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2023 SHPE-LDC U.S. Latinos in Engineering and Tech Report



**BREAKING BARRIERS,
BUILDING FUTURES**

2023 SHPE-LDC U.S. Latinos in Engineering and Tech Report

ABOUT THE SOCIETY OF HISPANIC PROFESSIONAL ENGINEERS (SHPE)

SHPE is the largest association in the U.S. for Hispanics in STEM. They meet each of their students and professional members where they are—offering effective training, mentorship, and programming for their vibrant community to create a world where Hispanics are highly valued and influential as leading innovators, scientists, mathematicians, and engineers. Its mission is to change lives by empowering the Hispanic community to realize its fullest potential and to impact the world through STEM awareness, access, support, and development.

ABOUT THE LATINO DONOR COLLABORATIVE (LDC)

The LDC is a non-profit and non-partisan organization that creates original economic research about the Latino/Hispanic community in the United States. Our data is used by decision-makers and resource allocators to promote growth in the new mainstream American economy. Together with our partners at top U.S. research centers, we produce fact-based data to identify opportunities.



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* The terms Latino and Hispanic are used interchangeably in this report.

A Letter From the Latino Donor Collaborative

We are delighted to introduce the 2023 SHPE-LDC U.S. Latinos in Engineering and Technology Report, a collaborative effort that holds immense significance for the future of engineering and technology in the United States.

Latino participation in the engineering and technology fields is not merely a matter of diversity and inclusion; it is a vital component of maintaining our nation's global competitiveness and technological advancement. As the report reveals, by nurturing and encouraging young Latinos, who constitute a substantial 25% of young people in the U.S., to pursue STEM education, we are on the path to eliminating concerns of talent shortages in these critical sectors.

It is an absolute pleasure to collaborate with the Society of Hispanic Professional Engineers (SHPE) in bringing this report to fruition. SHPE's mission and dedication are pivotal to the continued leadership of the United States in the technology field, and we commend their efforts.

The 2023 SHPE-LDC U.S. Latinos in Engineering and Technology Report unveils several noteworthy insights:

1. From 2010 to 2021, there has been a remarkable 73.6% increase in U.S. Latinos' enrollment in undergraduate engineering programs. The future holds promise, with projections of 10.9 million job openings in STEM fields by 2031.
2. While U.S. Latinos currently constitute 9.4% of the engineering workforce, their presence in undergraduate engineering education has surged to 15.8%. This is not only significant due to the percentage growth but also because of the overall increase in enrollment. In essence, the pie has grown larger, and Latino participation has grown significantly within that expanded sphere.
3. U.S. Latinos, representing 19.1% of the U.S. workforce, were responsible for a remarkable 73% of the growth in U.S. labor force participation between 2010 and 2020, surpassing all other major population groups.

We urge all organizations, academic institutions, research organizations, and employers in the engineering and technology fields to utilize this report as a benchmark and develop strategies to harness the potential of the Latino cohort. Together, we can fuel innovation, bridge talent gaps, and ensure the United States continues to lead in engineering and technology.

We look forward to the transformative impact this report will undoubtedly have.

Sincerely,

Sol Trujillo
Co-Founder and Chairman of the Board
The Latino Donor Collaborative

Ana Valdez
President and CEO
The Latino Donor Collaborative



Sol Trujillo



Ana Valdez



Miguel Alemañy



Kimberly D. Douglas



Dayna L. Martínez

A Letter From SHPE

We are honored to welcome you to the inaugural report produced in collaboration with the Latino Donor Collaborative (LDC).

The collaboration between the LDC and SHPE embodies a spirit of unity and shared purpose essential to overcoming challenges and seizing the opportunities presented by the ever-evolving landscape of engineering and tech. Together, we have embarked on a journey to explore the experiences, achievements, and aspirations of Latinos in these fields.

This report delves deep into the experiences of Latino students and professionals, highlighting their contributions and challenges and discussing the untapped potential within this dynamic and rapidly growing community. It provides invaluable insights that inform our organizations and catalyze change across the broader engineering and tech ecosystem.

At SHPE, we have long recognized the critical importance of diversity and inclusion in driving innovation and fostering excellence in the STEM fields. We understand that the future of engineering and tech depends on our ability to harness the vast talents and perspectives the Hispanic community offers. This report is a testament to our commitment to that vision.

As we navigate the path ahead, let us remember that diversity is not merely a buzzword. It is also a critical business tool to accelerate growth and creativity; it impacts the bottom-line and is a wise business decision. The richness of the Hispanic community's experiences, culture, and perspective is a source of innovation waiting to be tapped. By fostering inclusivity, we not only empower individuals to reach their fullest potential but also propel our industries and society to greater heights.

SHPE's overarching goal is to expedite the achievement of parity in engineering degrees awarded to Hispanic students. While the current trajectory suggests that Hispanic engineering enrollment will reach parity with Hispanic workforce numbers by 2035, our aspiration is to attain equity in engineering degrees awarded well before the projected year of 2060.

