

Latinos Not Engaging in Science, Technology, Engineering and Mathematics (STEM) Careers

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ABSTRACT

The U.S. Census Bureau records the Latino identifying population in the United States (U.S.) as the largest and fastest-growing racial/ethnic group in the U.S. and predicts that by 2060, a quarter of the total population in America will be Latinos. In 2010 the U.S. National Center for Education Statistics reported that the educational performance of Latinos in public schools lag behind Whites in mathematics and reading scores. The U.S. Education system focus on teaching future generations for the advancement of the world by preparing students for careers in Science, Technology, Engineering and Mathematics (STEM). It is thus vital to understand the factors that contribute to Latinos' education problems. This is addressed in an extensive literature review.

The purpose of this paper is to bring some understanding to the question: "Why do Latinos continue to lack interest in STEM fields?" by presenting how Latinos' population data, their career distribution trends, and efforts of supportive laws and programs like multiculturalism, maintain the status of Latinos' low scholastic achievements. Firstly, a brief history of law, reporting, policies, and important findings that shape the present status of limiting Latino interest in STEM, will be discussed. Secondly, the paper is sorted into examining three critical factors: Institutional, Educational and Latinos, and the difficulties, controversies, and barriers Latinos face in their pursuit of a STEM career.

INTRODUCTION

There is a growing awareness that Latinos in the U.S. are left behind in academic achievements. This is especially an important issue as Latinos are the fastest-growing immigrant population in America. It is predicted that the Latino population in America will increase from 55million in 2014 to 115 million in 2060. It has been indicated that Latino students' academic achievement in the U.S. has not been good enough to ascertain a fruitful future of Latinos in STEM careers.

Hispanic students make up 20% of the U.S. school population, outnumbering African American and Asian students.¹ The report also shows a gap in the academic achievement of Latinos² compared to other contemporary ethnic groups. It reported that only 14% of Latinos in

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1. US National Center for Education Statistics, "*Digest of Education Statistics 2014.*" edited by Thomas D. Snyder, Cristobal de Brey and Sally A Dillow. Washington, DC: US Department of Education, 2014.

2. In this paper the term "Latinos and Hispanics" are use interchangeable as they include all ethnic sub-groups, (e.g., Spain, South and Central America and Caribbean descend) whose primary language is Spanish. The U.S. Census Hispanic reporting interchangeably used the terms "Latino or Hispanic".

4th grade scored well in reading proficiency tests, but 57% of Latinos score was below the basic reading level. Only 10% of Latinos scored at proficiency in mathematics in 8th grade, but in high school, the average achievement is lower than that of White students and their mathematics skill is equivalent to that of a 13-year-old white student.

However, regardless of the extensive literature about Latinos' lack of scholastic achievement, the literature mostly focuses on reported immigrant Latinos as English language learners (ELL), and when discussing the challenges to prepare Latinos into STEM careers, little attention is given to the emotional issues impeding their achievements. Less addressed is, what might be missing to change that status quo of Latinos as low scholastic achievers and encourage their careers into STEM.

This paper intends to touch a little on the history of policies and programs and the education trends of Latinos and present three pillars that can help us to understand the potential evolution of Latinos into STEM.

For example, one error on the demographic trends reporting of immigrants was the discovery that the U.S. Census reports are just “estimated approximation”³ rather than the real number of immigrants inland. As the census collected the information every ten years, the immigrants entering and exiting the country yield results that might be too high or low, depending on the year of the data collected. The immigrant behavior of assimilation for long or short term or the intentions behind their plan to stay is unpredictable.

Besides the wide variety of reporting about minorities' lower scholastic achievement from K-12 to higher education degrees, organizations like the U.S. Department of Education, the U.S. Census Bureau, grab the media headlines, negatively reporting about Latinos.⁴

Even with this numerical reporting, it did not examine the emotional issues behind Latinos' low scholastic achievement. The collective distribution of Latinos within its minority ethnic classes are mostly addressed as marginalized groups and underachievers. Let us start answering the question, where did all this negative reporting start? It is necessary to look back into the history of policy in education and how the demographic reporting of the Latino population reflects a

3. Redstone, Ilana, and Douglas S. Massey. “Coming to Stay: An Analysis of the U.S. Census Question on Immigrants' Year of Arrival.” *Demography* 41, no. 4 (2004): 721-38.

4. Madrid, E. Michael. “The Latino Achievement Gap.” *Multicultural Education* 18, no. 3 (2011): 7-12.

continuing status of Latino education.

HISTORIC EDUCATION LAWS, POLICY AND REPORTS

The U.S. Census Demographic Report

If we look at the U.S. Census Bureau, established in 1790 when Congress assigned responsibilities to U.S. Judicial districts' marshals to address the accountability of its citizens, we see that at the time, white people were the only ones reporting. The data now collected every decade is the latest report. In 2010, the report showed that Latinos self-identified within the race of their choice. The most highlighted information on the 2010 Census is that the Hispanic population increased by 15.2 million from 2000 to a total of 50.5million Hispanics, and California seems to be the state with the largest minority population.⁵

The Census data has been reporting through the years the increases statistics prediction of larger populations of Latinos in America. They treat the Latino population as a conglomerate group. The U.S. Census' published tabulations of immigrants do not reflect the real numbers of race distribution in America. Their responses understated or overstated as their migratory career incorporated movements in and out of the country as well as relocations from state to state.

Their reporting lacked the follow-up data to trace a minority Latino family, as the demographic data did not ask the question, "Where you have lived in the last ten years?"⁶ Latinos population has increased in numbers, so has their public school's enrollment.

