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Reimagining the Synthesis of Latino Youth in the Science Lab: Using Latino Cultural Identity to Teach Cellular Permeability

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Abstract: The Specifics

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Abstract

Academic excellence is often thought of as achieved through "motivation". I use this term lightly because of its many definitions and lack of true value to its meaning in correlation with my project. Institutions often analyze student academics through the scope of the student. That is, completing homework assignments, preparing for tests and quizzes, spending adequate time outside of the classroom practicing academic integrity, staying out of the principal's office, and so forth. Seldom institutions have shifted their focus to critique their own faculty and curriculum to analyze student academic interest. It is through the work of the faculty member that student academic interest increase and students will become more engaged and connected to his or her learning. When focusing on dropout rates, college applicants, and number of suspensions and expulsions, I want to bring awareness to understanding the relationship between teaching a curriculum and creating interested, curious, thought-provoking students rather than analyzing student behavior.

While I am interested in wrestling with raising the interest and relevancy of academics to all students, I have specifically chosen to research minority engagement in science curriculum with focus on teaching strategies for my senior capstone. Initially I wanted to wrestle with raising academic interest among all students because this has proven to increase student performance in a multitude of areas (dropout rates, test scores, college graduates), but the research behind the lack of minorities in the field of science seemed much more achievable and realistic given three months to explore the entire subject matter. Throughout the course of my teaching career I will continue to analyze overall academic engagement for minorities and non-minorities alike throughout all of academia and analyze various outcomes of academic

engagement (or lack thereof); however, I have narrowed my scope of work only for my capstone project so that I can adhere all attention on minority engagement through middle school science curriculum.

1. The Issue

My Family History:

I am a French-American girl who is working hard for my college degree in a family with grandparents who emigrated from Europe and have an elementary level education. My mom's parents both immigrated to California in the 1950s. My maternal abuelita grew up on the streets of Valencia and got a six-month work visa to come to San Francisco with a wealthy family that she nannied for. My maternal aitatxi (that's Basque for grandpa) came to America after his cousin got him a job at the presidio as a gardener at the age of 21. The Presidio of San Francisco was active during the time and it was my grandpa's job to help keep it physically appealing as both a center for military gathering and a tourist location. My mom was born and raised in Redwood City with the rich French and Spanish culture that her parents brought to the family. My mom later met my dad while she was studying abroad in France. My dad is from the same small village that my maternal aitatxi is from, so they spent a lot of time together with family and friends. Eventually they got married in that same small village of Ahetze, France and moved to Sunnyvale, CA to start a life for their children. The two started a family before my mom was able to complete her AA, so it took her some extra time and extra babysitting effort of my abuelita to get her degree, but she eventually got it. My dad doesn't have a high school diploma

because he didn't like school and often had to help his mom work the farm they lived on, so the school board recommended he either drop out or attend a trade school so that he has work experience in a field of his choice. He took the trade school opportunity and got a certification for mechanics. When he came to America he took a couple of English classes at the community college to work on his accent and his English vocabulary, but never finished high school and never got any sort of college degree.

Parallel Relevance to Other Immigrant Students:

I am the first in my family to go to a four-year institution much like many people that I went to elementary, middle, and high school with. My mom pushed me to do well in school because she wanted our family to do well here in California. She wanted our move to America to have meaning and she wanted my sister and me to have a good education so we could become something great. My classmates and I all had the same goal and our parents all had the same American dream, yet we reached very different outcomes and I hadn't realize this degree of separation until I reached college and was forced to wrestle with the very different outcomes of two similar backgrounds.

I grew up in a primarily Latino and Filipino neighborhood. All of my friends in elementary school were Hispanic and we were very close. As I grew up, I noticed that although I was in the same schooling system as my friends, I seemed to be benefitting much greater than them, meaning there had to be some deeper meaning behind academic success other than our familial backgrounds. My mom wanted me to have a great education so that I could live up to our family's dream, so she pushed me to get A's and B's in school. I was earning As and Bs in the same classes that my Latino counterparts were earning Cs, Ds, and Fs, but I didn't start to notice this until middle school as I started to grow older. In high school, I continued earning

mostly As and Bs while my elementary friends still struggled with lower grades. My elementary friends were not in gangs as much of my other high school classmates were, so I couldn't understand why they had such low grades. I reimagined what it meant that my friends and I had parents who immigrated to America for us to succeed and do well in school so that we could become something great, yet my friends seemed to have a much harder time that I. That was when I really started to question why I was doing so well and they weren't. I used to assume "they just aren't trying hard enough" or "they must not be doing their homework and studying for their tests" but it wasn't until later that I realized something much different was happening. The reality was that everyone who had low grades at my high school failed to see how their learning was relevant and often questioned teachers by asking why we needed to know the material they taught. I saw relevance in my learning because of a handful of teachers that I had come across in my K-12 education, and also because a large part of academically successful individuals who continue to college and earn masters degrees and achieve white-collar jobs are people who look like me, which I will later discuss in detail. However, after my two years here at CSUMB have I learned that societal roles have silenced and retained specific ethnic groups to obtain jobs similar to their parents, and many of these underprivileged members don't see opportunities for themselves in "white" fields like NASA or large business corporations.