Together we can contribute to the growing Latino commitment to higher education and achieving excellence by increasing the number of undergraduate and graduate degrees in engineering and tech they earn.

Sincerely,

Miguel Alemañy, Interim Chief Executive Officer

Dr. Kimberly D. Douglas, Chief Research & Impact Officer

Dr. Dayna L. Martínez, Senior Director, Research & Impact

Executive Summary

In an era marked by escalating interconnectivity and rapid technological advancement, the United States stands at a critical crossroads where maintaining global competitiveness is no longer an option but an imperative. This report, titled "2023 SHPE-LDC U.S. Latinos in Engineering and Tech," is a comprehensive exploration of the pivotal role played by U.S. Latinos within the domains of engineering and tech. It is essential to frame this narrative within the broader context of U.S. Latinos' far-reaching influence on the nation's dynamic workforce.

As shown by research shared from the LDC, U.S. Latinos have a profound economic impact, contributing \$3.2 trillion to the nation's economy. They are a formidable economic powerhouse with statistics that cannot be ignored. If the U.S. Latino population were an independent nation, it would possess the fifth-largest GDP in the world. They would be the third-fastest growing economic force in the world behind only China and India. On the demographic front, U.S. Latinos constitute nearly 20% of the U.S. population and a staggering 25% of the young demographic aged 18 and under, highlighting their future workforce potential and continued economic significance.

In engineering and tech, U.S. Latinos have a growing influence that is not merely a matter of inclusion but an economic imperative. Latinos' growing participation in these fields is pivotal to the nation's competitiveness and its ability to surmount future challenges.

U.S. Latinos demonstrate the highest workforce participation rate among the country's major demographic groups; furthermore, this rate has consistently grown over time. Latinos were responsible for 73% of workforce growth from 2010 to 2020, signifying their impact across various industries over the years. With projections indicating a staggering 10.9 million job openings in STEM occupations by 2031, the importance of Latinos' growing presence in these fields cannot be overstated. Promising trends are witnessed in their undergraduate engineering enrollment, which grew by 73.6% between 2010 and 2021. Furthermore, Latinos' rise in completed baccalaureate, master's and doctoral engineering degrees underscores their





determination to pursue higher education and excellence. These trends position Latinos to meet the increasing demand for skilled engineering and tech professionals. The overarching mission of the Society of Hispanic Professional Engineers (SHPE) aligns with these objectives by supporting a diverse, capable, and innovative workforce that not only fosters individual aspirations but also underpins the nation's collective prosperity.

U.S. Latinos are poised to play pivotal roles in shaping the nation's technological trajectory through their substantial contributions to engineering and tech fields. However, for U.S. Latinos to realize their full potential in these areas, it is important to understand their critical needs, challenges, and opportunities. Organizations such as SHPE, assume a pivotal role in this endeavor by supporting and empowering U.S. Latino students and professionals in engineering and tech. With this objective, SHPE has conducted research to better understand its members' life and career experiences. Existing barriers must be addressed, such as the limited access to role models and mentors, the need for career and academic advancement support, the demand for financial assistance and literacy, and the pressing challenges of homelessness and physical and mental health among members. SHPE helps provide the necessary resources and support, and catalyzes the collective impacts from industry, government, academia, non-profits, and individuals to empower U.S. Latino success in STEM.

With 14,351 members in 2023, SHPE plays a pivotal role in facilitating student graduation via diverse programs and scholarships. An engineering graduation rate of 87.7% among its members (vs. the U.S. general population's rate of around 50%) demonstrates its impact. This is even more impressive considering that over half of SHPE's members were and are the first in their families to attend college. First-generation-to-college students typically have drop-out rates 92.2% higher than those from families whose parents had earned higher education degrees.

In conclusion, this report underscores that U.S. Latinos are not just a valuable asset but an indispensable one, crucial for meeting the increasing workforce needs in engineering and tech. Their presence in these sectors is no longer optional; it is vital, particularly in light of the surge in job opportunities and education trends. Organizations like SHPE will continue to be instrumental in unlocking the vast potential of the U.S. Latino community, ensuring that the nation remains unstoppable in the global landscape. We hope this will inspire readers to contribute as well.

U.S. Latinos Shaping the Country's Workforce Landscape

U.S. Latinos are a powerful force, significantly driving the economy and redefining American market dynamics. While the report focuses on the U.S. Latinos in engineering and tech, the topic must be framed within the larger context of how members of this growing demographic shape the country's workforce.

Latino Gross Domestic Product

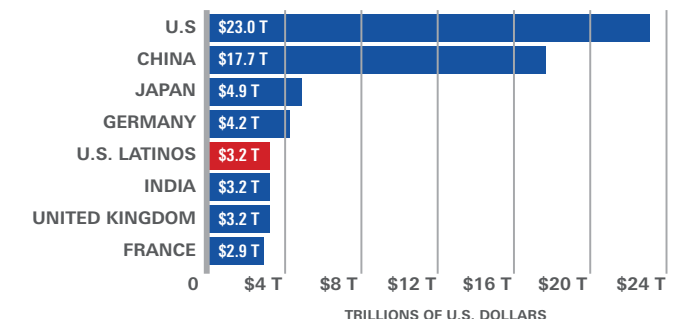
If the population of Latinos in the United States were its own country, it would be the fifth-largest GDP in the world (See Figure 1.1).