When did this trend begin? It was set with the intention of integrating and abolishing segregation in the school system.

Ethnic Heritage Act (EHA) 1972-HR-994

We can say that it all began since the Civil Rights Act of 1964 adopted the 1968 Bilingual Education Act to ensure equal opportunities to a bilingual child in the United States. Then in 1972, Congress acknowledged that society has become diverse by the increase of minority numbers and historically passed the Ethnic Heritage Act (EHA) -H.R. 994-which target English language learners (ELL). The EHA became Public Law 92-318 (June 23, 1972), allowing students the

5. Bureau, US CENSUS. "The Hispanic Population: 2010 Census Briefs." In 2010 Census Briefs. Washington, DC: US Department of Commerce US Census Bureau, 2010.

6. Redstone, "Coming to Stay", 722.

opportunity to learn and study their own culture as well as that of their peers. This federal government supportive effort was intended to stimulate awareness of the importance of these minorities' culture in America.⁷

However, from an educational standpoint, it did not answer what, who, and how educational institutions should implement this new minority education culture

For example, in 1989, when the New York Education Commissioner, Mr. Thomas Sobol, created the Task Force responsibility for reviewing the N.Y. schools' social curriculum to provide quality of education to the "Pluralistic Society," they did not foresee the negative effect of the task force rendered "Curriculum of Inclusion" report. The report claimed the N.Y. schools were contributing to the "miseducation" of young people with an education system that mostly focused on European culture. The report's recommendation was to replace this educational system for one of the inclusions of multicultural contributions to all aspects of society. This inclusion challenges the New York school system in what to teach, how to teach it, and how to assess students' learning. It triggered multidisciplinary approaches to unify diversity into multiculturalism,⁸ adding multiple perspectives and different patterns to organize multiple learning environments, and resources into teaching, learning, and assessment methods of multi-ethnic communities.⁹

Among the most prominent education approaches is Multiculturalism. The Multicultural education promotes all students to answer the question of "Who am I?", which mostly causes controversy in the dominant white community. The intention was prejudice reduction fomenting integration by educating the student about diversity. The Multiculturalism approach in education has not been well received by scholars, teachers, and society at large. It has caused racial tension, ethnic hostilities, religious conflicts, class division, gender grievances, and ideological cleavages.¹⁰

7. Burke, A., J.A. Williams, and D. Skinner. In *The Latino Education Crisis: The Consequences of Failed Social Policies*, edited by Patricia C. Gandaras and Francis Contreras, 2009.

8. Fullinwider, Robert K. *Public Education in a Multicultural Society: Policy, Theory, Critique*. Cambridge, UK: Cambridge University Press, 1996.

9. Grant, S.G. "Appeasing the Right, Missing the Point? Reading the New York State Social Studies Framework." *Social Education* 61 (1997): 102-07.

10. Banks, James A. "Multicultural Education: Historical Development, Dimensions, and Practice." *Review of Research in Education* 19 (1993): 3-49.

The Comprehension Immigration Reform Act 2006 (S. 261 and H.R. 4437)

The law incorporated the English-only clause like many other policies and programs developed to deal with the large population of immigrants in the U.S. This policy deals with enculturation and assimilation expected from immigrants coming to the U.S. The enculturation demands English language proficiency which continues to be a hot debate issue and has left bilingual minorities behind in education and career opportunities. Multicultural education was intended to embrace immigrants' culture but instead, it has been felt by Latinos as an oppression policy. The assimilation expectation is based on English language proficiency. Hence, contrary to what was intended, this Immigration Reform policy split those in favor of multiculturalism and those with the goal of English proficiency.

Another educational reform was the No Child Left Behind policy, which provided educational assistance to poor children in exchange for improving their academic progress. This language policy for English Language Learners (ELLs) being negotiated at every level of the education system from the federal government to the classroom, has not embraced the minority communities but isolated and segregated them.¹¹

In 2000, the National Latino/an Education Research and Policy Project (NLERAP) – a five years' research project resulting in a collective volume work – concluded the historical fact that the U.S public school has underserved Latino/a community. It addressed the past three decades of Latino scholars' research from the perspective of multiculturalism, teacher education, and public policy to after-school programs. This work volume acknowledges the economic hardships and educational challenges in the U.S. Latino/ communities continued to be subjected to the 1930s standardized tests originally used for Spanish-speaking Mexican- Americans.¹²

Regardless of these policies, the graduation trend of minorities and their workforce situation is better explained by the data collected throughout the years by several institutions. The anti-immigration sentiment continued to grow as the wave of immigration among Latinos kept increasing and the implementation of bilingual education or bilingualism has increased the

11. Menken, Kate. *English Learners Left Behind: Standardized Testing as Language Policy*. 2008.

12. Pedraza, Pedro and Rivera, Melissa. *Latino Education: An Agenda for Community Action Research*. Mahwah, NJ:(Lawrence Erlbaum Associates, Publishers), 2008.

multicultural and multilingual communities in America.¹³

The Controversy of Inclusion and Assimilation into Schools

In the 80s, the U.S. Census began the compulsory ethnicity identification of minorities and sorted them into different groups. At the same time, laws and policies intended to embrace minorities within school education did not embrace but segregate them, forcing them to live mostly in urban areas. The 2010 U.S. Census map, shows half of the Latinos live in two states, California (11 million) and Texas (6.6 million). (Figure 1) For the last 28 years, American schools continued to have a steady increase in the Latino student population. Segregation of Black and Latino students are resulting in them attending overcrowded schools in those urban zones. Their schools are poorly equipped and have lower budgets than the adjacent white students' schools. Overpopulation of Latinos generates a lot of inequalities in-school opportunities, processes, and education outcomes.¹⁴ Suarez- Orozco address some positive facts of the effect of the Latinos being the large minority population in the U.S., which are: (1) Latinos segment of U.S. population traces its descendance to the Spanish-speaking, Caribbean & Latin-American world; (2) Latinos create a socio-cultural space of their own racialization process that will shape their future in the U.S.;(3) Latinos by sheer force of their *en masse*¹⁵ number break the Black-White binary mindset about race in America, and (4) Latinos socio-cultural space in *en masse* articulate a new way of cultural adaptation and assimilation.