Why this issue matters:

This issue matters to me because I saw members of my own community silenced by education and forced to live a life that could have been very different given the right avenues for a motivating, captivating education. I had the same education that they had, and we had fundamentally different outcomes. I fell into the practice of doing school – completing my daily homework, studying for tests, accepting everything my teachers taught me without challenge or

debate, and earned higher grades while my classmates challenged the system and frequently asked questions only to receive answers like "you'll need this for next year" or "because you need to graduate". The fact that our teachers never connected our learning to our everyday doing caused my Latino friends to be less interested in school and do even more poorly because they didn't see themselves in the curriculum. I was taught to do everything that my teacher asked of me, regardless of how relevant or how menial it seemed. I also frequently saw my own race and my own skin color in many academically successful fields, so I never doubted my learning or presented any questions to my teachers. Later in my essay I will provide examples and research that shows the correlation between "successful schooling" as a way to allow students to question and analyze their learning while seeing their learning as relevant and culturally integrated.

How others can benefit from this research and set of beliefs:

Others can benefit from my research within classrooms of their own because although I find that minorities see less relevance to learning than non-minorities, this "style of learning" that connects students' interests and backgrounds into a curriculum can positively affect all students. Whether a classroom has ESL students or all English-dominant students – every classroom has academically disconnected students and allows them to not fully participate curiously and explore their own learning in the classroom to expand their knowledge. By participating curiously and having the ability to flex natural curiosity, students will feel a better sense of connection to the curriculum that the teacher has presented and also forces the teacher to rethink his or her curriculum so that the teacher can rethink the curriculum through multiple cultural lenses which I will later discuss. Students that have been silenced by their own curriculum and are forced to live without an education that means anything to their personal life are the reason I explore this issue. I have never personally had to question the material that I was

learning because I was able to see myself and people of my color within the curriculum and within the larger society. Students that are not able to see themselves in the curriculum and therefore cannot see themselves in the larger society constantly question their teachers' curriculum because their teacher has failed to show any integration of their students' cultures and the teacher's curriculum. Any and all students can potentially benefit from culturally integrated education and everyone's education should be relative to their own personal lifestyle so that they may grow upon it and learn about (and from) their own family, culture, and practices.

Questions to resolve:

What happens in classrooms that cause students to resist and dislike school? How do teachers teach in a way that students can see themselves within society? Which avenues can we explore to allow students to see more relevance and integration in the classroom? If we change our curriculum to challenge and assess students in ways that are considerably different than traditional lecture and testing, how might parents and administrators be wary?

Defined priorities:

Here, my focus isn't on the grading scale, assessments, or cultural integration, but rather on the overarching theme of communication between teachers, students, families, and community members. It is here that I can begin to analyze the aspects in which students feel most integrated and more likely to explore their own learning so that they don't feel pressures to do well in their grades and linguistic capacity. Many aspects of the traditional school system allow students to become disengaged and uninterested in schooling because of low academic participation, low academic interest, low test scores, and low grades. Throughout the course of

my educational career I will continue to explore the multiple avenues in which students may feel a disconnect from learning and its chain effects on academic integrity, grading policy, quality testing, and eventual dropout rate, but for this essay I've chosen to focus what I feel starts the movement away from academic interest which is academic integrity and relevance to individual students and his or her familial culture and practices. By reimagining curriculum to include culturally relevant teaching methods, I argue that student academic interest will increase and thus disconnected students will be able to see themselves in white-collar jobs and have the academic capacity to constantly challenge, question, and debate as educated community members.

2. Literature Review

For my research, I wanted to start by focusing on creating interest and inclusion in the classroom. I then wanted to look specifically at cultural relevancy as an avenue for academic integrity. I base my research on a number of books including Michelle Fine's *Framing Dropouts*, Jonathan Kozol's *Death at an Early Age,* John Ogbu's *Minority Education and Caste,* Luis Moll's *Funds of Knowledge,* a documentary titled *Underwater Dreams,* and a collection of Rochelle Gutierrez's scholarly articles – some of which I quote to provide background to my argument and some of which I have used to specifically cater my project.