U.S. Latinos boast a remarkable total economic output of \$3.2 trillion,¹ making them the third-fastest-growing economy among major powerhouses behind only China and India (Figure 1.2).

Since the LDC started measuring it, the Latino GDP has consistently ranked among the top 10 global economies (Table 1.1).

Latinos are the third fastest-growing economy in the world

Figure 1.1: The Latino GDP on the World Stage.¹



The world's leading economies in 2021 compared to the U.S. Latino GDP as estimated from expenditures name "by and behalf" of members of this demographic.

Figure 1.2: Real annualized percent GDP growth among the world's leading economies between 2011 and 2021

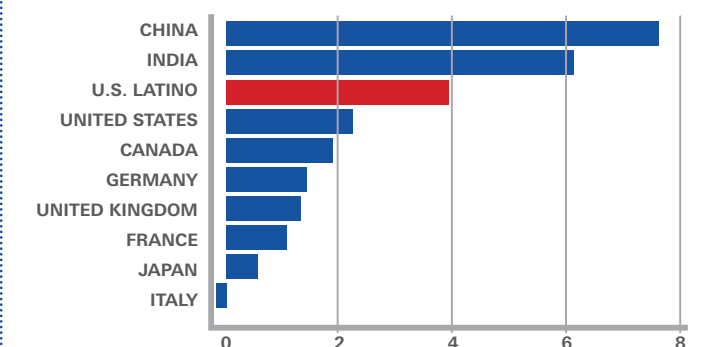


Table 1.1: In eleven years, the U.S. Latino GDP has increased by 88%.^{1,2}

	Latinos as a percentage of U.S. population	U.S. Latino GDP	If U.S. Latinos were their own country, its economy would be the...
2010	16.0%	\$1.7 T	-
2015	17.0%	\$2.1 T	7th largest
2017	18.4%	\$2.3 T	8th largest
2018	18.7%	\$2.6 T	8th largest
2019	18.7%	\$2.7 T	7th largest
2020	19.0%	\$2.8 T	5th largest
2021	19.1%	\$3.2 T	5th largest

Latino Purchasing Power

U.S. Latinos have tremendous purchasing power, measured at \$3.4 trillion in 2021.¹ Even more remarkable are the linked growth rates: Latino income exhibited a genuine annualized growth of 4.7%, in contrast to 1.9% among non-Latinos.¹ Equally noteworthy are the robust growth rates in consumption and purchasing power, surpassing those of non-Latino counterparts by over a factor of two.¹ These figures underscore the substantial contribution the Latino community makes in driving the advancement of the U.S. economy.

Latino Entrepreneurs

Latinos are often entrepreneurs by nature, accounting for 50% of net new small businesses over the past decade (2007–2017).⁷ Even during the COVID-19 pandemic from 2019 to 2022 Latino-owned businesses experienced exceptional growth, increasing revenue by 25% and outpacing their White-owned counterparts, which grew by only 9% (Figure 1.3).⁷ This notable achievement underscores the entrepreneurial spirit and resilience embodied within the U.S. Latino community, whose members are 1.7% more likely to become entrepreneurs than non-Latinos.⁷

Figure 1.3: Median Annual Revenue Growth Rate of Latino-Owned Businesses compared to White-owned Businesses from 2019 to 2020⁷

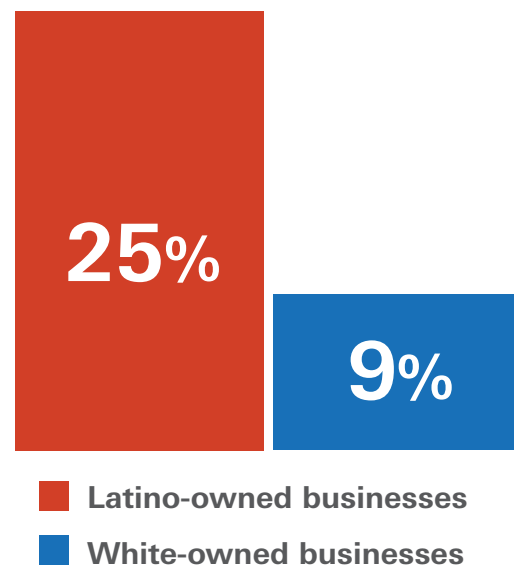
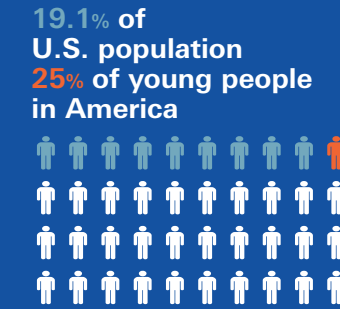
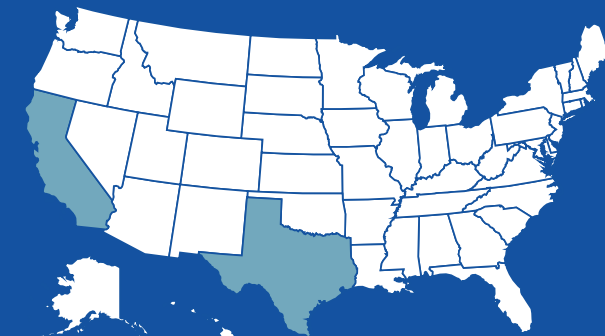


