BOARD # 350: Degree Attainment and Social Mobility of STEM Students at Two Hispanic Majority Institutions

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Introduction

This poster represents two different yet essential topics related to Latinos or Hispanics as they obtain STEM degrees. Latinos are the largest minority group in the United States [1]. It has been forecasted that by 2060, more than 30% of the workforce will be composed of Latinos [2]. The increase in the Hispanic population is also reflected in college enrollment and the workforce. STEM fields saw a rise of 56% in Hispanic enrollment, and Black enrollment increased by 36% between 2017 and 2021 [3]. Even though the Hispanic/Latino population keeps growing, there are few role models to follow in the STEM field. Added to the lack of role models in a continually diversified college population, a high STEM student attrition [4] shows that a lack of diversified pathways to degree completion is a roadblock to completion by Hispanics who could qualify as nontraditional students. The first study explores the impact of STEM degree attainment on intragenerational Social Mobility among Hispanic students in border universities. The second study examines the unique pathways for nontraditional students and the years needed to obtain a degree. Both studies involve participants from the University of Texas at El Paso (UTEP) and the University of Texas at Rio Grande Valley (UTRGV). For this research, participants may self-identify as Hispanic or Latino(x); the literature review found that Latino and Hispanic are used interchangeably [5]-[6]. The U.S.-Mexico border in Texas spans 1,248 miles, extending from El Paso to Brownsville in the south. This region has a population of over 80% Hispanic. Some studies have been conducted on social mobility; however, the specificity of intragenerational social mobility in Hispanic students' higher education in STEM on the US—Mexico border has yet to be investigated. Social mobility is a change in a person's socioeconomic situation from their parents (intergenerational mobility) to their lifetime (intragenerational mobility). Nontraditional students with STEM degrees share one or many of the following characteristics: be over 25 years old, not live on-campus, have part-time enrollment, part-time or full-time employment, be economically independent, be a caregiver, or have one or more dependents [7]. Current research on retention and degree attainment in STEM degrees focuses on high-impact practices (HIPS) to engage students. Some questions remain unanswered, like the transformational role of

undergraduate research on nontraditional students and the differences in STEM degree experiences for students who took longer than the average of 6 years to graduate. While reviewing the current literature, we found a gap regarding the specific topics of the two studies we present here. The results of this study can advise legislators and educational institutions about the effectiveness of recruiting and graduating Hispanic students in STEM fields and assist them in understanding the socioeconomic benefits they might receive upon entering the labor workforce. As more Hispanics receive a STEM degree, they will achieve more representation and become role models for future generations.

Experimental Methods

Both studies involved students from the University of Texas System Louis Stokes Alliance for Minorities Participation (UT System LSAMP) program at UTEP and UTRGV. The University of Texas Rio Grande Valley (UTRGV) is a public research university established in 2013 through the merger of the University of Texas-Pan American and the University of Texas at Brownsville, whose population is 90% Hispanic. Established in 1914, the University of Texas at El Paso (UTEP) is a Carnegie R1 public research institution strategically located along the U.S.-Mexico border. With a student-to-faculty ratio 19:1, UTEP has a predominantly Hispanic student body comprising approximately 84% of total enrollment.

Researchers employed mixed methods despite utilizing various primary designs. Mixed methods can be executed in two different ways, sequentially or concurrently, depending on the priority the research needs [8], [9]. Both studies used two-phased explanatory sequential mixed methods to obtain quantitative data and then explain the quantitative results using in-depth qualitative data [10] with purposeful homogeneous sampling. For the first study's first phase, statistical quantitative results data were collected from the participants through a survey followed up with individual interviews to probe or explain those results in more depth. A quantitative hypothesis addressed the self-assessment of higher education graduates in STEM and whether the initial socioeconomic level and academic support relate to upward social mobility. The second phase continued with the quantitative results to explain how a STEM degree promotes the social mobility of a selected group of students. In this explanatory sequential follow-up, the plan is to explore social mobility with Hispanic students. The independent variable was the student's undergraduate or graduate research participation. On the other hand, the dependent variables were: a) monthly earnings, b) medical insurance, c) active participation in research, d) self-disclosed socioeconomic status (SES) at the beginning of their higher education journey, and e) self-disclosed SES at the moment of the study.

Quantitative data for study 2 was collected via student transcripts of the participants (N=68) to look for overall earned credits, transfer credits from other institutions, and the total years to a degree. The qualitative portion of the study required participants (N=14) to answer an online survey to identify potential nontraditional status, their experiences pre- and post-undergraduate research participation, program feedback, and whether their research experience influenced years to a degree. The questions about their college experience vary from Gonyea and associates' 2003 College Student Experiences Questionnaire: Norms for the Fourth Edition.