In Deborah Meier's book *The Power of their Ideas*, Meier explains, "What is needed is not just new information about teaching/learning, not just more course work, but a new way of learning about learning" (Meier 2002). Meier argues that many people are too set in believing what school is supposed to be and that in order to make learning enjoyable so that students will want to learn and go to school is to connect learning to a student's personal life. I want to expand this idea that teachers teach the way they have been taught, meaning that teachers seldom

create new, invigorating ways to learn material. Teachers often use at-the-ready materials such as printable worksheets and textbook chapter quizzes to guide their classroom because that's what is traditionally done. There are multiple ways to teach the same information, but to develop new curriculum around cultural relevance and student interest would be time consuming on behalf of the teacher and is seldom done. Meier uses this chapter to discuss the faults that we've acquired through teaching and offers suggestions to "escape" these habits. Teachers are thrown choices multiple times a day with open-ended answers which is unlike most professions. We as teachers think we make good teachers because we've been in school for our entire childhood and therefore think we know how to properly instruct a classroom. Meier says that there is hope for change if we change views of learning, develop new habits of mind, and develop new habits of work. Though, in order to change education for our students, we must be more selective in the teachers we hire at our schools and push our teachers to constantly expand their own knowledge and learning. Meier centralizes her "escape" around the idea that schools favor a central system that they can't pull themselves out of – the "importance" of the grade and its effect on learning.

Meier also states, "Too many kids don't see a connection between their efforts and school success, don't know what it is they need to practice, can't imagine themselves ever being 'academic,' and have never seen 'academics' played" (Meier 2002). Students often don't know why they're learning what they're learning and go to school because they are told and "that's the way it's supposed to be". We as educators fail to cater to individual industries without engaging our students to understand why it is important. Students work to get good grades, but don't necessarily have the skills or knowledge to apply that intelligence to daily life. This is partly because students don't see a connection between "academics" and their daily lives, and because we as educators don't help guide children to see these connections.

In the beginning of Jonathan Kozol's book *Death at an Early Age*, Kozol states a similar idea when discussing an art class that he observed in which the teacher was extremely defensive about her teaching practices. Kozol watched students complete an art project – many of which her projects simply involved copying art samples, offering no individual creativity. "The fact that [students] were being asked to copy something in which they could not believe because it was not of them and did not in any way correspond to their own interests did not occur to the Art Teacher" (Kozol 1967) and the teacher later came to Kozol and said, "He wants to show you his little scribbles because he want stop use you and your affection for him and make you pity him but we don't have time for that". This doesn't mean that all teachers force-feed students, but it shows that teachers will find something they like and something that works and stick with it, even if it doesn't work for all the students. It also shows that any student who tries to lash out and express any individual creativity or question his or her learning is punished for being disrespectful. Kozol also states, "The blame, in almost all cases, is immediately placed upon the child's background and his family. Then, but only after it has divested itself of prior responsibility, does the school administration come forward to profess a willingness to do what it can". It is because of this that I personally have changed my own ways of thinking because I, too, used to have the mindset that my classmates just needed to try a little harder or take time to study for tests, but the reason why students do not do well in school is not actually because of the student – but instead because of the teacher's unmodified, lack of individualized curriculum. In further research of a collection of scholarly articles written by Rochelle Gutierrez, I have found that many students who speak out against unmodified curriculum are those individuals who do not see his or herself in the curriculum.

In Gutierrez's article *Equity in Discourse for Mathematics Education: Theories, Practices, and Policies*, Gutierrez states, "Students need to have opportunities to see themselves in the curriculum (mirror) as well as have a view onto a broader world (window) […] The goal is not to replace traditional mathematics with a pre-defined 'culturally relevant mathematics', but rather to strike a balance between the number of windows and mirrors provided to any given student in his/her mathematics career" (Gutierrez 2012). By seeing myself in the curriculum *and* in the larger society, I was able to achieve a better sense of connection to the curriculum that my freshman year biology teacher had presented. Mr. Magee had reimagined his curriculum and transformed it into every-day practice. However, Mr. Magee's teaching alone is not the only reason I was able to succeed. He had helped me to see myself in the curriculum, but I was also able to see myself in the larger society.This is what I believe set me apart from my Latino classmates. Even though we had similar family histories by immigrating to America for a better life, I argue that the reason why my educational path was fundamentally different from theirs is because I can see people of my own ethnicity in white-collar jobs. Because of this, I felt more comfortable participating in science because science is historically a European practice.

I saw relevance in my learning because a large part of academically successful individuals who continue to college and earn masters degrees and achieve white-collar jobs are people of my own skin color. According to the National Science Foundation online database, Hispanic males make up and Hispanic females make up 4% and 2% of the science and engineering fields respectively as compared to 51% white males and 18% white females. In further analysis, 5.6 Percent of scientists are Hispanic while 5.1% are nurses and 4.8% are postsecondary teachers as compared to white, Asian, black, and Hispanic males and females, showing the large gap between higher education and Hispanic culture.

After conducting this research, it was apparent that I should focus my attention to the 2 and 4% of Hispanics rather than the 51 and 18% of my own race. However, I had to be cautious as to not come across as the white savior. I chose to focus on the practices of the teacher rather than the "motivation" of the student, and I have chosen to transform a science lesson into a culturally relevant Latino curriculum. Depending on the demographics of the school and the students of the classroom, this lesson can be modified to discuss other areas, or can be implemented simply to expand the science lesson so that all students can see relevance in the lesson.