Figure 1.4: U.S. Latino Population and Latino Majority in Top U.S. GDP States^{4,5}

California and Texas, the two states with highest GDP in the U.S., now have a majority Latino population.



Latino Population Growth

The U.S. Latino population constitutes nearly 20% of the U.S. population² and 25% of young people in the U.S. (Figure 1.4).³ This impressive display of population and economic strength is substantiated by tangible evidence, as demonstrated by California and Texas, two states with majority Latino populations^{4,5} that rank among the highest in GDP nationally.⁶ These two states account for 30% of the total GDP of the United States.

The U.S. Latino population is the largest group other than non-Hispanic whites in the U.S.,² as seen in Figure 1.5. The Latino proportion of the total numbers grows even higher when one looks at the younger segment of the U.S. population demographics of the U.S. Latino cohort.

Latino Youth Drive Change

U.S. Latinos are younger than the average American (median age 30 years vs. 38 years),⁸ and 84.1% of them speak English.⁹ For example, their significant contribution to the English-language media landscape underlines the compelling impact they can have and the need to prioritize their authentic representation.

U.S. Latinos' collective influence, rooted in demographics, purchasing power, and cultural affinity, holds the potential to reshape multiple industries. Resource allocators, educators, and everyone interested in the well-being of America need to know the indispensable value of engaging this dynamic cohort to drive growth by establishing proportionate segmentation.

Figure 1.5: U.S. Population Breakdown by Race/Ethnicity 2022 Total U.S. Population

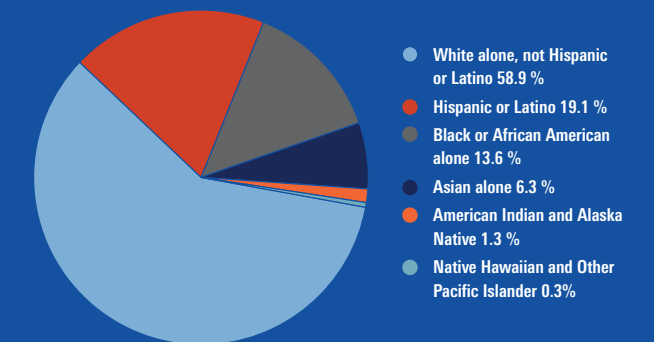
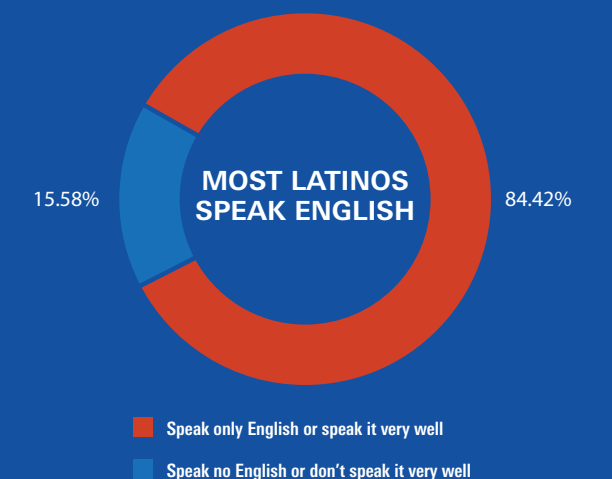


Figure 1.6: English Language Proficiency Among Latinos





What is this Report, & Why is it Needed?

This report aims to provide an overview of Latinos in engineering and tech. The numbers tell a story of Latinos' growing influence in these fields, from demographic representation to workforce participation and educational attainment. The increased participation of the Latino cohort is an economic imperative as the U.S. strives to remain competitive on the global stage and navigates the challenges of the future. Optimizing the potential of America's Latino population in engineering and tech will undoubtedly be key to the nation's success. The data in this report underscores that Latino representation isn't just beneficial, it's crucial for economic prosperity, innovation, national security, and maintaining a global leadership position in critical industries.

Moreover, this report uncovers strengths, opportunities, and vital challenges and gaps that demand attention to unlock U.S. Latinos' full potential in engineering and tech. Organizations like the Society of Hispanic Professional Engineers (SHPE) hold a vital role in this endeavor. SHPE's mission, rooted in empowering the U.S. Hispanic community to impactfully engage in science, technology, engineering, and math (STEM) industries,¹⁰ underscores the concerted effort required to maximize U.S. Latino contributions.