Therefore, the application of power by number might have some influence on the canvas of America. The education trends of the large population of Latinos will be discussed next.

STATISTICS TRENDS OF LATINOS IN HIGHER EDUCATION

Institutions have used the data generated by the U.S. Census to determine the Latino workforce distribution and education trends into STEM careers. Some of these institutions monitoring the U.S. workforce are the National Science Foundation (NSF) and its National Science Board

13. Contreras, Frances. *Achieving Equality for Latino Students: Expanding the Pathway to Higher Education*. New York: Teachers College Press, 2011.

14. Suarez-Orozco, M. M. "Hispanic Americans: Comparative Considerations and the Educational Problem of Children." *U.S National Library of Medicine-National Institute of Health* 25, no. 2 (1987): 141-64.

15. Merriam-Webster dictionary definition of *en masse* is in a body: as a whole.

Commission (NSBC), the U.S. Bureau of Labor Statistics, (USB) and the U.S. Department of Education (USDoEd).

The U.S. Labor of Statistics established by the Department of Interior was created in 1884 to collect information on employment and labor. U.S. Workforce reports indicated that from 1993 to 2015, the proportion of the White population has decreased from 84% to 67%. This reporting is not realistic on this percentage offset since the increase in Hispanic populations in the last three decades shown by U.S. Census¹⁶ identified multiracial identities distributions that were not available before.

The U.S. Department of Education (USDoEd) began operation in 1980 but was originally established in 1887, under the name Office of Education. The USDoEd 2019 budget of \$129.8 billion supports U.S. citizens and their American families pay for college with post-secondary grants, loans, and work-study. The USDoEd in 2012,¹⁷ depicts in the chart a comparison by gender of all race/ethnicity groups, based on high school completion, bachelors and above, on non-STEM degrees and STEM fields. Latinos, regardless of gender distribution and level of education, rank lower than other race groups. Asians of both genders are the best paid-for STEM or non-STEM fields and Asian males with high school diplomas were paid better than all other race groups with high school diplomas ([Figure 2](#)).

The National Science Foundation (NSF) created in 1950 as an independent federal agency, established the National Science Board (SCB), which is composed of 25 members and a director. Among its many functions, NSF promotes the progress of science. NSF through its board generates the Science and Engineering Indicators (S & E) report.

The National Science Board Commission¹⁸ (NSBC) indicated in 2015 that the labor force for Latinos in Science and Engineering was only 10% in all fields (regardless of being a citizen or permanent resident) as compared to all ethnic groups. It seems that Asians and Whites were holding the highest degrees in engineering and sciences depicted the 2015 NSF ([Table 1](#)). Even when Latinos account for only a 6% trend in 2014 for Science and Engineering (including several

16. US Census, 2010, "Us Census: Agency History Overview." 14

17. US Department of Education. "Higher Education: Gaps in Access and Persistence Study." Washington, DC: Institution of Education Sciences, 2012.

18. National Science Board Commission. "Science and Engineering Indicators 2015." Arlington, VA: National Science Foundation, 2015.

engineering fields), Latinos' science account was lower degree holders in mathematics and physical science.

In 2018, the National Science Foundation listed in chapter 2 of the “Highlight of 2018 Science and Engineering Indicators” the major distributions for science and engineering at international and local U.S. levels.¹⁹ This report stated that within the last ten years, bachelor degrees awarded to Hispanics (only permanent residents) increased from 7-13%. (Take note that the U.S. has 11million undocumented Latinos.) The bachelor up to doctoral degrees awarded have increased but the degree recipients are mostly international students holding temporary visas. In 2017, 69% of students who graduated in Science and Engineering came from China and India (Figure 4).

LATINOS BARRIERS AND DIFFICULTIES THAT INTERFERE IN STEM CAREER CHOICE

Latinos face many extrinsic barriers when planning for higher education. Latino Americans, with no immigration issues or language barriers, are considered regarding this issue. Latinos, in general, ranked within the poorest race/ethnic group. They lacked financial solvency and many of them work and study since high school age to help their family. So, family solvency is low to pay for higher education and since the statistics indicate many Latinos lacked support in school before high school graduation, that could be why statistics showed they dropped in 10th grade. Due to lack of solvency in the family, Latinos cannot apply for student loans and if they get into college, they mostly engaged in part-time studies lowering their rate of graduation with increased years spent in college. In summary, they lacked support from the school or higher education institution before and after high school graduation.²⁰

The difficulties are intrinsic. Intrinsic difficulties have to do with themselves; they perceived their ethnicity, culture, and values being different from the embracing culture. Latinos immigrants (i.e., 11 million) might graduate from high school, but unless they have access to temporary visas or citizenship before they graduate from high school, they will not have access to higher education. Foreign-born Latinos have unfamiliarity with the U.S. education system and

19. National Science Foundation. “Science and Engineering Indicators 2018.” NSF, <https://www.nsf.gov/statistics/2018/nsb20181/report>.