After reading *Funds of Knowledge* it became apparent that all students have great academic ability when using previous knowledge in the classroom. Moll et al say this approach involves "analyzing the social history of the households, their origins and development, and most prominently for our purposes, the labor history of the families which reveals the accumulated bodies of knowledge of the households" (Moll et al 1992). Teachers in home-based contexts of learning see the child as "whole" rather than just the "student" which is vital and has been proven a determining factor in student academic success. The authors also argue that "our concept of funds of knowledge is innovative, we believe, in its special relevance to teaching, and contrasts with the more general term "culture," or with the concept of a "culture-sensitive curriculum," and with the latter's reliance on folkloric displays, such as storytelling, arts, crafts, and dance performance" (Moll et al 139). There is a vast amount of knowledge that students and their families carry at home which they use on a regular basis, yet may be unaware that they have. As an educator, it is my duty to make visible the amounts of knowledge my students already hold and to create curriculum through their funds of knowledge. Of all academic areas, the field of science seems the most distant from everyday life because of its complex vocabulary,

use of expensive equipment, and so forth; however, I make the argument that science is actually relevant to a student's lifestyle and can be made apparent through the student's funds of knowledge.

3. Project/Curriculum

For my project, I purchased a 1970s cellular biology textbook titled *Cell Biology* by De Robertis, Wiktor W. Nowinski, and Francisco A. Saez to teach culturally relevant pedagogy through a seventh grade science curriculum. According to seventh grade science standards, students must be able to differentiate between plant and animal cells and to identify a few vital structures such as the cell wall, cell membrane, nucleus, and mitochondria. In 9th grade biology, students further learn that a cell membrane is semipermeable which means that molecules can pass into and out of the cell depending on the size of the molecule and the condition of the cell. I used this progressive curriculum as a scientific model, and then integrated Latino culture into the curriculum.

Robertis et al define permeability as "fundamental to the functioning of the living cell and maintenance of satisfactory intracellular physiologic conditions. This function determines which substances can enter the cell, many of which may be necessary to maintain its vital processes and the synthesis of living substances. It also regulates the outflow of excretory material and water from the cell" (Robertis et al 1970). This means that permeability is vital for the cell in order to regulate its inner conditions and to work together with other cells in order to benefit the organism. It describes the cell as needing nearly perfect conditions in order to best benefit the organism with little room for error – which thus emphasizes the importance of this

function. I need to cover these concepts in order to be a qualified science teacher, but then I take what seems to have no relevance to any culture, and I start by giving it relevance to any and all students. I make this relevant to all students by allowing the student to see his or herself as the cell and the community as the organism, and then specifically to Latinos as I talk about further integration and synthesis of parts.

I start by defining the term "permeability" scientifically as "the ability to move materials into and out of the cell by the work of transport chains to break down molecules into simpler parts to allow for permeation." I make this concept relevant by redefining it as "a process that allows all students to have the ability to easily move into a curriculum and to see themselves in any field of work regardless of race." I defined the cell as "the smallest unit of a living organism that is considered 'living' when all of its parts work together," and have made relevance by redefining the living cell as "every individual student that contributes to a larger idea." The term "satisfactory intracellular conditions" are important to cells because they make up all living things and need to be in good condition so that the entire organism can be well, but when considering the student as the cell and the community as the organism, I show relevance to my students by redefining the term as important to students because they eventually become active members of society so they need to be fully functional as individuals so that society can thrive. "Vital processes" describe important functions that a cell and its parts do in order to be well and keep the organism healthy and balanced. I argue that it also describes important functions that a school and its teachers do in order to be well and keep a community healthy and balanced. The "synthesis of living substances" is important when organisms interact with each other which is scientifically important for relationships (dominance in some organisms) and reproduction (for all organisms) while the "synthesis of successful academia" is important when students and

community members interact with each other which is societally important for relationships (dominance in some society members) and reproduction (of ideas and concepts).

For Latino students, I take two specific words – permeability and synthesis – and reconstruct the terms from their science definitions into culturally relevant definitions. I define the term permeability as "the ability to move materials into and out of the cell by the work of transport chains to break down molecules into simpler parts to allow for permeation" and reconstruct it into "the ability for Latino students to move into and out of a curriculum and to see themselves in the field of science by the work of educators to break down the science curriculum to allow for social equity." Similarly, I define the term synthesis as "the combination of things working together in order to allow the cell to function properly and to eventually be successful carrying out functions in order to thrive and reproduce more cells to recreate or form new tissues and organs" and reconstruct it into "the combination of Latino students and families, administrators, and community members working together so that Latino students can engage their curiosity to eventually become actors in their own world and be active citizens seeing themselves in a curriculum in order to thrive within communities and produce more ideas to challenge current academics to recreate or form a socially just curriculum and healthy communities so that they are the problem solvers of their own communities and so that their education has an everyday impact."