This report weaves the data of U.S. Latino empowerment, economic growth, organizational assistance, and the critical need to foster Latino development in engineering and tech to meet the growing workforce shortage in these sectors. This report also serves as a benchmark for universities, employers, funders, and organizations, enabling ongoing analysis of Latino representation in a vital industry that significantly contributes to the economic strength of the U.S.

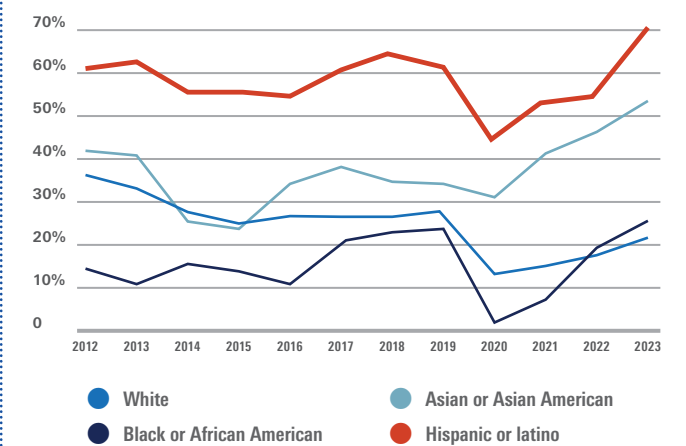
U.S. Latinos Shaping the Country's Workforce Landscape

Latinos represent 19.1% of the total U.S. population,² 25% of young Americans,³ and 18.5% of the U.S. workforce.¹¹

U.S. Latinos drove 73% of the growth in the U.S. workforce participation between 2010 and 2020.¹¹ Across the spectrum of jobs—healthcare, cybersecurity, manufacturing, defense, services, and technology—the impact of Latino workers is felt across most industries.

As depicted in Figure 3.1, the U.S. Latino workforce participation rate stands out as the highest among all other major groups of the U.S. population¹² and exhibits a consistent growth trajectory. Even though the U.S. Latino population is younger than the overall demographic, its workforce over-indexes in participation over time.

Figure 3.1: Labor Force Participation by Race and Ethnicity¹²



The Current Shortage of Engineering and Technology Professionals

Research highlights concerns about workforce shortages in engineering and tech fields. The American Council of Engineering Companies (ACEC) recently reported that 49% of firms have turned down work specifically due to workforce shortages.¹³ For example, the U.S. Bureau of Labor Statistics projects a need for about 25,000 new civil engineers annually throughout this decade.¹⁴

The importance of STEM fields cannot be overstated, with projections indicating a staggering 10.9 million job openings by 2031, representing

a substantial 10.8% growth trajectory.¹⁵ In this context, Latino workforce growth is critical. Their presence in engineering and tech is not just an option but an imperative, especially considering the surge in job openings and Latino workforce and education participation trends.

Latinos are poised to contribute significantly and occupy pivotal roles in the nation's technological trajectory. Their active participation is essential to meeting the increasing demand for engineering and tech professionals in the ever-changing workforce environment.



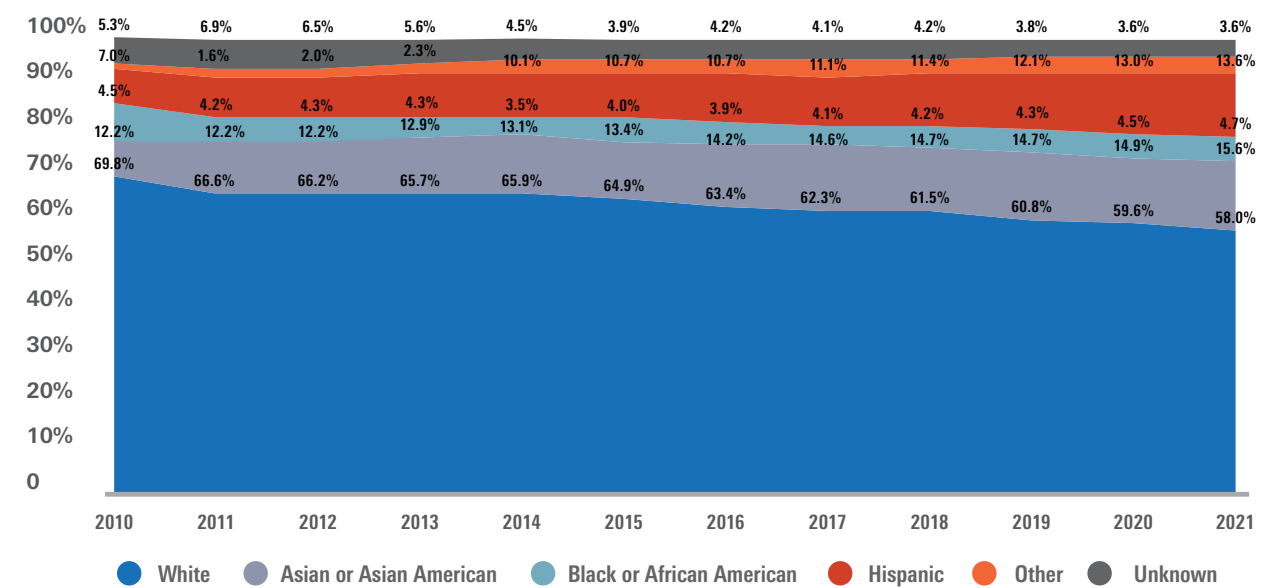
U.S. Latinos: A Positive Trend In Engineering and Tech Degrees

