by two years in reading and writing when entering kindergarten. Boys are three times as likely to be diagnosed with attention deficit/hyperactivity disorder, than are girls and four times as likely to be diagnosed with dyslexia, autism and stuttering (U. S. Department of Education, 2002). The U. S. Department of Education (2004) has predicted that by 2011, sixty percent of the individuals receiving a degree will be female.

Some theorists have suggested that the problems with boys in behavior and achievement may be due to nurture but many others, like Salamone (2003), have suggested that “nature and nurture” work together simultaneously (Wiens, 2006). Boys and girls have very different understanding of their interactions with teachers and their place in school (Sax, 2005). Conlin (2003) stated that boys feel that people around them believe they cannot be trusted. In recent times the definition of manhood has changed and this changed definition lacks academic achievement as a characteristic and boys do not work towards it. The preconception boys have is that boys do not work hard in school and only nineteen percent of the boys believe being smart is a desirable characteristic (Bishop, et. al., 2003). Actually, boys will go out of their way to hide the effort they may put into their school work from peers so that they are more acceptable (Jackson, 1998; Watts & Borders, 2005) and do not want to appear enthusiastic about school (Newkirk, 2002). In terms of nature, studies conducted on boys’ and girls’ hearing has shown that girls’ hearing is more sensitive than that of boys in the one thousand to four thousand Hertz range (Cassidy & Ditty, 2001); therefore, boys have to be actively engaged in class to hear what is being spoken (Morlet, et al., 1996). Anatomically the

temporal lobe of the brains for the majority of language functions matures six years later in boys, and negatively impacting their learning (Schlaper et al., 1995).

Advanced Placement Program

The historical events of the 20th century had significant impacts on the educational process in the US. Legal battles led to the implementation of compulsory attendance laws, the depression increased the youth participation in secondary schools and many changes were implemented within the programs and curricula the schools offered. After World War II, another program was brought into the educational system within the US. This program, the Advanced Placement Program, was a result of the struggle between securing equity for all students and attaining recognition for the students who are high achievers. School administrators and reformers in the 1950s were concerned that high achieving students were not being challenged with rigorous curriculum and this thought process was the result of the Cold War world (Schneider, 2009).

Preparatory schools in the 1950s worked to revise their curriculum and realized that the problems in the curriculum was not at just at one school but across many other schools with issues reaching into colleges as well. John Kemper, Headmaster of Phillips Andover, began working with two other preparatory schools, Exeter and Lawrenceville, along with Harvard, Princeton, and Yale universities. These institutions, with the support of Ford Foundation's Fund for the Advancement of Education (FAE), began working on a project that would promote more challenging curricula at the secondary level (Schneider, 2009). The context of the times, Cold War world, called for finding the most

talented students in the nation and training them to meet the intellectual demands of the political times. Studies conducted by the FAE stated that educators suggest that coursework should not be repeated and in order to achieve that goal colleges and high schools must work together to help students reach the heights of academic opportunities. Reformers of the time strongly felt that that problem with schools was that the curriculum and the difference between what is taught in high schools and colleges were too wide. Educators, as stated by Bruner (1983), strongly believed that students were up to the challenge of the rigorous content and would make significant contributions to the country based on their academic achievements. The study developed a program that stated that students would study advanced materials at the end of which they would take a placement test. The placement test score would allow the students to earn college credit. The study assumed that advanced work could be done only by the strongest students at the most challenging schools and that some exceptionally gifted individuals would be able to complete their undergraduate programs in three years. Due to these assumptions, the program was initially offered at a small number of public and private high schools (Schneider, 2009). As discussed earlier in the literature review, the secondary school curriculum had gone through many transitions and this was the change being made in the 1950s to meet the needs of the time.

At the inception of the program in 1953, only eighteen high schools participated and five hundred thirty-two students took the exams. The evaluations of the exams were based on one to five grading scale in which a one indicated a below-average understanding and a five demonstrated complete comprehension. The colleges would decide if the students received college credit based on their score. The Advanced

Placement Program's first president was Charles Keller and the program was under the umbrella of the College Board. The first testing monitored by the Board was given in the spring of 1956. The program initially followed through on the tenets it was based on to help gifted students earn college credit. The premise of the program was that "all students are not equal" and in 1959 James Conant stated that the US education system is failing to differentiate curriculum and for that reason many students are going through the system without being challenged. This idea gained credibility when Sputnik was launched in 1957 and it was thought that US was incapable of competing against the Soviet Union in the scientific arena (Hampel, 1986). The launch of Sputnik sparked the passage of legislation in 1958 called the National Defense Education Act, which provided funds for the greater development of science, mathematics, and modern languages at the primary and secondary level. The context of the times made the Advanced Placement Program appear favorably in the academic arena (Schneider, 2009).

The Advanced Placement Program was appealing to teachers and students. Teachers were being provided an opportunity to teach challenging material in more heterogeneous groupings, which allowed them to move through the curriculum at a faster pace. Students were able to use the program to become more competitive and compelling for colleges for the limited number of places in their programs (Gores & Barry, 1956). The program grew rapidly for participating in the program was close to attending an "elite prep school." It was noted in 1961 by James Conant that fifty percent of the entering class at Harvard had taken part in the advanced placement and almost ten percent of them had earned enough credits to qualify as second year undergraduate students. The program began to change from the original premise, which was to

challenge the high achieving students with more rigorous content, and it was rapidly becoming a tool to get an edge in the college admissions process (Bragdon, 1960).

Enrollment in colleges had doubled from 1950 to 1980 and even students at the “elite prep schools” had to compete for places which made students more credible when an advanced placement course was on the transcript (Casserly, 1966).

The advanced placement began to be viewed as a means to provide underserved communities an avenue through which they can enter post-secondary institutions and promote equity. Reformers and educational leaders strongly felt that with appropriate funding, the advanced placement could also be beneficial for socially disadvantaged students (Marland, 1976). By the mid-1980s, sixty seven hundred schools and two hundred thousand students were participating in the program. Much discussion had begun with regards to equity in the program, for larger schools in the suburbs were more likely to have the advanced placement than were smaller schools. The number of students taking the advanced placement tests has increased dramatically since its inception and great strides have been made in categories in which parity has not been reached and one these areas would be gender. In the beginning of the Advanced Placement Program in the 1950s, the examinee was most likely a boy whereas in 2006 the distribution was fifty-six percent to forty-four percent favoring girls (Mollison, 2006), but whether that is the case in different subject areas is worth considering and examining. The Advanced Placement Program’s purpose is to provide students with rigorous course work and prepare them for courses in colleges of their choice. The number of students taking the advanced placement exams is constantly on the rise with students’ hopes to get a head-start on their college credits. The Advanced Placement

Program encourages teachers, advanced placement coordinators and school administrators to ensure that their Advanced Placement Program is equitable for all. Ideally, the advanced-placement classes must reflect the diversity of the school populations including gender. In the data presented by the College Board, nationally there is a difference in advanced placement enrollment of boys and girls (Moore & Slate, 2008). This leads into the next portion of the literature review that will specifically examine gender in the Advanced Placement Program.

Gender equity in Advanced Placement Program. The factors discussed earlier in the literature review, which dealt specifically with gender, have a significant impact on the Advanced Placement Program. The number of students taking the advanced placement exams is constantly on the rise with students' hopes to get a head start on their college credits. The Advanced Placement Program attempts to encourage teachers, Advanced Placement Coordinators and school administrators that their Advanced Placement Program should be equitable for all. The advanced placement classes should reflect the diversity of the school populations including gender. In the data presented by the College Board, nationally there is a difference in advanced placement enrollment of boys and girls. More boys enroll in advanced placement exams than do girls but such is not the case for the state of Texas. In Texas public schools, seventeen percent of the female student body signs up for advanced placement exams in comparison to only thirteen percent of the male student body but disparity still exists within subject areas (Texas Education Agency, 2007). Generally more boys take the math and science advanced placement exams and girls take the languages, literature and history advanced

placement exams. Government and Politics and Latin advanced placement exams are taken equally by boys and girls. The same disparity is seen in the areas of performance for boys score higher in math and science and girls score higher in language, literature and history (Moore & Slate, 2008). These statistics and more can be examined at the College Board website, http://www.collegeboard.com/html/aprtn/subject_specific_data.html. The following, for example, are some of the numbers for the national averages for the year 2009 in the area of AP Physics C: Electricity and Magnetism and AP Spanish Language.

Examinees by Gender, Class of 2009

AP Physics C: Electricity and Magnetism

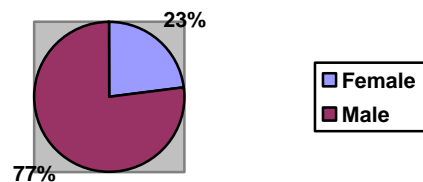


Figure 1: Participation by Gender AP Physics C: E & M

Examinees by Gender, Class of 2009

AP Spanish Language

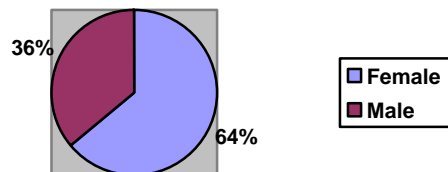


Figure 2: Participation by Gender in AP Spanish Language

The literature review, with regards to the advance placement coursework, classroom and social experiences and expectations, indicates that gender equity in all areas is still a goal that needs to be accomplished and that educators must work towards. Staff development opportunities developed by administrators for the teachers at the school related to gender issue give credence to the idea of evaluating gender irregularities and examining the impact of the staff development. The observations made by the teachers in the classroom with regards to gender inequities, lends support to the study. Parent and student comments further underline the need. The literature review strongly suggests the idea that gender inequities exist; however, but not just for one gender but for both. Both genders experience disparity in different areas, and the study will examine where the disparities may exists in the Advanced Placement Program.

The differences in gender have been studied and reported for many years, and the gender equity discussions have developed as a result of the political work done to illuminate gender bias and widen access for girls in all walks of life. In the 1990s, a ground breaking publication, “How School’s Shortchange Girls,” fueled the discussion and exposed the inequity in girls’ education. The publication brought forth the biased teaching practices, curricular omissions, sexual harassment, unfair testing procedures and limited access or lower participation in certain subjects (Dentith, 2008). At all levels of education, gender issues continue to be debated hotly and the discussion revolves around the source of the differences. Are the differences due to the biological variations in male and females or is it due to the cultural and environmental factors? Schools’ inability to understand the differences in genders unintentionally creates an environment in which “girls are pushed out of computer science and boys are pushed out of subjects such as arts

and languages” (Rycik, 2008). Other studies indicate that if schools were to evaluate data on test scores, grades, and discipline referrals with gender as the focus, they will discover that boys make up eighty percent of schools discipline referrals, sixty-seven percent of the schools Ds and Fs are earned by boys and less than half the As. Standardized tests indicate that boys are lagging behind girls in literacy skills by a year and a half. This disparity in student achievement requires educators’ caring about boys and girls specifically (Gurian, 2006).

Gender inequity studies, in which girls are lagging, have forced educators to target science, technology, engineering and math (STEM). The American Association of University Women and the National Science Foundation dedicated 90 million dollars of funds to reduce these inequities. The core belief is that successful academic engagement in the areas of STEM would result in more lucrative careers for women. The goals were to work towards equitable career opportunities, reduce the salary gap and have more female representation in management. These efforts have been successful in the areas of biology, anatomy and advanced math but not in physics and computer science (Dentith, 2008). From their elementary days fewer girls than boys have career aspiration related to science (Vanimali & Abell, 2009). To overcome the gender gap in these areas, one will need to closely examine gender inequity interventions (Dentith, 2008). A journal article examining the data for a public school in nearby Dallas, Texas, finds the enrollment in advanced placement tests for biology and math are fairly equally balanced in terms of gender but the areas that are still primarily male are advanced placement tests for physics and computer science (Nelson & Sanders, 2004). Research also indicates that girls may lag behind boys in the areas of science, technology, engineering and math but not so in

reading. The National Association of Educational Progress examined data for reading at the fourth, eighth, and twelfth grade and found the scores by students' gender across the years indicate that male reading levels are lower than those of females. Based on this study in the area of reading, it is the male that is being left behind from elementary through university (Klecker, 2006).

Having described how I came to my overarching research question in Chapter 1 and researched key themes in the literature that lay the groundwork for my investigation in Chapter 2, I will now describe in Chapter 3 the research methodology I will use to study the Examination of Gender in Advanced Placement Tests.

Chapter Three

Methodology

My thesis research is to examine the teacher perceptions of gender equity within the classroom and the Advanced Placement Program and connects the trends in these perceptions to student participation by gender in different advanced placement subject area tests. This approach will explore whether gender disparities exist within each discrete subject area and can potentially impact policies within a particular school campus and/or the community/broader educational milieu surrounding it. The methodology used to accomplish the study involves both quantitative and qualitative means of inquiry as further detailed in this chapter.

Purposes

The rationale for my study can be justified at the personal, the social and at the practical levels. Due to my personal history and experiences, a number of personal purposes underpin this study. Equity and accessibility of opportunities is very important to me and has critically influenced my life. As a woman in a generally male-dominated South Asian culture, I have been privileged to have the opportunity to positively influence traditions and customs so that students, boys or girls, are able to participate in school programs without becoming victims of gender stereotypes and societal dogmas. As Chapter 1 indicated, one's gender is shaped not only by biology but by one's family background, societal influences, and the other cultural environments that individuals are exposed to within their lives. Also, I am a mother of a daughter and a son, and I want both of my children and other young people to be able to avail all the opportunities that

are out there without factors imposing limitations. My hope is that the research and work I do to promote equity and fairness through positive actions and interpretations will some day become the legacy that I leave behind.

The social purpose that the study elaborates gender roles and issues that are still consciously and unconsciously part of the fabric of our society and how these issues play out in a particular educational setting - along with the impact they have on individuals and groups of students enrolled in certain classes, in the broader school milieu and within the urban context as a whole. The study provides a snapshot of how our society is doing towards achieving the goal of accomplishing gender parity. It adds to the knowledge base of why boys or girls respond the way they sometimes do in the classroom setting, and in making decisions about their future. Examining the gender correspondence of advanced placement tests in different subject areas is also significant for all secondary school campuses. Over the decades, much effort has been put into eliminating or minimizing the gender gap but constant effort is needed to ensure that the gender gap in fact has been minimized to the greatest extent possible, and through external means, so that no one gender is receiving any special favor at the cost of the other. Parents, teachers, students and administrators alike feel the need to constantly make sure that no child is being hindered in their efforts in accessing a quality education. As stated in the No Child Left Behind (NCLB) Act of 2001, no matter what the race, gender, ethnicity, disability, income or background of a student, quality educational experience must be made available. This further emphasizes the purpose of the study as a means to examine the equitability of opportunities in the learning environment. This research also indicates the need for schools to evaluate their present practices that impact student engagement

and achievement across gender lines. The study further uses school information in order to evaluate its standing on the topic of gender issues - particularly as institutions are charged with the responsibility of maintaining an environment that equitably promotes self evaluation and growth among all students.

The learning from my study will also make significant contributions to the existing literature regarding the practical situations that arise around gender disparity in classroom and in school setting, and I believe that it will be useful to general practitioners in the area of learning - both in school and at the university level because Advanced Placement Program involves both. Specifically, the campus site used for this study is an independent private school in Texas that is a co-educational day school offering a 13-year sequence of college preparatory training. The school aspires to provide the community with exacting standards and is geared towards the development of an individual's spiritual, ethical, intellectual, social and physical growth. The campus offers talented, motivated and energetic students a genuinely challenging environment in which they can seek academic accomplishment, and a backdrop that is conducive for the development of a sense of self-worth and personal responsibility within each individual. The school's environment promotes student achievements to excel beyond the average and students respond to this environment by taking on challenges, including advanced placement course work. The goal is for students to pursue academic and extracurricular excellence in response to the challenging and competitive environment present in the school milieu, in a setting that aspires generally to be gender-blind. The effectiveness of the Advance Placement Program is illuminated in a practical setting because it generates evidence that further informs practice in that setting. The teacher responses from the survey provides

valuable data necessary for understanding why teachers think that students select certain advanced placement classes and how the students respond differently in each of those classes based on gender or other factors. Understanding this mechanism is useful in deciphering the decision-making set that students are presented by the teachers and the teachers' own perception of their interaction with the students in the classroom. Student participation in educational settings recently has suggested that there is equality. However, detailed examinations have often yielded contradictions highlighting the disparities that one stereotypically believes to exist - both in the global marketplace setting and within certain professions. From the year 2008, data shows that fifty-two percent of the doctorates were earned by women, but again this was only a superficial examination of the facts. Specifically in the areas of engineering and physical sciences the numbers show that less than forty percent of the doctorates were earned by women and as few as ten percent in the area of aerospace engineering. The numbers are reversed in the areas of education and health sciences, sixty-eight percent and seventy-four percent respectively (The Chronicle of Higher Education, 2010). My study, which is a detailed examination of the number of students (by gender) currently take part in the tests that are offered in Advanced Placement Program, sheds further light on the possible gender inequity issues that may exist. It provides concrete examples from an on-site study, while correlating it to the school's overall approach to the management of the issue of gender equity, and its aspirations to create a program that achieves greater equity. The study provides rich details concerning student participation in different subject areas and programs that can be used to initiate programs to promote gender equitable participation in the advanced placement tests offered by the campus. This examination provides a

better understanding of the gender issues that may exist in high schools based on teachers' perceptions and insights into the practices that possibly could be promoting inequities. The perceptions that teachers have of gender inequities on campus and in classrooms can be further examined in detail to develop future staff and campus development opportunities that are more relevant to the needs of the students and in keeping with the school's creed. The teachers' beliefs about the Advanced Placement Program's gender equity may be validated by the data or contradicted by the reality at hand. The school, administrators and teachers alike, can gain significantly from the study. Ideally, reflections on practices and methodologies should be a constant part of an educator's career as well as be part of the campus culture. Because of the school's mission, teachers and staff members work hard to establish a strong Advanced Placement Program; the goal generally is to ensure that all students can benefit from the school's offerings. Similarly, teachers at the school are constantly embarking upon new initiatives to gain understanding and knowledge in areas that can provide an equitable learning environment for all students. The data from my thesis study will allow these teachers to see the full impact of their current approaches and the current state of their school with regards to gender equity. One key question to ask if the school has been successful in closing the gender gap in all subject areas is whether this has inadvertently resulted in a reverse situation, where now the other gender feels or faces inequity in opportunities. Also, what happens past high school that causes females to shy away from the STEM professions? The current study also undertakes to research and answer these specific questions while gathering information that can provide schools and teachers with avenues for future research at their individual campuses, including a representative methodology

describing what new knowledge needs to be gained and implemented on their campus to be able to answer the questions of equity. Another important question that needs exploration is whether the school is well versed in gender issues across the subject areas or do specific areas need further re-thinking and improvement? It is important to assess the overall gender equity initiatives, formal and otherwise, that are implemented in schools, and to ensure that each subject area is made part of the study as opposed to its being a cursory, superfluous assessment of the macro numbers. One area that has dogged gender research is that there are a greater preponderance of boys and girls to be present in certain areas, including professional vocations, and hence it is important to ask if there are certain subjects that cater by and large exclusively to a specific gender and the reasons behind this phenomenon (The Chronicle of Higher Education, 2010).

Importantly, it is critical to explore and understand what course of action the school needs to take to alleviate such a bias. As a matter of best-practice, school faculty members must constantly examine and re-examine their pedagogical practices through self research and data collection to be able to self-correct if necessary. Females or males should not be the dominant in any one area by virtue of school policies and teacher interaction - and if for some reason it is found that that is the case, the school needs to refine its methodologies and seek solutions to reduce the disparity. Without self reflection, a campus can become stagnant and may not be able to meet its own goals of excellence nor fulfill the needs of their student across gender lines.

Commonplaces of Curriculum

This study centers on gender and its impact on the classroom practices and curriculum through the perspective of the teachers, one of Schwab's (1983) curriculum commonplaces. The teacher questionnaires presents observations and perceptions teachers have with respect to student interactions with each other and how it impacts the educational process within the private school setting. The teachers are the gatekeepers through which the issues are examined. As the commonplaces of curriculum state, four commonplaces impact the curriculum-making situations, one of which is the teacher and the others of which are the learner, the subject matter and the milieu. The teacher commonplace is what the teacher brings to the classroom in terms of content knowledge, style of teaching, and interactions with students, parents and colleagues as well as preferences and biases. The teachers work with college ready students in a private preparatory high school where the societal expectations are that students will enter fields of study like STEM disciplines in universities and make the U. S. more competitive in an increasingly volatile global economy. The learner commonplace adds to the dynamics of the class through the learners' prior knowledge of the content and how that shapes the curriculum to the learners' learning styles influence teacher methodology. The subject matter commonplace is significant because the curriculum involves content matters, whereas the milieu commonplace includes the learning environment and how it impacts the curriculum, learner and the teacher as well as the educational and societal forces shaping schools' and student's present and future roles in society. These commonplaces interact with one another to create positive learning environment and meet the objectives of the curriculum (Sack, 2008). In the study, the teachers' perceptions of gender, within

the classroom and for the Advanced Placement Program, gives the researcher a perspective of how teachers view learners in their classrooms. The learners' interactions in the classroom with each other based on gender affects the decisions that they make with regards to subject matter and the curriculum. How the curriculum is presented necessarily leaves impressions within the learners' minds. Dewey (1938) talked about how experiences impact the education of students and how every experience builds upon the experience that preceded it. According to him, students' future can be positively or negatively influenced by experiences (Neill, 2005). The milieu, in this case the private school setting and policies, impacts the teacher, learners and the subject matter. The school has traditionally provided many opportunities for teachers to understand the research available on gender issues and how it impacts their teaching methodology and in-class interaction with boys and girls in various academic settings. Separately, over the years, numerous studies have been conducted nationally to examine the impact of gender on student's course selection and their performance in these courses. The studies have varied based on the impact of gender on different achievements tests and the corresponding national trends. Any school that is based on the mission to provide a gender-blind core of opportunities to its students has an obligation to examine how its set of policies compare to the national trends and evaluate if a gender disparity exists on the campus that is affecting or influencing the opportunities available to students to pursue advanced placement and related achievements. As stated in the literature review, education has traditionally been a male-dominated arena, and only fairly recently have policies enabled changes leading to more equitable learning environments. In society, certain professions like engineering and medicine have been practiced by males whereas

professions like nursing and teaching have been female-inclined, and the latter professions have been under fire concerning whether or not they are even “professions” at all. These four curriculum commonplaces constitute an environment within which the teachers and students participate and learn. The teachers’ questionnaire offers a portal through which all of the other factors that are being examined and understood.

The lack of gender equality in Advanced Placement test has been documented in literature, so has the need for participation and achievement of boys and girls in all academic areas. One question to ask here is if this is consistent with the findings at the school of study. Past studies have shown parity on math and science tests taken across the nation but participation in these fields are fewer for the females (Viadero, 2009). Another area that is explored is whether the findings at the school of study are consistent with the national statistics and, if so, then how does the school of study fare in the area of language, history, etc. The current study’s attempts to evaluate how the school compares to national statistics and reviews student participation in advanced placement tests in general as well as in specific subject areas and finally analyzes and synthesizes teacher perceptions with regards to gender within the classroom and the Advanced Placement Program.

Mixed Methods Research

The study involves the use of mixed methods, and integration of quantitative and qualitative techniques to collect data in order to provide a pluralistic view of the state of the aforementioned phenomena at hand (Borkan, 2004). The mixed methods research is the third type of research used in education and is not limited to just the quantitative or

the qualitative but is a combination of both. The reason the mixed methods approach is chosen here and generally used is because it uses the strengths of both research approaches while helping minimize their weaknesses. As stated in the pragmatism philosophy of education (Encyclopedia Britannica, 2010), only approaches that are applicable in real world situations should be used. The mixed research approach (Johnson & Onwuegbuzie, 2004), has a number of strengths that promote its usage. First, the data from the mixed research can provide more descriptions for the numbers determined or extracted during the research process and enable a clearer picture of the situation. Second, the mixed methods approach can answer research questions more broadly because the study is not limited to one method of inquiry. Third, the mixed methods approach can counter the weakness of the other method. Finally, the mixed approach provides conclusions with stronger evidences from both forms of data collection and can often provide unexpected insights (Borkan, 2004). The evidence obtained through the mixed method design is stronger because it is developed through a convergence and corroboration of the results. Hence, the insights gathered through the mixed methods approach may not be available if only one method was utilized. One other upside of the multiple methods is that it also allows the researcher to generalize the results from what limited (and sometimes conflicting) data is available. The combination of qualitative and quantitative methods can thus result in a more complete knowledge base impacting theory and practice (Johnson & Onwuegbuzie, 2004).

However, like any methodology, the mixed methods approach has its own set of weaknesses. For example, the mixed method approach may be a challenge for an individual researcher and may sometimes require a team of researchers. Also, the

researcher, in order to use the different methods, has to learn the varying approaches and how to integrate and use them together. Other methodologists, particularly purists like Guba and Lincoln (1989), state that only one type of paradigm should be used, qualitative or quantitative, because the two paradigms are incommensurate with one another. In short, they deal in different understandings of truth, and therefore they feel that the two approaches cannot be collapsed into one study. Mixed methods design can also be very time consuming because of the multiple components of data collection and analysis. Finally, a significant weakness of the mixed methods lies in how the researcher works out the details of data analysis such as conflicting results interpretation (Johnson & Onwuegbuzie, 2004).

Given that mixed methods approach yields greater benefits than disutility, the current study uses the mixed methods approach so that a better understanding can be developed of the role and stereotypes associated with gender in the classroom and the advanced placement course work in a particular school setting. The actual study for the research takes place on a campus where the samples are small and would in fact produce insignificant results, and it purports not to get beneath the surface (concerning people's reasoning) instead explore the connection between the quantitative numbers gathered and qualitative inferences to provide further data and information. The analysis of the mixed methods data ultimately provides a more illuminative lens through which the campus is viewed and its dynamics explored. It enables the researchers to be more reflective and critical of the data and to render it useful for a larger audience.

Quantitative Component

The direction of the study and the methods used to collect the data are critical components of any research endeavor. The direction of this study is determined by the four questions of the study. For example, the first two questions probe whether there is a connection between the number of female and male students taking the advanced placement tests, and whether there is a connection between the number of female and male students taking math, science, language, history and English on the advanced placement tests. These two questions naturally warrant a larger focus on the quantitative elements of the enquiry, and the archived quantitative data is examined for the Advanced Placement Program at the school of study for the last four years beginning with the school year of 2006-2007 and ending with 2009-2010. The advanced placement data studied is the total student participation based on total enrollment with regards to gender and student participation based in different subject areas with regards to gender as well. The evaluation involves the percent participation in advanced placement of boys and girls with regards to the total high school participation and the percent participation of boys and girls in different subject areas. These percentages are compared to the national statistics and examined for similarities and differences. Going back in time provides the data necessary to determine if the connections that exist on the campus are for only one year or are they the same over longer durations not varying much from year to year. Student enrollment data provides the number of students that have previously and are currently attending the school, and delineates the information by how many of them are male versus female. If the enrollment of students based on gender is fairly equal then the same should be reflected within the Advanced Placement Program assuming no gender

based influences. The advanced placement coordinator has assembled past records from the years of interest that show how many students for each stated year participated in the advanced placement tests, including by subject areas. The student participation data in different subjects in advanced placement tests is also separated based on gender. The percentages for participation based on each gender are then grouped and studied based on the individual subject areas so that the connection between the numbers and the qualitative data is made. For example, the percent participation based on gender in the chemistry advanced placement test is connected to the qualitative data and then all the science advanced placement percentages are averaged to connect the science field to the qualitative data.

Qualitative Component

The qualitative piece gathers teacher stories on their perceptions of student experiences and the curriculum presented within the secondary curriculum with regards to gender parity. The qualitative data is collected via a teacher questionnaire that teachers in the private high school fill out anonymously. The questionnaire was developed through ideas or thoughts included on the *Impact of Gender on the Classroom Environment & Student Interaction* website and the http://www.unescobkk.org/fileadmin/user_upload/efa/Publications/Genia_Toolkit_2009.pdf link, and self-reflection. The questionnaire was edited and field tested by educators ranging from teachers, counselors and administrators in the University of Houston Main Campus Executive Educational Doctoral Cohort 2011. These perceptions are then laid alongside the quantitative data with central attention being focused on student participation in

advanced placement coursework and other classroom experiences that have transpired in relation to gender.

The qualitative data involves the use of the qualitative/narrative inquiry method and the tool is the anonymous teachers' questionnaire. In qualitative inquiry, the view is that there is no one absolute truth but multiple realities of how people make sense of a phenomenon; that is, how they story their lives (Connelly & Clandinin, 1990). The teachers' questionnaire responses are examined through the social constructivism and pragmatism lenses. In the social constructivism approach the researcher tries to understand the world in which the participants live and work (Kim, 2001). The questionnaire responses provide a glimpse of what the teachers perceive to be the attitude of students with regards to gender and how it impacts their educational career and choices along with the impact of other factors on the students' lives. In narrative inquiries of teachers, the teachers hold and express a sense of knowing (Dewey, 1938), that they carry from one situation to another and the inquiry enables human experiences to be unpacked. The responses to the questionnaires provide one window into the life of the school in terms of students, teachers and the curriculum enactment. The responses may vary from teacher to teacher based on teacher gender, years of experience and the subject matter they teach. These responses are connected to the student participation numbers in the advanced placement coursework based on gender and subject area. The researcher uses a variety of tools in order to collect the data needed to make the connections and evaluations of multiple truths as expressed by multiple participants.