Heart and brain cells come together and communicate – referred to as "cellular adhesion" – to exchange materials through a channel called a "gap junction". These cells communicate and exchange information in order to quickly respond to any unsatisfactory condition to better the organism and maintain a healthy state. I want to challenge teachers to constantly be in communication with students and families so that science is no longer seen as an isolated area of

academia, but rather as a daily practice in everyday life. For example, Latino families in the Salinas Valley and Monterey County conduct back-breaking work in the fields that produce local goods to fill grocery stores and feed the public. However, many people are unaware of the harmful effects of long-term radiation exposure on the human body. Similarly, many people do not know the harmful effects of pesticides on our favorite fruits and vegetables at the local grocery store. Hispanic students may see no relevance between chemistry and the life of their families, but I argue that there is great relevance. A simple middle school chemistry lesson of the combination of chemicals to form harmful substances, their use as pesticides in the fields, and their harmful effects on the human body have the most relevance to Latino families, yet it has not been made visible by the teacher and therefore Latino students cannot see this relevance. Instead of teaching culturally relevant pedagogy, teachers rely on textbooks to define terms that students will rarely use and almost never hear in their daily life instead of teaching chemistry through the funds of knowledge that a student already has about chemistry.

Similarly, Latino field-working families have a lot of scientific knowledge in terms of photosynthesis and nutrient depletion, but they are unaware of this because the integration and relevance has not been made apparent. Anyone who has taken care of plants knows that leaves begin to turn yellow due to overwatering, and a plant will begin to shrivel due to lack of water. Every field-worker in the Salinas Valley knows this, yet we discredit their knowledge because they lack the academic vocabulary to explain this phenomenon called “chlorosis”. Field-workers also know that they can yield the most fruitful crop by using a term called “crop rotation” which is defined as “the practice of growing different crops in succession on the same land chiefly to preserve the productive capacity of the soil” (Merriam-Webster 2014). After fruits and vegetables have occupied the same soil for months at a time, the soil begins to lose fruitful

nutrients such as Nitrogen and Phosphorus. This concept is considered to be "scientific" because of its elaboration of process and use of academic vocabulary, but we cannot discredit individuals as being anything less than scientific simply because they lack the language and ideas of a "scientist".

I argue that everyone is filled with science, even if they are unaware of the amounts of knowledge they hold. We all get headaches and we all know how to alleviate a headache, but we do not consider ourselves scientists because we cannot scientifically explain the exact processes that we are undergoing. We all know that we can subside the sound of a stomach growl with a bit of food, but we do not consider ourselves scientists for knowing that food alleviates hunger because of our lack of academic vocabulary. Traditional science seems to be so distant and irrelevant to our everyday lives because our teachers make it so. Rather than learning about our digestive system through practice and experimentation, we pick up a textbook and memorize some definitions of organs and structures. I argue that with the help of textbook vocabulary, we can minimize the reliance of textbooks and make learning relevant through doing, practicing, and questioning our everyday being. What happens to my stomach if I swallow mouth wash? Why do I get a runny nose in the spring? Why are the days longer in the summer but shorter in the winter? These are questions that students should be asking and that teachers should be using to teach science standards. By allowing students to ask questions and explore their own curiosity as I have in my freshman year biology class with Mr. Magee, students can make sense of their own world and see themselves as scientists not because of the color of their skin or the education that they have, but because they know the vocabulary and know the processes that they use every day and can therefore make sense of everything around them.

4. Personal Journals

Throughout the semester I've made a lot of discoveries about myself and about the community in which I live in terms of integrated curriculum. Some of my journal writings reflect my experiences before my upper division courses at CSUMB, and others document my personal thoughts and experiences throughout my last two years of college. I include these journals as I document my own thoughts that have burgeoned in the process of my college career as they have created stepping stones to my capstone project. I have always been interested in rethinking public schooling with regards to the grading scale, standardized testing, participation, parental involvement, culturally relevant curriculum, and so on; however, these journals capture the specific thoughts I have had in coming closer to my specific workscope.

Journal 1: Introductions – July 2014

Growing up, my mom was always very involved in my school. She kept very close communication with my teachers, attended PTA meetings, and even helped my teachers with craft ideas and leading the afterschool French class. My father grew up in a small village in France. He never found education important and before dropping out of middle school, he attended a four-year trade school where he learned mechanics and graduated with the equivalent of a trade school credential. When I was growing up my dad never pushed my learning like my mom did. My dad figured he didn't have any say in our education since he didn't graduate grade school. My mom was the one who attended parent-teacher conferences (my dad avoided these because he's embarrassed by his French accent and doesn't like repeating himself when people have a hard time understanding him), and my mom jumped into any opportunity she could get her hands on.

My mom was the type of mom who wanted me to make my own decisions superficially – I chose which instrument I wanted to play, I chose to be in choir as an elective, I chose when I wanted to quit going to girl scout meetings, and I chose which activities and sports I wanted to be a part of. However, my mom's one rule was that my sister and I get good grades and participate in class. She stressed the importance of honor roll and would become angry with anything lower than a B- to the point of coming to class to observe why I was getting such a low grade. My mom shaped my education to focus on good grades and polite classroom manners (not speaking out of turn, questioning me in front of the teacher if there was ever any conflict).