Contrary to common stereotypes, education is one of the strongest values in the U.S. Latino culture.¹⁷ Latinos have shown a consistent growth trend in bachelor's degrees achieved. Figure 3.2 illustrates this growth with a focus on undergraduate engineering degrees.

The following pages share U.S. Latino educational trends in engineering, confirming these students are poised to fulfill ever-growing workforce requirements.



Figure 3.2: Share of Engineering Bachelor's Degrees by Race/Ethnicity¹⁶



U.S. Latinos have the highest increase in undergraduate engineering student enrollment rates, surpassing the growth rates of any other ethnic group between 2010 and 2021 with 73.6%

Trends in Engineering College Degrees

U.S. Latinos have the highest increase in undergraduate engineering student enrollment rates, surpassing the growth rates of any other ethnic group between 2010 and 2021 with 73.6% (not counting the “other” category).¹⁶ See Table 3.1 and Figures 3.3 and 3.4.

As seen in Table 3.2, the population of Latinos in the U.S. grew 23% from 2010 to 2021, and the Latino undergraduate engineering student enrollment rate grew 73.6% during the same period of time.

Strong growth is also observed in the total number of engineering degrees awarded. Table 3.3 and Figure 3.5 display the tremendous growth in bachelor’s degrees awarded in engineering. Between 2010 and 2021, U.S. Latino engineering bachelor degrees awarded grew from 7.0% to 13.6%, representing a 94.3% increase.¹⁶ While

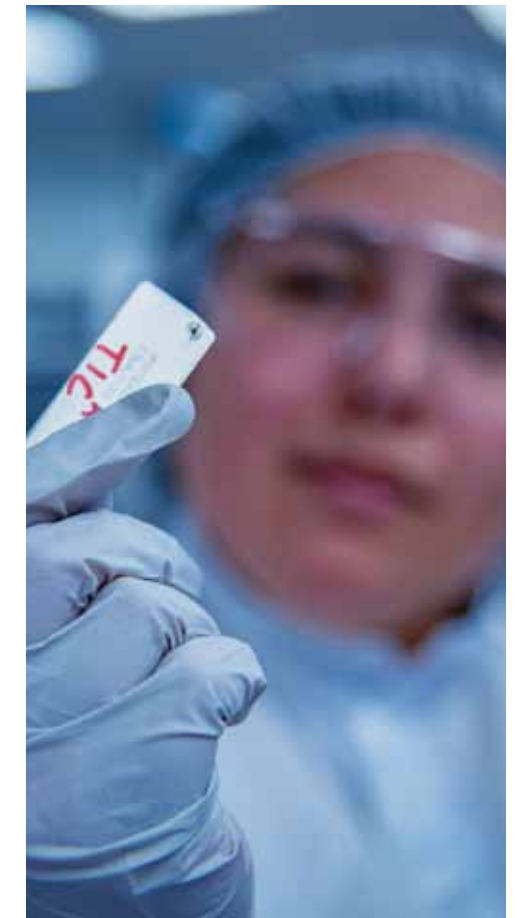


Table 3.1: Undergraduate Engineering Student Enrollment Rate by Race/Ethnicity.^{16*}

	Race/Ethnicity	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Rate of Change from 2010 to 2021	
Percentage Enrollment	Hispanic	9.1%	10.9%	11.4%	11.6%	11.6%	12.5%	12.9%	13.6%	12.9%	14.5%	15.5%	15.8%	73.6%	Increase
	Black or African American	5.9%	5.5%	5.5%	5.3%	5.1%	5.1%	4.8%	5.0%	4.3%	5.2%	5.4%	5.4%	-8.5%	Decrease
	Asian or Asian American	11.9%	11.6%	11.9%	12.1%	12.3%	13.3%	13.7%	14.2%	14.6%	16.1%	15.5%	16.1%	35.3%	Increase
	White	66.5%	63.9%	63.7%	62.4%	62.2%	61.3%	60.4%	59.0%	60.6%	55.7%	54.6%	53.4%	-19.7%	Decrease
	Other	2.1%	2.8%	3.4%	3.6%	3.8%	3.9%	4.2%	4.4%	3.5%	4.9%	5.2%	5.0%	138.1%	Increase
	Unknown	4.5%	5.3%	4.1%	5.0%	5.0%	3.9%	4.0%	3.8%	4.1%	3.6%	3.8%	4.3%	-4.4%	Decrease

*Numbers based on ASEE reports “Engineering By the Numbers” from 2010 to 2021, there might be small discrepancies due to rounding.