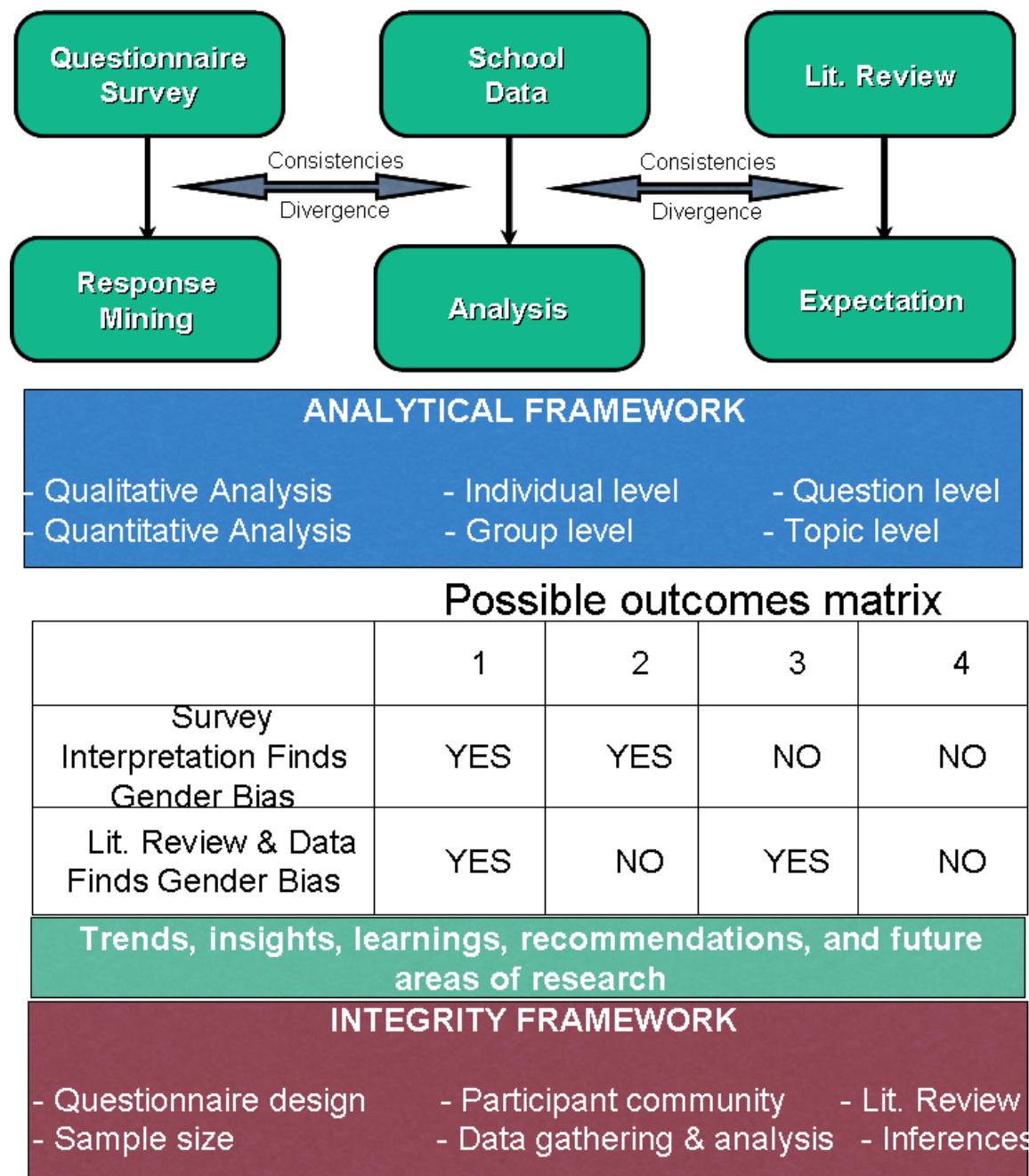


Figure3: Data Analysis and Interpretation

Research Questions

The research study involves collecting and interpreting, analyzing and synthesizing data to address the following questions:

1. Is there a disparity between the number of female and male students taking the advanced placement tests?
2. Is there a disparity between the number of female and male students taking math, science, language, history and English on the advanced placement tests?
3. What are teachers' perceptions concerning gender equity in the classroom and in the Advanced Placement Program?
4. How do the teachers' perceptions connect to the school's statistical record determined for the first two examining gender participation in advanced placement tests?

The above four questions comprise the model through which this study collects the data and develops the insights necessary to formulate a clear description of the actual versus perceived status of gender bias in classrooms in a specific college preparatory high school setting.

Data Analysis and Interpretation: Quantitative

Interpretative devices for the quantitative and qualitative data vary. The quantitative data of student participation in the advanced placement program are compared for all four years and the trends are used for descriptive percentages. In the results section, the student participation in the Advanced Placement Program is stated for

the school years beginning in 2006-2009 based on gender answering research question one, as stated above. The results for the students participation in the different subject area in the Advanced Placement Program is stated in the results section based on gender for the same school years answering research question number two. Is the female and male participation going up or down across the program in the applicable school years? The second level of data interpretation involves looking at participation of females and males in different subject areas and again the attempt is to determine if certain patterns exist. For example, are the female or male students more apparent in a certain subject area or there is parity across subject areas? The final quantitative analysis involves looking at where the school compares to the national statistics of gender participation in different subject areas and this allows the researcher to determine if the school is doing well or needs to work in certain areas.

Data Analysis and Interpretation: Qualitative

The questionnaire contains twelve questions with subparts to answer the four research questions stated above and connect to the descriptive quantitative data. Even though the first two research questions are determining the numbers of the female and male participants and participants in different subject areas, the answer to these questions is also obtained from the questionnaire.

Survey Question	Corresponding Research Questions
1	One, Three, and Four
2	One, Three, and Four
3	Two, Three, and Four
4	Two, Three, and Four
5	Three
6	Three
7	Two, Three, and Four
8	Two, Three, and Four
9	Three
10	Three
11	Two, Three, and Four
12	One, Two, Three, and Four

Figure 4: Correlation of Questionnaire to Research Questions

The first two questions of the questionnaire obtain teachers' views on why advanced placement courses attract a disparate percentage of boys and girls. It explores whether this may be due to the students' interests, family background, gender roles, teacher influences, school atmosphere, future career options, peer influences, and personal effort. These views provide the answers to research questions one, three and four. Questions three and four on the questionnaire focus on teachers' narrative of why women predominantly chose liberal arts careers compared to men in the science and engineering careers. The responses of these questions answers the research questions number two, three and four. Questionnaire questions five, six and nine gather teacher

perceptions of how boys and girls learn; who is more active in learning; and what does the word gender equity mean; and the responses from these questions provide data for research question three. Questions seven and eight on the questionnaire, determine if one gender has to be encouraged to participate in certain courses according to the teachers. The teacher responses provide understanding of research questions two, three and four. Question ten on the questionnaire gathers teacher stories of gender equity discussions in the classrooms and these stories add to the data for the answer to research question three. Teacher views on student self-concepts are obtained from question eleven in the questionnaire and the answers are data for research questions two, three and four. Finally, the last question on the questionnaire obtains teacher views of students taking higher level courses in different subject areas and the data from this question provide data for all the research questions.

The qualitative data requires a more elaborate approach to interpretation. The teacher stories are analyzed using broadening, burrowing and storying and restorying interpretative tools. In broadening the findings and analysis of the teacher questionnaires situate the practices, policies and experiences in a wider context. The questionnaires ask teachers what content that they teach. This allows for different units of analysis to come together and presents the views of the science teachers, language teachers and history teachers followed by a wider range with each group (i.e., science teachers-Physics, Chemistry, Biology). The view is further broadened by examining the responses based on the gender of the teacher. The mission of the school, where the study that is being conducted is regarding college preparation, promotes student involvement in the Advanced Placement Program. This makes it significantly important to study the

Advanced Placement Program and the value placed on gender equity in STEM areas as well as others. The broadening interpretative device includes the above aspects but also incorporate the views of teachers with regards to gender influences being a result of nature vs. nurture, and the views of teachers with regards to typical gender behaviors within the classroom. The multiple analyses of broadening from different perspectives gives a broader, richer view of the campus with regards to the issues related to gender in the Advanced Placement Program and how this influences the teachers' perceptions.

Conversely, the burrowing approach to analyzing the teacher questionnaire provides a more focused view of the campus with regards to the research questions. This form of analysis centers on particular issues and situations. This focus on particular aspects provides specific details which support larger meanings and explain the study on hand. The questionnaires are examined for similarities and differences in general and then examined more specifically for similarities and differences based on the subject matter the teachers teach. This analysis may present the multiple truths present on a campus due to the different contexts, subjects and genders. The analysis may show that some teachers observe significant gender issues on campus and others believe no issues exist with regards to gender.

Both broadening and burrowing inform the storying and restorying, the third qualitative tool of analysis. Perceptions of teachers with varying experiences, gender and content expertise narrates the story of the campus site and student participation numbers in the advanced placement tests provide the details. The analysis of these findings helps recreate a story in a larger context to provide a broader more holistic lens that the researcher uses to approach the situation (Ollerenshaw & Creswell, 2002). For example,

if in science teachers' questionnaire the student may be influenced greatly by peers in selecting future course work but the language teachers' may state that the teachers play the most critical role. The individual narratives are different but when the story is retold in a larger context the approach varies significantly. The burrowing approach combined with the broadening approach aids in the development of the story that exists on the campus of study providing a wider and in depth understanding.

Pilot Questionnaire Data and Analysis

A teacher in a K – 12 private school was asked to fill out the questionnaire used in the research study. The teacher, female with 13 years of teaching experience, has taught chemistry, physical science and life sciences. Questions one and two on the questionnaire are the same questions with the exception that question one asks for information about boys and question two regarding the girls. The question essentially ask the participating teachers to rank the listed factors that play a role in the students' choice of advanced placement subjects they take, since different advanced placement courses attract a disparate percentage of boys and girls. The answer choices range from one to ten for each possible option provided, with one being the least important factor and ten being the factor playing the most important role. In the question for the boys and the girls, the teacher participating in the pilot stated that the teachers played the most important role in influencing the advanced placement course and the least important was the absence of the desire to work hard. The second most important factor for boys was increasing their chances of getting in to good colleges. For girls, the three factors that were ranked equally importantly in determining their choices were: getting into good

colleges, getting college credits and peer influence. The three factors were ranked equally for the third most important role and they were the number of college credits, being influenced by their peers, and the student's gender playing a role in course selection. According to the teacher participating in the pilot, boys and girls respond the same to parents' expectations and hence it ranks as the sixth most important influence on her list. The teacher respondent ranked girls' selection of courses based on talents to be more of a critical role than for boys, and it ranked as the fifth and sixth most important factor respectively.

The teacher responded to the third and fourth question -- asking why more men are in science and engineering than women and more women in liberal arts career than men, in a narrative stating that society still segregates/discriminates based on gender and girls are aware of the male-dominated careers and how they are not glamorous, popular or success worthy. The teacher's responses are focused on the maturity differences between boys and girls and states girls are more mature and boys are "dinking around and wasting time." She stated in her response to question six that girls are more active in their learning. In questions seven and eight, she stated that boys need to be motivated to take non-male stereotypical courses and activities and girls need to be motivated to take part in male stereotypical courses and activities. Her view for question number nine is that gender equity still has a ways to go and our western culture still discriminates gender-wise, and gender equity still needs to be worked on given the counter-productive role of certain advertisements and the sexually provocative nature of today's culture. For question ten, she states that gender equity on her campus can be handled only individually, and believes that the influences of the "good old boys network" prevails,

often requiring her to work individually with students. She felt that it was during specific “teachable moments” that she could make an impact on her students - when certain situations arise. She stated that in general boys feel more comfortable in talking about non-traditional enrollment, and that boys are more likely to sign up for math and science higher level courses while the girls are most likely to sign up for English, history and foreign languages higher level courses in answers to question eleven and twelve.

The analysis of the data with the analytical tools of burrowing and broadening would generally requires the questionnaire responses from more than one individual but this was just the result of pilot questionnaire. With similar questionnaires, the researcher delves further into the respondents by examining if the teachers have similar years of teaching experience, the content that they teach and the gender of the teacher. This analysis gives a more in depth view of what is happening in the classroom and how the teachers of similar traits are viewing the student experiences and responses to the environment. The teacher’s narrative tells a story of her classroom from her perspective and this story combined with other stories can be retold from a broader perspective to provide a more holistic view of the campus site. It helps the researcher broaden the perspective of the policies and practices in place while delving into each individual questionnaire response as a data point by which to answer the four key research questions. These policies may also require more training for teachers in the future - so that they can give individual mentoring to students who need to broaden their horizons on issues pertaining to course selection (and ultimately career options) while limiting the possible impacts of gender disparity of the nature described by the teacher participating in the pilot. The school can also broaden the offering of extra-curricular activities to

allow students to experiment with options that are not gender stereotypical and this may lead to students engaging in a wider course selection process across the grade levels.

Summary

Education in schools should be available to all irrespective of race, ethnicity, and gender, and the focus should be to make sure all students succeed and achieve to their full potential. As an educator, I have observed gender inequity and worked towards creating more equitable learning environment for all. Through conducting this study, I explore whether a particular school community has been able to provide an equitable learning for all. The school community is made of parents, students, teachers, staff and administrators and the thesis study will be important for all. All members of the school community strive to provide an equitable learning environment for all by playing vital roles in the student's lives. The school is co-educational with generally equal number of female and male students and that should be the case in the engagement of students in different evaluative measures. For that reason, examining the student enrollment in advance placement tests based on gender is important. The study involves examining the percentages of student participation based on gender in the Advanced Placement Program and in the specific subject areas for the past four academic years. Teacher questionnaires provide the teacher perception with regards to gender issues in the classroom and the Advanced Placement Program. Connecting both (representative percentages with the teachers' narrative inquiry) provides the multiple truths that may exist on the campus of study indicating the contexts and subject areas in which the truths are present. The stories told in the individual teacher narratives allow the restorying of the combined

narratives to enhance the understanding of the school milieu. The mixed methods approach allows the different tools to provide a more in depth analysis of the data collected and get a broader perspective of the gender issues in place.

Mixed Methods Research Design for Private, College Preparatory High School

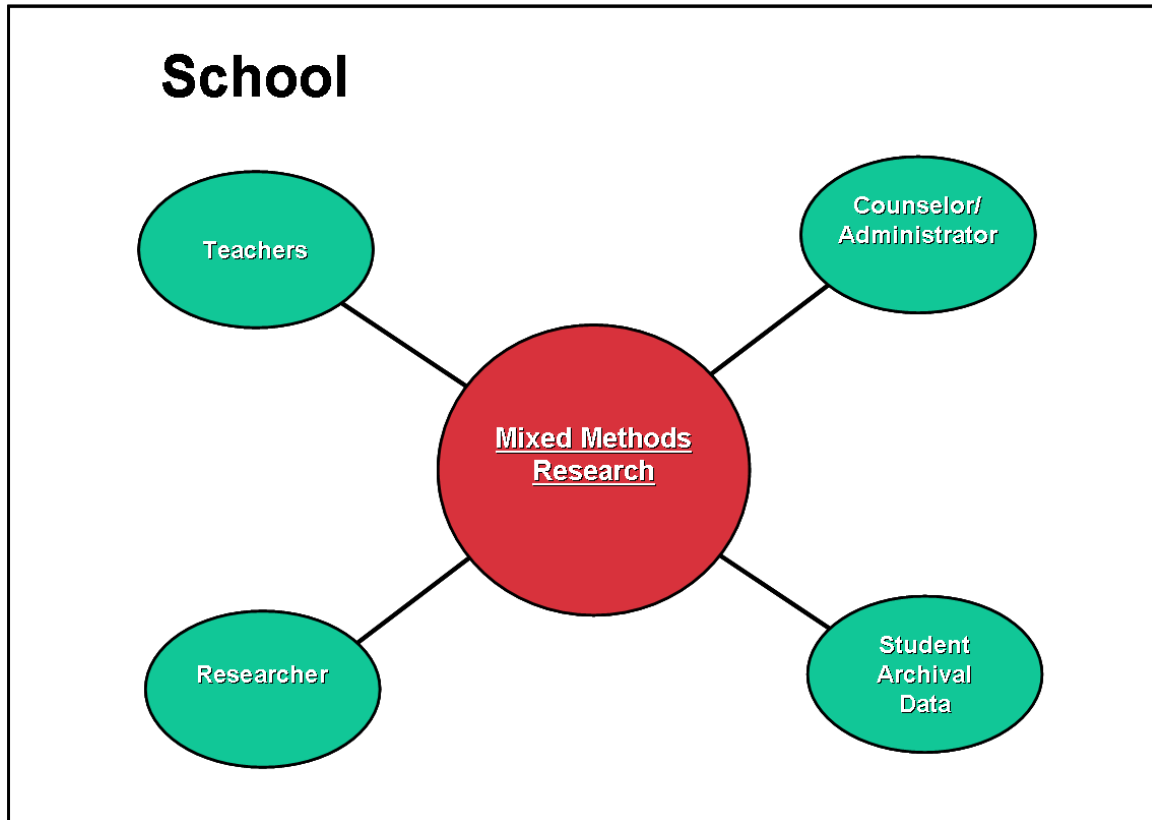


Figure 5: Study Informants

Having described my mixed methods research design and those who will contribute to it in Chapter 3, I will then interpret the data I collected on Examination of Gender in Advanced Placement Tests in Chapter 4 and 5 and reflect back on the findings and conduct of my inquiry in Chapter 6.

Chapter Four

Quantitative Findings

This thesis research was designed to examine the teacher perceptions of gender equity within the classroom and the Advanced Placement Program at one college preparatory school and connects the trends in these perceptions to student participation by gender in different advanced placement subject area tests. The research approach explored whether gender disparities exist within each discrete subject area, math, science, English, history and foreign language can potentially impact policies at a particular school campus and/or the community/broader educational milieu surrounding it. The data was amassed through the mixed methods research approach. The approach included both the quantitative and the qualitative evidence gathering. This chapter focuses on the quantitative approach and the first two research questions of the thesis study. The quantitative approach examined advanced placement participation for the past four school years in different subject areas based on gender and compared it to the school's overall gender distribution, the school's cumulative advanced placement participation and national averages in different subject areas based on gender. The mixed methods approach was used to address research questions three and four in Chapter Five to arrive at conclusions in Chapter Six.

Advanced Placement Program Findings

For the last four school years, quantitative data was obtained from the Advanced Placement Coordinator. The data was for different subject areas and the total student participation in the Advanced Placement Program. The registrar provided the list of

students for the past four school years with the gender listed and the distribution of each grade for the previous school year based on the gender. For each school year, I examined the AP score report for each test and identified the students as female or male. At the end, I determined the total and calculated the percent female and male participation. The AP Coordinator also provided the list of students who participated in the Advanced Placement Program for that school year based on grade level, and I went through to identify students' genders and determined the overall percent participation based on gender and per grade level also based on gender. For this analysis, I used the student list provided by the registrar, which presented the gender of each student at the high school, and then determined the gender distribution for each grade level for the last four school years.

Analysis of student enrollment in school based on gender. The school's admission process actively monitors the gender distribution within each grade in order to have an equal representation of female and male students. At times due to attrition or other factors, the numbers vary from year to year and within grade levels. For the academic year 2007, the student body consisted of five hundred thirty-four students representing fifty-one percent females and forty-nine percent males. The freshmen class was made up of one hundred thirty-eight students representing fifty-percent females and fifty-percent males. The sophomore class was made up of one hundred thirty-eight students representing fifty-two percent females and forty-eight percent males. The junior class was made up of one hundred thirty-five students representing fifty-percent females

and fifty-percent males, and the senior class was made up of one hundred twenty-three students constituting fifty-one percent females and forty-nine percent males.

The academic year of 2008 consisted of five hundred thirty-seven students representing fifty-percent female students and fifty-percent male students. The freshmen class was made up of one hundred thirty-two students representing fifty percent for both females and males. The sophomore class was made up of one hundred thirty-five students representing fifty-percent for both females and males. The junior class was made up of one hundred thirty-four students constituting fifty-one percent females and forty-nine percent males, and the senior class was made up of one hundred thirty-six students representing fifty-one percent females and forty-nine percent males.

The academic year of 2009 had five hundred twenty-six students of which fifty-one percent were females and forty-nine percent were males. The freshmen class was made up of one hundred thirty-four students representing fifty-four percent females and forty-six percent males. The sophomore class was made up of one hundred thirty students representing fifty percent of both females and males. The junior class was made up of one hundred twenty-nine students representing forty-eight percent females and fifty-two percent males and the senior class was made up of one hundred thirty-three students representing fifty percent for both females and males.

The academic year of 2010 had five hundred thirty-nine students representing fifty-percent females and fifty-percent males. The freshmen class was made up of one hundred forty-five students with fifty percent being females and fifty percent males. The sophomore class was made up of one hundred thirty-three students representing fifty-three percent females and forty-seven percent males. The junior class consisted of one

hundred twenty-nine students representing fifty percent for both female and male students and the senior class was made up of one hundred thirty-two students representing forty-nine percent females and fifty-one percent males.

Student Enrollment

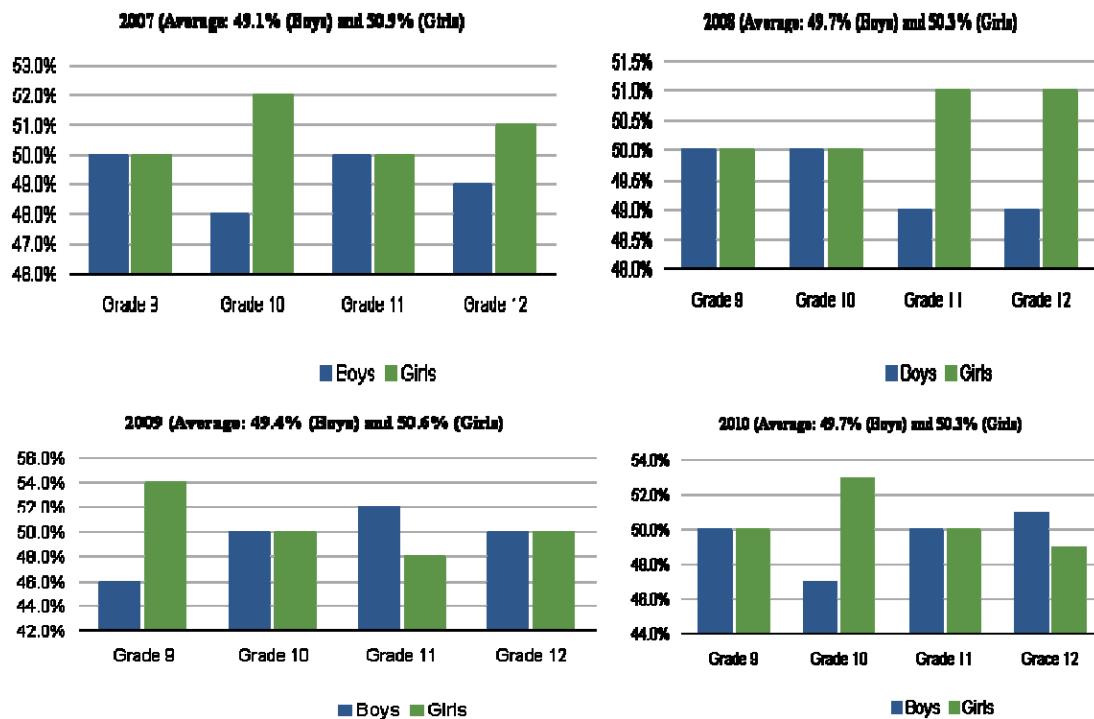


Figure 6: Student Enrollment Based on Gender

As Figure 6 indicates, the student enrollment numbers are generally equitable with regards to gender for all four years. The small margin of difference is about two percent. The differences and similarities are observed within individual grade levels. During the year 2007, the sophomore class had fifty-two percent females and forty-eight percent males. The largest gender distribution difference for any grade level is evident in

2009 and 2010. The gender distribution for freshmen in 2009 was fifty-four percent females to forty-six percent males and forty-eight percent female and fifty-two percent males in the juniors. The pattern continued, for 2009's freshmen class and 2009's junior class was the sophomore class and senior class in 2010, respectively. The numbers had improved slightly to fifty-three percent females to forty-seven percent males for sophomores in 2010 and forty-nine percent females to fifty-two percent males for seniors in 2010.

Analysis of data for overall advanced placement participation based on gender. The school has a strong Advanced Placement Program in which a good portion of the students start participating during their sophomore year. In the academic year 2007, three hundred thirty-four students participated in the program representing sixty-two percent of the school student population which was fifty-two percent female and forty-eight percent male. The grade level distribution was as follows. The freshmen class had one female participant. The sophomore class had fifty-five female students participating and forty-five male students representing fifty-five percent females and forty-five percent males. The junior class had sixty-seven female students participating, fifty-two percent of the class, and sixty-one male students, cumulatively representing forty-eight percent. The senior class had forty-nine female students and fifty-six male students participating, representing forty-seven percent and fifty-three percent respectively.

The academic year 2008 had three hundred forty-four students take the advanced placement tests representing sixty-four percent of the school student population and the

gender distribution was fifty-two percent females and forty-eight percent males. Two of those students are from the freshmen class; one was female and one was male. The sophomore class had ninety-five participants; fifty-three percent were female and forty-seven percent are male. One hundred and thirty-three students from the junior class participated and fifty-one percent were female and forty-nine percent were male. The senior class had one hundred fourteen students participate of which fifty-three percent were female and forty-seven percent were male.

During the 2009 academic year, the school had three hundred thirty-one participants in the Advanced Placement Program representing sixty-three percent of the school student population. The gender distribution overall was fifty-two percent female and forty-eight percent males. The freshmen class had only one female student participate. Eighty-two participants were from the sophomore class representing fifty-six percent females and forty-four percent males. The junior class had one hundred twenty-nine participants representing forty-seven percent females and fifty-three percent males. The senior class had one hundred nineteen participants of which fifty-three percent were female students and forty-seven percent male students.

The academic year 2010 had three hundred thirty-one students participating in the Advanced Placement Program representing sixty-one percent of the school student population in which forty-nine percent were female students and fifty-one percent were male students. The freshmen class had only one male student participant. The sophomore class had eighty-eight students participate of which fifty-five percent were female students and forty-five percent were male students. One hundred thirty students from the junior class participated in the program with fifty percent being female students

and fifty percent being male students. The senior class had one hundred twelve participants made up of forty-five percent female students and fifty-five percent male students.

AP Participation



Figure 7: AP Participation

Participation Data for Different Subject Areas. The student participation in the Advanced Placement Program in different subject areas based on gender in the academic years 2007-2010 is summarized below, and compared to the national averages

for the corresponding year. The graphs representing the four academic years for different subject areas based on gender are in Appendix A.

AP Music Theory. The AP Music Theory is not a test taken by many at the school and for the academic years 2007-2010, the number of participants ranged from five to seven. For the academic year 2007, with only five participants, sixty percent of the participants were female students and forty percent were male students. The 4th Annual AP Report to the Nation indicates that the national average was forty-three percent female students and fifty-seven percent male students for this test. Six students participated during the academic year of 2008 consisted of sixty-seven percent female students and thirty-three percent male students. The national average for this test from the 5th Annual AP Report to the Nation indicated that forty-three percent were female students and fifty-seven percent were male. The academic year 2009 had seven students participate in the test and the percent distribution of female student to male students was seventy-one percent and twenty-nine percent respectively. The 6th Annual AP Report to the Nation indicated the same percent distribution of female student participation to male students to those seen during the years 2007 and 2008. The participation of students was six during the 2010 academic year for the test with thirty-three percent being female students and sixty-seven percent being male students. The 7th Annual AP Report to the Nation indicated the same percent distribution of female student participation to male students to those seen in the last three years.

AP English Language and Composition. The AP English Language and Composition exam is taken primarily by juniors at the research site and a majority of the students participate. For the academic years from 2007 to 2010, the number of participants ranged from one hundred twenty-three students to one hundred thirty-five students. In 2007, the junior class was made up of one hundred thirty-five students and one hundred twenty-three students took this AP test of which fifty-five percent were female and forty-five percent were male. The national average, according to the 4th Annual AP Report to the Nation, was sixty-three percent female students and thirty-seven percent male students. The year 2008 brought equitable participation for all the members of the junior class participated in the AP test and the participation was fifty percent for both genders. This was in contrast to the 5th Annual AP Report to the Nation in which the national participation was sixty-three percent females and thirty-seven percent was male. The year 2009 showed participation in favor of males and only two members of the junior class did not participate. Where the participants were concerned, forty-eight percent were female students and fifty-two percent were male students. The national averages for this year were the same as previous year according to the 6th Annual AP Report to the Nation. In 2010, the percentage of male participation declined in comparison to 2009 and all the members of the junior class participated representing fifty percent of both genders. In relation to the 7th Annual Report to the Nation, the national averages were that female student participation was sixty-three percent and male student participation was thirty-seven percent.

AP English Literature and Composition. Student participation in the AP English Literature and Composition is in direct contrast to the participation in the AP English Language and Composition. The participants are generally juniors and seniors and the participation ranges from seventeen students to one student in the academic years of 2007 – 2010. Year 2007 saw seventeen participants of which sixty-five percent were female students and thirty-five percent were male students. These numbers are comparable to the national average in which sixty-four percent were female students and thirty-six percent were male students according to the 4th Annual AP Report to the Nation. In 2008, the number of participants dropped to four students with both genders being represented equally and in contrast to the national numbers in which sixty-four percent of the participants were female and thirty-six percent were males as stated in the 5th Annual AP Report to the Nation. Each year 2009 and 2010 had only one student take the test. In 2009, only one male took the test, and the 6th Annual AP Report to the Nation stated sixty-four percent females participated compared to thirty-six percent males participated. The next year had only one female student participate. According to the 7th Annual Report to the Nation, the gender participation distribution mirrored that of 2009.

AP Chinese Language and Culture. The school's program in Chinese has been in place for only three years beginning in the academic year of 2009. Since its inception, only three students have taken the AP test, two in the year 2009 and one in the year 2010. In 2009, the participants were female and, in 2010, the participant was male. The 6th Annual AP Report to the Nation stated that the national average was fifty-six percent females to forty-four percent males in this test and the 7th Annual AP Report to the

Nation states that fifty-five percent of the participants were female and forty-five percent were males.

AP French Language. The number of participants in the French program at the AP level is not very high for the numbers range from thirteen participants to eighteen participants in the academic years of 2007-2010. In 2007, thirteen students participated in the AP test representing sixty-nine percent females and thirty-one percent males. These numbers are similar to the national averages stated in the 4th Annual AP Report to the Nation, which are seventy-percent female participation compared to thirty-percent male participation. In the year 2008, the number of participants increased to eighteen representing seventy-two percent female and twenty-eight percent males. The 5th Annual AP Report to the Nation reported the same numbers as the previous year. Seventeen students participated in the AP test in the year 2009 representing seventy-one percent females and twenty-nine percent males and the 6th Annual AP Report to the Nation reported the same national averages as the past two years. The year 2010 had fifteen participants, and the percentage of female participation dropped to sixty and the male participation increased to forty percent. The 7th Annual AP Report to the Nation stated that females were seventy percent of the participants and males were thirty percent of the participants.