It wasn't until high school that I started trading my grades for a sense of curiosity – particularly because of one teacher. He was enthusiastic, funny, smart, and presented my class with challenges to traditional scientific theories like the food pyramid. His passion created a fire in me that allowed me to find more opportunities to rethink the sciences, regardless of my grade. This is when I was not only interested in good grades, but also in *wanting* to learn – though the motivation for getting good grades had never fully left my mind.

Since then I find pleasure in exploring the "wrongs" – or in other words – I like to disprove theories and beliefs. I find even more pleasure when others prove me wrong and I have the opportunity to learn something new. This is what I consider to be "education", and I consider a "good education" to be opportunities of expression, questioning, learning through doing, growing through discussion, and presenting new ideas of information. I think simple worksheets and homework assignments don't challenge students to have new ideas, rather I believe discussions are essential to a good education and that good education comes with constant change – change of students' beliefs, change of curriculum to fit various student interests, change of "proper" institutional rules so that more learning can take place not only

within my classroom, but hopefully within the entire school and eventually in the entire community. This is a change I think will benefit students most so that they don't only practice this kind of learning for the time they're in my class, but throughout their entire educational career.

Journal 2: Moving Past Restricted Mentalities – July 2014

Today in class I have been enlightened. Through back and forth discussion, my class discussed ideas behind "whiteness" and what it means to be a white teacher in a school primarily made up of African Americans and Latinos. When asked why I wanted to be a teacher in lower income and work for a title one school, I answered with the following:

Growing up, I lived in a primarily Hispanic and Filipino neighborhood. All my closest friends in elementary school were Hispanic and Filipino, and I was considered a minority. Growing up, a lot of my friends became interested in different hobbies. I joined the middle school choir and cross country team while my friends joined softball and soccer. Along with our new hobbies came new friends, and we eventually parted ways – yet we always had the same education. In high school, my elementary friends and I had grown very different and although we came from the same schools growing up, we valued education completely differently. I attended class, finished homework, and studied for tests to get A's (which was very important to me at the time) while my friends skipped class, never did their homework, and often ended up in detention. Long story short, I became confused and upset that we all had started from the same school and we became so different through our educational paths, and I wanted all of my past friends to value and prosper from teachers and administrators like I had.

This discussion carried on in class and we started talking about the idea of having a "white savior mentality". I had never considered this until my professor asked me whether or not different cultures define education in the same ways. To me, being educated meant getting good grades and wanting to learn. I hadn't considered other cultures' regards to education, and we talked about the differences between my values of education in regards to my elementary friends' values, and by wanting everyone to value education as I do is to be narrow-minded and ignorant.

This "white savior mentality" has sparked new beginnings for me. Throughout my life and my educational career, I've never considered my values in respect to my future students' values. I've learned that different families hold different values, and education might not be as important or as interesting to my students as it was for me – but this is something I cannot change. This class discussion has also kept me questioning what other "white savior" mindsets I've been carrying about education, and keeps me thinking about possible ways I can incorporate different cultural and familial values in my classroom. This discussion is only the beginning of my new way of thinking, and I will continue to step back from my own set of values and analyze that of my classroom for as long as I am an educator.

Journal 3: Grades and Enthusiasm – August 2014

"Good teachers" are defined differently by different students. Some "good teachers" are teachers that give out A's and never pass out a quiz in their life. Some "good teachers" are strict, but make sure their students understand the material they're learning. Other "good teachers" entertain their class to keep their attention and keep the classroom lively and entertaining so that

students are more motivated to learn. "Good teachers" are defined differently based on students and student experience – students that are used to getting A's and B's may want more of a challenge. Students who regularly get D's and F's may want an easier teacher as a "good teacher". I want my students to love me, but the only form of "good teaching" that I learned through education is (earlier on) to get good grades and (later on) to be challenged and take risks.

Our students are trained through the education system to maintain their grades, so that they can take their A's home to their families and get praise. High GPAs and high SAT scores are recognized by colleges as well as top employers like Google and NASA. Our students are evolved to "learn" by memorizing the material that teachers give them (also known as studying), ace the test, and receive appraisal from families and teachers. These students are seen as "good students" and students that get C's, D's, and F's are seen as "bad students". I want to work to minimize the importance of grades and to establish a sense of importance around wanting to learn by questioning and experimenting. Through science, this can be simplified to "I can have my students come up with hypotheses and conduct an experiment," but I want learning to be more than that. I want my students to want to hypothesize – not because they have to, but because they are truly curious and interested in the science behind photosynthesis, rock formation, or tide currents.