Figure 3.3: Undergraduate Engineering Student Enrollment Rates by Race/Ethnicity (ASEE) (Including White).¹⁶

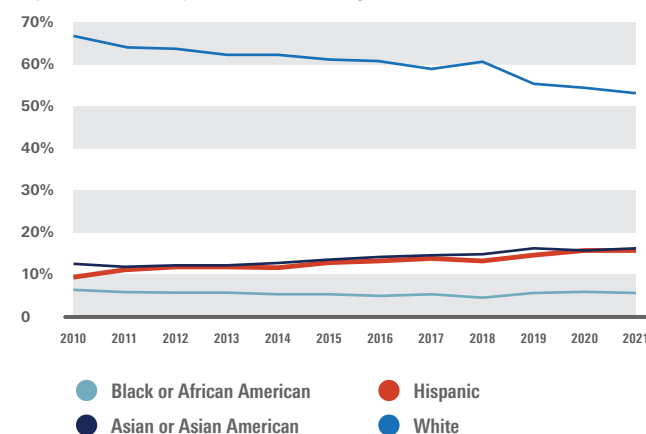


Figure 3.4: Undergraduate Engineering Student Enrollment Rates by Race/Ethnicity (ASEE) (Excluding White).¹⁶

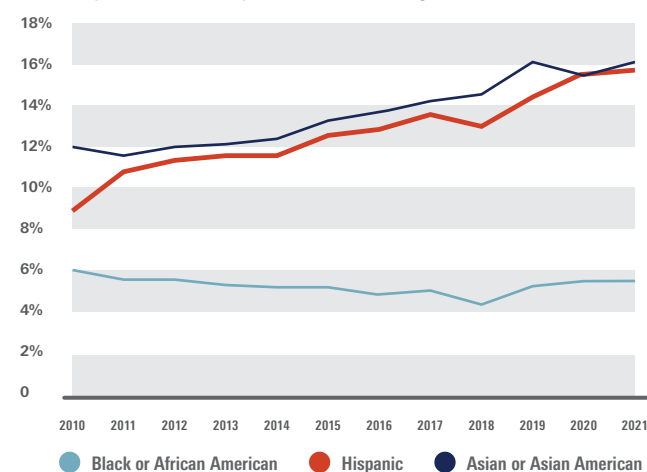


Table 3.2: Overall Population Growth by Race/Ethnicity¹⁸

Population Growth from 2010 to 2020 (for only those who selected one race)

Race/Ethnicity	Metric	2010	2020	Rate of Change from 2010 to 2020	
Hispanic	Percentage	16.3%	18.7%	14.7%	Increase
	Number	50477594	62080044	23.0%	Increase
Black or African American	Percentage	12.6%	12.4%	-1.6%	Decrease
	Number	38929319	41104200	5.6%	Increase
Asian or Asian American	Percentage	4.8%	6.0%	25.0%	Increase
	Number	14674252	19886049	35.5%	Increase
White	Percentage	72.4%	61.6%	-14.9%	Decrease
	Number	223553265	20427273	-8.6%	Decrease

Table 3.3: Undergraduate Engineering Degrees Awarded by Race/Ethnicity*¹⁶

	Race/Ethnicity	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Rate of Change from 2010 to 2021	
Percentage Engineering Degrees Awarded	Hispanic	7.0%	8.5%	9.0%	9.3%	10.1%	10.7%	10.7%	11.1%	11.4%	12.1%	13.0%	13.6%	94.3%	Increase
	Black or African American	4.5%	4.2%	4.2%	4.3%	3.5%	4.0%	3.9%	4.1%	4.2%	4.3%	4.5%	4.7%	4.4%	Increase
	Asian or Asian American	12.2%	12.2%	12.2%	12.9%	13.1%	13.4%	14.2%	14.6%	14.7%	14.7%	14.9%	15.6%	27.9%	Increase
	White	69.8%	66.6%	66.2%	65.7%	65.9%	64.9%	63.4%	62.3%	61.5%	60.8%	59.6%	58.0%	-16.9%	Decrease
	Other	1.2%	1.6%	2.0%	2.3%	2.9%	3.1%	3.6%	3.8%	4.0%	4.3%	4.4%	4.6%	283.3%	Increase
	Unknown	5.3%	6.9%	6.4%	5.5%	4.5%	3.9%	4.2%	4.1%	4.2%	3.8%	3.6%	3.5%	-34.0%	Decrease
Total Number Degrees Awarded	Hispanic	5810	7495	8408	9223	10772	12061	13319	15122	16509	17616	19427	19888	242.3%	Increase
	Black or African American	3735	3703	3924	4264	3733	4509	4855	5586	6082	6260	6725	6873	84.0%	Increase
	Asian or Asian American	10126	10757	11398	12793	13972	15105	17676	19890	21288	21401	22267	22812	125.3%	Increase
	White	57935	58725	61846	65157	70288	73156	78918	84873	89063	88517	89067	84815	46.4%	Increase
	Other	996	1411	1868	2281	3093	3494	4481	5177	5793	6260	6575	6727	575.4%	Increase
	Unknown	4399	6084	5979	5455	4800	4396	5228	5586	6082	5532	5380	5118	16.3%	Increase
	Total	83001	88176	93423	99173	106658	112721	124477	136233	144818	145587	149442	146233	76.2%	Increase