20. Fernandez, Jacqueline. “Undocumented Latino Student Pursuing Degree in Stem Disciplines: Attitudes, Perceptions, Teacher Support, and Future Views.” *Journal of Latinos and Education* 17, no. 4 (2008).

classroom environment. The historical trend of language barriers, low scores on Reagent exams, SAT tests and a low grade point average (GPA) for college admission make the college enrollment almost null. Embracing programs like ELL and teachers with no training on culture, language, and skills to identify Latinos' learning challenges hinder more than help them. Critics of ELL question the validity of Reagent and SAT score exams to measure achievement failures.²¹

THREE PILLARS FOR LATINOS STEM ACHIEVEMENTS

The three pillars for Latinos to achieve STEM education are the Latinos, as an ethnic group with its extrinsic social levels and intrinsic personal levels, the K-12 education system that provides the basic preparation for higher education, and the institution that provides the STEM degrees. There is a shared commonality within these three areas, namely motivation language, culture, and learning. As shown, all three areas share the language issue, which seems to be a critical factor affecting their higher achievement ([Figure 3](#)).

Latinos

There are multiple explanations to understand the context of “how” Latino students can progress in their education and engage in STEM careers. The individual perspective of the Latino in the microcosm of his/her life experiences expands into the social perspective to a macrocosm of interactions that goes from family to peers in school and beyond to the institution that can provide higher education. This is what these three pillars represent.

Beginning with the Latino student's personal and social interactions, we start with language. The importance of language is underscored by an ethnographic study conducted in Canada, which concluded that Latino families consider the preservation of their primary language as helpful in constructing a strong cultural identity and maintaining the cohesiveness of their family. This ethnographic study of Latinos in Canada acknowledges (the same as in America) that Latinos faces many academic challenges

Guardado defined the term Heritage Language Development because it incorporates the importance and pride Latino families placed on the primary language, Spanish. Hence, preserving the Spanish language opens the second factor for a Latino, which is the Latinos' family values and

21. Saez, Pedro A., Heidi A. Bender, William B. Barr, Monica R. Mindt, Chris E. Morrison, Jason Hassenstab, Marivelisse Rodriguez, and Blanca Vazquez. “The Impact of Education and Acculturation on Nonverbal Neuropsychological Test Performance among Latino/a Patient with Epilepsy.” *Applied Neuropsychology* 21 (2014): 108.

culture, as it set their identity, regardless of the trends of spatial segregation, schools, and homeownership segregation outcomes.²²

Family influences the household particularities as food, values, parenthood, and relocation trends. It also varied within the Latinos ethnicity diversity as their racial and ethnic mixing and inter-marriages effects on the offspring identity shifts issues.

At a personal level, Latino students need to exercise a sense of self-efficacy in the things that matter for their scholastic achievement. Bandura²³ defined self-efficacy as individuals' belief that they have the capacity and will take the necessary actions to achieve a particular outcome. Latinos have to take their future into their own hands, and they need to demonstrate self-confidence and awareness of their difficult circumstances but never ceases to exhibit control over their destiny. As Bandura said, self-confidence influences performance. This leads us to another important concept, motivation. In the life of any citizen around the world, we all have hopes and things that inspired us to excel in life. Latinos in America (regardless of being citizens or immigrants) have been inspired by the idea that America is "The Land of Opportunity." When Latinos students enter the public school system, they expect to be provided with opportunities to get a good education that will lead to a progressive job or an excellent chance to register in higher education.²⁴ Not only are we all inspired to reach our dreams but also studies on the concept of motivation predict educational attainments and achievements?

Education

Teachers are expected to trust and be understanding of the Latino student. Teachers must acquire the attitudes, skills, and disposition to work effectively with Latinos. Latinos' primary language of Spanish continues to be underscored by the school system when addressing academic achievement. Therefore, Latinos feel "culturally deprived" – as not been able to share their culture – to the

22. Guardado, Martin. "Language, Identity, and Cultural Awareness in Spanish-Speaking Families." *Canadian Ethnic Studies* 40, no. 3 (2008): 171-81.

23. Bandura, A. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice Hall Publisher, 1986.

24. Hustinx, Paul W.J., Hans Kuyper, Margaretha P.C. van der Werf, and Pieterneel Dijkstra. "Achievement Motivation Revisited: New Longitudinal Data to Demonstrate Its Predictive Power." *Education Psychology* 29, no. 5 (2009): 561-82.

dominant cultural group, especially when the dominant social group determines what counts as a culture.²⁵

Some critics placed the blame of Latinos lacking achievement in family culture, language barriers, and lack of interest in being assimilated into the American school system. The majority of education theorists and researchers' expectations toward students from disadvantaged families (regardless of experience or lack of experiences as teachers),²⁶ consistently doubts their abilities. As schools are the first place to prepare for STEM, the teacher is the first contact to fulfill that function. Teachers should be active in breaking the negative cycle that keeps Latinos behind in STEM careers. Teachers need to incorporate a new bilingual pedagogy program but that also demands preparation to deal with this ethnic group with language barriers. The teacher should — as part of her professional development program — be required to pass a compulsory Emotion-Sensitivity training. Hayes, in his description of professional development, suggested the educator should address the student's major challenges to increase students' learning and achievement and have been trained to address those activities for Latinos. The teacher pedagogy should be beyond the curriculum guidance.²⁷

Standardized Test States like New York, who demand Regents exam passing for granting high school diplomas infringe the opportunity of immigrant Latinos whose inculturation and ELL program could not equate the achievement levels they bring into America due to language barriers.