Now, I know that a lot of students won't have the same passion for science as I do, and I know that expecting my students to always want to question their own learning is unfair. I am still working on a grading system that will be put into place for my future classroom, because I want my students that are concerned for grades to be able to move away from the grades and move towards curiosity. I also want my students that have less enthusiasm for learning to feel a sense of accomplishment (whether it is through better grades, notes sent home, or understanding

content). I want to acknowledge the students that are concerned for the A's and B's to take home to their families, but I also want to push my students out of their comfort zone and also let them know that it's okay to not always be right – but to feel safe enough to question something without knowing its outcome. I want my classroom to be a place where my students can learn from each other, and I hope that each individual student carries with them something that we can use to teach a topic in a different perspective.

I want my students to feel proud of where they come from and who they are. I don't expect them to change all of their perspectives on said topics, but I do want all of my students to come to class with an open mind so that my classroom, as a whole, can be introduced to new ideas that they may have never experienced before. In Deborah Meier's book *The Power of Their Ideas,* Meier states, "A school system in which students must come together with others who are different may or may not further any one individual family's life goals, but it holds the potential to further our common goals as a democratic society. If we want to chart the future together these 'details' of what goes on in our schools matter." (Meier 2002). Meier uses this quote in continuation of her belief that we need to focus on individual children as equally as we need to focus on the whole as a classroom, and I want to incorporate this into my classroom and to move past "typical teaching" with standardized tests and graded worksheets.

While I used to define a "good teacher" as being easy and handing out A's, now I would define a "good teacher" as a teacher who challenges his or her students, but who also caters to the individual child's interests and values to create not only a sense of accomplishment (through good grades or appraisal), but also a sense of curiosity to explore and excitement with new findings. While I used to define a "good student" as someone who submitted good work on time, I would now define a "good student" as one who presents their own opinions about

different scientific topics, but is also open to learn about other perspectives and use these new findings to expand their own beliefs and knowledge.

Journal 4: Cultural Relevancy - September 2014

My family took a trip to Ahetze, France for two weeks in August. We went to visit my dad's side of the family who all live in the small town of Ahetze. It had been seven years since my sister and I have made our last trip, so we were overdue for a family visit. My French has improved tremendously to the point of basic communication, but I wouldn't consider myself fluent because I still lack a lot of verbs and nouns that make a sentence understandable.

French country culture is very different than French city culture and very different than American culture. My family is from a small town of farmers who live off the land. My grandparents don't have any education and my dad made it to 8th grade before embarking on a journey to trade school. In Ahetze, shops are open from 7am-noon, and then reopened 2:30-8pm. In the countryside of France (not just the town of Ahetze) lunch is an important part of the day that requires everyone to come home and sit around the table with family. Even schools provide two hour lunch periods so that families can enjoy lunch at home and then resume schooling until dinner time. People of the countryside also don't have technology (painful for my two week trip) and WiFi is more of a tourist city thing (Paris, St. Jean De Luz, Bordeaux, etc.).

Talking to my family was painful. They didn't understand anything I was saying about college, about my iPhone (compared to their Nokia flip phones), and my dad would keep telling me to stop trying to explain these things to them because "they'll never understand you" and I was wasting my time. This infuriated me. I thought, "How am I supposed to communicate with

my family if they don't even know what I'm talking about?? Of course they'll never get it if I don't have the vocabulary to explain it and my dad who DOES have the vocabulary thinks it's a lost cause!" The rest of our two-hour lunch resulted in me sitting silently angry at my family and their lack of education.

The next day, my parents had planned to hop among houses between lunch and dinner. We would spend lunch with my great aunt Gabrielle and my great uncle Pierro, then head to my dad's old elementary school friend Poncho's house, and finally end the evening with dinner at Marie Claire and Panpilli's house – more family friends since childhood. I was still feeling uneasy and frustrated about yesterday's inability to communicate with my cousins and uncle, so I wasn't looking forward to tonight's visits – especially because visits consist of wine and peanuts which lead to drunk conversations which means more slurred words and talking way too fast for comprehension. Fun.

We got to our "appetizer" stop at Tanta Gabrielle and TonTon Pierro's house where the first two hours were spent talking about a funeral that had just happened for a cousin of a cousin (I'm telling you this town is REALLY small) and the next two hours about random drunk babbling. What made this meal different was my ability to sit back and listen to the conversation. Rather than excitedly using my new linguistic abilities, I sat back and listened to the conversations that were taking place. My uncle spent 45 minutes talking about the Porto he had served me and explaining which Porto to drink when, how to drink it, what to drink it with, how the grapes were grown and farmed, and so on. There was so much knowledge that my uncle had about wine that I had never realized before.