AP French Literature. The student participation in the literature is lower than the participation in the language and ranges from zero to eleven in the academic years 2007-2010. Nine students participated in the year 2007 representing seventy-eight percent

females and twenty-two percent males and the 4th Annual AP Report to the Nation stated that national averages were seventy-one percent females and twenty-nine percent males. In 2008, eleven students participated in the test representing seventy-three percent females and twenty-seven percent males. According to the 5th Annual AP Report to the Nation, the national participation was seventy percent females and thirty percent males. The participation declined to nine students in the year 2009 representing sixty-seven percent females to thirty-three percent males, and these numbers were very close to the national averages as stated in the 6th Annual AP Report to the Nation in which sixty-eight percent were females and thirty-two percent were males. No students participated in the year 2010.

AP Latin Vergil. The number of participants varied from six to twelve on the test from the years 2007 – 2010. Twelve students participated in the test in the year 2007 representing thirty-three percent females to sixty-seven percent males where as the national averages were fifty percent for both according to the 4th Annual AP Report to the Nation. The participation dropped to ten in the year 2008 and was made up of thirty-percent females and seventy-percent males. The national averages were fifty-three percent females and forty-seven percent males as stated in the 5th Annual AP Report to the Nation. Only six students participated in the year 2009, and the distribution of females to males was equal. The 6th Annual AP Report to the Nation stated that fifty-four percent of participants were females and forty-six percent were males across the nation. The number of participants increased slightly to eight in the year 2010, of which eighty-eight percent were females and twelve percent were males. According to the 7th Annual

AP Report to the Nation, the national averages were fifty-three percent female and forty-seven percent male.

AP Latin Literature. Of the four years studied, only 2007 and 2009 had student participation in the test. In the year 2007, four students took the test and the gender distribution was equal. The national averages for the Latin Vergil and the Latin Literature are the same since the College Board combines the participation of both and then looks at the percent distribution. The year 2009 only had one student participate, who was a male.

AP Spanish Language. The student participation in the test varied from thirty-three students to fifty-nine students in the academic years of 2007-2010. In the year 2007, forty-one students participated in the test, of which forty-nine percent were female and fifty-one percent were male. In contrast, nationally sixty-four percent of the participants were female and thirty-six percent were male according to the 4th Annual AP Report to the Nation. The year 2008 was dramatically different from the year before. The number of participants went up to forty-six and the gender distribution was seventy-six percent female to twenty-four percent male. The national average for 2008 was sixty-five percent females to thirty-five percent males based on the 5th Annual AP Report to the Nation. The year 2009 had thirty-three participants, of which fifty-eight percent were female and forty-two percent were male. The national average was sixty-four percent female and thirty-six percent male according to 6th Annual AP Report to the Nation. Fifty-nine students participated in the test in the year 2010 which consisted of sixty-six

percent female and thirty-four percent males, and the national average was sixty-three percent females participated and thirty-seven percent males participated based on the 7th Annual AP Report to the Nation.

AP Spanish Literature. The research site showed participants only for the year 2007 and 2009 in this AP test. The year 2007 had eight participants and the gender distribution was eighty-eight percent females compared to twelve percent males. The national averages were sixty-seven percent females and thirty-three percent males based on the 4th Annual AP Report to the Nation. Thirteen students participated in the year 2009, of which eighty-five percent were females and fifteen percent were male. The national average for the year 2009 was the same as the year 2007 based on the 6th Annual AP Report to the Nation.

AP Calculus AB. The participation on the AP Calculus AB test varies from sixty-four students to seventy-four during the academic years 2007-2010. The year 2007 had the maximum students participate with seventy-four students made up of fifty-four percent females and forty-six percent males. The national averages were forty-eight percent females to fifty-two percent males for this year, according to the 4th Annual AP Report to the Nation. Seventy-one students participated in the year 2008 of which fifty-two percent were females and forty-eight percent were males. The 5th Annual AP Report to the Nation indicated the national averages were forty-nine percent female and fifty-one percent male. The year 2009 saw sixty-four participants representing fifty-nine percent females and forty-one percent males. These numbers were the exact opposite of the

national averages which had forty-nine percent female participants compared to fifty-one percent males based on the 6th Annual AP Report to the Nation. The year 2010 had the same number of participants as the previous year but the gender distribution was different, fifty-two percent females and forty-eight percent males. The national averages were the same as 2009, according to the 7th Annual AP Report to the Nation.

AP Calculus BC. AP Calculus BC has fewer participants than does AP Calculus AB and those ranged from thirty-four to forty-five in the years 2007- 2010. Thirty-four students participated in the year 2007 forty-seven percent females and fifty-three percent males. The 4th Annual AP Report to the Nation stated the national averages to be forty-one percent females and fifty-nine percent males. The number of participants increased, in the year 2008, to thirty-nine students made up of fifty-one percent females and forty-nine percent males. The national averages were forty-two percent females and fifty-eight percent males based on the 5th Annual AP Report to the Nation. The year 2009 had forty-five participants of which forty percent were females and sixty percent were male. The numbers were similar to the national averages of forty-two percent females and fifty-eight percent males based on the 6th Annual AP Report to the Nation. The academic year 2010 had a decline in the number of participants to thirty-nine, and the gender distribution was fifty-one percent females to forty-nine percent males. The 7th Annual AP Report to the Nation stated the national averages to be forty-one percent female participants and fifty-nine percent male participants.

AP Statistics. The AP Statistics test participants ranged from fourteen to twenty-nine for the years 2007-2010. Only fourteen students participated in the year 2007 of which fourteen percent were female and eighty-six percent were male in contrast to the national averages, in which the gender distribution was equal according to the 4th Annual AP Report to the Nation. The number of participants rose in the year 2008 to twenty-eight representing thirty-six percent females and sixty four percent males. The national averages were fifty-two percent females to forty-eight percent males according to the 5th Annual AP Report to the Nation. The year 2009 had twenty-nine participants representing thirty-six percent females and sixty-six percent males. The national average was fifty-one percent females and forty-nine percent males according to the 6th Annual AP Report to the Nation. The year 2010 had the same number of participants as the year before but the gender distribution was thirty-eight percent females to sixty-eight percent males. The 7th Annual AP Report to the Nation stated the national averages to be the same as the year 2009.

AP Computer Science A. The AP Computer Science A test had minimal participants in the years 2007-2010 with a range between two and eight. In 2007, four students participated, of which all were male and the national average was seventeen percent females and eighty-three percent males according to the 4th Annual AP Report to the Nation. Only two students participated in the year 2008 again both males and the national average was the same as the year before based on the 5th Annual AP Report to the Nation. The number of participants quadrupled in the year 2009 to eight of which twelve percent females and eighty-eight percent males. The 6th Annual AP Report to the

Nation stated the national averages to be the same as previous years. The number of participants declined in the year 2010 to two and all were male. The national average was nineteen percent females and eighty-one percent males according to the 7th Annual AP Report to the Nation.

AP Biology. The AP Biology has low participation and varies from ten to eighteen in the years 2007-2010. In the year 2007 ten students participated and sixty percent were female students and forty percent were male. These numbers were similar to the national average of fifty-eight percent females and forty-two percent males based on the 4th Annual AP Report to the Nation. The number of participants increased in 2008 to seventeen representing sixty-five percent females and thirty-five percent males. The 5th Annual AP Report to the Nation stated the national averages to be fifty-nine percent females and forty-one percent males. In 2009, the number of participants were eighteen with sixty-one percent being female and thirty-nine percent being male. The national averages were the same as the previous year according to the 6th Annual AP Report to the Nation. The number of participants dropped in the year 2010 to ten and the gender distribution was sixty-percent females to forty-percent males. The 7th Annual AP Report to the Nation stated the national averages to be fifty-eight percent females and forty-two percent males.

AP Chemistry. The AP Chemistry test participants varied from forty-one to forty-nine in the years 2007-2010. Forty-six students participated in the year 2007 representing fifty-nine percent females and forty-one percent males. The national

average was forty-seven percent females and fifty-three percent males based on the 4th Annual AP Report to the Nation. The number of participants dropped in the year 2008 to forty-one and the gender distribution reversed from the previous year to forty-one percent females to fifty-nine percent males. These numbers were similar to the national average of forty-eight percent females and fifty-two percent males according to the 5th Annual AP Report to the Nation. In 2009, forty-two students participated representing sixty-two percent females to thirty-eight percent males in contrast to the previous year and the national average of forty-seven percent females and fifty-three percent males according to the 6th Annual AP Report to the Nation. The year 2010 saw an increase in the participants compared to previous years with the gender distribution being fifty-one percent females and forty-nine percent males and the national averages were the same as the year 2009 based on the 7th Annual AP Report to the Nation.

AP Environmental Science. The AP Environmental Science test had participants only in years 2007 and 2009 and the participants were two and one respectively. The two participants in 2007 were both male in contrast to the national average of fifty-six percent females and forty-four percent males based on the 4th Annual AP Report to the Nation. In 2009, only one male student participated and the national averages were the same as that of 2007 according to the 6th Annual AP Report to the Nation.

AP Physics C: Electricity and Magnetism. The AP Physics C: Electricity and Magnetism has students from the eleventh and twelfth grade participate the numbers varied from ten to thirteen from the years 2007-2010. The year 2007 had thirteen

students participate in the test and the gender distribution was twenty-three percent females and seventy-seven percent males. These numbers were similar to the national average of twenty-two percent female and seventy-eight percent male based on the 4th Annual AP Report to the Nation. Ten students participated in the test in the year 2008, and the gender distribution was equal in contrast to the 5th Annual AP Report to the Nation's national averages of twenty-four percent female and seventy-six percent males. In 2009, the number of participants is the same as the previous year, ten students, but the gender distribution was forty-percent female and sixty-percent male. The national averages were twenty-three percent female and seventy-seven percent male according to the 6th Annual AP Report to the Nation. The number of participants increased to thirteen in the year 2010 and the gender distribution was thirty-one percent female and sixty-nine percent male and the national averages were the same as the year 2009, according to the 7th Annual AP Report to the Nation.

AP Physics C: Mechanics. The AP Physics C: Mechanics exam has had a decline in the number of participants from the year 2007 to 2010. In 2007 twenty-nine students participated in the test, and the gender distribution was fifty-five percent female and forty-five percent male in contrast to the national average of twenty-seven percent female to seventy-three percent male based on the 4th Annual AP Report to the Nation. Nineteen students participated in the year 2008 representing fifty-three percent females and forty-seven percent males. The national averages for the year were twenty-seven percent female and seventy-three percent male according to the 5th Annual AP Report to the Nation. Twenty-two students participated in the year 2009, and the gender

distribution was thirty-two percent female and sixty-eight percent male whereas the national averages were twenty-seven percent female and seventy-three percent male based on the 6th Annual AP Report to the Nation. The year 2010 had ten participants, and the gender distribution was forty-percent female and sixty-percent male and the national average was twenty-six percent female and seventy-four percent male according to the 7th Annual AP Report to the Nation.

AP Government and Politics: Comparative. The number of participants in AP Government and Politics Comparative exam ranged from twenty-five and forty-three. In 2007 forty-three students participated, and the gender distribution was forty-two percent female and fifty-eight percent male. The national average was forty-eight percent female and fifty-two percent male based on the 4th Annual AP Report to the Nation. Twenty-five students participated in 2008, and the gender distribution was fifty-two percent female and forty-eight percent male according to the 5th Annual AP Report to the Nation. In the year 2009 thirty-nine students participated, of which fifty-four percent were female and forty-six percent were male. The 6th Annual AP Report to the Nation stated the national averages to be fifty percent female and fifty percent male. Twenty-nine students participated in the year 2010, and the gender distribution was thirty-one percent female and sixty-nine percent male. The national average was forty-nine percent females and fifty-one percent males according to the 7th Annual AP Report to the Nation.

AP Government and Politics: United States. The AP Government and Politics United States had student participation ranging from thirty-four to forty-six in the years

2007-2010. Forty-five students participated in the year 2007 representing forty percent females and sixty percent males whereas the national averages were fifty-three percent female participation and forty-seven percent male according to the 4th Annual AP Report to the Nation. The student participation numbers declined in the year 2008 to forty-one students, and the gender distribution was fifty-eight percent females and forty-two percent males. These numbers were similar to the national average of fifty-four percent females and forty-six percent males based on the 5th Annual AP Report to the Nation. Student participation increased in the year 2009 to forty-six representing fifty-seven percent females and forty-three percent males. The 6th Annual AP Report to the Nation stated the national averages to be fifty-three percent females and forty-seven percent males. The student participation dropped to thirty-four in the year 2010 with the gender distribution being thirty-eight percent females and sixty-two percent males. The national averages were the same as the year 2009 according to the 7th Annual AP Report to the Nation.

AP Macroeconomics. The AP Macroeconomics test had only one male participant in the year 2007 and no participants in the following three years. The national average in that year was forty-five percent female and fifty-five percent male based on the 4th Annual AP Report to the Nation.

AP Microeconomics. The AP Microeconomics test only had three participants in the year 2007 and no participants in the following three years, and the national average

was forty-three percent females and fifty-seven percent males according to the 4th Annual AP Report to the Nation.

AP European History. The AP European History participation varied from thirty-three to thirty-seven students from the year 2007-2010. Thirty-three students participated in the year 2007 of which forty-two percent were female and fifty-eight percent were male. The 4th Annual AP Report to the Nation stated the national average to be fifty-four percent females and forty-six percent males. In the year 2008 forty-two students participated in the test representing fifty-five percent females and forty-five percent males, very close to the national average of fifty-four percent females and forty-six percent males according to the 5th Annual AP Report to the Nation. In 2009 thirty-seven students participated in the test representing forty-nine percent females and fifty-one percent males and the national averages were fifty-four percent females and forty-six percent males based on the 6th Annual AP Report to the Nation. The student participation rose in the year 2010 from the previous year to forty-three students but the gender distribution was the same as the previous year. The 7th Annual AP Report to the Nation stated the national averages to be fifty-three percent females and forty-seven percent males.

AP Psychology. The student participation in the AP Psychology test was erratic in the years from 2007-2010. In 2007 fourteen students participated in the test of which fifty-seven percent were females and forty-three percent were male. The national average was sixty-five percent females and thirty-five percent males, stated in the 4th

Annual AP Report to the Nation. The year 2008 had thirteen participants, and the gender distribution was fifty-four percent females and forty-six percent males in comparison to the national average of sixty-five percent females and thirty-five percent males according to the 5th Annual AP Report to the Nation. The school had no participants in the test for the year 2009. Three students participated in the year 2010, of which all were female. The national average was sixty-four percent females and thirty-six percent males according to the 7th Annual AP Report to the Nation.

AP United States History. The AP United States History examination is generally taken by eleventh graders and twelfth graders with participation varying from fifty students to seventy-seven. In 2007 seventy students participated in the test representing fifty-six percent females and forty-four percent males, and similarly the national averages were fifty-five percent females and forty-five percent males based on the 4th Annual AP Report to the nation. Seventy-seven students participated in the test in the year 2008 representing fifty-three percent females and forty-seven percent males. The national average was the same as the previous year according to the 5th Annual AP Report to the Nation. In 2009, sixty-eight students participated representing fifty-four percent females and forty-six percent males. The 6th Annual AP Report to the Nation stated the participation to be fifty-three percent females and forty-seven percent males in the test. The student participation declined to fifty in the year 2010, and the gender distribution was fifty-two percent female and forty-eight percent male. The national averages were fifty-four percent females and forty-six percent males based on the 7th Annual AP Report to the Nation.

AP World History. The AP World History test is taken by tenth graders and the student participation has varied from sixty-two to eighty-six students. The student participation in 2007 was eighty-six students made up of fifty-six percent females and forty-four percent males. The national averages are similar, fifty-five percent females and forty-five percent males according to the 4th Annual AP Report to the Nation. The student participation dropped in 2008 to seventy-eight students representing fifty-one percent females and forty-nine percent males and the national averages were fifty-six percent females and forty-four percent males based on the 5th Annual AP Report to the Nation. The student participation number declined further to sixty-two in the year 2009, and the gender distribution was equal. The 6th Annual AP Report to the Nation stated the averages to be fifty-six percent females and forty-four percent males. In 2010, the number of participants was sixty-two, and the gender distribution was forty-eight percent females and fifty-two percent males. The national averages were fifty-five percent females and forty-five percent males according to the 7th Annual AP Report to the Nation.

Addressing Research Questions One and Two

Research Question One: Is there a disparity between the number of female and male students taking the advanced placement tests? The analyses of the findings show that there is no significant disparity in the number of female and male students taking the advanced placement tests. The overall participation in the advanced placement

tests based on gender and the overall student enrollment based on gender vary by only one to three percent for the four years. Slightly larger differences can be found for specific grade levels for the four academic years and those result mainly from attrition.

For the academic year 2007, four percent more males participated in the senior class than the student enrollment numbers for that grade level. In 2008, no difference larger than three percent was evident. The year 2009 had a sophomore class in which six percent more females participated than the student enrollment numbers for that grade level. Four percent more males participated in the senior class than the student enrollment numbers for that grade in the year 2010.

Research Question Two: Is there a disparity between the number of female and male students taking math, science, language, history and English on the advanced placement tests? The disparity between female and male students taking different subjects is irregular in certain subjects and consistent in others. At the research site, the students participate in three different math subject area AP, Calculus AB, Calculus BC and Statistics. The Calculus AB and Calculus BC tests have relatively equal participation for females and male when compared with the school's gender distribution in which the difference in percentage is about three percent for all years except for 2009. In 2009, eight percent more females participated in the Calculus AB test and nine percent fewer females participated in the Calculus BC test. The schools' participation numbers were slightly better than the national average for the years of study for the Calculus AB test with the numbers favoring females in the year 2009 at the school. For the Calculus BC test, the national numbers favor males on average by seven percent so the school's

participation is relatively more equitable. Inequity is seen in statistics in which the male student participation is much greater for the school for all four years compared to the school gender distribution. The national averages for the course are more equitable than the school's average.

In science, students participate in numerous AP course, but for areas like environmental science, the student participation is too low to be studied. The Biology AP for all four years has inequitable participation where the numbers favor females in contrast to the gender distribution of the school enrollment as well as the school's AP participation numbers. The school's gender distribution numbers for the Biology AP equal the national average for all four years. The gender participation in Chemistry AP is irregular for the year 2007 when females were favored, for 2008 when males were favored, for 2009 when females were favored and for 2010 when the numbers were generally equitable when compared to the school's gender distribution for the respective years. The national averages for the Chemistry AP for 2010 are equitable within a three percent range which is in contrast to the participation at the school for 2007, 2008 and 2009. The Physics C: E & M had inequity in gender participation for 2007, 2009 and 2010 where males were favored. This is in contrast to the school's AP participation based on gender and this inequity was evident in all four years at the national level also where males were favored. The year 2008 was an anomaly; the participation was equal at the school for this test. The Physics C: Mechanics test favored females by a small margin in 2007 and 2008 but in 2009 and 2010, the pendulum shifted in favor of males. Whereas the AP participation based on gender for the school was generally equitable, the national averages for all four years favor males in this test.

Foreign Language AP test results show disparity favoring females in certain languages. Other foreign languages indicate a trend in which males were favored before but with time the pendulum is shifting. The student participation in the Chinese AP test was too low for the data to be significant. In the French Language and Literature AP, inequity exists in favor of females for all four years in concurrence with the national data but contrasting the school's AP participation gender distribution numbers. The student participation in the Latin Vergil AP is low but shows an interesting trend. In the year 2007 and 2008, the test had more male participants but the numbers shifted and 2009 showed equity and 2010 provided numbers that display more female participation. The participation in the Latin Literature examination is irregular, no participants in the year 2008 and 2010 and too small a number to be analyzed. The Spanish Language AP test was equitable with a statistically insignificant difference for the year 2007 but the following years show a disparity in favor of females. This is in agreement with the national statistics that show that females have participated more in the Spanish Language AP for the last four years. As stated before, the school's AP participation was relatively equitable for all four years. The Spanish Literature AP had participants for only two years, 2007 and 2009, but it shows inequity in favor of females which reflects the national statistics for those years.

The school had significantly more students participate in the different tests offered in the area of history. World History AP had relatively equitable participation for the years 2008, 2009 and 2010 but the year 2007 had a slight advantage in female participation. The national averages for the four years show that a greater percentage of females (by a small margin) participate in the test. Overall, there was more female

participation in the whole AP program for the tenth grade level in which this test was taken for all four years. The gender participation in United States History AP test was relatively equal for all four years with a slight advantage for females in the year 2007. The difference in the gender participation for the overall AP program varies from that on this test by a range of one to four percent as is the case for the national averages for all four years. The year 2007 had more male participation in the European History AP test and the smaller but more female participation in the year 2008. The years 2009 and 2010 were equitable gender participation for this test. The national averages state a slight advantage for female participation in this area. The trends for the Comparative Government and Politics AP test and the United States Government and Politics AP test at the school are similar for some years and different for others. The year 2007 and 2010 had disparity in favor of males more so in the year 2010 for both tests. In 2008 and 2009, a small percentage more females participated in the United States Government and Politics AP whereas the Comparative Government and Politics had more female participation but the margins were relatively insignificant. The national averages for the Comparative Government and Politics were generally equitable but for the United States Government and Politics the numbers indicate a small advantage to females for all four years.

English Language AP participation based on gender was equitable except for 2007 when a small percentage more of females participated. This trend of equity was seen in the overall AP program as well but the national average suggests that more females participate in this test. Participation on the English Literature AP has declined at the school so the data analysis would not be significant. The other AP test areas in which

the participation was too small or irregular to be analyzed was Music Theory, Computer Science A, Microeconomics, Macroeconomics and Psychology.

The overall AP program has equitable participation based on gender but inequity exists within certain subject areas. The data gathered at the school site has shown disparity in favor of females in the areas of French Language AP, Spanish Language AP and Biology AP and in favor of males in Statistics AP, Physics C: E & M AP and Physics C: Mechanics AP. The Comparative and United States Government and Politics AP tests showed disparity favoring males only for the year 2010.

Chapter 5 presents the qualitative findings by analyzing the responses from the teacher questionnaire and addressing the research questions three and four of the thesis topic.

Chapter Five

Qualitative Findings

This thesis research was designed to examine the teacher perceptions of gender equity within the classroom and the Advanced Placement Program at one college preparatory school and connects the trends in these perceptions to student participation by gender in different advanced placement subject area tests. The research approach probed whether gender disparities exist within each discrete subject area, math, science, English, history and foreign language can potentially impact policies at a particular school campus and/or the community/broader educational milieu surrounding it. The data was amassed through the mixed methods research approach. The approach involved the gathering of both quantitative and the qualitative evidence. The qualitative approach used a teacher questionnaire to examine teacher perceptions with regards to gender in the classroom and the advanced placement program. The mixed methods approach was used to address the research questions three and four in Chapter Five and conclusions are rendered in Chapter Six.

Questionnaire Findings

The qualitative data involved an anonymous questionnaire that was distributed electronically to teachers, counselors and administrators. The questionnaire was sent by an administrator to the upper school staff and a second reminder email was circulated by me with the approval of administrators. The high school staff, including teachers, administrators and counselors, consists of fifty-seven percent female educators (forty-four individuals) and forty-three percent male educators (thirty-three individuals).

Thirty-seven individuals filled out the questionnaire, representing forty-seven percent of the high school staff. Of this number, fifty-nine percent were female and forty-one percent were male. The female participation was two percent higher than the percent make up of the staff. The qualitative findings analyze each question based on four factors. These four factors are (1) the overall participant views, (2) the gender of participants, (3) the subject matter of the participant, and (4) the teachers' years of experience. The years of experience has been divided into Level 1; one to ten years of experience, Level 2; eleven to twenty years of experience, Level 3; twenty one to thirty years of experience, and Level 4; thirty one years of experience and beyond.

Question 1 and 2: Different AP courses attract a disparate percentage of boys and girls. On a scale of 1 through 10 (with 10 being highest) rank how each factor below plays a role in boy's/girl's choice of which AP subject he/she takes.

Overall participant views. The participants had selected factors that in their perceptions play a significant role in determining the choices boys make with regards to AP. From the responses, three factors were found on average to be the most important, innate talent, teachers influence and getting into good colleges. The factors that were the least important were that boys do not like to work hard and the number of course credits that they may receive for college. The other factors, parental expectations, gender, school policies and environment, and peer influence, of which parental influence and peer influence were ranked higher, fell in between. The participants had also selected factors that in their perceptions play a significant role in determining the choices girls make with

regards to AP. From the responses, three factors were found on average to be the most important, (1) getting into good colleges, (2) parental expectations and (3) innate talent. The factor that was the least important was that girls do not like to work hard. The other factors, teachers influence, peer influence and school policies and environments, of which teachers' influence was ranked higher, were in between.

For both boys and girls, the respondents stated that getting into good colleges and innate talent are the most crucial in deciding the selection students make with regards to AP courses. Respondents also perceived that teachers' influence plays a stronger role for boys than girls. The other variance in the answers was the influence of parents. Teachers perceive that parental expectations are more significant for girls than they are for boys. For other factors importance was generally the same for boys and girls in general based on the answers of the participants.

Gender of participants. The female participants' responses for the factors that play a role in deciding AP courses vary for boys and girls. The teachers stated that innate talent, teachers' influence and getting into good colleges are the factors that influence boys the most in that order. With the girls, the factors that influence them the most are parental expectations, getting into good colleges and innate talent. Parental expectations are one of the more important factors for girls, but not for boys for whom the teachers favored innate talent. The least important factor for boys and girls, according to female respondents, is that they do not like to work hard. The other factors fall in between but one other factor that is close to being most important for both boys and girls is the

teachers' influence. Gender, according to female teachers, is of average importance for both boys and girls.

The male participants' responses for the factors that play a role in deciding AP courses also vary for boys and girls. Male teachers perceived teacher influence, innate talent and getting into good colleges to be the most important factors in that order. For girls, the male teachers stated that getting into good colleges, parental expectations, innate talent and teachers' influence are the most important. Parental expectations are also critical for girls, whereas for boys it is teachers' influence according to the respondents. The male respondents also stated that for boys and girls, the least important factor is that they do not want to work hard. The remaining factors fall in between the most and least important. Male teachers also classified gender as being of average importance for both boys and girls.

It is interesting to note that neither gender of teachers stated that gender does not play a role in deciding what AP courses students will take but that other factors may be more influential. Another factor that stood out in the data was that of students wanting to work hard according to teachers. Both female and male participants gave girls a lower numerical value for not wanting to work hard than the boys. This suggests they believe that, for girls, the amount of work is not critical.

Subject Matter of Participants. The participants of the questionnaire teach different subject areas and the responses varied based on what they teach. Out of the thirty-seven participants, six were English teachers. They stated that teachers' influence, innate talent and peer influence are the most important factors that influence the AP

courses for boys. The factors that impact boys the least are boys do not like working hard and highest number of course credits. The other factors fall in between the most and the least. For girls, they perceive the factors of most importance to be parental expectations, getting into good college and innate talent. English teachers asserted that the least important influential factor for girls is girls do not like to work hard. The other factors fall in between but closer to more important than least based on the average ranking.

Math teachers, seven participants, contributed that for boys the most influential factors are innate talent and getting into good colleges. The least influential factors were boys do not like to work hard, gender and highest number of course credits. The other factors were on average in between the two. For girls, math teachers perceived the most influential factors to be innate talent, parental expectations and getting into good colleges. The least influential factors are that girls do not like to work hard, gender and highest number of course credits. It is interesting to note that math teachers, like the other subject teachers, asserted that for girls parental expectations are critical. Looking at the responses of all the teachers math teachers were the ones that ranked gender as not playing a significant role in the decisions students make with regards to AP courses whereas the other subject areas did not rank it as the most important but have placed it in the average importance category.

The highest number of research participants for the study came from the science department, ten teachers. Based on the science teachers' responses, teachers' influence and innate talent are the most significant factors for boys. The least important factor is that boys do not want to work hard for science teachers but the ranking is not extremely low. The other factors of peer influence, getting into good college, gender, number of

course credits, and school policies and environment, are ranked in between. For girls, science teachers perceive the most influential factors to be innate talent, getting into good colleges, parental expectations, teachers' influence and peer influence as being the most critical. For girls, the least influential factor was that girls do not want to work hard but the ranking was lower than it was for boys. The other factors of gender, school policies and environment and highest number of college credits were ranked in between. For both boys and girls, the respondents stated innate talent and getting into good colleges to be important but the variance was that parental influence for girls was more significant than for boys.

Of the thirty-seven participants, seven participants were from the history department. Innate talent, teachers' influence and getting into good college were the most influential factors for boys in AP course selection. The least influential factors were boys do not like to work hard and the number of course credits. The factors of parental expectations, gender and school policies and environment were ranked in the middle. For girls, parental expectations, innate talent and getting into good college were the factors that history teachers perceived to be the most significant for girls. The least important factor for girls was that they do not like to work hard based on the responses but the ranking was lower than those assigned boys by the same participants. The other factors teachers' influence, peer influence and school policies and environment were ranked in the middle. One aspect of the responses from the history teachers that stands out, other than the difference in the lowest ranking for girls and boys, was that girls are influenced by parents more than the boys and the innate talents and getting into good colleges is important for both.

The foreign language department had only four respondents out of the thirty-seven participants. Based on the views of the foreign language teachers, the teachers' influence and peer influence were the most influential in boys' choices with regards to AP courses. The least important factor was stated to be that boys do not like to work hard like all the teachers in the different subject areas. Factors like innate talent, gender, getting into good college and school policies were ranked in between. For girls, foreign language teachers perceive getting into good colleges, school policies and environment and parental expectations are the most critical. As with other subject teachers, girls do not like to work hard was ranked the least important but the ranking was lower than the ranking given to boys' not wanting to work hard. Innate talent, gender, teachers' influence, and the number of course credits and peer influence were positioned between the most and least important but were ranked closer to the more critical by foreign language teachers.

The computer science teachers had varying views concerning the factors affecting the AP course choices of boys and girls. Computer science teachers perceive that teachers' influence is the most influential factor for boys with regards to AP courses. Innate talent, parental expectation, getting into good college and peer influence were ranked in between. The least influential factors are that boys do not want to work hard and school policies and environment. For girls, getting into good college, parental expectations and peer influence were considered the most influential factors in choosing AP courses. Innate talent, teachers' influence and number of course credit were ranked in between. The least influential factors were school policies and girls do not like to work hard based on the teachers' responses. The computer science teachers were the only ones

to rank school policies and environment as the least influential but, like the other subject area teachers, parental expectation was ranked as being the most influential factor for girls.