Institution

Socioeconomic status: A large percentage of Latino immigrant families come from low-income countries. Latino parents once in America frequently face multiple barriers in obtaining high salary jobs, being placed in a good neighborhood and even accessing public social services. There are many negative assumptions associated with Latino families. Among these is seeing poverty as preventing parents' involvement in children's school activities or being less likely to be interested in having their children getting a higher education. Other assumptions are that because they have large families or work more than one job, they cannot motivate their child's academic

25. Nieto, Sonia. "Culture and Education." Chap. 9 In *Culture and Education*, edited by B. Nelson, 127. London: Lawrence Stenhouse, 1967.

26. Georgiou, Stelios N. "Beliefs of Experienced and Novice Teachers About Achievement." *Educational Psychology* 28, no. 2 (2008): 119-31

27. Mizell, Hayes. "Why Professional Development Matters?," edited by Valerie Von Frank. Oxford, OH: Learning Forward, 2010.

achievement.²⁸ Many high school dropout and unemployment rates are linked to troubled neighborhoods as being considered toxic environments for the youth and impede their education and emotional development continuing the cycle of limited economic progress in life.²⁹ Zambrana³⁰ has identified the socioeconomic position (SEP) to address years of schooling and differ it from the definition of socioeconomic status (SES), which is the position in society based on social and economic factors. But more than the status is the fact that Latinos rank among the poorest-racial/ethnic groups. In the last 40 years, studies on generational progress among Latinos with indicators that measure progress such as language use, socioeconomic status and neighborhood integration (i.e., residential integration) have not improved their graduation rates.³¹

School Concept of Achievements: Schools, being part of the hierarchy system of public education institutions, are responsible for promoting science literacy. The standard concept of achievement is dependent on the grade point average (grades score). Latino students enter school with a cultural understanding of what they know and display and convey that knowledge. If the teacher does not share that understanding, the teacher can easily misjudge the pupil's competency.³²

Bilingual Latinos Schooling Transition Process from H.S. to College: Underestimating a social group's culture takes away a person's feeling of belonging. In 1993 Bourdieu³³ defined social structures are not being based only on money, as in social capital, but as a cultural capital. Cultural capital is defined as acquired tastes, values and languages and dialects or the educational qualifications that mark a person as belonging to a privileged social and cultural class. As Latinos have their native culture and language, the cultural capital is acquired as an unconscious transmission of Latino heritage.

New Bilingual Pedagogy for Latinos: Teachers follow state standards and are held

28. Zambrana, Ruth Enid. *Latinos in American Society: Families and Communities in Transition*. Ithaca, NY: Cornell University Press, 2011

29. Burton, Linda. "Childhood Adultification in Economically Disadvantaged Families: A Conceptual Model." *Family Relations* 56, no. 4 (2007): 229-345.

30. Zambrana, "Latinos Family Transition", 3.

31. Nuñez, Anne-Marie. "Achieving Equity for Latino Students: Expanding the Pathway to Higher Education through Public Policy." *Journal of Educational Administration* 51, no. 1 (2013): 95-97.

32. National Coalition of Educational Equity Advocates. "Education America: A Call for Equity in School Reform." (1994) <http://www.eric.ed.gov/ERICWebPortal/recordDetail?accno>.

33. Bourdieu, Pierre. *The Field of Cultural Production: Essays on Art and Literature*. Cambridge: Polity Press, 1993.

accountable for raising Latinos' achievement standards, but the state standards-setting always controls the pedagogical objectives and the classroom instructions. The intervention of a classroom teacher is limited by the high number of students per class generally seen in minority schools. Rather than force an ELL program, add the option of bilingual classes for facilitating the transition into English without losing the content of the context of a class subject. If teachers for Latinos are also bilingual, they can clarify to many high school students the science themes that generally are too complex for a non-English speaker student. Also, consider a peer support system that encourages native-born Latinos to help foreign-born Latinos.

Change the GPA Stigma by not prioritizing Standardized Test: As an achievement measure, there can be another system to rank knowledge and learning. States like New York who demand Regents exam passing for granting high school diplomas infringe on the opportunity of immigrant Latinos whose inculturation and ELL program could not equate the achievement levels they bring into America due to language barriers. A homogeneous system to evaluate students' needs to consider other English language testing methods that capture learning and problem solving and reasoning skills. Most STEM fields rely on the student's ability to reason the best solution to problems.

The negative stereotype of Latinos as Underachievers: The measure of academic achievements in schools is mostly based on performance productivity or ability reflected by high-grade scoring tests or intelligence tests. Since 1950 the research about "underachievers" has flourished. But the failure of measuring the reasons for underachievers continued. A recent study conducted with Puerto Rican students by Diaz ³⁴ asserted that there are many "gifted" underachievers, students being wrongly labeled as bad students, emotionally disturbed and rated as "problematic" students.³⁵ The same argument holds against the myth that all Latinos are intellectually inferior, underachievers and lazy.³⁶

34 Diaz, Eva I. "Perceived Factors Influencing the Academic Underachievement of Talented Students of Puerto Rican Descent." *Gifted Child Quarterly* 42, no. 2 (1998): 105-21.

35. Diaz, "Perceived Factors Underachievement", 109.

36. Antrop-Gonzalez, R., Velez, William, and Garret, Thomas. "Examining Familial-Based Academic Success Factors in Urban High School Students: The Case of Puerto Rican Female High Achievers." *Marriage & Family Review* 43, no. 1/2 (2008): 140-60.