On one of the last evenings my parents, sister, and I sat down to have our usual dinner with Amatxi (Basque grandma). She used to have live animals on her farm but has gotten too old to slaughter and tend the animals like she used to, so she buys meat from the neighbor. She usually buys half a cow (or pig), cooks it, and then preserves EVERYTHING in jars. If you walk into her barn, I guarantee you you'll find every type of meat you've ever imagined – from creamy pate to ribs to thinly sliced ham cured with salt – she's got it all. I was helping her prepare dinner in the kitchen which consisted of taking the foods out of jars and heating them in the microwave. She was telling me about how she preserves the meats, the importance of the fat on top, the power of salt, the way the weather can be bad for preservation and so on. I had spent the entirety of my trip basing my family's knowledge and understanding around my lifestyle. They don't know anything about iPhones, SD cards, email, or online text books because they are not exposed to it. However, they can tell you more than you know about growing types of crops, using the food for medicinal purposes as well as recipes, or how to make sure your rabbits will taste good after they're slaughtered for dinner. That was when I realized how narrow-minded I was and how judgmental I was being based on materialistic things. My family isn't stupid like I angrily said they were, my family just had different sets of skills and knowledge based on their everyday lives.

To relate this to my classroom and to different cultures, it's important to consider someone's everyday life before you assume anything about their knowledge of your own life. You can't judge someone's intelligence out of context because everyone lives differently and it's unfair to hold everyone to the same set of standards.

"If you judge a fish on its ability to climb a tree, it will live its whole life believing it is stupid" – Albert Einstein

Journal 5: External Motivation - November 2014

Tonight in my Diversity in Education class, our dean came and spoke about his personal educational experience. Dr. Alvarado shared his story about his brother's troubling lifestyle and gang activity. Dr. Alvarado expressed his disinterest in gang violence because of the frequency at which he had to care for his brother and rush his brother to the hospital. Throughout middle and high school, Dr. Alvarado wore baggy clothes simply because he wanted to dress like his brother and his brother's friends, but he had no interest in violence and drug use. Dr. Alvarado often stirred up trouble in the classroom because all of his teachers considered him a bad seed and would not spend time to figure out why he was misbehaving.

He told the story of one auto-tech teacher who made his students feel important, creating a sense of inclusion regardless of race and actions. This teacher held very high standards for his students knowing that they could accomplish great things. Dr. Alvarado would sometimes doubt himself, and his auto-tech teacher would steer him back on track, encouraging him that he actually knew more than he thought and that by working hard, he could accomplish more than giving up. Dr. Alvarado surprised himself and did very well in the class. He earned respect for his auto-tech teacher who never gave up hope and always pushed his students to give their best work.

During his senior year in high school, Dr. Alvarado began to consider college opportunities to continue his new-found love for the auto-tech industry. He stopped by his school counselor's office and told her "I want to go to college." She looked him up and down and replied, "You're not the college type. College is much more demanding than high school. You're better off getting into a job than going to college." Disheartened and angered, Dr.

Alvarado said that in that instant, he was inspired to go to college not only to prove his counselor wrong, but to take her job because no counselor should ever talk students out of going to college and furthering their education.

After class I continued to challenge myself to think about his story. Had anyone ever told me I was incapable of something? How many people have told Dr. Alvarado that he would not be able to do something just because of the way he looked? I continued to explore my white privilege and have learned not only to hold high standards for all of my students, but to never allow my students to become disinterested or disheartened.

5. Results

I did not participate in a classroom, so I do not have tangible results of student work through a newly integrated science curriculum; however, I plan to use my life work to explore this arena further and collect results as part of frequent modifications. I will start by interpreting results from my specific study of working with Latino students in the science classroom and analyze which aspects worked well and which ones need improvement. From there, I will expand my work so that my Latino students find relevance to their lifestyles and gain an interest in learning and questioning the sciences. Once I have obtained a larger success rate (success rate being that at least 85% of the class has found interest in the sciences) I will translate that curriculum into other cultural groups and to other academic studies, such as math, history, English, etc. I also plan to explore new ways of grading student participation, assessing student knowledge, and involving parents in student learning to name a few. As I continue my educational career, I will constantly be searching for ways to improve individual academic

participation and integration, whether it be centered around race, gender, ethnicity, background, or language.

As educators, we need to start this communication and integration of culture, background, and individuality into our academics. As parents, we need to be sure that our children are getting an integrated education. As community members, we need to change our politics and our paradigm about education so that we can teach for all students and allow all of our students to see themselves as successful.

To start, we as educators, parents, faculty, and community members need to send clear messages to our students about stretching curriculum to include multiple cultures and practices. We should always be actively transporting students into our curriculum to ensure that they are getting the most of their education and can then become active community members and stretch themselves outside of their social standing. We need to have conversations about new curriculum with our community members, parents, teachers, and faculty so that we don't change what students are learning, rather we take what the students already know and develop their learning based on their prior knowledge. Culturally relevant pedagogy is important for our communities to increase academic integrity and increase academic relevancy while eventually decreasing student dropout rate. We need to stretch our curriculum to include multiple cultures so that students see why science is important and fundamental to being active citizens.

This newfound style of teaching culturally relevant pedagogy will not only allow students to see themselves in the curriculum and keep students from questioning their learning. This will also allow students to continue to question their learning in other areas of academics and

continue to see relevance not only in science, but in all subjects, and thus continue to question, analyze, and make sense of their everyday world even after they have graduated high school.

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