Years of Teacher Participant Experience. The participants in the research have varying experiences and the relatively equal amounts of participants fell into the four categories of experience, Level 1-4. Of the thirty-seven participants, eight are in the Level 1 category and their experience range from zero to ten years. These participants expressed that teacher's influence; innate talent and peer influence are the most important factors for boys in selecting AP courses. The least influential factors for boys were school policies and environment, parental expectation and that boys do like to work hard. The other factors, gender, getting into good college, and number of course credits, fell in between. For girls, the teachers with the least experience perceive getting into good college, innate talent, parental expectation, and number of course credits were the most influential. The least significant factors were girls do not like to work hard and school policies and environment. The gender, teachers' influence and peer influence were ranked in the middle. In comparison, the responses for girls not liking to work hard had a much lower ranking than that of the boys not liking to work hard. Also, the respondents ranked parental expectations for girls to be more important than that for boys. Innate ability was ranked high for both boys and girls.

Ten of the participants out of thirty-seven had Level 2 of experience, eleven to twenty years. Getting into good college, teacher's influence, parental expectations and innate talent were ranked as the most important factor in AP course selection for boys.

The least important factor for boys was that boys do not like working hard. Peer influence, number of course credits, gender and school policies and environment were ranked in the middle for influential factors for boys. Respondents of Level 2 experience suggested that for girls getting into good college, parental expectations, innate talent and teacher's influence are the most critical. The least important factor for girls was that girls do not like working hard. Peer influence, number of course credits, gender and school policies and environment were ranked in the middle for influential factors for girls. The respondents with Level 2 experience had relatively the same ranking for boys and girls.

Level 3 experience teachers, twenty-one to thirty years, were ten out of the thirty-seven participants. Based on their responses, for boys the most critical factors are innate talent, teacher's influence and getting into good college. The least critical factor for boys was that boys do not like to work hard. The factors of parental expectations, gender, peer influence and school policies and environment were ranked in the middle. For girls, the Level 3 teachers stated that parental expectations, innate talent, teacher's influence and getting into good college are the most influential factors in choosing AP courses. The least influential factor for girls was that girls do not like to work hard. School policies and environment, gender, peer influence and number of course credits were ranked in the middle. For Level 3 experience teachers, parental expectations were critical for girls but ranked in the middle for boys. They also ranked boys do not like to work hard higher than girls do not like to work hard.

The last category was the Level 4 experience, thirty-one years or more, which had nine respondents. Their responses for boys asserted that innate talent, teacher's influence and school policies and environment are the most influential in AP course selection.

Boys do not like to work hard and number of course credits were ranked the lowest and the other factors, parental expectations, gender, getting into good college and peer influence were ranked in the middle. For girls, the respondents contributed that parental expectations, innate talent, getting into good college and teacher's influence were ranked as the most significant factor in AP course selection. The least significant for girls was that girls do not like to work hard and the number of course credits. School policies and environment and gender were ranked in the middle. Like the other level of experience teachers, the Level 4 experience teachers offered that parental expectations were very important for girls compared to boys. Unlike the other level experience teachers, the Level 4 experienced teachers did not rank that boys do not like to work hard higher than girls do not like to work hard.

Question 3: Why do you think there are more men than women in science and engineering careers?

Overall participant views. In the questionnaire, respondents had four options for question three and they were biology innately makes men more suited for science and engineering careers; parents, teachers, school policies, and peers strongly influence this choice; the system allows men a higher chance of success in science/engineering career; and none of the above, here is the reason followed by a blank. These were assigned letters A, B, C, and D respectively for data analysis. Out of thirty-seven participants, nineteen respondents selected option B as the reason for why more men than women in science and engineering of which one respondent picked two options. Eight participants

perceive that option D was an appropriate response and stated that multiple other factors play a role. Some of these factors were male mentoring, interest governs choice, system of society and culture imposes views, and role models. A few respondents, six, expressed that C was the reason for the inequity, three of the respondents said the reason was A, and two did not answer the question. Hence, overall, based on the participant's responses, the teachers, parents, peers and school policies influence an individual significantly when choosing careers.

Options for Question 3	Number of Research Participants that Selected the Option
A	2
B	19
C	6
D	8

Figure 8: Responses to Question 3

Gender of participant. The responses from the female and male participants were similar in terms of the factors that promote the inequity in science and engineering. Eleven out of twenty-two female respondents suggested that option B was the reason. Similarly eight of the fifteen male respondents also chose option B as the reason for the inequity. Five of the female respondents asserted that there are other factors impacting the situations like male mentoring, interest, and system and environment imposes expectations. But only three male respondents chose option D and cited role models and societal/cultural expectations as the reason for the disparity. It is interesting to note that

four females and only two male respondents chose option C suggesting that the system allows men more opportunities in these areas. For option A, two males chose that as the reason and only one female indicating that biology does not have a significant impact. Two of the female participants did not answer the question indicating that may not like the question or do not want to submit their views on paper.

Subject Matter of Participant. All the participants' responses were separated based on the subject matter they teach. Seven math teachers filled out the questionnaire out of the thirty-seven respondents. Five out of the seven stated that option B was the reason for the inequity and two asserted option D citing role models as the reason. This expresses that math teachers strongly perceive that teachers, parents, peers and school policies impact the individual's career path. English teachers', six respondents, answers were different. Only two out of the six chose option B as a factor for the inequity. Three of the English teachers believe option C, the system in place, was the reason for the disparity and one of the teachers did not even answer the question. One English teacher expressed role models play an important role in all of this.

Science teachers had the greater number of respondents, ten out of thirty-seven. Based on their responses, option B, chosen by six, was the reason for the disparity. Only two selected option D and suggested that interest and environment are critical in promoting inequity. Only one respondent chose C and one chose not to answer again indicating a hesitation in submitting their views or a sense that they find the question faulty. Three out of the seven history teacher participants chose B as the option indicating similarities to other subject teachers. Two out of seven perceive that the

system, option C, promotes the difference and only one chose option D stating that culture and societal expectations have an impact. The foreign language teachers and computer science teachers had the least number of respondents, four and three respectively. Two of the foreign language teachers chose option B, one chose option A and one chose option D which gave the reason as the system imposes expectations. Two out of the three computer science teachers selected option D and asserted genetics and environment were the reasons for the inequity and one chose option A, biology, as the answer. None of the computer science teachers selected option B as the answer unlike any other subject area.

Years of teacher participant experience. The participants in the research have varying experiences and the relatively equal amounts of participants fell into the four categories of experience, Level 1-4. The participants with the Level 1 of experience had the most variation in their answers. Three out of the eight in this category stated option B as the reason for the disparity. Two out of eight chose option C and one chose option D citing society and cultural expectations for the disparity. Unlike any other levels of experience, two of Level 1 experience teachers chose option A as the reason for the inequity. In the Level 2 of experience, seven out of ten respondents chose option B. Two out of ten chose option D and contributed that genetics and environment play a role. One of the Level 2 teachers left the question blank. Six out of ten Level 3 of experience teachers chose option B as the reason for the inequity. One left the question blank, two chose option C and one chose option D without further clarification. The Level 4 of experience teachers had different responses in comparison to the other levels. Four out of

the nine teachers selected option D and assert male mentoring, interest, role models and the system imposing expectations as reasons for the inequity. Three out of the nine chose option B but for other level teachers option B was the major reason. Two out of the nine chose option C as the reason. Overall in all the levels of experiences, option B was the most selected except for in the Level 4 where option D was the most selected.

Level of Experience	Number of Research Participants that Selected the Different Options	
1	Option A – 2 Option C – 2	Option B – 3 Option D – 1
2	Option A – 0 Option C – 0 Blank – 1	Option B – 7 Option D – 2
3	Option A – 0 Option C – 2 Blank – 1	Option B – 6 Option D – 1
4	Option A – 0 Option C – 2	Option B – 3 Option D – 4

Figure 9: Responses to Question 3 Based on Teacher Experience

Question 4: Why do you think there are more women than men in liberal arts careers?

Overall participant views. In the questionnaire, respondents had four options for question four and they were biology innately makes women more suited for liberal arts careers; parents, teachers, school policies, and peers strongly influence this choice; the system allows women a higher chance of success in liberal arts career; and none of the above, here is the reason followed by a blank. These were assigned letters A, B, C, and D respectively for data analysis. A majority of the participants, twenty-five, chose either option B or D as their answers. Thirteen participants, of whom one chose two answers, selected option B as the major reason why women participate in more liberal arts careers. The respondents, twelve, who chose option D cited the following reasons: interest governs choice, safe careers for daughters, liberal arts careers do not attract aggressive personalities, gender roles, career interruptions due to children, environmental factors, historical trends and that women have better social skills. Nine out of the thirty-seven participants chose option C and three chose option A. One person did not respond to this question.

Gender of Participant. The responses from the female and male participants were similar and dissimilar in terms of the factors that promote the inequity in liberal arts careers. Seven out of twenty-two female respondents chose option D as their answer, citing the following reasons; interest, safe careers for daughters, liberal arts careers do not attract aggressive personalities, career interruptions due to children, environmental

factors, and gender roles. Seven out of the twenty-two respondents, of whom one chose two answers, chose option C, six chose option B, two chose option A and one female did not respond to the question, whereas the male respondents all answered the question and the majority of them chose option B or D. Seven out of the fifteen male participants chose option B and five chose option D citing gender roles, historical trends and role models as the reasons for the disparities. Unlike the females, only two of the male participants chose option C which faults the system for the inequities and only one male chose option A. Also females stated multiple reasons for the inequity in liberal arts careers where as the males had fewer factors.

Subject Matter of Participant. All the participants' responses were separated based on the subject matter they teach. Seven math teachers filled out the questionnaire out of the thirty-seven respondents. Three out of seven math teachers chose option B, two chose option C and two chose option D citing role models as the reason for the inequity. Six English teachers answered the question of which one chose two answers. Three teachers chose option C, two chose option B and two chose option D citing career interruption due to children and safe careers for daughters as reasons for the inequity. One out of ten science teachers did not answer the question; one chose option A and one chose option C as reasons for the inequities. Four science teachers chose option B and three chose option D, stating interests, liberal careers do not attract aggressive personalities, and better social skills as the factors for the inequity.

The responses for the seven history teachers were spread out between the options. Only one history teacher chose option A and the rest chose option B, C and D evenly.

The teachers who chose option D stated gender roles and historical trends as the reason for the inequity. Only four foreign language teachers participated and two of them chose option D as the reason and stated that gender roles and expectations are the factors for the inequity. Only one teacher chose option A and one chose option B. The responses from the three computer science teachers were divided equally among options B, C and D. For D, they asserted that environment plays a role in the disparity. From all the subject-area teachers, option B and D were selected the most often as the factor that promotes the inequity. Unlike the other subject area teachers, more English teachers chose option C that faults the system for the disparity. Overall, all subject area teachers suggested that other factors that play a role in the selection of career paths.

Years of teacher participant experience. The participants in the research have varying experiences and the relatively equal amounts of participants fell into the four categories of experience, Level 1- 4. Eight out of thirty-seven fell into the Level 1 of experience and interestingly they were the only ones to select option A as the answer. Two out of the seven selected option B, one chose option C and two chose option D. One teacher who chose option D cited historical trends as the reason for the disparity. The four out of the ten Level 2 teachers selected option B, three chose option C, two chose option D and one chose not to respond to the question. The teachers who selected option D state that environment plays a role and the fact that liberal arts careers do not attract aggressive people. In the Level 3 experience category, five out of ten chose option B, of which one chose two answers, three chose option C and three chose option D. One of the teachers who chose option D asserted that there are more women in liberal arts careers

because they have better social skills. The Level 4 experience teachers' responses were very different from those of the other level experience teachers. Five out of nine chose option D and cited interest; parents want safe careers for daughters, career interruption due to childbirth and rearing, historical trends, role models and gender roles as reasons for the disparity. Of this number, two chose option B and two chose option C. It is interesting to note that teachers with fewer years of teaching experience chose biology, option A, as the reason for the inequity where as the Level 4 of experience teachers cited multiple other factors for this situation. The other two levels primarily chose option B which states that teachers, parents, school policies and peers influence this choice.

Question 5: Do you believe that students learn differently based on gender? If yes, how do boys learn and how do girls learn?

Overall participant views. In the questionnaire, participants had two choices for question five, yes or no. If they responded yes, they had to state how they believe boys learn and how they believe girls learn. Overall, twenty-five out of the thirty-seven respondents contributed that, yes, boys and girls do learn differently. Nine teachers believe that they do not learn differently and three chose not to answer the question. The two most common responses to how boys learn were that it is through hands on activities and competition. Some teachers also stated that boys are greater risk takers, learn for status reasons, learn independently, learn through humor and are intuitive and deductive in their approach to logic. For girls, the two most common responses to how girls learn were through cooperation and verbal methods. The other reasons for how girls learn

suggested by teachers were through synthesis of ideas, minimal risks, relating to every day life, step-by-step processes, and memorization. The learning styles suggested by the overall response expressed that girls and boys learn very differently from one another.

Gender of Participant. The responses of the female and male teachers to question five were quite similar in many areas. Overwhelmingly, female teachers suggested that boys and girls learn differently with sixteen out of twenty-two saying yes, four stating no and two abstaining. The female teachers submitted that boys learn through active learning and competition. They also stated that boys are the risk takers, intuitive and deductive in their approach to logic, and learn through humor. According to the female teachers, girls learn through cooperation and verbal methods of teaching. Girls are risk averse in their approach to learning and learn through every day life examples with step-by-step process in the female teachers' view.

Male teachers also believe that boys and girls learn differently but not as overwhelmingly as the female teachers. Nine out of the fifteen male teachers stated that yes boys and girls do learn differently, five stated no and one decided not to answer the question. Male teachers responded similarly to the female teachers by stating that boys learn through active learning and competition. Boys' approach to their learning is more independent and they are willing to take risks. The male teachers agree with female teachers that girls learn through cooperation and verbal means. Girls tend to learn by note taking and small group activities.

Subject Matter of Participant. The responses for question five varied based on the subjects the participant taught. Four out of the nine math teachers stated that, yes, boys and girls do learn differently but three stated, no, they do not learn differently. According to the math teachers who said yes, boys are more willing to take risks and learn in an active competitive environment whereas girls learn by well defined solutions, through cooperation, and memorization. A majority of the English teachers, five out of six offered that, yes, boys and girls do learn differently and only one said no. Based on the English teachers' responses, boys learn through competition, hands on activities and by using humor. Girls learn through cooperation, everyday examples, and synthesis of ideas. A majority of the science teachers, eight out of ten, stated that, yes, boys and girls do learn differently and two stated no. Science teachers expressed that boys learn through hands on activities, taking risks, and are intuitive and deductive in their logic. Girls, according to the science teachers, learn through verbal means, step-by-step processes, through example, and are unwilling to take risks.

History teachers also strongly believe that boys and girls do learn differently. Five out of seven history teachers said, yes, that boys and girls do learn differently, one submitted no and one decided not to answer the question. History teachers verbalized that boys learn through hands on methods and competition where as girls learn through step-by-step processes, verbal means, and cooperation. Foreign Language teachers' views vary from other subject area teachers for two out of four said that boys and girls do not learn differently. One teacher decided not to answer the question and one said yes. The teacher who responded yes had similar thoughts to the other teachers on how boys and girls learn. Boys learn through hands-on activities and girls through verbal means.

The responses from the computer science teachers were divided up into one per category. One said yes, one said no and one did not answer the question. The teacher who said yes submitted that boys learn through hands on methods and girls through studying and reviewing.

Years of teacher participant experience. The participants in the research have varying experiences and the relatively equal amounts of participants fell into the four categories of experience, Level 1-4. All the levels of experience teachers had varying answers for question five. In the Level 1 experience category, seven out of eight teachers stated that boys and girls do learn differently and one stated no. These teachers asserted that boys learn through hands on activities and competition where as girls learn through verbal means and cooperation. In contrast, a majority of the Level 2 experience teachers, five out of ten, contributed that boys and girls do not learn differently. Four said, yes, boys and girls do learn differently and one of the Level 2 experience teachers decided not to answer the question. The Level 2 teachers who responded yes stated that boys learn through taking risks, hands on activities and intuitive and deductive reasoning in their logic. Girls according to the Level 2 experience category learn through verbal means, examples and step-by-step processes. The Level 3 experience category teachers strongly believe that boys and girls do learn differently. Seven out of ten expressed yes, two verbalized no and one decided not to answer the question. According to the Level 3 experience teachers, boys learn through risk taking, competition and humorous approach whereas the girls in contrast learn through cooperation, step-by-step processes and verbal means. The Level 4 experience teachers have the same views as that of the Level 3

experience teachers. Six out of nine Level 4 experience teachers submitted that, yes, boys and girls do learn differently, two suggested no and one did not answer the question. The teachers who responded yes suggested that boys learn through competition and hands-on activities and girls learn through cooperation and verbal means. Overall, the teachers, no matter what level of experience, who believe that boys and girls learn differently, have similar ideas on how they learn. Boys learn through hands on approach and competition and girls through cooperation and verbal methods. A limited number of teachers stated that boys and girls do not learn differently.

Question 6: Which gender is generally more active in their learning?

Overall participant views. In the questionnaire, respondents had two options for question six: boys or girls. A plurality of the participants, fifteen out of thirty-seven stated that boys were more active and eleven chose girls as more active. Eleven out of the thirty-seven chose not to answer the question and made the following comments; bad question, no appreciable difference, both can be active and non active, no definition of what is active, both active in different ways and question too ambiguous. It is interesting to note that the number of teachers who chose girls as more active corresponds to the number of teachers who chose not to answer for the aforementioned reasons.

Gender of participant. The responses of the participants based on gender were similar and different for question six. For the female participants, nine out of twenty-two asserted that boys were more active in their learning and eight out of twenty-two chose girls not indicating a clear majority for one or the other. Five out of twenty-two chose

not to answer the question and contributed that both are active, unclear definition of what is active and both can be active and non active. Similarly, male teachers, six out of fifteen chose boys as being more active and only three male teachers chose girls. Six out of the fifteen male respondents chose not to answer the question and verbalized that it was a bad question, ambiguous question and no appreciable differences. A smaller proportion of female teachers chose not to answer the question compared to the male teachers also smaller proportion of male teachers believe girls to be more active than female teachers.

Subject matter of participant. The responses for the participants of different subject areas for question six were similar and different. A majority of the math teachers, four out of seven, did not chose to respond to the question and stated that it was a bad question, both equal and the question was ambiguous. Two of the math teachers asserted that girls were more active and only one math teacher perceives boys to be more active. Four out of the seven English teachers perceive girls to be more active, and only one offered that boys are more active. Two English teachers did not respond with either gender and elaborated that there are no great differences and both are active. A majority of the science teachers, six out of ten, view boys to be more active and one science teacher chose girls. Three science teachers chose not to respond and one offered that there is no clear definition of what is active so cannot respond.

History teachers, four out of six, expressed that boys are more active in their learning and two stated that girls are more active. In the area of foreign language, two out of four teachers selected boys as more active and one chose girls. One of the foreign

language teachers chose not to respond and did not state why. Computer science teachers had one suggest that girls are more active; one offered that boys are more active and one chose not to respond out of the three, total. The teacher who chose not to respond expressed that both can be active and non active. It was surprising to see that the perceptions of the math and science teachers were so different, given the fact that their subject matter is complementary. Science courses require a strong foundation of mathematics for students and science teachers overwhelmingly chose boys as more active and math teachers suggested that they are equal, bad question or ambiguous. The other difference was noted in how English teachers responded in comparison to the other subject areas. They were the only group that a majority submitted that girls were more active.

Years of teacher participant experience. The participants in the research have varying experiences and the relatively equal numbers of participants fell into the four categories of experience, Level 1-4. All the levels of experience teachers had varying answers for question six. Level 1 experience teachers, four out of eight, perceive boys to be more active, three asserted that girls are more active and one did not respond to the question nor offered their reasons. Level 2 experience teachers, five out of ten, chose not to answer the question and expressed the following reasons; no difference, both active and non active and no clear definition of what is active so cannot respond. Four out of ten Level 2 experience teachers stated that boys were more active and one submitted that girls were more active. Unlike the other levels, Level 3 experience teachers, four out of ten, stated that girls were more active, three asserted that boys were more active and three

chose not to answer. The reasons supplied for not answering were that both are equal and the question is ambiguous. Level 4 experience teachers, four out of nine, contributed that boys were more active, three chose girls to be more active and two refused to respond expressing that the question was bad. Level 1, 2 and 4 of experience teachers responded similarly in suggesting that boys were more active than girls whereas Level 3 was the only level that submitted that girls were more active. Level 2 experience teachers had the largest portion of participants that did not respond to the question and stated the aforementioned reasons.

Question 7 and 8: It is necessary to encourage boys/ girls to participate in _____ courses.

Overall participant views. The respondents responses were multiple for question seven and eight, asking in what course do teachers need to encourage boys and girls respectively. For question seven, eight out of the thirty seven participants did not respond to the question and left it blank. Six teachers stated that boys need to be encouraged in all courses, five asserted that English is one area that needs to be encouraged for boys, fine arts was the course expressed by four teachers, three teachers offered that humanities was an area in which boys needed encouragement in and three verbalized that boys need to be encouraged in foreign language courses. Some teachers suggested the following courses in which boys need encouragement; liberal arts, writing, process-based courses, and dance. A few of the respondents did not state courses but presented ideas in which boys need to be encouraged such as following their interest,

delving into areas that have been underrepresented due to cultural inequities and taking challenging courses out of interest area. For some of the responses, it was unclear what the respondent may have been trying to assert for example; often, parenting and regular level. Overall it seems that the respondents wanted boys to be encouraged in non STEM (science, technology, engineering and math) areas.

The responses for question eight were very different from those for question seven. For girls, eleven out of thirty-seven respondents stated that girls need to be encouraged to take science courses. Nine teachers want girls to be encouraged in math, six in all courses and three in the areas of technology. Seven respondents chose to leave the question blank like question seven. The other teachers responded with ideas rather than courses like follow interest area, underrepresented areas, challenging courses outside of interest area, depends on individual and AP level. Some responses were unclear such as more often, mechanical, and not enough data.

Gender of participant. The responses for question seven varied based on the gender of the respondent. The female teachers, six out of twenty-two, stated that boys need to be encouraged in all areas, three asserted that boys need to be encouraged in foreign language, two contributed that boys need to be encouraged to take humanities courses and two offered that boys need to be encouraged to take fine arts courses. Five female teachers did not respond to the question. A few female teachers expressed that boys need to be encouraged in the following areas; liberal arts, writing, and dance. Some female teachers responded with ideas rather than courses such as follow interest areas, process-based courses and parenting. Male teachers, five out of fifteen suggested that boys need

to be encouraged to take English courses and two submitted that boys need encouragement in fine arts. A few male teachers stated that boys need to be encouraged in the areas of foreign language and humanities and some male teachers, like the females, responded with ideas rather than courses such as taking challenging courses outside of interest area and pursue areas underrepresented due to cultural history. Some of the male teachers responses were unclear like often and regular level.

For question eight, the responses varied based on the gender of teachers as it did in question seven. The female teachers, six out of twenty-two asserted that girls need to be encouraged to take science courses, six contributed that girls need to be encouraged to take all courses, five offered that girls need to be encouraged to take math courses and two expressed that girls need to be encouraged to take technology courses. Five female teachers did not respond to the question and few suggested ideas like follow interest and mechanical rather than stating the courses in which girls need to be encouraged. The male teachers, six out of fifteen, asserted that girls need to be encouraged to take science courses, four contributed that girls need to be encouraged to take math courses, and two expressed that girls need to be encouraged to take technology courses. Two male teachers did not respond to the question. Some male teachers responded with ideas rather than courses such as areas of underrepresentation, depends on individual student, challenging courses outside of interest area and AP level. Two teachers' responses were unclear. In general, both male and female teachers expressed that girl's need encouragement in STEM areas and boys need encouragement in non-STEM areas.

Subject matter of participant. The responses to question seven and eight varied based on the subjects teachers taught. Many teachers responded with multiple answers for one question. For question seven, two out of seven math teachers offered that boys need to be encouraged in all courses; two suggested that boys need to be encouraged in fine arts courses and two left the question blank. A few math teachers responded with answers that were unclear such as often, question mark and regular level. For question eight, two out of seven math teachers submitted that girls need to be encouraged in all courses; one said girls need to be encouraged in math; and one asserted that girls need to be encouraged in science. Some math teachers responded with ideas such as AP level and it depends on individuals, while others responded with ambiguous responses like more often and question mark. English teachers' responses were different for each teacher in question seven. English teachers stated that boys need to be encouraged in the following courses: liberal arts, writing, fine arts, foreign languages and English. One teacher asserted that boys need to be encouraged in all courses and one contributed that boys need to be encouraged to take process-based courses. One English teacher did not respond to the question. For question eight, two English teachers stated that girls need to be encouraged to take science courses; two asserted that girls need to be encouraged to take technology courses; one said math courses; and one contributed that girls need to be encouraged to take all courses. Two of the English teachers did not respond and one expressed that not enough data. Science teachers' responses were multiple for question seven. For boys, two out of ten science teachers verbalized that they need to be encouraged in humanities; two suggested that they need to be encouraged in all; one teacher submitted that they need to be encouraged in English; one asserted that they need

to be encouraged in foreign language; and one contributed that they need to be encouraged in dance. Two of the science teachers offered ideas rather than courses and the ideas were that boys should follow interest and move into areas that are underrepresented due to past cultural history. For girls, five out of ten teachers submitted that they need to be encouraged to take science courses; one said physics specifically; three stated that they need to be encouraged to take math courses; and two asserted that they need to be encouraged to take all courses. One teacher expressed that girls need to follow interest when taking courses and one verbalized that they need to be encouraged to participate in underrepresented areas.

History teachers' responses were numerous for question seven. For boys, two out of six history teachers submitted that they need to be encouraged to take English; one stated that they need to be encouraged to take foreign language; and one asserted that they need to be encouraged to take humanities courses. One suggested that boys need to be encouraged to take courses outside of their interest area. Two of the teachers left the question blank. For girls, three out of seven history teachers stated that they need to be encouraged to take science courses; three asserted that they need to be encouraged to take math courses. One offered that girls need to be encouraged to take challenging courses outside of interest area and one decided not to answer the question. For questions seven and eight, the responses for the foreign language teachers were different for each participant. For boys, the history teachers expressed that they need to be encouraged in parenting and all courses. Two did not respond to the question. For girls, the history teachers suggested that they need to be encouraged in science courses, mechanical courses and all courses. One teacher did not respond to the question. The computer

science teachers, two out of three, left questions seven and eight, blank. One teacher stated that boys need to be encouraged in English and foreign languages and girls need to be encouraged to take science, math and technology courses. It is interesting to note that despite the subjects they teach, a good portion of the teachers asserted that girls should be encouraged in the areas of math and science and boys need to be encouraged in the area of fine arts and English.

Years of teacher participant experience. The participants in the research have varying experiences and the relatively equal amounts of participants fell into the four categories of experience, Level 1-4. The teachers from all levels of experience responded differently to questions seven and eight. In Level 1, three out of eight teachers stated that boys need to be encouraged to take English courses; one asserted that boys need to be encouraged to take all courses; one contributed that boys need to be encouraged to take dance; and one said that boys need to be encouraged to take fine arts. One teacher offered that boys need to be encouraged to take challenging courses outside of interest area and one left the question blank. For girls, Level 1 teachers, four out of nine expressed that they need to be encouraged to take science courses especially physics; two suggested that they need to be encouraged to take math courses; and one submitted that they need to be encouraged to take all courses. One suggested that girls need to be encouraged to take challenging courses outside of interest area and one responded by stating that not enough data was available.

Level 2 teachers, three out of ten did not respond to either question seven or eight. Two teachers asserted that boys need to be encouraged to take foreign language courses

and two contributed that boys need to be encouraged to take all courses. One teacher responded stating that boys need to be encouraged to take fine arts courses. One suggested that boys need to be encouraged to take English courses and one offered that boys need to participate in underrepresented areas. One teacher responded by saying that boys need to be encouraged to take regular courses. For girls, three out of ten Level 2 teachers expressed that girls need to be encouraged to take math courses; two verbalized that they need to be encouraged to take science courses; two suggested that they be encouraged to take all courses; and one submitted that they be encouraged to take technology courses. One teacher stated that girls need to take courses in underrepresented areas and one asserted AP level.

Where Level 3 teachers were concerned, three out of ten contributed that boys need to be encouraged to take all courses; two offered that they need to be encouraged to take foreign language courses; and two asserted that they need to be encouraged to take humanities courses. One teacher suggested that boys need to be encouraged to take writing courses and one stated that they need to be encouraged to take fine arts courses. One teacher suggested that boys be encouraged to take process-based courses. For girls, four out of ten Level 3 teachers submitted that they need to be encouraged to take science courses; three asserted that they need to be encouraged to take all courses; two stated that they need to be encouraged to take math courses; and one contributed that they be encouraged to take technology courses. Two Level 3 teachers left the question blank and one offered that it depends on the individual.

Level 4 teachers had a variety of responses for question seven. Two left the question blank. The others expressed that boys should be encouraged to take liberal arts,

English, fine arts and humanities courses. One said that boys should follow interest and one suggested that boys should be encouraged to take parenting courses. Two answers were unclear for one teacher submitted often and the other placed a question mark. For question eight, two out of nine suggested that girls be encouraged to take science courses; two submitted that girls be encouraged to take math courses; one said that girls need to be encouraged to take technology courses; and one stated that they be encouraged to take mechanical courses. One asserted that girls need to be encouraged to follow interests. Two left the question blank and two of the responses were question marks and ambiguous. No matter the level of experience the teachers have, a majority of them perceive that girls need to be encouraged in math and science and boys in the area of fine arts and English.

Question 9: What comes to mind when you read the words “Gender Equity”?