CONCLUSION

The research inquiry for this paper was heuristics in nature, as the author explored many intrinsic issues (i.e., the emotional, schooling, social acceptance) affecting Latinos that frequently points to the cause for Latinos left behind scholastically. The exploration discovered that most of the articles addressed extrinsic issues affecting Latinos in school (i.e., ELL program, multiculturalism programs, ELL reading, writing, and math assessments) rather than validation and respect for their culture and language with bilingual education curriculums instead of ELL programs.

Given that Latinos are the poorest group in society, how they can enroll in any STEM career without funding? If the federal funding to school support ELL, what happens after high school? Where are these findings – as Latinos do not qualify – due to their low income – to take student loans? Is there any funding in early grades for their continuing education after high school?

We know native Latinos (i.e., American Latinos) college enrolment data reveal that Hispanic students value university education yet enrol only part-time in two-year institutions. As academic preparation is a prerequisite to finishing a four-year degree, we should focus on what the higher education institutions can do to promote a four-year bachelor's degree. One thing that educators can do to prevent this continued trend of Latinos not engaged in STEM is to promote remedial courses at the college level to construct the academic deficiency contributing to the low graduation rates.³⁷

As we have seen, policy and programs have not resolved the issue throughout the last century, and our present situation is that there are 11million foreign-born Latinos in the United States, and more are expected to come into the country in the coming years. The institutions responsible for creating policies, and those education committees with jurisdiction over legislation, compete for monopoly and the public awareness on this issue, but they have not changed the differential between what is understanding and what is interpreting policy. We know that policies change through time. They are dynamic. New policy initiatives should be paired with new research efforts to learn the factors behind the Latino achievement gap.

This paper presented the first historical perspective of educational policies, research, and educational trends of Latinos in the context of shedding light on the reasons that prevent Latinos

37. Fry, Richard "Hispanic Youth Dropping out of U.S. Schools: Measuring the Challenge." Washington, DC 20036: Pew Hispanic Center, 2003.

from entering STEM careers. The following conclusions are made; the interpretation of policy through analysis to solve the social problem can only be beneficial if it embraced by all members of society not just the elite at the legislative body.³⁸ The author agrees with Nancy Shulock's position of including and listening to the concerns of all members of society. In this case, in listening to foreign and native American Latinos' concerns, we might solve the problem of a large population of Latinos not studying STEM careers.

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TABLES AND FIGURES

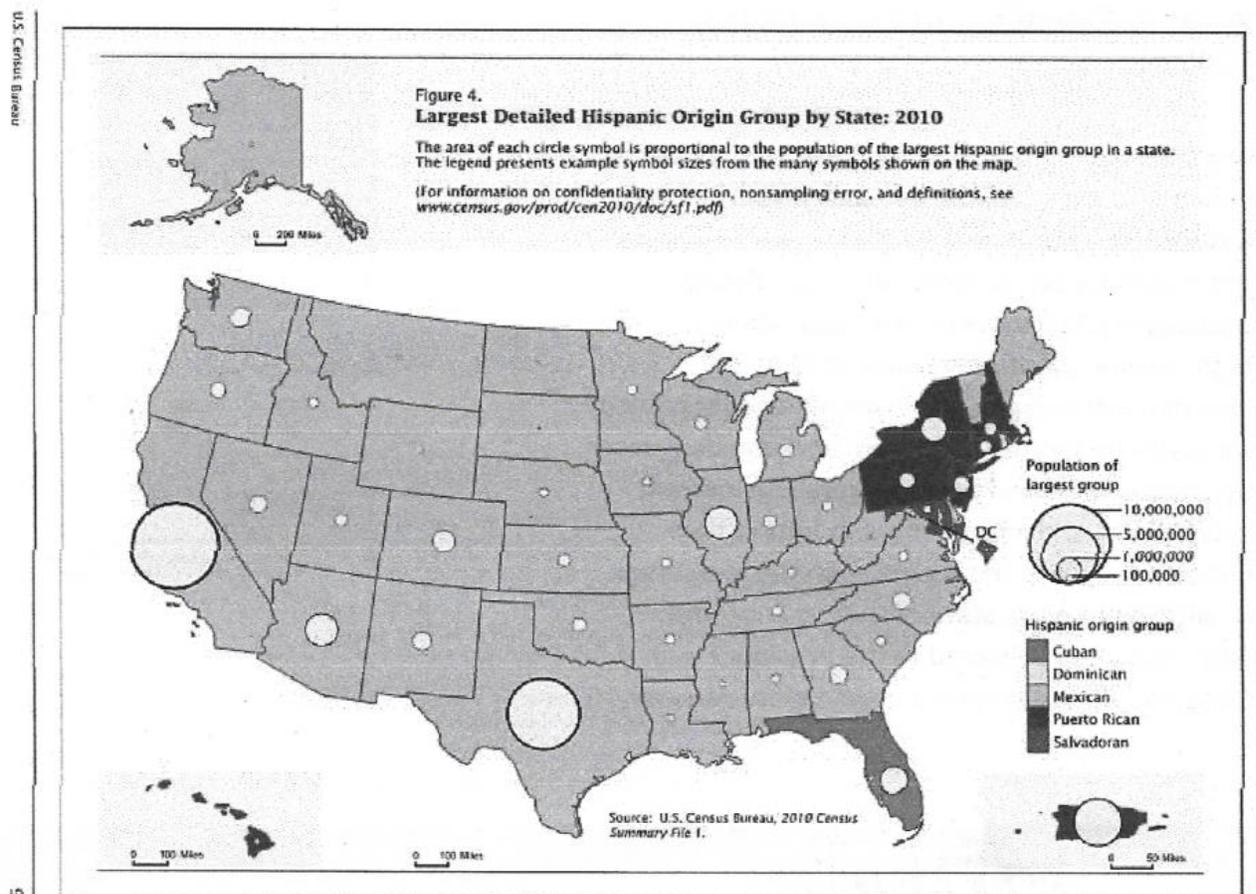
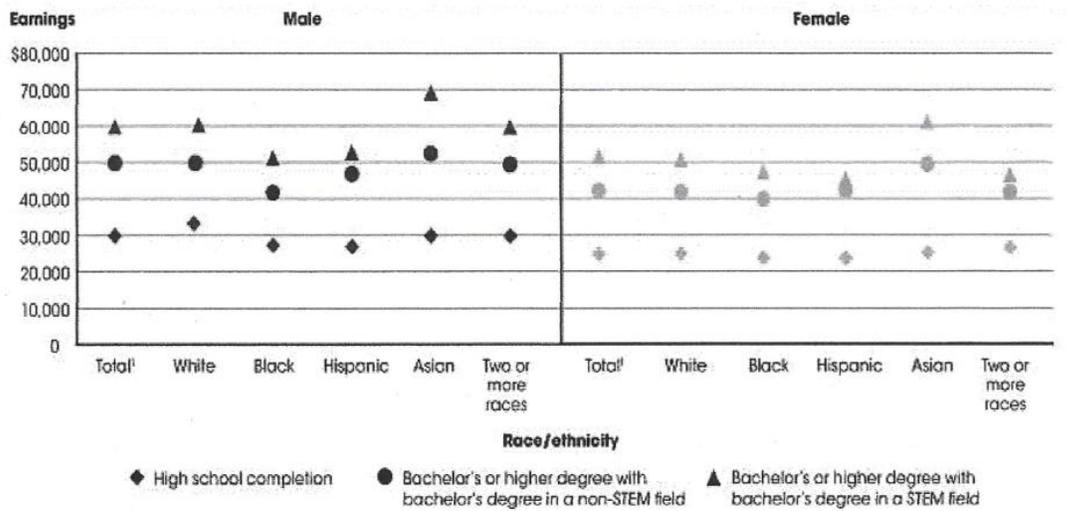