Results and Discussion

Both studies are works in progress; however, the first results can be seen as we analyze the collected data. Our research uses Vincent Tinto's theoretical framework on student retention to underscore the critical role of both academic and social integration in shaping students' decisions to continue or leave higher education institutions. This model can be vital in examining student experiences, including social mobility—the movement of individuals or groups within a social hierarchy [11]. Scholars base their articles on social mobility on the principle that education enables individuals to ascend from their previous social status. Researchers in higher education have extensively utilized and built upon Tinto's model to comprehend student attrition and devise effective retention strategies [12]-[13]. By fostering supportive academic environments and engaging social communities, educational institutions can increase student commitment and reduce attrition rates, thus promoting persistence and graduation [14], [15].
In study 1, 38 participants answered the survey; 71.05% came from UTEP (N=27), 21.05% from UTRGV (N=8), 2.63% from El Paso Community College (N=1), and 5.26% (N=2) from other institutions. Participants' chosen STEM field included the health sciences at 7.89% (N=3), computer science at 2.63% (N=1), engineering at 31.58% (N=12), biological sciences at 44.74% (N=17), health sciences 7.89% (N=3), mathematics and statistics 2.63% (N=1), physical sciences at 7.89% (N=3), and 2.63% (N=1) preferred not to say. Some of the first results of the intragenerational social mobility research were as follows: **Medical insurance**: Participants were asked if they had medical insurance BEFORE they started working; 5.85% gave an affirmative answer, while 46.88% did not, and 3.12% preferred not to say. Similarly, the following question asked participants if they had medical insurance AFTER they began working; the responses were: "Yes, the same as before," 43.75%, "Yes, better than before," 18.75%, "No," 34.38%, and 3.12% preferred not to say. **Self-disclosed socioeconomic status at the beginning and current of their higher education journey**: The survey asked the participants: "Please think of this ladder as representing where people stand in our society. At the top (10) of the ladder are the people who are the best off, those who have the most money, the most education, and the best jobs. At the bottom (1) are the people who are the worst off, those who have the least money, the least education, and the worst jobs or no job. Which rung best represents where you stood on the ladder BEFORE and AFTER you started working/studying a STEM degree?" The responses changed as follows BEFORE: 9.38% rung 1, 12.5% rung 2, 31.25% rung 3, 6.25% rung 4, 15.62% rung 5, 15.62% rung 6, 6.25% rung 7, and 3.12% rung 8. No representation on rungs 9 and 10. However, for AFTER, the data changes significantly. There was nobody feeling rungs 1-3 represented themselves. 25% on rung 4, 15.62% on rung 5, 15.62% on rung 6, 9.38% on rung 7, 15.62% on rung 8, 12.5% on rung 9, 6.25% chose not to disclose, and no representation on rung 10. As seen by the early data analysis, the benefits Latinos collect for pursuing or obtaining a STEM degree under an LSAMP fellowship have moved them upward in the socioeconomic status ladder. More of them have medical insurance (18.75% better than before), and the participants perceive their socioeconomic status as better than before they started working with their highest STEM education degree. While the researcher is still working on the qualitative part of the data, most participants mentioned their perception of moving upward compared with their peers who did not pursue STEM degrees or did not have LSAMP support.

Study 2 split the results of the student transcripts into four subgroups: the students who graduated at or in less than 4 years (subgroup 1), those who graduated within the average of 4.5-6 years (subgroup 2), more than 6 years, and those who had not yet graduated (N=23). The number of total credit hours transferred by participants varied between the subgroups. Subgroup 1 (N=10, M=38.90) transferred less than those who graduated within the average of 4.5-6 years (N=21, M=43.81) and those who took longer than 6 years to graduate (N=12, M=45.83). When including the time spent in other institutions before enrollment at UTEP or UTRGV, most transcripts reported more than the minimum of 120 credit hours needed for graduation. Subgroup 1 had the least amount of total credit hours earned when graduated (N=10, M=145.80), followed by subgroup 2 (N=21, M=149.67) and subgroup 3 (N=12, M=165.08). Out of the 14 participants who answered the online survey, 71.42% (10 participants) showed a mix of characteristics of nontraditional students: were either part-time (2), full-time (6), self-employed (1) employment status, be over the age of 25 (7), or have dependents (6). These results show the intersectional reality of nontraditional students.

Final Remarks

As mentioned, early results from the first study show that Hispanic STEM students and graduates in the UT System LSAMP program have allowed students to move upward in the SES ladder within their lifespan, given all the resources and opportunities the program presented—most especially the mentoring they receive during their journey. During the interviews, several participants mentioned "giving back" to those who helped them excel in their career paths. Interestingly, their "giving back" is achieved by empowering other students like them to keep pursuing their degrees and use all the opportunities LSAMP has provided them. The fact that LSAMP's structure is based on Tinto's theoretical framework gives us a better understanding of how it empowers Hispanic students to complete their STEM studies, thus improving their SES. Future work might consider expanding the population to include other research areas and not be limited to Hispanics in STEM fields.

Similarly, in Study 2, quantitative data of student transcripts reported that students that graduated at or in less than 4 years transferred on average more credit hours than the other 2 subgroups. The subgroup of students that took longer than 6.5 years to graduate had fewer transfer credit hours yet more overall earned credit hours than the other two subgroups. This could be due to switching from one degree to another, courses that became outdated throughout the years, or courses unrelated to the degree plan that had to be taken when pivotal courses were not offered that semester. It is worth noting that due to the unique sociocultural context of the institutions and the small participant samples, the results do not provide a complete picture of nontraditional students and the institutions involved.

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