Overall participant views. The participants’ responses for question nine examined the issues and experiences that teachers had within the classroom with students and outside of the classroom with parents and other colleagues. Three of the participants chose not to respond to the question but one respondent asserted that “I dare not submit to print.” Ten out of thirty-seven respondents believe that gender equity means equal access and opportunity for all while keeping in mind the differences between the genders and that both genders do not have to be the same. The respondents went on to contribute that “the differences do not mean that either gender should be treated based on the differences or coerced overtly or covertly to participate in certain areas.” Five respondents offered

that the treatment of the gender must be equal and that both genders need to be encouraged in all areas. One respondent expressed that “society needs to be realistic in that genders are equal and due to the differences they should complement one another rather than compete.” According to one teacher, “the environment expects both genders to be capable but boys show more confidence.” This statement was echoed by a teacher that suggested that gender equity is not present at the school for subtle reasons such as “powerful males being present within the faculty, administration and students who do not recognize their privilege.” “Balancing the playing field and getting rid of outdated gender roles” was necessary per one teacher’s views. For one teacher, gender equity means that one gender is favored. A few teachers asserted that courses need to be taught where both gender styles are used and both gender need to receive positive and negative attention within the classroom. More equal opportunities are needed for females was the view of one teacher and another contributed that “gender equity is misunderstood and a politically charged term due to ignorance.” One respondent verbalized that women get paid less and in areas like education, and another stated that men will receive promotions when both genders are competing for the same position. Due to the old boys’ network, the science field has historically had more men but it is changing according to one respondent. A good portion of the respondents believe that gender equity is equal access and opportunity with several individuals elaborating on their definitions with particulars like understanding the differences between genders and not coercing one to participate in a specific area.

Gender of participant. The responses for question nine were similar and different based on gender and the female responses were more diverse. Seven out of the twenty-two female teachers stated gender equity means equal access, opportunity and same treatment of both genders while understanding the differences. Two of the female respondents elected to not answer the question. The remaining female teachers had a variety of responses to the question. One contributed that to her it is one gender being favored over another. According to one female teacher, gender equity is being able to accept that both genders are capable but boys tend to show more confidence. A female teacher stated that gender equity is not present at the school for “subtle but powerful males are present within the faculty, administration and students who do not recognize their privilege.” Attention and encouragement needs to be given to both genders in the classroom in a positive and negative manner based on a female teacher’s view. One female teacher asserted that their needs to be more equal opportunity for females and the term “gender equity is misunderstood and is politically charged due to ignorance.” Women are paid less and men get more promotions in areas like education according to one female teacher. Due to the old boys’ network, science has more men but it is changing, according to one female respondent. Another female teacher contributed that genders are equal but equity is unrealistic due to differences and the environment should be of complementing each other rather than competition.

Male teachers, nine out of fifteen, expressed that gender equity means equal access and opportunity in which differences are understood but no coercion in one area or another. One male teacher asserted that “I dare not submit to print” with regards to gender equity, one male suggested that it was lack of gender bias and one male teacher

did not respond to the question. Balancing the playing field and getting rid of gender roles was submitted by one respondent for gender equity and mutual respect for all views from both genders was asserted by another male teacher. Courses need to be taught addressing the learning styles of both genders rather than force to learn like the other so that both can experience success according to one male respondent. Regardless of the gender of the participants, a number of teachers viewed gender equity as equal access and opportunity with individual tangents based on their personal experiences.

Subject matter of participant. For question nine, the respondents' answers were alike and different depending on the subject area of the respondent. All math teachers responded to the question and five out of seven submitted that gender equity is equal opportunity, access and treatment of genders. One stated that "I dare not submit to print" and one suggested that gender equality is unrealistic due to inherent biological differences and they should complement one another rather than competing. One out of six English teachers did not respond to this question and one stated that "gender equity is misunderstood and is politically charged due to ignorance." Three of the English teachers stated that to them gender equity is equal access and opportunity while understanding the differences but no coercion in one area or another. Accepting that both genders are equal constitutes gender equity, according to one English teacher, but this respondent also asserted that boys show more confidence. All of the science teachers responded to question nine and four out of ten stated that gender equity is equal access, encouragement and opportunity for both. One science teacher contributed that gender equity means that one gender is favored while another offered that a balanced playing field without the

outdated gender roles is needed. Gender equity is not present at the school, according to one of the science teachers who also expressed that “powerful males with in the faculty, students and administration are present but appear unaware of the privilege.” One science teacher verbalized that women are paid less and in the area of education, men are promoted over women. Due to the old boys’ network, science has more men, but it is changing, according to one science teacher.

Out of the seven history teachers that participated, one did not answer question nine. Three of the history teachers indicated that gender equity is equal access and opportunity whereas one stated that it is mutual respect for all views from both genders. Teaching courses so both gender styles are addressed is suggested by one history teacher. Equal number of men and women forms gender equity for one of the history teachers. Two out of four foreign language teachers expressed that gender equity is lack of gender bias, one verbalized that attention in the classroom to both genders needs to be positive and negative, and another suggested that more equal opportunities for females are needed for the campus to claim gender equity. One of the computer science teachers did not respond to the question. One submitted that both genders should be treated equally; another stated that either gender should not be forced to learn like the other for both to experience success. Regardless of the subject matter they teach, a significant number of teachers view gender equity as equal access and opportunity but viewpoints may be more specifically tailored due to the content they teach.

Years of teacher participant experience. The participants in the research have varying experiences and relatively equal numbers of participants fell into the four

categories of experience, Level 1-4. For Level 1 experience teachers, four out of eight, indicated that gender equity is equal access and opportunity while understanding differences without coercion in one area or another. One offered that gender equity is mutual respect for all views from both genders and another expressed that it had to do with lack of gender bias. Due to the old boys' network, science has more men, but is changing over time, according to one Level 1 teacher. One Level 1 teacher suggested that attention, positive and negative, needs to be given to both genders to achieve gender equity in the classroom.

Five out of ten Level 2 teachers stated that equal access and opportunity is gender equity. One Level 2 teacher asserted that balancing the playing field by getting rid of gender roles is gender equity whereas another stated that equal numbers of both genders is equity. More opportunities for females was gender equity for one Level 2 teacher, and one teacher responded by suggesting that women get paid less and that men get more promotions especially in the field of education. The classroom, according to one Level 2 teacher, forces one gender to learn like another does rather than providing an environment conducive for both to succeed.

Where Level 3 teachers were concerned, three out of ten stated that gender equity is equal access and opportunity while understanding differences. Two out of ten offered that gender equity is that both should be treated the same and one submitted that the term is "misunderstood and politically charged due to ignorance." One of the Level 3 teachers chose not to answer the question and one stated that gender equity is not present at the school due to "subtle but powerful males (faculty, administration and students) who do

not recognize their privilege.” One respondent’s answer was unclear because the teacher asserted that boys were more active.

As for Level 4 experienced teachers, two out of nine did not respond to question nine. Two contributed that gender equity is equal access and opportunity; one suggested that it is unrealistic because the “genders are different and they should complement one another rather than compete.” One stated that it is the lack of gender bias, one offered that course be taught addressing both gender styles and another asserted that it is when one gender is favored. An additional person also asserted that “I dare not submit to print” what their view was on gender equity for data collection purposes. A majority of the teachers view gender equity as equal access and opportunity but their responses are also shaped by the number of years spent in education and the time period in which they grew up or other factors that impacted their thoughts.

Question 10: Does the discussion of gender equity come up in your classroom in your discussions with students, parents or other teachers? Please explain how each group feels about gender equity.

Overall participant views. The question having to do with gender equity discussions with students, parents or other teachers received multiple responses from the participants. Twenty out of the thirty-seven respondents stated that they had not had any discussions with regards to gender equity; five chose to leave the question blank; and one respondent asserted that these discussions only come up when the “teacher is not ready to teach the course material.” Other participants had numerous responses to this question

such as “Mothers understand the importance of gender equity, but girls do not and boys are clueless until college.” Another teacher contributed that the subject he teaches is historically biased against women and the students appreciate that the teacher wants to change the phenomenon. One teacher believes that “students are taught strong feminist ideas but are either afraid to question feminism or do not have a propensity to question anything at all.” Two teachers offered that when the discussion comes up “boys either roll their eyes or dismiss the idea” and one of these teachers elaborated saying “male teachers have more status accorded them by students, administration and other faculty members.” Another teacher disagreed with the previous two and verbalized that boys defer to girls, the stronger student, when serious answers are needed. Yet another teacher discussed how gender equity comes up for discussion as part of curriculum within literature readings and it has to be explained to “parents how traditional roles within the families usurp notion of gender equity” and this teacher further suggested that the “school treats males and females differently.” According to one respondent, “girls discuss inequity in a larger social context and boys speak of inequity within the immediate school context.” One teacher submitted that boys feel that they suffer more discrimination at her hands because girls’ grades are often better than boys; another teacher stated that the gender equity discussions come up when one group feels the other group is getting special treatment; and still another asserted that discussions come up when students talk about the outdated notion that colleges like girls in science and boys in education. It is fascinating to see that a majority of the teachers contributed that gender equity never comes up for discussions but then a good portion of teachers discuss the experiences that they have had in their classrooms concerning this topic.

Gender of participant. The participants' responses for question ten were alike as well as different based on the participant's gender. Twelve out of twenty-two female teachers stated that gender equity does not come up for discussions within their classrooms. Four of the female teachers did not even respond to the question. The other female participants had numerous responses to this question such as "Mothers understand the importance of gender equity but girls do not and boys are clueless until college." Another female teacher suggested that "students are taught feminist ideas and are afraid to question feminism or just do not ask questions." Two female teachers expressed that when discussion of gender equity does come up the "boys either roll their eyes or scoff at the idea" and one of these teachers went on to say that "male teachers are given more status by students, administration and faculty." A further teacher suggested that topic comes up since the curriculum calls for literature discussion and "parents have to be explained that the traditional family roles usurp notions of gender equity;" she also verbalized that the "school treats females and males differently." Lastly, one female teacher submitted that boys feel they suffer more discrimination because girls often earn better grades.

Question ten answers by male teachers were multiple and only one male teacher chose to leave the question blank. Eight out of fifteen males stated that gender equity discussions do not come up in the classroom and one asserted that it only arises when the "teacher is not ready to teach the material." One male teacher contributed that the subject he teaches has been historically biased against females and the students appreciate his efforts in trying to change it. Another male teacher offered that the conversation arises when students bring up outdated ideas that colleges like girls in science and boys in

education. Boys at times defer to the girls for serious answers because they are stronger students, according to one of the male teachers, and another male teacher expressed that the topic emerges when one group feels like the other is getting special treatment. One teacher verbalized that “girls discuss inequity in a larger social context and boys discuss inequity in the school context.” It is interesting to note that more female teachers left the question blank than the male teachers.

Subject matter of participant. The question of discussion of gender equity in the classroom has varying responses from teachers based on the subject they teach. Four out of the seven math teachers said that gender equity discussions do not come up in their classroom and one chose not to answer the question. One of the math teachers stated that it comes up only in classrooms in which the “teacher is not ready to teach” and one math teacher asserted that when it does it is usually because one group believes the other is getting special treatment. In the group of English teachers, only one contributed that it does not come up for discussions and one left the question blank. The remaining teachers had various responses such as one teacher said that “Mothers understand the importance but girls do not and boys are clue less until college.” One of the English teachers contributed that if the topic comes up the “boys roll their eyes” and this same teacher verbalized that male teachers enjoy more status from students, administrators, and faculty. Discussion of gender equity develop, according to one of the teachers, because it is a part of curriculum in literature and it must be explained to “parents that traditional family roles usurp notions of gender equity;” this teacher further asserted that the “school treats males and females differently.” Science teachers, eight out of ten, overwhelmingly

suggested that gender equity discussions do not come up in class discussions. One of the science teachers submitted that the subject has been historically biased against women and makes the effort to change it which the students appreciate. Another science teacher stated that if the discussions arise “the boys scoff at the idea.”

In the history teacher group, two out of seven stated that the topic does not come up for discussion and one teacher left the question blank. Another history teacher asserted that it comes up for discussion with the outdated ideas that colleges like girls in science and boys in education. “Girls speak of inequity in the larger social context and boys speak of it in the school context” according to one history teacher. Boys believe that they suffer more discrimination in this teacher’s class because girls earn better grades according to one of the history teachers. Of the four foreign language teachers that participated, two expressed that the topic does not come up in class discussions and one teacher left the question blank. The one foreign language teacher that did respond to the question wrote that “students are taught strong feminist ideas and are afraid to question feminism or just do not question anything.” Two of the three computer science teachers suggested that the topic does not come up for discussion and one chose not to answer the question. The factor that stood out the most is that the two subjects that had the most responses of no, gender equity does not come up for discussion, were math and science. The subject area that had the most yes responses was English.

Years of teacher participant experience. The participants in the research have varying experiences and the relatively equal amounts of participants fell into the four categories of experience, Level 1-4. The number of years of teacher experience results in

varied responses for the question about gender equity discussions in the classroom. In the Level 1 category, three out of eight asserted that it does not come up for discussion and one teacher did not answer the question. One of the Level 1 teachers contributed that boys defer to girls for serious answers since they are the stronger students and one asserted that it comes up for discussion because of the outdated idea that colleges like girls in science and boys in education. Another Level 1 teacher offered that “girls speak of inequity in the larger school context and boys do so in terms of the school context.” Similarly, another teacher expressed that boys feel that they suffer most discrimination in this teacher’s classroom because girls earn better grades. In the Level 2 group, a majority of the teachers verbalized that the topic of gender equity does not come up for discussion, nine out of ten. Only one teacher submitted that it comes up because the subject this teacher teaches is historically biased against women and the students appreciate the teacher’s efforts in trying to change it.

In the Level 3 category, three out of ten teachers stated that the topic does not come up for discussion and a further three chose to leave the question blank. Two teachers in this group asserted that when it does the “boys roll their eyes and scoff at the idea” and one of them also verbalized that “male teachers enjoy more status by students, administration and faculty.” One of the Level 3 teachers suggested that it only comes up when one group feels the other is getting special treatment; another offered that it comes up because of the curriculum and “parents must be explained that traditional roles usurp notions of gender equity and schools treat females and males differently.” In the Level 4 group, five of nine teachers stated that the topic does not come up in their classroom, one left the question blank and one asserted that if it does that means the “teacher is not ready

to teach the content.” One of the Level 4 teachers stated that “Mothers understand the importance but girls do not and boys do not get it until college.” One of the Level 4 teachers contributed that students are taught strong feminist ideas and are afraid to question feminism or just to question any thing. In the different levels, the teachers experiences are not the same due to number of years in education but other issues may have had an impact.

Question 11: Do both boys and girls feel confident in selecting enrollment in courses that may not traditionally be represented by high numbers of that gender?

Overall participant views. The participants’ responses to question eleven varied but a majority chose one answer. Nineteen out of thirty-seven participants stated that both boys and girls are confident in selecting non-traditional courses but one of the respondents asserted that both are not equally successful. Six of the teachers contributed that boys are more confident and one offered that it is because high level math and science courses are taught in non-traditional and computer formats attracting more boys than girls. Six participants expressed that girls are more confident and one chose multiple answers and one of the respondents stating that the girls need to feel “macho”. Five teachers verbalized that, no, both are not confident in selecting non-traditional subjects and the reasons were as follows: boys are not likely to sign up for dance as girls are unlikely to enroll in multivariate calculus, the school’s expectation should be that both genders take courses in all fields, rework the system, and some girls in science feel inadequate when boys understand material faster and are more articulate about it. Two of

the teachers chose not to answer the question. Overall, it seems from the responses gathered that a majority of the teachers perceive that both genders are confident in selecting non-traditional courses.

Gender of participant. The responses of participants for question eleven were different based on the gender of the participant. A majority of the female teachers, twelve out of twenty-two, perceived that both genders are confident in selecting non-traditional courses. Three females stated that boys are more confident and one chose multiple answers, boys are more confident, girls are more confident and, no, both are not confident. Girls are more confident, according to four of the female teachers, and one asserted it was the need to feel “macho.” Three of the female teachers noted that both are not confident, citing the following reasons: school should expect both genders to take all courses, rework the system and girls feel inadequate when boys understand material faster than girls and are louder. Two female teachers chose not to respond to the question.

A smaller portion of the male teachers, seven out of fifteen, stated that both genders are confident in selecting non-traditional courses. Four male teachers offered that boys are more confident and one stated that high level math and science courses are taught in non-traditional and computer formats attracting more boys than girls. Two male teachers contributed that girls were more confident and two expressed that, no, both are not confident of which one verbalized that boys just as likely to sign up for dance as a girl will sign up for multivariate calculus. Overall, a major portion of the female teachers

perceived both genders to be confident in selecting non-traditional courses than males, but all male teachers chose to answer the question.

Subject matter of participant. The responses of the participants for question eleven were similar in certain ways yet different in others. A majority of the math teachers, five out of eight, suggested that both are more confident in selecting non-traditional courses. Two math teachers said that boys are more confident and only one submitted that girls are more confident. English teachers also, three out of six, stated that both genders were confident in selecting non traditional courses. One English teacher asserted that boys were more confident; one stated that, no, both are not confident and the school should expect both genders to take all courses. One English teacher decided not to answer the question. For science teachers, three out of ten stated that both are confident but one of them stated that they are not equally successful. Three science teachers asserted that boys were more confident of which one offered that high level math and science courses are taught in a non-traditional manner and computer format attracting more boys than girls. Two science teachers asserted that girls are more confident and one of them said it was due to girls need to feel macho. Three science teachers contributed that, no, both are not confident and the reasons they gave were boys are as likely to sign up for dance as girls for multivariate calculus, rework the system and girls feel inadequate because boys understand faster and are louder.

A majority of the history teachers, three out of six, perceive that both genders are confident in selecting non-traditional courses. Two history teachers believe that girls are more confident and one offered that both are not confident but did not provide an

explanation or reason. Three out of four of the foreign language teachers expressed that they perceive both genders to be more confident and one teacher verbalized that girls are more confident. The computer science teachers, two out of three, suggested that both are confident and one submitted that boys are confident. It is interesting to note that a majority of the different subject teachers except those in science perceive both genders to be confident. The science teachers had varying views on the confidence level of the genders in selecting non-traditional courses.

Years of teacher participant experience. The participants in the research have varying experiences and the relatively equal amounts of participants fell into the four categories of experience, Level 1-4. The participants' responses had similarities and differences based on the experiences of the teachers. Level 1 experience teachers, five out of eight, stated that both genders are more confident in selecting non-traditional courses. Three of the teachers asserted that girls are more confident. For Level 2, five out of ten teachers contributed that both genders are confident. Two offered that boys are more confident of whom one expressed that high level math and science courses are taught in a non-traditional manner and computer format that more boys are attracted than girls. Two teachers expressed that, no, both are not confident and expressed that it was because boys are as likely to sign up for dance as girls for multivariate calculus, and girls feel inadequate when boys understand faster and are louder. The Level 3 teachers, four out of ten, verbalized that both are confident but one of them suggested that both are not equally successful. Three submitted that boys are more successful and of these respondents one chose multiple answers. Three stated that no, both are not successful

and the reasons are that the school should expect both genders to take all courses and reworking the system is necessary. One of the teachers expressed that girls are more confident. Five out of nine Level 4 teachers stated that both genders are confident. Two teachers asserted that boys are more confident and two offered that girls are more confident. Overall, regardless of experience, a good portion of the teachers perceived that both genders are confident with non-traditional course selection.

Question 12: In your opinion, which gender is more likely to take higher level courses in math, science, English, history and foreign languages?

Overall participant views. The respondents had multiple answers for question twelve for its four constituent parts. Twenty-three out of thirty-seven participants stated that males are more likely to take higher level math courses, seven teachers stated that both genders are likely to do so and three left the question blank. Twenty out of thirty-seven participants stated that males are more likely to take higher level of science courses. Of these latter respondents three had multiple answers, saying that boys take the physics and engineering courses and girls take biology and chemistry. Five teachers asserted that girls are more likely where the previous statement was concerned. Seven teachers contributed that both genders are likely to take higher level science courses and three did not respond to the question. Twenty-seven out of thirty-seven teachers offered that girls are more likely to take higher level English courses; four teachers expressed that both are likely to take higher level English courses; three chose not to respond; and none of the teachers suggested that boys are likely to take higher level English courses. Eleven

out of thirty-seven teachers submitted that boys are more likely to take higher level history courses; four stated that girls are more likely; fourteen teachers asserted that both genders are likely; three offered that they are not sure; and three chose not to respond to the question. Twenty-three out of thirty-seven teachers expressed that girls are more likely to sign up for higher level foreign language courses, six suggested that both are likely; two said neither or do not know; and three chose not to answer the question. Overall, based on the participants' responses, boys are more likely to take higher level math and science courses; girls are more likely to take higher level English and foreign language courses; and both genders are more likely to take higher level history courses.

Gender of participants. The participants' responses are similar and different for the multiple questions within question twelve based on the gender of the respondent. Fourteen out of twenty-two female teachers asserted that boys are more likely to take higher level math courses; six females offered that both are likely and two chose not to answer the question. Eleven out of twenty-two female teachers contributed that boys are more likely to take higher level science courses of which two had chosen multiple answers. Three females expressed that girls are more likely to take higher level science courses with two female teachers choosing multiple answers. The reasons for the multiple answers were that girls take biology and chemistry and boys take physics and engineering. Seven female teachers verbalized that both are likely to take higher level science courses and three females chose not to answer the question. Seventeen out of twenty-two female teachers suggested that girls are more likely to take higher level English courses; two females stated that both are likely; three females chose not to

answer the question and none of the teachers said that boys are likely. For history, five female teachers stated that boys are more likely to take higher level courses; two females asserted that girls are more likely; eleven females contributed that both are likely; three females chose not to answer the question and one female was not sure. In the area of foreign language area, sixteen out of twenty-two female teachers offered that girls are more likely to take higher level courses; two females expressed that both are likely; three chose not to answer the question and one female was not sure.

For the male participants, eleven out of fifteen teachers stated that boys are more likely to take higher level math courses; one asserted that both are likely; two chose not to respond to the question; and one male teacher put a question mark as his answer. Nine out of fifteen male teachers contributed that boys are more likely to take higher level courses in science and one of these respondents had two answers; three males offered that girls are likely; one male said both are likely and two males chose not to respond to the question. The reason for the respondent with two answers was that girls are likely to take biology and chemistry and boys will take physics and engineering. Twelve out of fifteen male participants expressed that girls are more likely to take higher level English; one male said both; and two males chose not to respond to the question. Seven out of fifteen male participants indicated that boys are more likely to take higher level history courses; two males suggested that girls are likely; three males submitted that both are likely; two males did not respond to the question and one male was not sure. Nine out of fifteen male participants stated that girls are more likely to take higher level foreign language courses; three males asserted that both are likely; two males left the question blank; and one was not sure. Overall, female teachers believed that girls are more likely to take

higher level courses in English and foreign language; both are likely to take higher level courses in history; and boys are more likely to take higher level courses in math and science. Male teachers perceive that girls are more likely to take higher level courses in English and foreign language and boys are more likely to take higher level courses in math, science and history.

Subject matter of participant. The participants' responses to the multiple questions in question twelve vary based on the subject area of the participant. Three out of eight math teachers stated that boys are more likely to take higher level math courses; four math teachers asserted that both are likely and one math teacher responded with a question mark. Two math teachers contributed that boys are more likely to take higher level science courses; one math teacher offered that girls are likely; two math teachers expressed that both are likely; two math teachers left the question blank; and one math teacher responded by putting a question mark. A math teacher responded by stating that both are likely to take higher level science courses, except physics C. Five math teachers verbalized that girls are more likely to take higher level of English courses; one math teacher suggested that both are likely and two math teachers left this question blank. Two out of eight math teachers submitted that boys are more likely to higher level history courses; one math teacher stated that girls are more likely; one math teacher asserted that both are likely; two math teachers left the question blank and one math teacher responded with a question mark. Four out of eight math teachers offered that girls are more likely to take higher level foreign language courses; one math teacher contributed that both are

likely; two math teachers left the question blank and one math teacher responded with a question mark.

Four of six English teachers stated that boys are more likely to take higher level math courses and two asserted that both are likely. Three out of six English teachers contributed that boys are more likely to take higher level science courses, one English teacher offered that girls are more likely and two English teachers left the question blank. All six English teachers indicated that girls are more likely to enroll in higher level courses in English. Two out of six English teachers verbalized that boys are more likely to take higher level courses in history, three English teachers suggested that both are likely to enroll, and one English teacher was not sure. Five out of six English teachers submitted that girls are more likely to take higher level courses in foreign language and one English teacher responded with a question mark.

Nine of ten science teachers stated that boys are more likely to take higher level courses in math and one science teacher left the question blank. Six of ten science teachers asserted that boys are more likely to take higher level science courses but some of them chose multiple answers because they perceived that girls will take more biology and boys will take more physics. Three science teachers contributed that girls are more likely to take higher level courses in science with the aforementioned caveat; two science teachers offered that both are likely; and one science teacher did not respond to the question at all. Nine out of ten science teachers expressed that girls are more likely to take higher level courses in English and one science teacher chose not to respond to the question. Two out of ten science teachers suggested that boys are more likely to take higher level history courses; two science teachers submitted that girls are likely to enroll;

five science teachers stated that both are likely to sign up; and one science teacher chose not to respond. Eight of ten science teachers asserted that girls are more likely to take higher level courses in foreign language; one science teacher contributed that both are likely; and one science teacher left the question blank.

All six history teachers concurred that boys are more likely to take higher level courses in math. All six history teachers agreed that boys are more likely to take higher level courses in science. All six history teachers believed that girls are more likely to take higher level English. Three of six history teachers suggested that boys are more likely to take higher level courses in history; one history teacher submitted that girls are more likely to enroll; and two stated that both are likely. Five of the six history teachers asserted that girls are more likely to take higher level courses in a foreign language; one history teacher further contributed that both are likely.

Where the foreign language teachers are concerned, two out of four offered boys are more likely to take higher level courses in math and two foreign language teachers expressed that both are likely. Two foreign language teachers verbalized that boys are more likely to take higher level science courses, one foreign language teacher suggested that girls are more likely to enroll, and two foreign language teachers submitted that both are likely. One foreign language teacher had two answers because he stated that girls are more likely to take biology and boys are more likely to take physics. Two foreign language teachers asserted that girls are more likely to take higher level English courses and two foreign language teachers contributed that both are likely. Two foreign language teachers offered that boys are more likely to take higher level history courses and two foreign language teachers stated that both are likely. Two foreign language teachers

expressed that girls are more likely to take higher level foreign language courses and two foreign language teachers verbalized that both are likely.

In computer science, one out of three teachers stated that boys are more likely to take higher level courses in math; one suggested that both are likely and one left the question blank. One computer science teacher submitted that boys are more likely to take higher level science courses and two computer science teachers left the question blank. One computer science teacher stated that girls are more likely to take higher level courses in English and two computer science teachers left the question blank. One computer science teacher asserted that both are likely to take higher level courses in history and two left this question blank. One computer science teacher offered that girls are more likely to take higher level foreign language courses and two computer science teachers left the question blank. Overall, English, science and history teachers expressed that girls are more likely to take higher level courses in English and foreign language and boys are more likely to take higher level courses in math and science. English and science teachers suggested that both genders are likely to take higher level courses in history and history teachers submitted that boys are more likely to take higher level courses in history. Math teachers concurred with the English, science and history teachers when they stated that girls are more likely to take higher level courses in English and foreign language but they disagree in that math teachers suggested that both genders are likely to take higher level courses in math.

Years of teacher participant experience. The participants in the research have varying experiences and the relatively equal amounts of participants fell into the four

categories of experience, Level 1-4. The participants' responses to the multiple questions in question twelve vary according to the years of experience. Level 1 experience teachers, seven out of eight stated that boys are more likely to take higher level courses in math and one Level 1 teacher asserted that both are likely. Five out of eight Level 1 teachers offered that boys are more likely to take higher level courses in science; two Level 1 teachers expressed that girls are more likely and one Level 1 teacher verbalized that both are likely. All Level 1 teachers suggested that girls are more likely to take higher level courses in English. Four of eight Level 1 teachers submitted that boys are more likely to take higher level courses in history; one Level 1 teacher stated that girls are more likely to sign up; and three Level 1 teachers asserted that both are more likely to participate. Six out of eight Level 1 teachers contributed that girls are more likely to take higher level courses in foreign languages and two Level 1 teachers offered that both are likely to enroll.

With the Level 2 teachers, six out of ten asserted that boys are more likely to take higher level courses in math; one Level 2 teacher contributed that both are likely and two Level 2 teachers decided not to respond to the question. Six of ten Level 2 teachers suggested that boys are more likely to take higher level science courses and two of these gave two answers. Two Level 2 teachers submitted that girls are more likely to take higher level courses in science; one Level 2 teacher asserted that both are likely to enroll and two left the question blank. The teachers with multiple answers contributed that girls take biology and boys take physics. Seven out of ten Level 2 teachers stated that girls are more likely to take higher level courses in English; one Level 2 teacher asserted that both are likely to enroll and two Level 2 teachers left the question blank. Three out of ten

Level 2 teachers contributed that boys are more likely to take higher level courses in history; one Level 2 teacher offered that girls are more likely; four Level 2 teachers expressed that both are likely to take classes; and two Level 2 teachers left the question blank. Seven out of ten Level 2 teachers submitted that girls are more likely to take higher level courses in foreign language; one Level 2 teacher asserted that both are likely to enroll and two Level 2 teachers left the question blank.

Concerning the Level 3 teachers, seven out of ten offered that boys are more likely to take higher level courses in math and three Level 3 teachers contributed that both are likely. Five out of ten offered that boys are more likely to take higher level courses in science; five Level 3 teachers expressed that both are more likely; and one of them verbalized that except in physics C. Nine out of ten Level 3 teachers suggested that girls are more likely to take higher level courses in English and one Level 3 teacher submitted that both are likely to enroll. Two out of ten Level 3 teachers stated that boys are more likely to take higher level courses in history; two Level 3 teachers asserted that girls are more likely to participate; four Level 3 teachers offered that both are more likely and two Level 3 teachers were unsure. Nine out of ten Level 3 teachers expressed that girls are more likely to take higher level courses in foreign language and one Level 3 teacher was uncertain.

As for the Level 4 teachers, five out of nine stated that boys are more likely to take higher level courses in math and four Level 4 teachers verbalized that both are likely to participate. Four Level 4 teachers suggested that boys are more likely to take higher level courses in science; two Level 4 teachers submitted that girls are more likely to enroll; one Level 4 teacher stated that both are likely and three Level 4 teachers left the

question blank. One teacher gave multiple answers because the teacher stated that girls take biology and boys take physics. Five Level 4 teachers asserted that girls are more likely to take higher level courses in English; one Level 4 teacher offered that both are likely to participate; and three Level 4 teachers left the question blank. Three Level 4 teachers stated that boys are more likely to take higher level courses in history; three Level 4 teachers asserted that both are likely to take such courses and three Level 4 teachers left the question blank. Three Level 4 teachers offered that girls are more likely to take higher level courses in foreign language; two Level 4 teachers contributed that both are likely; three left the question blank and one Level 4 teacher was not sure. Across all levels of experience teachers believed that boys are more likely to take higher level courses in math and science and Level 1 teachers also expressed that boys are more likely to take higher level courses in history. All levels of experienced teachers indicated that girls are more likely to take higher level courses in English and foreign language. Level 2 and 3 experience teachers stated that both genders are likely to take higher level courses in history.