Figure 1. Largest Detailed Hispanic Origin Group by State: 2010



¹ Total includes other racial/ethnic groups not shown separately in the figure.
 NOTE: Estimates are for the entire population in the indicated age range, including persons in both households and group quarters. A household includes all the persons who occupy a housing unit. A group quarters is a nontypical household-type living arrangement where people live or stay in a group living arrangement that is owned or managed by an entity or organization providing housing and/or services for the residents. Group quarters include such places as college residence halls, residential treatment centers, skilled nursing facilities, group homes, military barracks, correctional facilities, and workers' dormitories. Employment status refers to the full calendar week prior to the week when the respondent answered the questions. Full-year worker refers to those who were employed 50 or more weeks during the previous year; full-time worker refers to those who were usually employed 35 or more hours per week. High school completion includes a high school diploma or an equivalent credential, including a General Educational Development (GED) certificate. Detail may not sum to totals because of rounding. Reporting standards for at least some data for Native Hawaiian/Pacific Islander males and females, American Indian males and females, and Alaska Native males and females were not met; therefore, data for males and females in these racial groups are not shown in the figure. Race categories exclude persons of Hispanic ethnicity. Science, technology, engineering, and mathematics (STEM) fields, as defined here, include agriculture and natural resources, biology and biomedical sciences, computer and information sciences, engineering and engineering technologies, health professions and clinical sciences, mathematics and statistics, and physical sciences and science technologies.
 SOURCE: U.S. Department of Commerce, Census Bureau, American Community Survey (ACS), 2010.

Figure 2. Median Annual earnings of full-time wage and salary workers by gender, race/ethnicity and highest education level of education (Figure 45-1) by USDOE (2010).³⁹

39. Bureau, US Department of Commerce Census. "American Community Survey(ACS)." Washington,DC: Department of Commerce, 2010.