Addressing the Research Questions Three and Four

Research Question Three: What are teachers' perceptions concerning gender equity in the classroom and in the Advanced Placement Program? The classroom and the programs at the research site are impacted by numerous factors and the teachers' perceptions with regards to gender equity depended upon the gender of the teacher, the subject area the teacher teaches and the level of teacher experience. Hence, the analysis

for this question depends upon all the previously mentioned factors. To understand the teachers' views, one of the questions asked of the participants was what factors affect the students' selection of advanced placement courses. Regardless of the teacher gender, subject area or years of experience the results were more similar rather than different. The variance in response related to the gender of the students. Teachers' communicated that in their opinion boys' decisions are based on innate talent, teacher's influence and getting into to good colleges, whereas for girls, it was getting into good colleges, parental expectations and innate talent. Based on teachers' perceptions, parents play a much more significant role in female student decisions; in contrast, teachers have more of an impact in the decisions boys make. Teachers in general did not openly declare that the gender of the students play the most important role but ranked it significantly close to the top, which suggested that it indeed was very important. Another point that was evident in all the responses was that teachers perceive that boys do not like working hard and that girls are more willing to do hard work.

The teachers' thought processes were analyzed further by questioning why there more men in the areas of science and engineering and more females in liberal arts. The major reason cited as being critical for more males in the area of science and engineering was the influence of parents, teachers, school policies and peers with a few varying responses. English teachers and teachers with the Level 1 experience stated that system in place is important and computer science teachers and teachers with Level 4 experience expressed that factors such as genetics, environment and role models are crucial. The reasons for more girls in the liberal arts area were more varied. Overall teachers stated that parents, teachers, school policies and peers are a strong influence but other things

such as interest and gender roles are also important influencing factors. Female teachers perceive that the system in place and gender roles guide the paths of girls whereas males agree with the overall perceptions. The responses based on the subject area of the participant were not majorly aligned with one response or another. But one similarity in the responses that stands out is that a good portion of the Level 1 experience teachers perceive biology (genetically) as being the critical factor in why there are more women in the field of liberal arts.

Based on the research participants' classroom experience, the majority of the research participants asserted that boys and girls learn differently. The only groups to state that boys and girls do not learn differently were the foreign language teachers, Level 2 experienced teachers and a good portion of the math teachers. All other groups regardless of gender, subject area or years of experience verbalized that boys learn with hands-on activities and competition and girls learn via cooperation and verbal means. The teachers' hesitation in responding came with the query of who is more active in their learning for a significant number of teachers did not respond to the question. Of the teachers that did respond to the question, majority of the respondents communicated that boys are more active. The results of this question varied amongst a few sections of the participating community. A good portion of the female teachers believe that girls are more active and when the answers were separated based on the subject area of the teacher and years of experience, English teachers and Level 3 teachers selected girls as being more active. So girls are more active in subject where they are more of a majority population and the subject is taught in the manner they learn, verbally and with

cooperation according to teachers' views. Perhaps they are more active in areas where they see more female role models.

The analysis of the data examined teachers' responses for the subjects that boys and girls need to be encouraged in, for understanding gender and for discussions in relation to it in the classroom presented further insight into the learning environment. Generally teachers asserted that boys need encouragement in non-STEM areas such as humanities, English, fine arts and foreign language and girls need to be promoted to participate in STEM areas. Regardless of teacher gender, subject area, and years of experience, the views shared were common; boys should be urged to generally participate in non-STEM areas and girls in STEM subjects. Gender equity is understood to be equal access and opportunity while understanding the difference between genders by a majority of the research participants. The non-majority expressed thought-provoking ideas that require exploration and discussion. One of the ideas was that gender equity is unrealistic because of the differences so the roles should be complementary. Another suggested that subtle but powerful male presence. One stated that role models and another communicated "I dare not submit in print" as ideas. Research participants also pointed out that gender issues do not come up in the class for discourse but a few had intriguing comments about the dialogue that does take place due to nature of the stated curriculum (i.e. English Literature). A few teachers noted that boys do not appreciate the discussion and girls discuss inequity issues in the larger social context compared to boys who notice inequity at the school level. The idea of gender inequity was further enhanced by teachers who talk about the traditional gender roles and how they perceive male teachers are afforded more status by both the school and students.

Finally, teachers' thoughts on non-traditional coursework and which gender is more likely to explore higher level courses in math, science, English, history and foreign language were obtained and investigated. This investigation indicated that a majority of teachers do believe that both genders are confident in taking part in non-traditional courses but some teachers asserted that may not be the case and that the school needs to rework the system so that both genders are encouraged to participate in all courses. The perception of the teachers were similar for the gender that will take higher level courses in math, science, English, History and foreign language irrespective of the teacher gender, subject area and years of experience. The consensus of research participants was that boys take higher level courses in math, science and history and girls take higher level courses in English and foreign language. Some of the elaborations in the responses stated that boys enroll in higher level physics classes and girls take higher level biology classes. The teachers' perception with regards to gender provides a more detailed picture of the dynamics that impact the learning environment from a gender-related perspective as interpreted by participating teachers.

Research Question Four: How do the teachers' perceptions connect to the school's statistical record determined for the first two examining gender participation in advanced placement tests? The findings indicate fascinating connections between the teachers' perceptions and the first two research questions examining gender participation in the advanced placement tests. The overall participation in the AP Program is generally equitable but it is the specific subjects that are of issue. Based on teachers' statements boys can be guided to participate more in these subject

areas by developing their talents in that area, teachers' promoting the course and the role these courses can play in the college admissions process. Girls, on the other hand, can be motivated to engage in these subjects by their parents (because for parental expectations exert more influence on girls as per teachers views), by developing their talents and the role the courses can play in college acceptances according to the teachers. The AP participation results indicated that boys participate more in some math subjects and physics. Moreover, for the areas of science and engineering to be more equitable, teachers asserted that parents, teachers, school policies and peers can in fact shape what happens with respect to gender equity because they exert the most influence. According to the teachers, students are also impacted by genetics, environment and role models. Hence, girls need to be provided with role models and the environment to experience success in these fields.

One of the teachers' perceptions that enhance the understanding of why more females participate in the area of foreign languages is that the genders learn differently. Foreign language teachers expressed that, in their professional opinion, boys and girls do not learn differently. This may be why girls participate more in this area. The class may be using certain methodologies that do not engage both genders. This is presented in the perceptions of how students learn as well. Participants stated that boys learn through competition and hands-on activities and science courses especially physics is generally taught in that manner. Girls learn through verbal means and cooperation and may be the manner in which languages are taught as well as biology, the more verbal of the sciences. The inequity in these areas also results from the fact that boys are more active in their learning compared to girls, according to the research participants. A majority of the

teachers observed that boys need to be encouraged in non-STEM areas and girls need to be motivated to enroll in STEM areas. The school has done an outstanding job in certain math and science courses like, Calculus AB and BC and chemistry but certain areas require improvements. Such improvements are consistent with what is reflected in the national averages where the inequities persist. This is evident from the AP participation results that indicated that girls participate more in languages compared to boys who participate more in the physics and statistics. A side note that in the area of Computer Science A AP, where the participation number were too low to be significant, had uneven participation favoring boys which also was supported by the teachers' perceptions.

All the research participants stated that gender equity is equal access and opportunity while understanding differences. However, they fail to realize that such conditions may not be present in the conditions or even in the times (i.e., the national average of females enrolled in STEM subjects versus the male average). It is obvious that certain areas, where inequitable participation exists, do not provide equal access and opportunity and measures may have to be implemented to achieve equity. As one teacher stated, the discussions that take place in her classroom reflect traditional gender roles and that powerful males have a subtle impact on both genders' thought processes. One of the teachers refused to write his/her assessment and another one spoke of girls bringing up inequity in the larger social context and boys talking about it at the school level. This suggests that the school at large may not have major gender equity issues but they exist, according to some teachers, as is evident in the inequities in certain subjects.

The final connection that can be drawn between the teachers' perceptions and the AP participation data was the teachers' perception about which gender participates more

in higher level courses within different subject areas. Overall, the teacher participants stated that boys take higher level courses in math, science and history and that girls take higher level courses in English and foreign language. Some of the AP participants percentages corroborate these perceptions because the numbers indicate that more boys participate in statistics and physics and more girls participate in French and Spanish. The only anomaly was Biology AP where more girls are involved. In Chapter 6, both the quantitative and qualitative results will be brought together to conclude the thesis research study, to make some suggestions for action at the local, state and national levels, and to share where further research may be necessary or suggested. Also, I will reflectively turn on the research process in Chapter 6, suggest ways I might have done things differently, other questions I might pose in the future, and name queries and ponders that remain even after this intensive study. Lastly, I will speak to what I have personally learned and how that will affect my teaching of students of both genders and my role as an educational leader in the school and as a female in the male-dominated STEM disciplines.

Chapter Six

Conclusions

Overview

During the course of my research I examined the teacher perceptions of gender equity within the classroom, specifically student participation by gender in the Advanced Placement Program. To accomplish the purpose of the study, my work has specifically addressed the following research questions:

5. Is there a disparity between the number of female and male students taking the advanced placement tests?
6. Is there a disparity between the number of female and male students taking math, science, language, history and English on the advanced placement tests?
7. What are teachers' perceptions concerning gender equity in the classroom and in the Advanced Placement Program?
8. How do the teachers' perceptions connect to the school's statistical record determined for the first two examining gender participation in advanced placement tests?

In my doctoral thesis, I have used my personal aperture as a teacher in an elite private school in U.S. to explore and understand the issue of gender disparity in classroom. The United States of America, in some ways, represents the most advanced and equitable form of society in which social and gender equality has approximated what is likely achievable by any country that adheres to the Western philosophical norms. In

particular, the reason for studying a U.S.-based private system of education was principally to discern and qualitatively understand the specific ideas and assumptions that have made the private school system of U.S. the envy of the developing world - particularly for women. Embedded within this quest was my desire to understand how fair has the U.S. based private school really been to those who have partaken in it, especially women?

The research site of my thesis study, the college preparatory campus where I work as chemistry teacher, is geared towards providing the community with exacting standards and further students' spiritual, ethical, intellectual, social and physical growth. Readers will recall that the campus offers talented, motivated, energetic students a genuinely challenging environment in which they can seek academic and extra-curricular achievements and a backdrop that is conducive for the development of a sense of self-worth and personal responsibility. The school milieu promotes student academic excellence beyond the average and students respond to this environment by taking on challenges, including advance placement course work. The goal is for students to achieve academic and extracurricular excellence in response to the challenging, competitive environment present in a school setting that promotes gender equity.

For me, the question of equity in U.S. based system was very important to understand. My parents had immigrated to U.S. approximately thirty-three years ago when I was seven years of age. In making that decision, they had walked away from a system in Pakistan which, in their view, did not work for them and that most probably would not be the education system of choice for me, their only child. They wanted me to have the best - and were willing to go to any length to give me that - even if it meant

physically and (more importantly) emotionally creating distance from their own family and cultural norms.

A generation and a half later, having received my education in the West, and having been brought up very much within the Western school system, I was ready to take stock. Was the Western school of education all that they had made out to be? Had the education system in the developing world (such as Pakistan and India) finally started to catch up with the rest of the world as far as education for women was concerned? What specific learning could be extracted from the success of U.S. education system that would have transferability to half a world away? My greatest desire in undertaking this research however has remained to determine if there is sufficient preparation to ultimately radically alter the opportunity-set for women seeking education in the developing world, particularly Eastern societies, based on a known example within the context of my own life in the Western world.

Implications of the Findings

The research study's findings support the purposes - personal, social and practical - for which this inquiry was initiated. These findings have specific implications for educational policy and the school milieu in particular. The study found that in general the overall student participation in the Advanced Placement Program at the research site is equitable in relation to the student enrollment numbers based on the gender of students from 2007-2010. While the data does not show any trends favoring one gender over another for participation in AP, it is however evident, that specific subject areas do show unequal participation.

Boys are predominant in Statistics AP, Physics C: E & M AP and Physics C: Mechanics AP; girls have a greater presence in French Language AP, Spanish AP and Biology AP. In certain areas, teachers perceive gender equity where none may actually exist, at least based on the numerical data available. For example, teachers believe that girls and boys coursework decisions are based on innate talent and getting into good colleges but that the difference is that boys are influenced by teachers and girls more affected by parents according to teachers perceptions.

Similar factors impact decisions for career paths with the added dynamics of peers and school policies, but girls are influenced more by traditional gender roles per teacher views. Teachers also cited that they perceive both genders to be confident in selecting non-traditional coursework. Unfortunately, the AP data did not support the teachers' perceptions in this regard. The teachers' perceptions of boys being encouraged in non-STEM areas and girls being encouraged to engage in STEM areas is however consistent with the AP data. Teachers' views that boys take higher level courses in math, science, and history and girls take higher level courses in foreign languages and English are also similar to some of the AP findings. These latter findings suggest that the research site may revisit the programs and policies in place in particular subject areas (i.e., Physics, Biology, Statistics, French, and Spanish) as indicated by the data.

The literature review also suggested that gender specifically is not only about human developmental biology but also impacted by the role of family background, societal influences and cultural environment, along with social-psychological aspects of the school setting that impact the individual. The snapshot of the school's findings suggests that, as a society we have made great strides as far as gender equity is

concerned, but certain subject areas still need additional work; not for just for one gender but for both. As a society, gender roles and expectations need to be continually reexamined and discussed with the young. Some teachers highlighted that gender roles, which help perpetuate inequity, persist in all facets of our society, including home and school. For the school, fostering an open dialogue is important amongst the students to celebrate the differences and diversity among youth and faculty, as opposed to forcing a dogmatic interpretation of what is considered traditionally a norm or equity. Specifically, cultural norms are a function of history, and what may have worked in the past, may not be a predictor of the future.

A significant number of teachers suggested that both genders perceive that they experience one or more forms of gender disparity. Boys discussed examples of inequity in the classroom as they rolled their eyes when gender issues surfaced, whereas girls discussed inequity in the larger social context according to teachers' views. Both examples suggest that issues related to gender need to be discussed in the larger school context. Research participants' resistance to discussing gender issues by leaving certain questions blank or stating that "I dare not submit in print" indicates that this may be an issue of considerable importance at the research site, a matter that some people find difficult to discuss openly, possibly due to uncertainty concerning the responses of others.

Classroom dynamics are also impacted by the findings of this research. Teachers' opinions indicated that, for girls, parents are a stronger influence than for boys, for whom teachers are more critically important. Girls may be more geared towards maintaining relationships and not wanting to disappoint their parents in the choices that they make. This, in turn, influences their course selections and therefore the career paths they may

choose. Teachers in the classroom can attempt to develop stronger relationships with girls in order to motivate them to participate more in non-traditional pathways. Also, the research participants indicated that boys learn via hands-on activities and competition while girls learn through cooperation and verbal means. Overall, however, boys were considered more active in their learning.

The question that subsequently arises is whether certain teaching methods are more engaging and perhaps less threatening for one gender but not the other? Are boys more active in their learning because they are inherently louder and more confident? And, if so, then what teaching context can be most effective for boys while retaining the attention of the girls? Courses where unequal participation persists need to be redeveloped to use teaching methodologies that facilitate the learning of both genders. Foreign language teachers stated that, in their view, boys and girls do not learn differently. This overarching perception must be influencing their teaching style. The data presented shows that more girls participate in foreign languages and it may be that the foreign language classrooms employs teaching methodologies that are more in line with how girls learn than how boys learn. One teacher also indicated that higher level math courses and physics course are taught in a non-traditional format with more computer usage which attracts boys. These are areas where more boys are participating. Here too the findings suggest that teaching approaches may need to be more inclusive.

The findings also indicate that teachers perceive both genders as being confident in taking non-traditional coursework. The AP data, however, shows otherwise and is an issue of concern because teachers' perceptions stand in sharp contrast with the actual quantitative data gathered. This, in turn, may wrongly influence their teaching

methodology in teaching non-traditional and traditional coursework in the classroom - which may inadvertently benefit one gender over the other. Here, all sorts of subtleties arise, serving to reinforce the idea that gender considerations are complex and deeply embedded matters.

The participant numbers of the Computer Science A AP test were too low to be analyzed but it was obvious that significantly more boys are participating each year analyzed. This additionally suggests that girls seem to be avoiding the course - either because they do not enjoy this particular non-traditional area of coursework or because they are not comfortable with the non-traditional subject matters in general. The same appears to be the case in Physics AP and the Statistics AP. However, the reverse is true for Biology AP, French AP and Spanish AP where more females are enrolled. These findings contradict the qualitative data gathered from the questionnaire which clearly show that teachers expect there to be general parity between boys and girls in non-traditional areas (i.e., areas where that gender did not have equal participation). In this regard, and in contradiction to the teachers' aggregate intuition, young females tend to have a greater preponderance to participate in Biology, French, and Spanish than young males.

The research study was initially provoked by my personal experiences of equity and accessibility of opportunities. Hence, the findings also have significant personal implications. The research site where I work is generally a gender equitable environment based on the qualitative and quantitative data but the details of the findings show that there are still segments that need to be reexamined and redeveloped to further promote parity in non-traditional subject areas for each gender. Overall, personally, I believe that

greater effort needs to be made for both genders to be able to experience all the different subject offerings. If students do not experience a variety of subject areas at the high school level, then how will they determine what careers they want to pursue? Traditional coursework pathways will continue and inequities will continue to persist if the apertures of students' potential career lenses are not broadened.

Lack of formal gender education in schools reinforces stereotypes and fails to promote gender awareness (Austin & Thompson, 2010) so the schools such as the one where I teach actively need to provide and develop programs that can build upon their current strength and strong record of gender parity. The school environment should be a place in which any student can grow and flourish, while teachers help students evaluate and manage the cultural and societal gender roles. Discussions related to student development and teacher development must be an intentional public conversation in the school milieu.

Where this research study is concerned, it is possible that a different approach to my enquiry may have yielded a different outcome. For example, I could have written the questionnaire more clearly to define what I specifically meant by "active learning" for boys versus girls. I found at the end of my research that respondents may have different definitions of active learning. While, by active learning, I had meant to classify students that take a proactive role in their own learning by seeking the guidance from teachers and other resources, it seems that a number of respondents took that to mean the hands-on activities approach to learning displayed by students in the actual classroom setting.

Additional reflection may also be warranted in other areas such as the literature review, the tabulation of national and school data, and the evaluation of qualitative

aspects of the questionnaire; including extrapolating the use of any of these learning in the classroom. However, I do take satisfaction in noting that these further (perhaps much needed) refinements to my work are not warranted due to an act of omission on my part during the course of study. Instead, they arise from scientific process required to refine my work, which is an act of commission. Even though it would have been extremely difficult, face-to-face teacher interviews may have worked out better than questionnaires because the responses that were provided were at times ambiguous and required more time in contextualizing given the respondents' other responses on similar or contrasting aspects. In a one-on-one interaction, for example, I could have probed further and asked additional questions to clarify what the teachers actually and specifically meant. With teacher interviews, I may have ended up with less ambiguous responses.

Another big element of my research is that I limited the respondents' survey primarily to my place of work: a private school. I wonder how teachers from a public school would have responded to the same set of questions. Additionally, the contrasting responses, once clustered by topical areas, could have provided insights that might have shed additional light on the public school versus private school debate currently raging in the halls of any educational institute.

Finally, this inquiry focused on teachers views and uses that as a proxy for how teachers perceive the issue of gender parity in their classrooms. This however is clearly a partial view, because the students form the other important side of that equation. My study did not interview students; instead it used their implicit decision of courses they took for AP tests as a proxy for their final culmination point of societal/school influences and personal interests. Because of this I believe that various other questions remain a

matter for future research and refinement and something that future generation of researchers can pursue as topics (or sub-topics) as part of their research undertaking.

Additionally, I believe that my own personal outlook as an educator has been substantively changed as a result of this investigation. As a teacher, I have become more cognizant of my teaching style and have intentionally incorporated methods to be more inclusive of both genders even more so than I did prior to the study. I have additionally thought of ways to encourage students to experiment with non-traditional coursework in my new advisory (homeroom) period during the forthcoming year. At the school level, I hope to as a class advisor (teacher leader) initiate dialogue among the faculty members about the role of gender (as distinct from sex) and what efforts need to be made by the faculty and school to promote more equitable participation by students who may otherwise, due to peer or parental expectation, be ready to give up on a subject area of interest.

As a science teacher in particular, I hope to motivate more girls to attend summer programs that may enable girls to more fully develop their interest in the STEM areas through undertaking interdisciplinary, intercultural work and projects. I strongly believe that exposure to different subject areas could promote student interest and interaction with appropriate role models. For example, I believe that I was strongly influenced by my science teacher during high school to pursue my interest in bio-chemistry and sciences in general. This cultivated in me a willingness and desire to undertake rigorous curriculum and to put in the requisite hard work, even when I saw other girls in my class opt to find vocations in more traditional areas such as liberal arts and languages. This strength and desire was a direct result of the role models I had in school and the projects I

became involved with at the High School for Health Professions, a magnet program for students interested in health careers.

Key Learning and Outcomes from Data Analysis

	Boys	Girls	Other
Lit Review (Ch. 2)	Weakness: reading scores; writing; higher cases of ADHD, dyslexia, stuttering; boys should not work hard or appear to work hard in school. Strength: spatial capability; leaps and risks in learning; through competition; take greater Math/Sci APs (Texas); score better in Math/Sci.	Weakness: Physics, engineering, comp. science, mathematics; lack of confidence. Strength: Reading, objects and landmarks; cooperative, methodical learning; Greater participation in overall APs (Texas); more participation and better scores in languages, literature, and history	- Media shapes gender roles and expectations - School environment also shapes social constructs (gender) - Positive gender relations require moving away from conventional gender constructs
National Stats (Ch. 4)	Weakness: Eng. Language; Eng. Lit; French Language; French Lit; Spanish Language; Biology Strength: Calculus B/C; Comp. Sci A; Physics C/E/M; Physics C-Mechanics; Music	Weakness: Calculus B/C; Comp. Sci; Physics C/E/M; Physics C-Mechanics; Music Strength: Eng. Language & Literature; French Language & Literature; Spanish Language; Biology	Equitable: Latin, Calculus A/B; Statistics; Chemistry; Govt. & Politics; European History; US History; World History
School Actual (Ch. 4)	Dominance: Physics, Statistics, US Govt. (2010); Comp. Sci Recessive: Biology, French, Spanish; Music	Dominance: Biology, French, Spanish, Music Recessive: Physics, Statistics, US Govt.(2010); Comp. Sci	Near-Equitable: Calculus A/B; Chemistry; Govt & politics; European History; US & World History (Also, English, Calculus B/C are also equitable - although a surprise) Volatile (changes each year): Latin
Teacher Survey (Opinion) (Ch. 5)	Key Influences: Innate talent, teachers influence, getting into good colleges; boys don't like to work hard. Why more men in science and engineering? Parents, teachers, school policies and peers have a strong impact. Other factors may be a) the system in place favoring men, and b) genetic predisposition. Learning Styles: Hands on learning, competition, risk-taking. Areas boys need to be encouraged: Non-STEM areas. Surprises: None	Key Influences: Good colleges, parental expectation, innate talent; propensity to work hard. Why more women in liberal arts? Parents, teachers, school policies, and peers. Other factors: Interest, safe careers, gender and roles. Learning styles: Cooperation, verbal methods, step-by-step. Areas girls need to be encouraged : STEM areas. Surprises: None	Notions of “gender equity” in classroom: Equal access & opportunity while recognizing the differences. Comments: “moms understand, girls don’t; and boys don’t get it until they go to college”; “students are taught strong feminist ideas which students don’t question”; “boys roll up their eyes”; “girls talk about it in larger social context, & boys at the school level”; “male teachers have a higher status because of subtle but powerful male role models”. Who is more confident in taking non-traditional courses: Both are confident. Who is more likely to take higher level courses: Math - Boys (surprise because B/G are equal in this area); Science - Boys (not a surprise because more boys in Phys and more girls in biology; equal in Chem)English - Girls (Surprise; SJS is equitable); History - Boys (Surprise; SJS is equitable); Foreign Language – girls (not a surprise; more girls in French and Spanish)

Figure 10: Summary of Literature Review and Empirical (Field-Based) Research Findings

Implications for the Literature

The results of this research study may have some future impact on the literature pertaining to the study of private schools and the programmatic philosophy they embrace. The data pertaining to the research site and the participation of students in the Advanced Placement Program there clearly shows that gender participation is very equitable in general, and far better than what the national AP data suggests for an average U.S. high school.

At the research site I found a few inequities within specific subject areas, including perhaps the approach of some teachers towards the issue of gender equality. Regardless of this, however, clearly, the research site can provide a very good example for other public and private schools who are striving for gender parity in their programs. In this regard, my study clearly highlights key parameters that each school (or an education institution) can use as a template against which to compare their own school or program to ascertain where they fall on the gender parity-disparity continuum. For example, a school can look at my study for the average number of students who take one of the two Physics APs nationally and compare their averages for the last few years against that number to see how their boys and girls fare against the national average. The school can then go further and compare their average against the research site to see how they fare against a private school. Many of the public schools are required to benchmark their programs. In many ways, my research simplifies their efforts.

The study also reinforces the importance of the mixed methods approach to program evaluation. Mixed methods examine both quantitative and qualitative data, and make use of the narrative to infer and synthesize the numerical findings. Through my research, the quantitative data indicated that the program at the research site is generally

equitable in the Advanced Placement Program except for a few subject areas. The qualitative/narrative inquiry portion, however, presented underlying attitudes that conveyed mixed messages about equity and accessibility. Participants in the research stated that both genders are confident in making non-traditional course selections but the data suggested a different view. Teacher observations in the classroom identify and draw to the fore a number of issues that are not apparent in the quantitative data. These include the role of strong but subtle powerful male teachers, “I dare not submit to print”, or boys rolling their eyes when gender issues are discussed.

The AP data from the research also corresponds with the literature. It shows that women have made great strides in education in general but not in physics (Sax, 2008), and their involvement and participation vary in other areas such English Language AP and Calculus BC. National statistics also indicate that more girls participate in the English Language AP and more boys participate in the Calculus BC. At the research site, however, there is equity for both these tests. (The subject areas where the research site percentages corroborate with the national statistics have already been stated in the literature.)

In the literature review, Glazer (2005) stated that boys are being left behind in the 2000s. But the findings of the research indicate something different from this: that both genders are experiencing inequity. Boys are lagging in foreign language and biology and girls are lagging in physics, statistics and computer science. The qualitative data both confirmed and disagreed with a number of findings stated in the literature review. The narrative data from the research study also suggested that girls learn through cooperation and verbal means and boys learn through competition, taking risks, and hands-on

activities. This aligns with the literature, which states that girls learn in group work and are better in reading (Buchmann, DiPrete & McDaniel, 2008). Boys, on the other hand are risk takers, competitive, and hands-on in their learning (Glazer, 2005). Other studies have suggested that girls are less vocal (Spencer, Porche & Tolman, 2003), and this is in agreement with what the respondents stated in the research study. The literature also indicates that girls are more active in learning (Downey & Vogt Yuan, 2005), but the research study presents a different view for the private school in which the teachers perceive boys as being more active but the definition of “active” for some was unclear.

The research study found that teachers’ in general felt that boys don’t like to work as hard as girls. The literature review does correspond with this intuition (felt by the teachers) by stating that there is a preconception that boys do not work hard (Bishop, et. al., 2003). In the literature, Chinn (2002) also states that girls balance the behavioral expectations of parents. This is evident in the teacher perceptions found in the responses to questionnaire, which ranks parental expectations to be more influential for girls than for boys. Overall, the issues and factors found in the research study add significantly to the literature regarding gender disparity and related issues and reaffirm the need for continued work in the area of gender issues in the classroom.

Implications for Practice

School practices can be significantly impacted by the findings of the research study. The findings indicate that a number of the practices in place at the research site are working well for the overall student population enrolled in the Advanced Placement Program from the standpoint of gender parity. The areas where practices may have to be

rethought are: physics, statistics, computer science, biology and foreign languages. This generally means that more effort needs to be made by the faculty to encourage student participation in these areas. The efforts, however, should not be limited to just teachers encouraging students to participate; instead, it should include a development of programs to promote awareness of career opportunities and small workshops to show the students what that particular field of study is all about. The research site may also need to offer more staff development opportunities to teachers in these areas so they can become fluent in teaching methodologies that promote awareness of opportunities for both genders equally - perhaps with a greater attention to those students who would otherwise traditionally have opted or self-selected themselves out of particular coursework. It is my belief that equitable teaching styles would over time enhance the participation of students who may have been discouraged or turned off by how a class is taught.

Schools at times are responsible for “doing gender” (Deutsch, 2007) - i.e., promoting traditionally held beliefs about gender stereotypes and biases. These could be in the form of teachers interacting with students in both formal and informal settings. Remedying this challenge requires giving students an opportunity to discuss openly the stereotypes they find in a school system or in their classes and allowing the stakeholders in the school system to have a conversation about what is being experienced by students. Teacher responses to the questionnaire indicate that teachers think gender roles are still very much part of cultural norms and students’ experience in general (both at home and in society at large). Gender roles enter the classroom either through the curriculum or a general discussion around a topic of interest that may over the course of the discussion be ridiculed - either out of fear or other emotions. These comments by teachers suggest that,

to the extent possible, schools should incorporate discussions of critical issues because ignoring them may continue to reinforce traditional gender stereotypes.

A discussion of ideas like feminism and gender parity/equity can help foster positive gender relations and aid students in abandoning traditional gender roles, and to redesign their personally understood concepts of what gender expectations are. Teachers suggested different ideas that indicate that the school environment in general may be equitable but that underlying issues still persist that may be having complex shaping effects. Some teachers did not respond to the questionnaire or some questions, another indicated that “I dare not submit in print” and yet another verbalized that strong but subtle powerful males are given more respect in the school milieu. Statements such as these indicate that the practices in place may require more in depth examination and redesign so that the surroundings are more equitable for all.

Implications for Future Research

The findings of this thesis research have provided multiple areas in which future research can be conducted. The foremost strand would include examining the academic performance of both genders in the overall Advanced Placement Program and within the different subject areas as well. Research in this area will indicate if the enactment of the curriculum in live classroom settings affords both genders opportunities to experience success. Another route future research can take is examining the college majors that graduates of the school select. Are we continuing the traditional path of more women opting for liberal arts careers and more men participating in science and engineering?

This investigation will provide society and schools with an idea of where equity issues stand and how effective the programs are that are in place.

This study has analyzed teacher perceptions of gender in the classroom and provided data corroborating the AP statistics for the research site and at the national level. To complement this study, student perception of gender inequities would be useful in enhancing our understanding of the issues; and to help in the development of better programs to promote equity and success for both genders in the classroom and society at large. Students are constantly dealing with expectations of culture, society, media, and family with respect to their roles in life. A greater comprehension of the influences would promote dialogue among adults and the young and foster positive gender relations across the board. Research can further probe student interactions in the classroom and how teachers respond to students based on gender issues. An examination of these interactions could improve teacher preparation programs so that more knowledge about methods that could actually work in the classroom is available. Such an examination can further foster positive gender relations at large.

The research findings also indicate that teachers perceive that girls are more likely to work harder than boys, which can also be an area for future research. Why do educators hold that perception and can that perception be supported/ refuted with evidence? This kind of a study would heighten our understanding of subtle classroom dynamics and other factors that impact student productivity, particularly that of boys (since some teachers answering the questionnaire felt that boys are not inclined to work as hard).

Finally, another potential topic for future research could be the impact of the hidden curriculum within a school and how it affects students, parents and educators in the short run and over the long haul. This research study reinforces that, as a society, we have travelled many miles towards the goal of attaining gender equity. Nevertheless, being close does not mean that desired gender parity has been universally reached. Continuing to remain awake to the phenomena and how it shapes daily classroom life and learning continues to be an imperative.

Corollary

In the background of my research study, I want to radically alter the opportunity-set available to women seeking education in the developing world, particularly within Eastern cultures. My personal background was a key factor in determining the topic of my thesis. I wanted to examine the factors that influence a child's decision to take (or not) certain subjects, and the interplay of nurture versus nature that determines the ultimate outcome. My South Asian father, has completed his matriculation (11 years of education), while my South Asian mother has completed 14 years of education, none of which was graduate education. Hence, I am the first person in my family to have completed a four-year undergraduate program and a graduate degree program and my doctoral program. The family traditions and cultural norms that were dominant factors during my parents' adulthood had over time become diluted by the efforts of my parents, who wanted me (their only child) to get the highest quality education in the world. In that effort, I am privileged, and I owe my family (specifically my parents) a huge debt of gratitude. It must have been hard for them to turn their backs on certain cultural

traditions, all the while knowing that their daughter's (my) life opportunities would be augmented/enriched by the difficult choices they were making--- of which I and my offspring would be the beneficiaries .

I also believe that it is my responsibility to lay the foundations for a better future for those in the developing world, particularly the children who want to receive an education, but whose families have not yet been able to break out of the cultural pressures that dictate who can be educated. I believe that a society should not dictate the education level for an individual, because education is a natural right that must be provided by the society for anyone willing to work hard enough to get it, especially if the person is geared towards using that education for societal good. In this regard, it is my hope that my work will pave the way for all those who view education as what it truly is - a great equalizer - and in it they will find the gem of an idea that everyone willing to get education deserves it.

Specifically, I have seen women in developing world being suppressed and stifled in social and ethical matters. Traditional cultures have over eons codified laws and norms favoring those who are physically strong at the cost of those in the society who are physically weak. Hence, often women have been left behind on key social parameters including education and health. Likely, the remote and rural societies are in worse condition than the urban societies, for which data is often available, or where Non-governmental Organizations (NGOs) have been able to make an impact.

It is my belief, borne out of my personal experience, my family's history and the vision of our community leadership, that when one educates a woman the whole family is educated. This is because women, as primary caregivers for children and caretakers at

home, have the greatest leverage in utilizing the education they have experienced in making decisions for themselves, their children, and the family in general. It is no coincidence that the largest companies in the world (including non-profits) believe that women provide a strong complement to the traditional “macho” model of accomplishing work, through a more balanced, integrated style of factors influencing that has roots as much in emotions as in rational thinking.

My current research is based upon my work in an elite private school and represents a study of the best of what the West has to offer its women in opportunities in education. In my assessment, this is a beacon for the rest of the world. Access to quality education and high female participation rates in non-traditional subjects in the U.S. (and the policies that inspire women to undertake non-traditional roles) is, what is critically needed in developing countries like Pakistan, India, and Bangladesh. How we made it happen in the U.S. is a story worth telling and retelling, until the policy makers in the developing countries have listened and internalized the lessons.

The story of gender bias - a boy rolling his eyes when the topic of gender equity is brought up, or a girl truly believing that she must choose a career based on societal expectations - is all too familiar the world over. In an increasingly globalized world, the lessons learned by educators in the U.S. should be made available to those now beginning to emerge from the clutches of social and cultural dogma(s).

It is important for the developing world to know that it takes decades of consistent policy making and systemic support at home, in the classroom, and at the school administration level for females to become meaningful, full participants in the society at

par with their male counterparts - and that this in turn allows the society to become a normal, balanced, and well-functioning entity.

Just like the economic crises of the 1920s and the World Wars empowered women in the West to become equal participants in the economic and education spheres, I believe that women in the developing world - where my family comes from - are on the cusp of being provided the same opportunity as the world becomes a well-networked global organism. The question, however, remains whether the society and the system in the developing world will take a similar long path of trials and tribulations before learning what the U.S. has already learned - or whether they will seize the opportunity to build upon the lessons already learned by educators in the West. The fact that I have international roots myself will perhaps allow less to be lost in intent and translation as these societies engage in the deliberation on gender equity in their classroom.

It is my fervent hope that my dissertation thesis will enable women in the developing countries who seek and yearn to educate themselves to leap-frog the struggles that women in U.S. and other developing countries have already suffered - thereby compressing the time and resources needed to effect the positive change at the same level - as has already occurred in the West.

In particular, it is the underprivileged segment in any society that is the last one to receive the benefits of a rising tide. This segment is generally undercapitalized and under-equipped to fight a battle rooted in ideological and social causes that do not have an immediate payoff. It is extremely important to clearly show the underpinnings of how the U.S. has systematically created institutions that have come very close to achieving gender equity, and how the society (and world at large) has benefitted from this parity. I hope

that my work will lay the intellectual foundation for policies that can ultimately emancipate the energies and talents of women who are currently being denied quality education of their choice by artificial societal constructs that limit their choices and diminish their potential.

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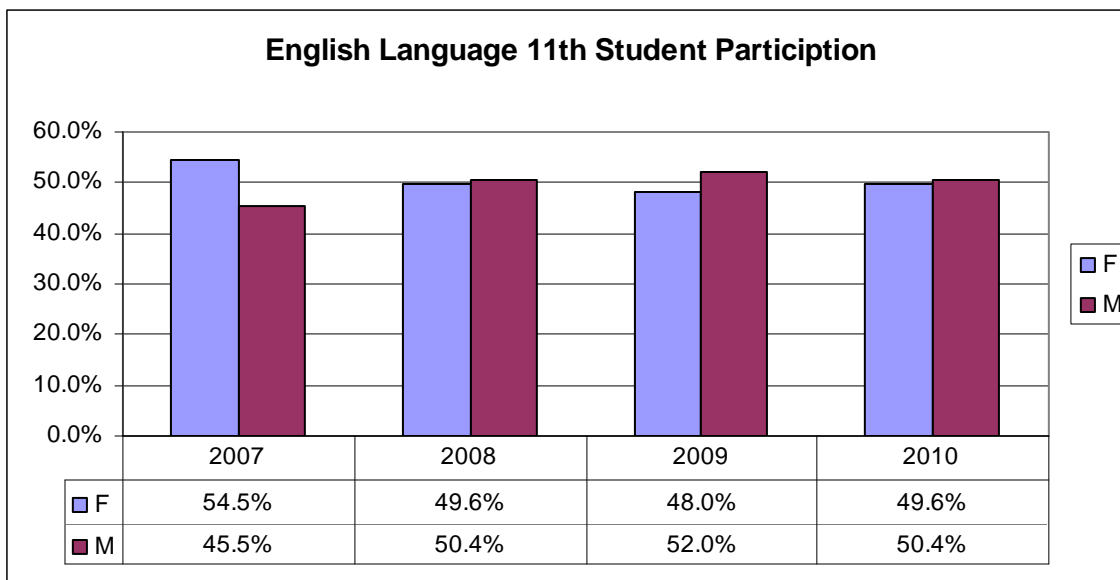
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APPENDIX A

GRAPHS AND DATA FOR ADVANCED PLACEMENT TESTS IN DIFFERENT SUBJECTS FOR 2007-2010

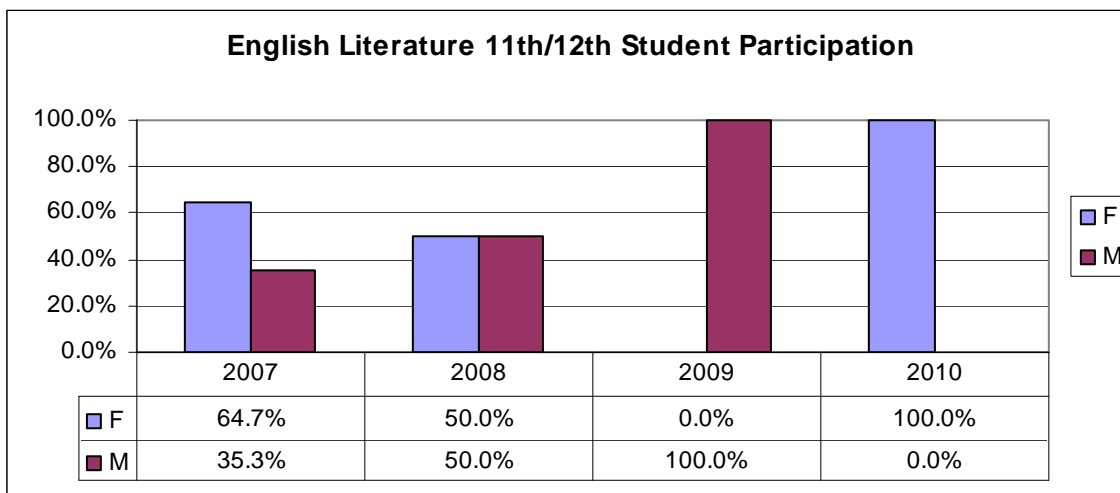
English Lang 11th AP (Student Participation)

	2007	2008	2009	2010
F	54.5%	49.6%	48.0%	49.6%
M	45.5%	50.4%	52.0%	50.4%
Total Students	123	135	127	129



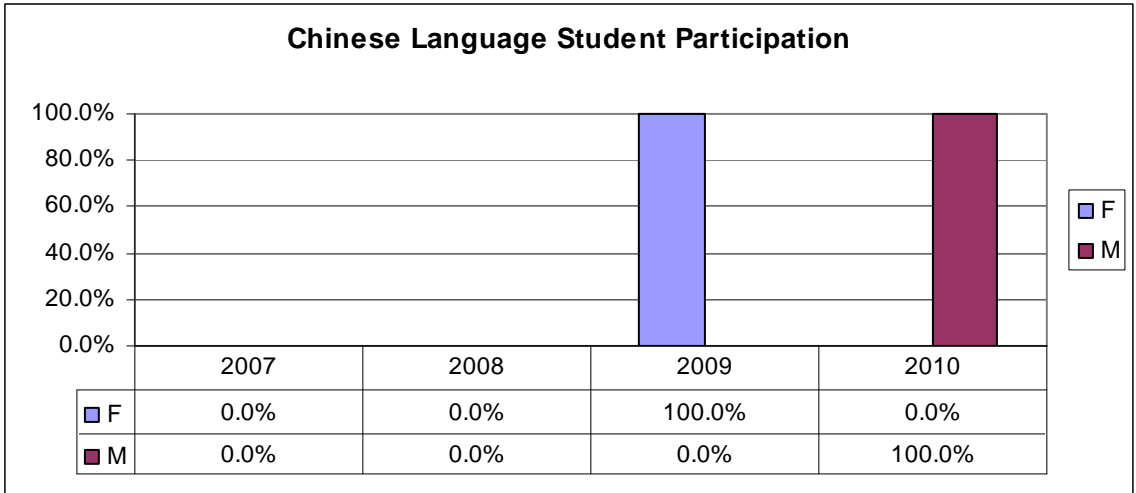
English Lit 11th/12th AP (Student Participation)

	2007	2008	2009	2010
F	64.7%	50.0%	0.0%	100.0%
M	35.3%	50.0%	100.0%	0.0%
Total Students	17	4	1	1



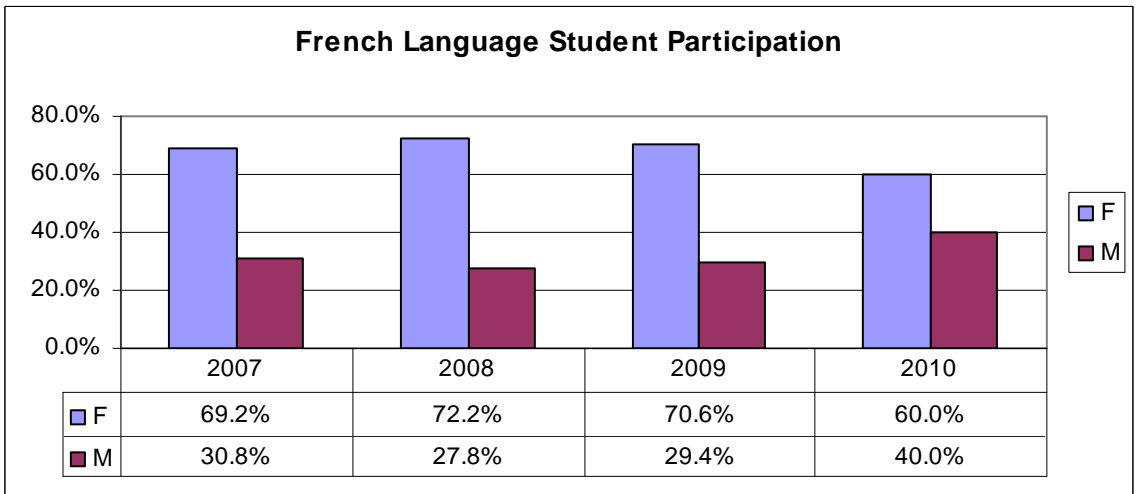
Chinese Language AP (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	0.0%	0.0%	100.0%	0.0%
M	0.0%	0.0%	0.0%	100.0%
Total Students	<i>0</i>	<i>0</i>	<i>2</i>	<i>1</i>



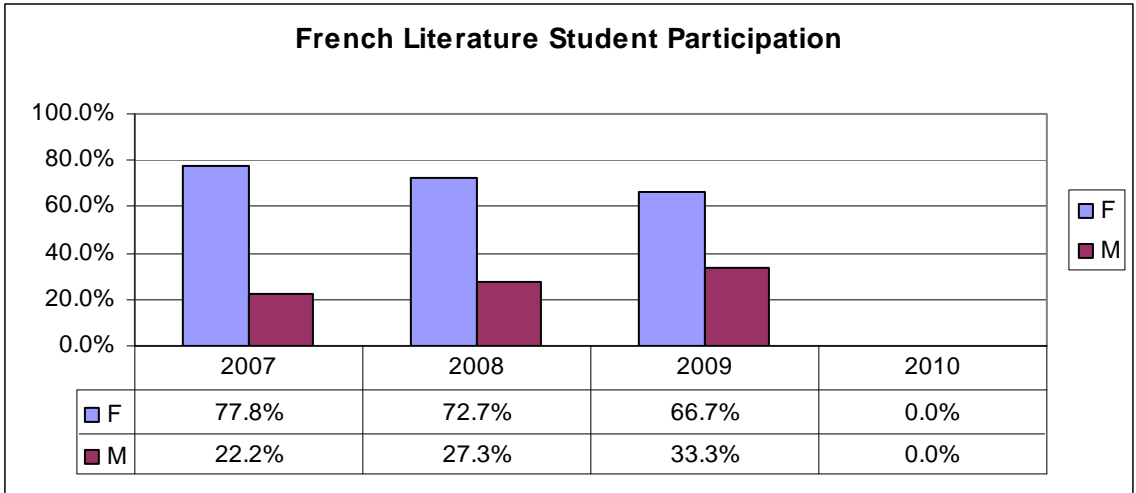
French Language AP (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	69.2%	72.2%	70.6%	60.0%
M	30.8%	27.8%	29.4%	40.0%
Total Students	<i>13</i>	<i>18</i>	<i>17</i>	<i>15</i>



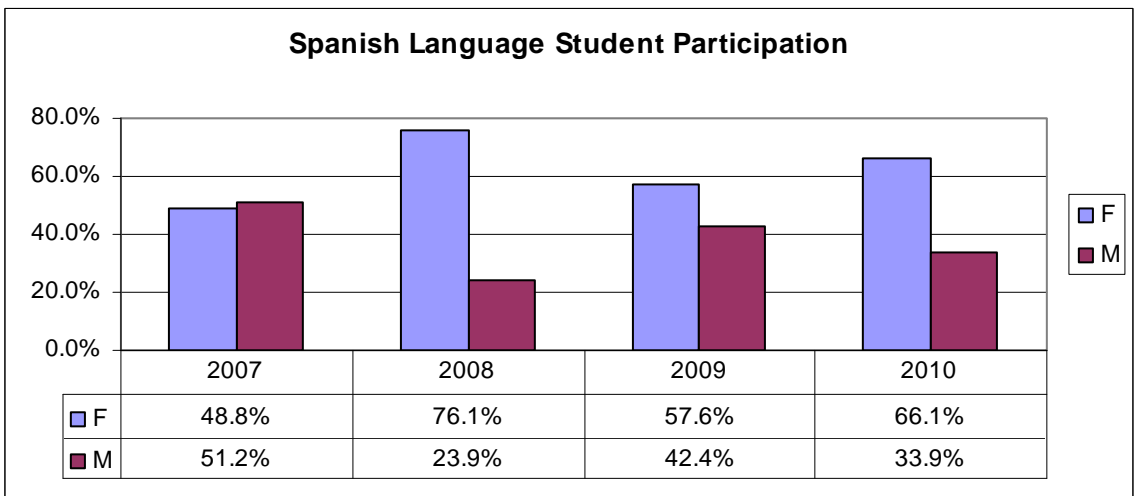
French Literature AP (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	77.8%	72.7%	66.7%	0.0%
M	22.2%	27.3%	33.3%	0.0%
Total Students	9	11	9	0



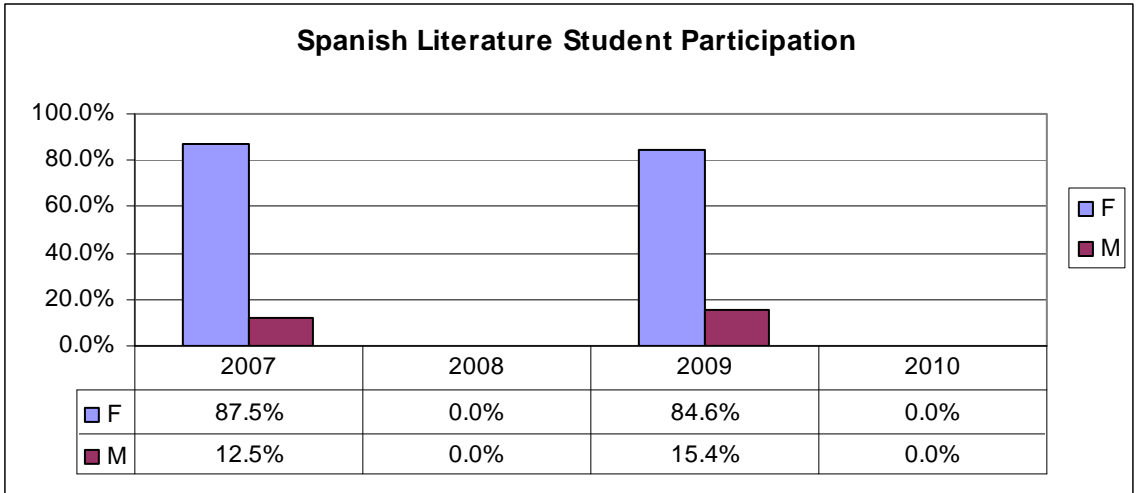
Spanish Language AP (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	48.8%	76.1%	57.6%	66.1%
M	51.2%	23.9%	42.4%	33.9%
Total Students	41	46	33	59



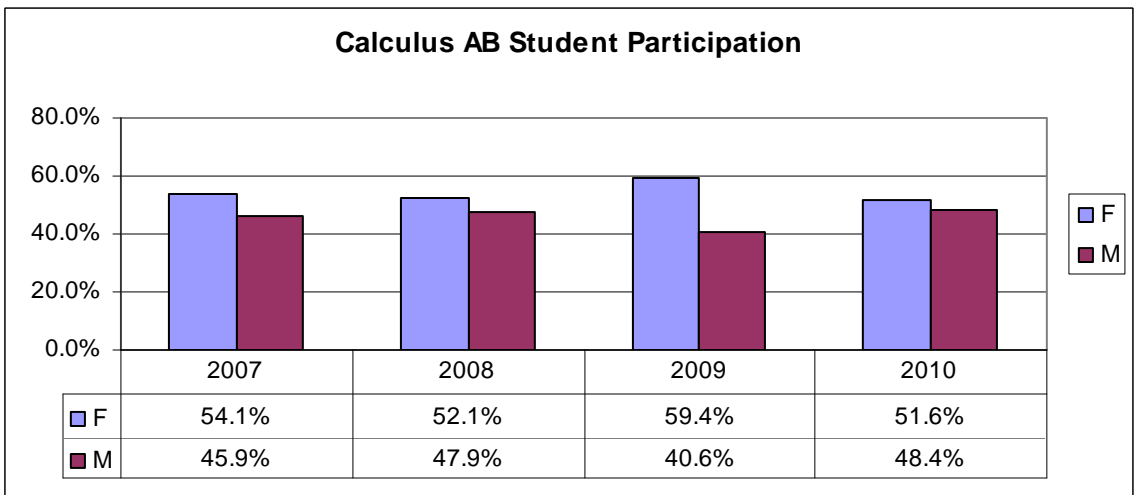
Spanish Literature AP (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	87.5%	0.0%	84.6%	0.0%
M	12.5%	0.0%	15.4%	0.0%
Total Students	<i>8</i>	<i>0</i>	<i>13</i>	<i>0</i>



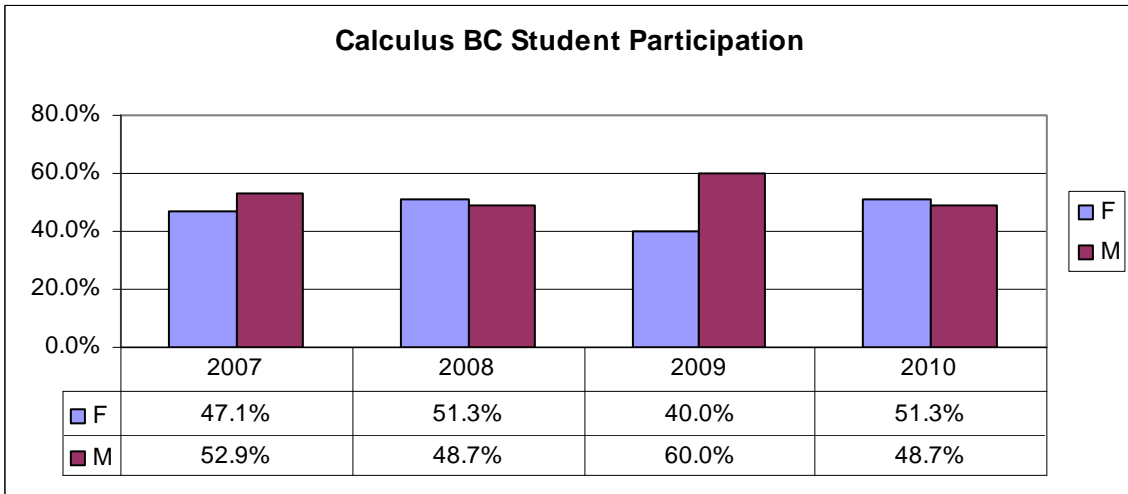
Calculus AB AP (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	54.1%	52.1%	59.4%	51.6%
M	45.9%	47.9%	40.6%	48.4%
Total Students	<i>74</i>	<i>71</i>	<i>64</i>	<i>64</i>



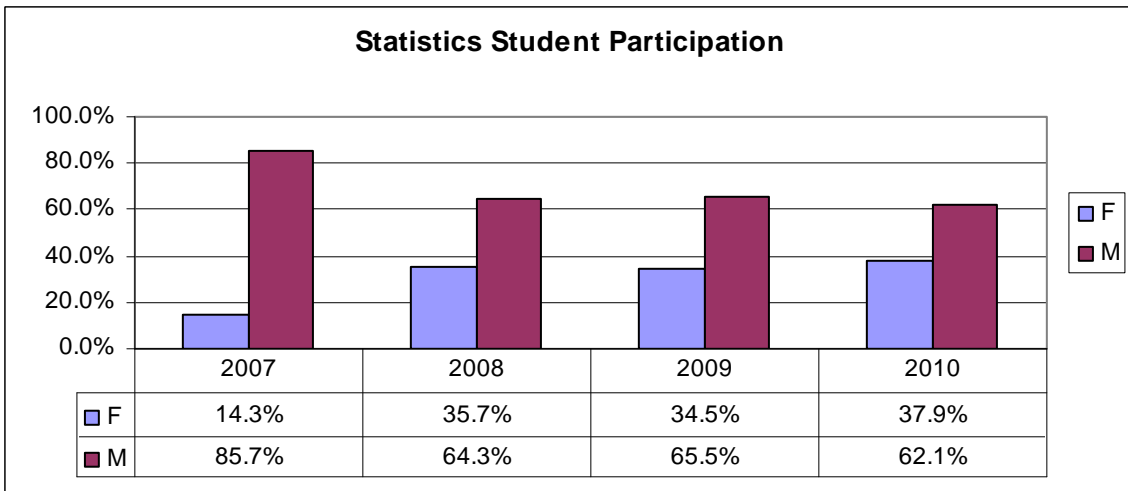
Calculus BC AP (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	47.1%	51.3%	40.0%	51.3%
M	52.9%	48.7%	60.0%	48.7%
Total Students	34	39	45	39



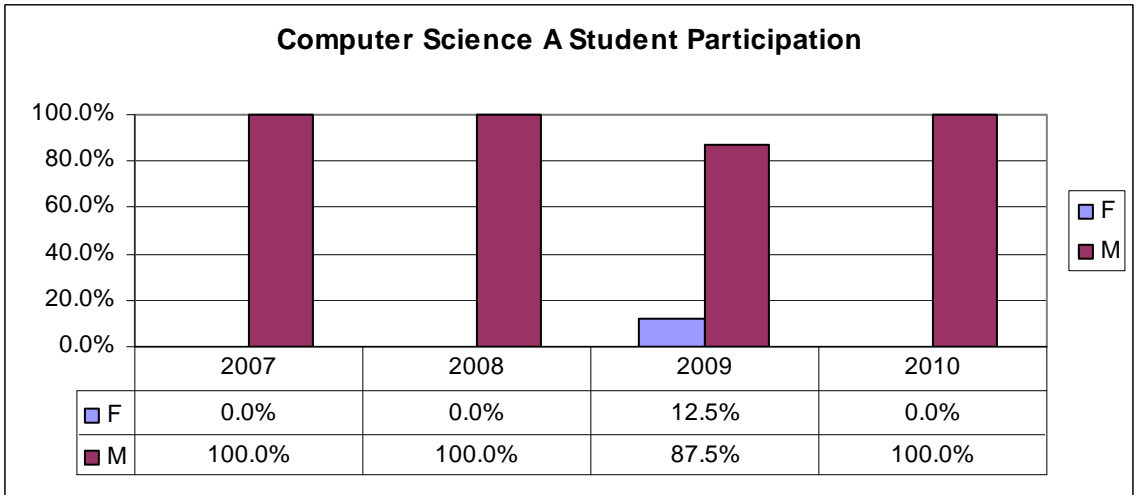
Statistics AP (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	14.3%	35.7%	34.5%	37.9%
M	85.7%	64.3%	65.5%	62.1%
Total Students	14	28	29	29



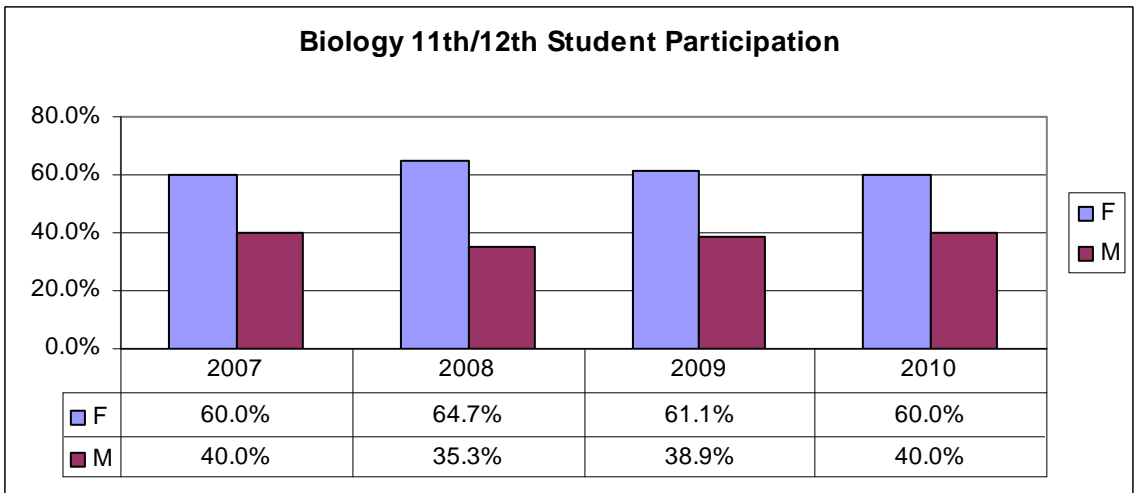
Computer Science A AP(Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	0.0%	0.0%	12.5%	0.0%
M	100.0%	100.0%	87.5%	100.0%
Total Students	<i>4</i>	<i>2</i>	<i>8</i>	<i>2</i>