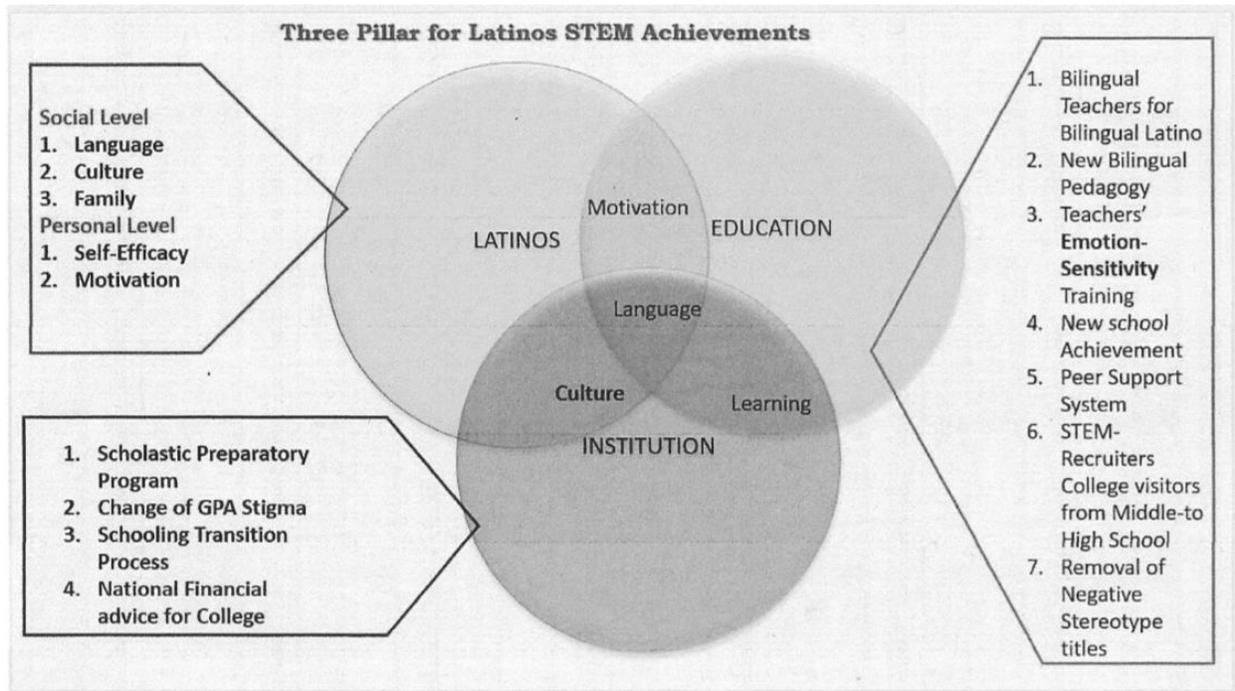


Figure 3. Three Pillars to Promote Latinos in STEM Careers⁴⁰

40. Created by Luz V. Garcia-Felix, MS, ME, MPh. (2019)

Table 1

1. Between 2000 and 2015, the share of bachelor’s degrees awarded to Hispanics among U.S. citizens and permanent residents increased from 7% to 13%, in S&E and in all fields combined, and remained steady at about 1% for American Indians and Alaska Natives. In the same period, the share of bachelor’s degrees awarded to blacks remained stable at 9% in S&E fields but increased from 9% to 10% in all fields.
2. A larger proportion of international graduate students than international undergraduate students enrolled in S&E. More than 6 in 10 international graduate students in the United States in fall 2017 were enrolled in S&E fields, compared with about 4 in 10 international undergraduates.
3. In fall 2017, 69% of the international S&E graduate students in the United States came from China and India, similar to prior years.
4. The number of temporary visa holders earning S&E doctoral degrees grew consistently between 2011 and 2014 but remained flat in 2015.
5. In 2015, international students earned more than half of the doctoral degrees awarded in engineering, economics, computer sciences, and mathematics and statistics. Their overall share of S&E degrees was 34%.
6. The number of temporary visa holders earning S&E doctoral degrees grew consistently between 2011 and 2014 but remained flat in 2015.
7. Students on temporary visas earned 2% of the associate’s and 5% of the bachelor’s degree in S&E fields in 2015
8. The number of S&E doctorates conferred annually by U.S. universities increased among U.S. citizens and permanent residents and among temporary visa holders.
9. Among fields that award large numbers of doctorates, the largest increases in degrees awarded between 2000 and 2015 were in engineering and in computer sciences.

Science & Engineering Labor Force by Race/Ethnic Distribution in 2015 data by NSF (2015) ⁴¹

41. National Science Foundation. "Science and Engineering Indicators ", 2015

Chapter 3 Science and Engineering Labor Force	
Highlights	Table 3-21
Introduction	Racial and ethnic distribution of employed individuals with S&E highest degree, by field of highest degree: 2015
U.S. S&E Workforce: Definition, Size, and Growth	(Percent)
S&E Workers in the Economy	
S&E Labor Market Conditions	
Age and Retirement of the S&E Workforce	
Women and Minorities in the S&E Workforce	
Women in the S&E Workforce	
Minorities in the S&E Workforce	
Salary Differences for Women and Racial and Ethnic Minorities	
Immigration and the S&E Workforce	
Global S&E Labor Force	
Conclusion	
Glossary	
References	

Race and ethnicity	All S&E fields	Biological, agricultural, and environmental life sciences	Computer and mathematical sciences	Physical sciences	Social sciences	Engineering
Employed with highest degree in S&E (number)	13,497,000	2,116,000	2,346,000	789,000	5,056,000	3,190,000
American Indian or Alaska Native	0.3	0.3	0.1	s	0.4	0.3
Asian	15.1	13.3	23.1	17.5	7.1	22.5
Black	6.4	5.4	7.3	3.2	8.6	3.8
Hispanic	8.4	8.2	5.8	5.4	10.0	8.7
Native Hawaiian or Other Pacific Islander	0.3	0.2	0.3	s	0.5	0.2
White	67.6	71.1	61.6	72.4	70.9	63.1
More than one race	1.9	1.6	1.8	1.0	2.5	1.4

s = suppressed for reasons of confidentiality and/or reliability.

Note(s)
Hispanic may be any race: American Indian or Alaska Native, Asian, black or African American, Native Hawaiian or Other Pacific Islander, white, and more than one race refer to individuals who are not of Hispanic origin. Percentages may not add to 100% because of rounding.

Source(s)
National Science Foundation, National Center for Science and Engineering Statistics, National Survey of College Graduates (NSCG) (2015). <https://www.nsf.gov/statistics/svygrads/>.

Science and Engineering Indicators 2018

Figure 4. 2018 National Science Foundation-Science and Engineering Indicators Report 9 Major Highlighted facts