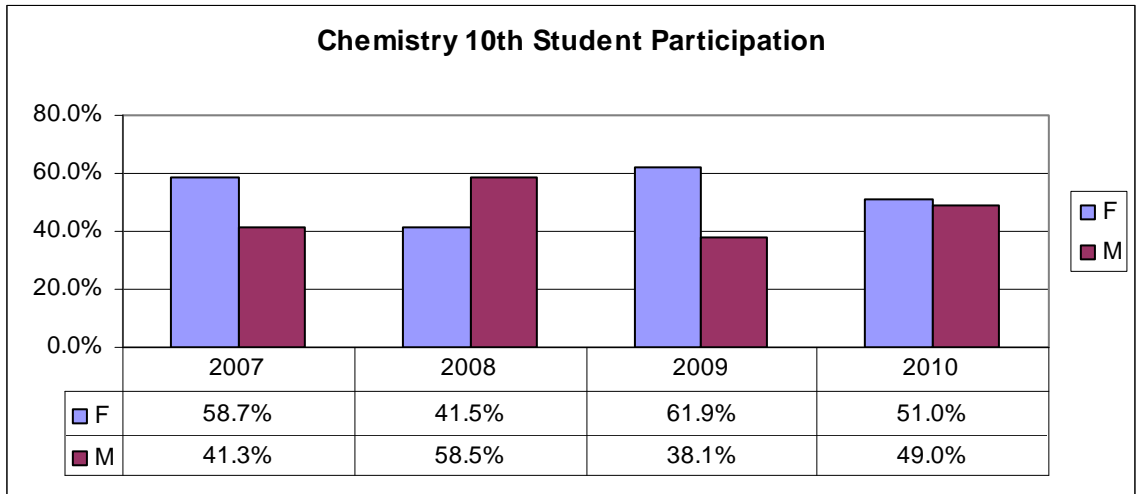
Biology 11th/12th AP (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	60.0%	64.7%	61.1%	60.0%
M	40.0%	35.3%	38.9%	40.0%
Total Students	<i>10</i>	<i>17</i>	<i>18</i>	<i>10</i>



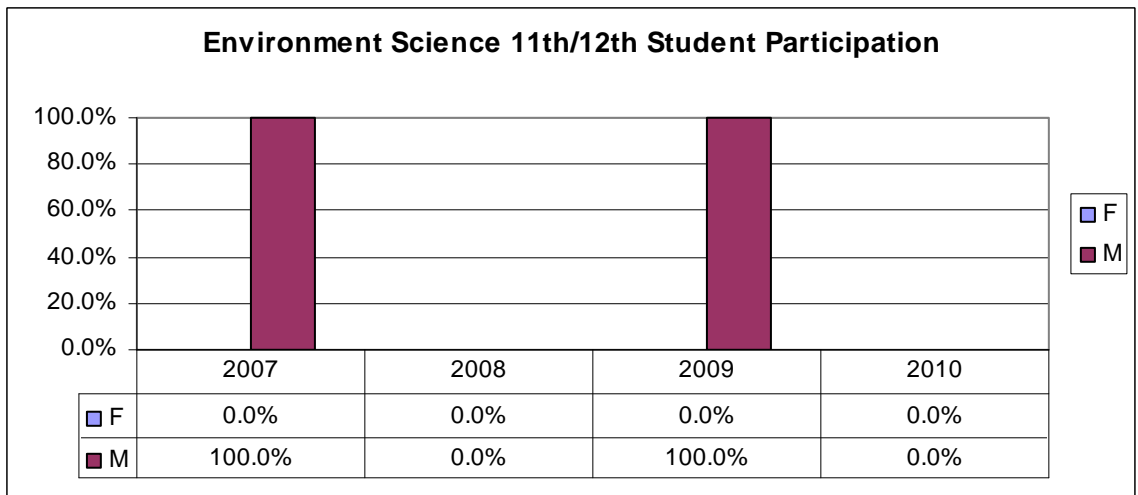
Chemistry AP 10th (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	58.7%	41.5%	61.9%	51.0%
M	41.3%	58.5%	38.1%	49.0%
Total Students	<i>46</i>	<i>41</i>	<i>42</i>	<i>49</i>



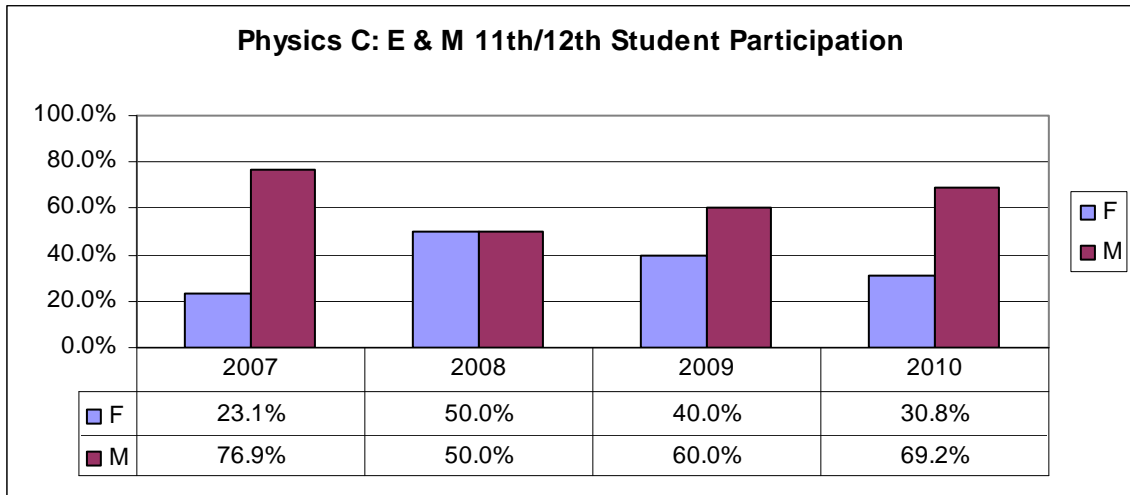
Environment Science AP 11th/12th (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	0.0%	0.0%	0.0%	0.0%
M	100.0%	0.0%	100.0%	0.0%
Total Students	<i>2</i>	<i>0</i>	<i>1</i>	<i>0</i>



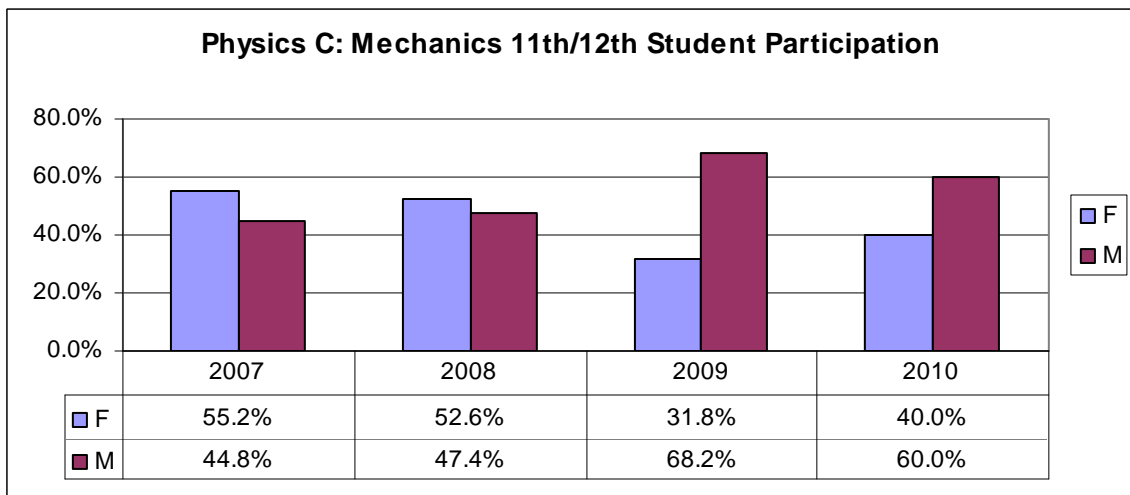
Physics C: E&M AP 11th/12th (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	23.1%	50.0%	40.0%	30.8%
M	76.9%	50.0%	60.0%	69.2%
Total Students	13	10	10	13



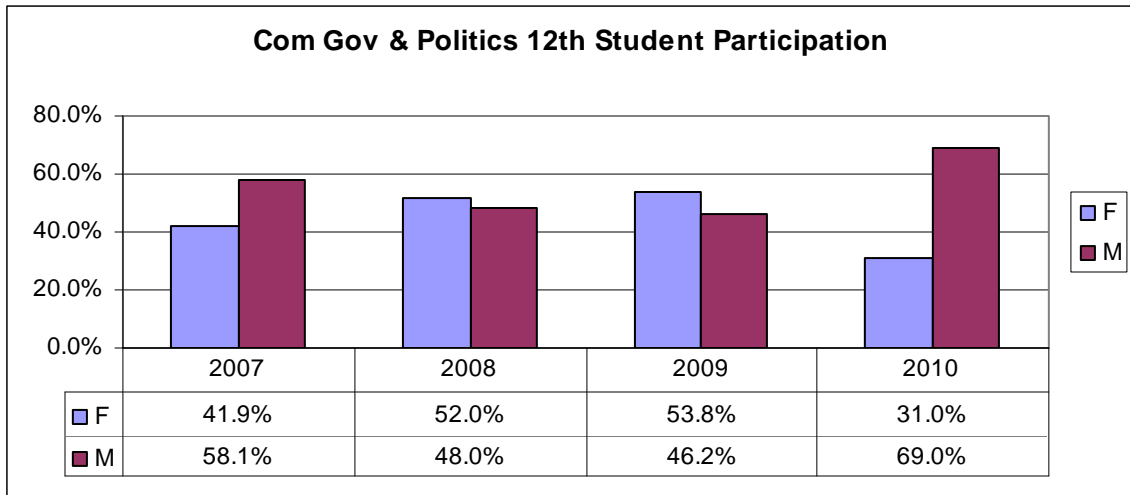
Physics C: Mechanics AP 11th/12th (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	55.2%	52.6%	31.8%	40.0%
M	44.8%	47.4%	68.2%	60.0%
Total Students	29	19	22	10



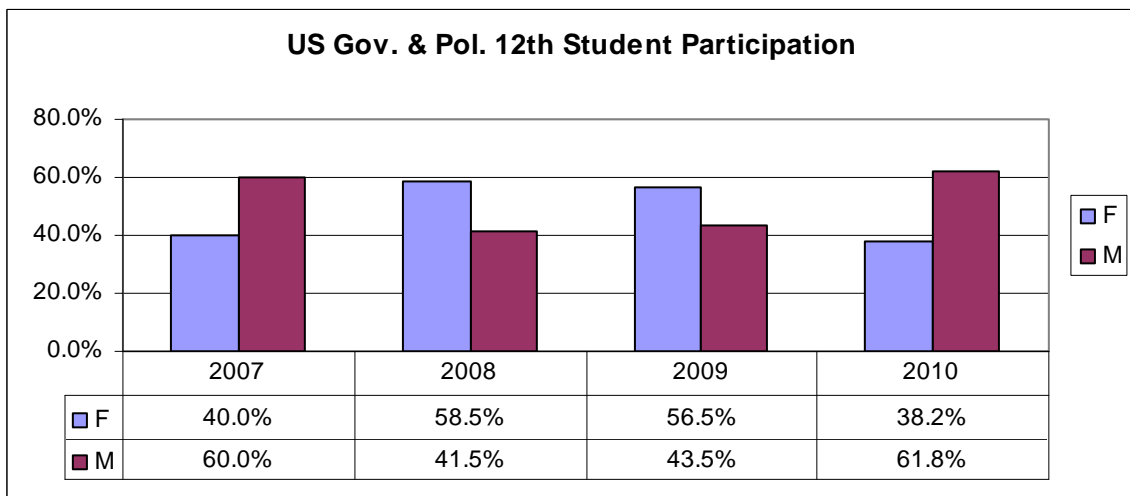
Comparative Government & Politics AP 12th (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	41.9%	52.0%	53.8%	31.0%
M	58.1%	48.0%	46.2%	69.0%
Total Students	43	25	39	29



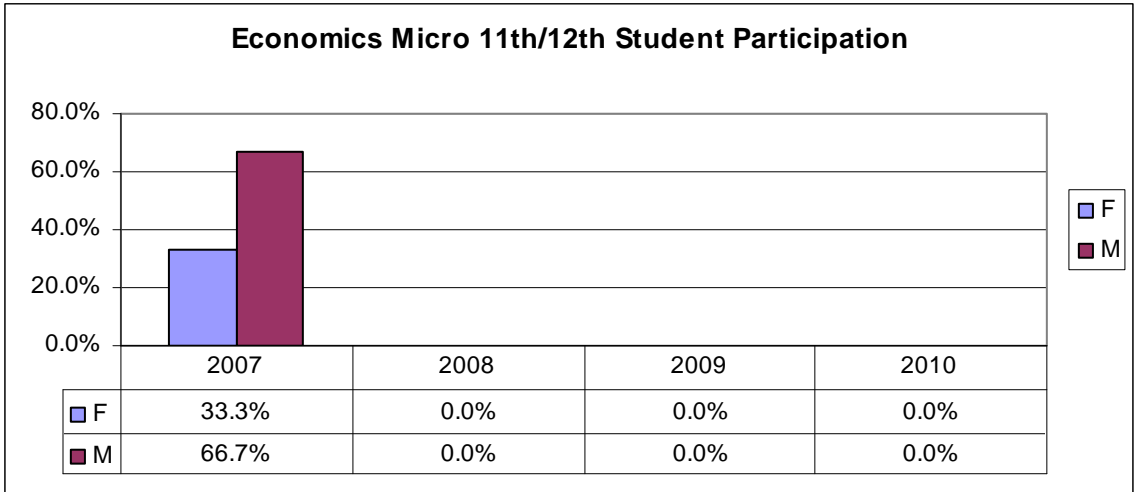
US Government & Politics AP 12th (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	40.0%	58.5%	56.5%	38.2%
M	60.0%	41.5%	43.5%	61.8%
Total Students	45	41	46	34



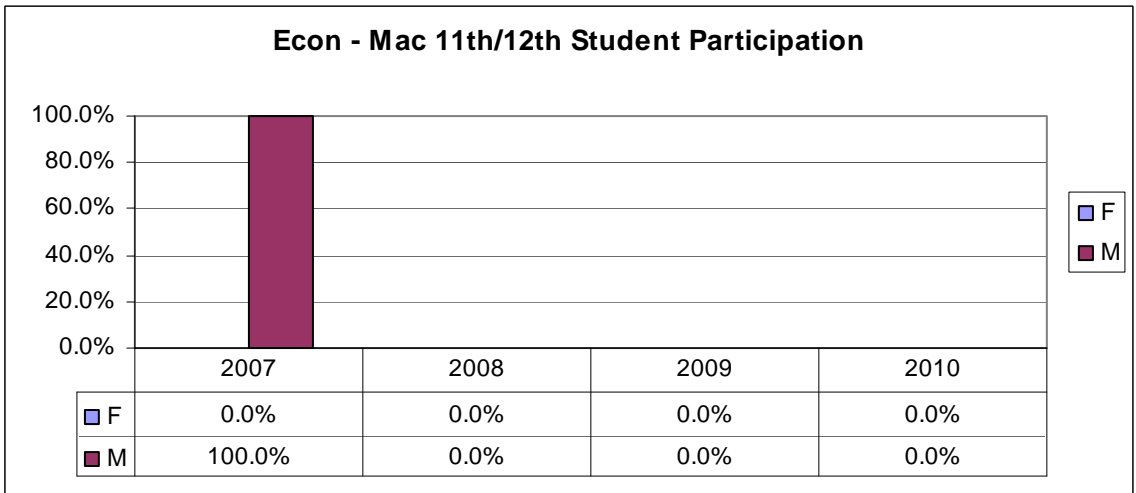
Economics Micro AP 11th/12th (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	33.3%	0.0%	0.0%	0.0%
M	66.7%	0.0%	0.0%	0.0%
Total Students	<i>3</i>	<i>0</i>	<i>0</i>	<i>0</i>



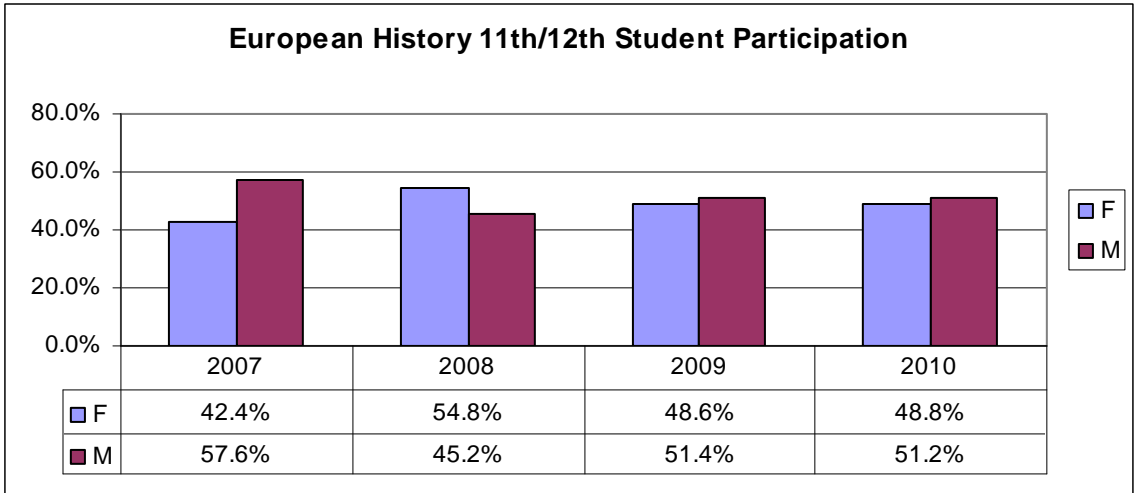
Economics Macro AP 11th/12th (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	0.0%	0.0%	0.0%	0.0%
M	100.0%	0.0%	0.0%	0.0%
Total Students	<i>1</i>	<i>0</i>	<i>0</i>	<i>0</i>



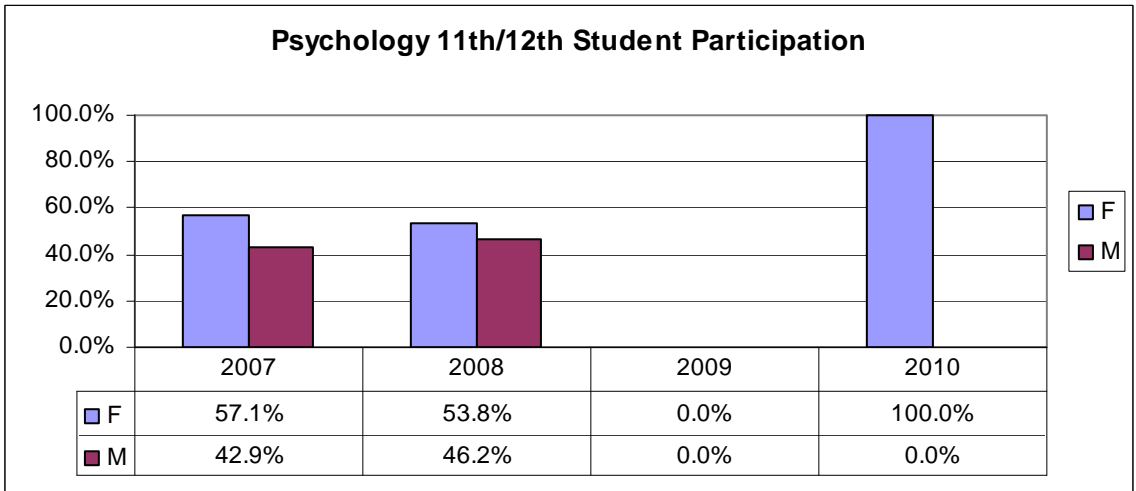
European History AP 11th/12th (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	42.4%	54.8%	48.6%	48.8%
M	57.6%	45.2%	51.4%	51.2%
Total Students	33	42	37	43



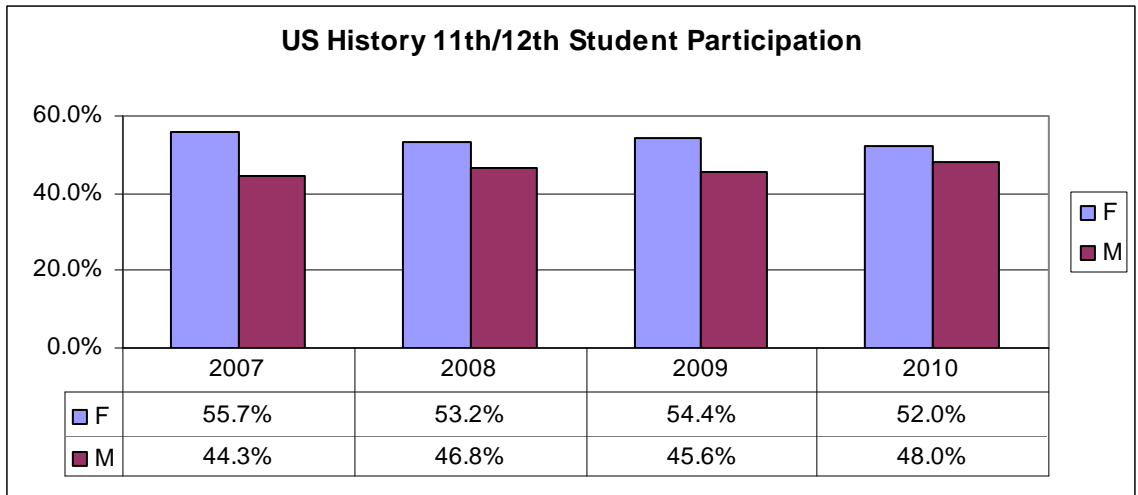
Psychology AP 11th/12th (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	57.1%	53.8%	0.0%	100.0%
M	42.9%	46.2%	0.0%	0.0%
Total Students	14	13	0	3



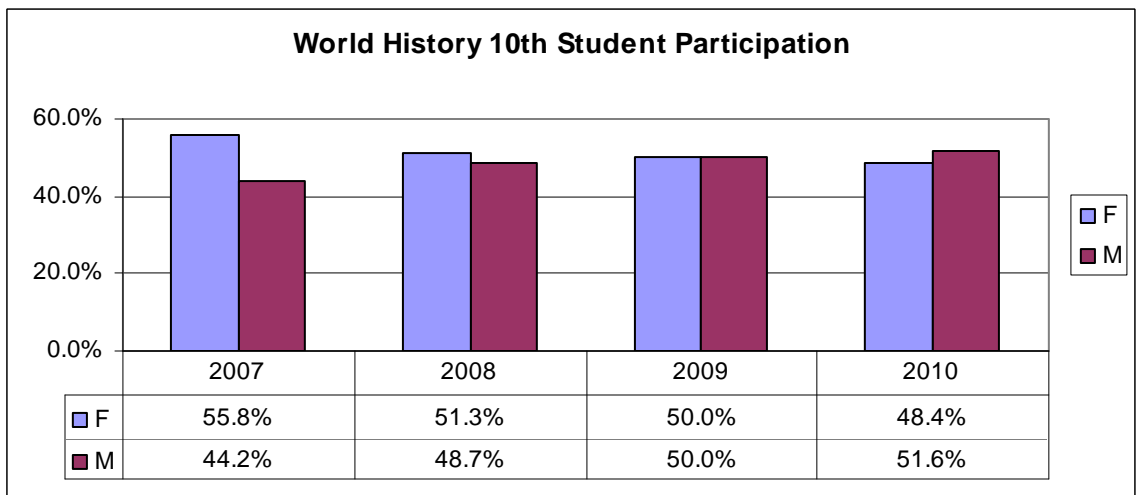
US History AP 11th/12th (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	55.7%	53.2%	54.4%	52.0%
M	44.3%	46.8%	45.6%	48.0%
Total Students	70	77	68	50



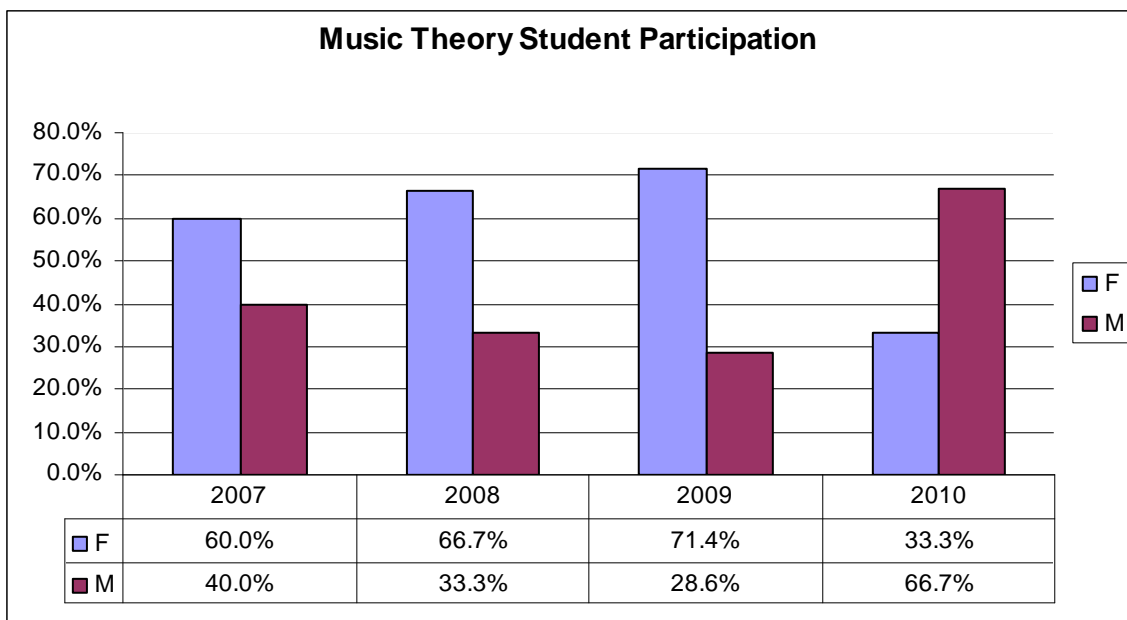
World History AP 10th (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	55.8%	51.3%	50.0%	48.4%
M	44.2%	48.7%	50.0%	51.6%
Total Students	86	78	62	62



Music Theory AP (Student Participation)

	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>
F	60.0%	66.7%	71.4%	33.3%
M	40.0%	33.3%	28.6%	66.7%
Total Students	<i>5</i>	<i>6</i>	<i>7</i>	<i>6</i>



APPENDIX B

SCHOOL'S CONSENT TO PARTICIPATE IN THE STUDY



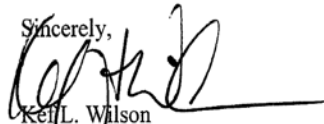
August 11, 2010

To Whom It May Concern:

The purpose of this letter is to certify that Sarwat Jafry is a full-time science teacher at St. John's School and has our permission to conduct the study entitled "Examination of Gender in Advanced Placement Tests." We will provide Sarwat with our support and will give her access to historical AP testing data.

It is our expectation that we will have full access to the results of the study.

Sincerely,



Kell L. Wilson
Head of Upper School

APPENDIX C

TEACHER QUESTIONNAIRE USED IN THE STUDY

Questionnaire for Gender Perceptions and the Advanced Placement (AP) Program

I. Background Information of Teacher:

1. Gender: _____
2. Years of Teaching Experience: _____
3. Subjects: _____

II. Questionnaire:

1. Different AP courses attract a disparate percentage of boys and girls. On a scale of 1 through 10 (with 10 being highest) rank how each factor below plays a role in **boy's** choice of which AP subject he takes:

- ___ Boys naturally gravitate towards certain subjects based on their **talents**
- ___ Boys primarily respond to **parent's/parents'/guardian's/guardians' expectations**
- ___ **Gender** plays a key role in determining a boy's interest in certain subjects
- ___ **Individual teachers** play an important role in influencing the AP courses
- ___ **School policies and environment** plays a primary role in this choice for boys
- ___ Boys take APs that will increase their chances of **getting into good colleges**
- ___ APs that will give them the highest **number of course credits** in college
- ___ Boys are influenced by the choices of their **peers**
- ___ Boys don't like to **work hard**

2. Different AP courses attract a disparate percentage of boys and girls. On a scale of 1 through 10 (with 10 being highest) rank how each factor below plays a role in **girl's** choice of which AP subject she takes:

- ___ Girls naturally gravitate towards certain subjects based on their **talents**
- ___ Girls primarily respond to **parent's/parents'/guardian's/guardians' expectations**
- ___ **Gender** plays a key role in determining a girl's interest in certain subjects
- ___ **Individual teachers** play an important role in influencing the AP courses
- ___ **School policies and environment** plays a primary role in this choice for girls
- ___ Girls take APs that will increase their chances of **getting into good colleges**
- ___ APs that will give them highest **number of course credits** in college
- ___ Girls are influenced by the choices of their **peers**
- ___ Girls don't like to work **hard**

3. Why do you think there are more men than women in science and engineering careers? (please choose one that you feel is most appropriate)

- ☐ Biology innately makes men more suited for science and engineering careers
- ☐ Parents, teachers, school policies, and peers strongly influence this choice
- ☐ The system allows men a higher chance of success in science/engineering careers
- ☐ None of the above, here's the reason: _____

4. Why do you think there are more women than men in liberal arts careers? (please choose one that you feel is most appropriate)

- ☐ Biology innately makes women more suited for liberal arts careers
- ☐ Parents, teachers, school policies, and peers strongly influence this choice
- ☐ The system allows women a higher chance of success in liberal arts careers
- ☐ None of the above, here's the reason: _____

5. Do you believe that students learn differently based on gender? _____
(If yes, please answer the questions below)

a. How do boys learn?

b. How do girls learn?

6. Which gender is generally more active in their learning?

- ☐ Boys
- ☐ Girls

7. It is necessary to encourage boys to participate in _____ courses.

8. It is necessary to encourage girls to participate in _____ courses.

9. What comes to mind when you read the words "Gender Equity":

10. Does the discussion of gender equity come up in your classroom in your discussions with students, parents or other teachers? Please explain how each group feels about gender equity.

11. Do **both** boys and girls feel confident in selecting enrollment in courses that may not traditionally be represented by high numbers of that gender?

- ☐ Yes - both feel confident
- ☐ Boys are more confident in seeking non-traditional enrollments
- ☐ Girls are more confident in seeking non-traditional enrollments
- ☐ No, here's what needs to be done: _____

12. In your opinion, which gender is more likely to take higher level courses in:

- a. Math: _____
- b. Science: _____
- c. English: _____
- d. History: _____
- e. Foreign languages: _____