*Numbers based on ASEE reports “Engineering By the Numbers” from 2010 to 2021, there might be small discrepancies due to rounding.



Figure 3.5: Hispanic Trend of Engineering Bachelor's Degrees Awarded¹⁶

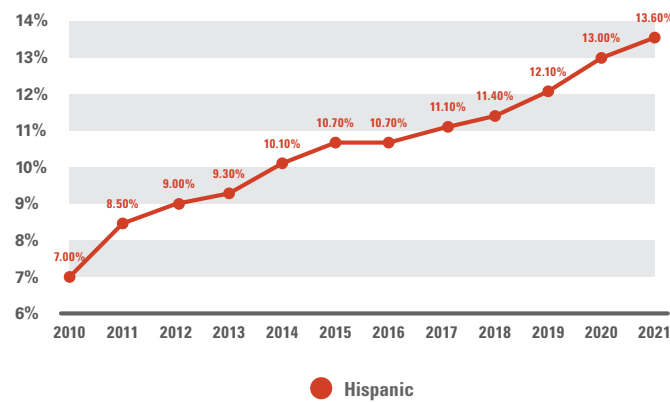
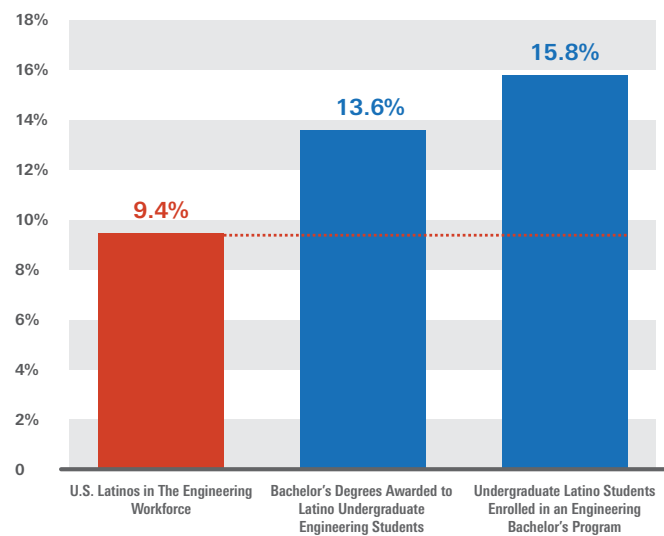


Figure 3.6: U.S. Latinos in Workforce Compared to Bachelor's Degrees Awarded and Undergraduate Enrollment of Latino Engineering Students in 2021



this number appears to be somewhat higher than enrollment growth, it results in significantly more degrees earned by U.S. Latinos over the period. The number of bachelor's degrees earned more than tripled from 5,810 in 2010 to 19,888 in 2021. This constant growth of degrees awarded and Latino participation is staggering and aspirational data presented later in the report suggests it would be reasonable to expect the trend to continue.

The data illustrates a clear trend of increasing Latino enrollment and baccalaureate degrees awarded. At present, Latinos constitute just 9.4% of the engineering workforce, while their representation among undergraduate engineering students is notably higher at 15.8% as of 2021 (Figure 3.6). With the ongoing growth in Latino education and involvement, this group is in a strong position to effectively address the rising demand and shortages in the field.

Trends in Engineering Master's and Doctoral Degrees

The data on U.S. Latino workforce participation, education attainment, and bachelor's degree completion rates are critical to addressing the engineering and technology workforce shortage in the U.S. In addition, Latino attainment of advanced engineering and technology degrees positions them as vital contributors within the U.S. research and innovation workforce: on university campuses, in national research labs, and within industrial research and development operations.

The data illustrate Latino fulfillment of educational aspirations that demonstrate these students' hunger and passion to strive beyond a four-year education and achieve their master's and doctoral degrees. The data is even more astounding when one considers the challenges that many young Latinos face on the path to achieving these goals. Figures 3.7 and 3.8 show that the trend of U.S. Latinos earning master's and doctoral degrees in engineering over the last 10 years grew significantly.

For master's degrees awarded in engineering, we start with 4.2% in 2003 and jump impressively to 9.4% in 2021 (Figure 3.7).¹⁶

And finally, doctorates in engineering awarded to U.S. Latinos grew more than double from 2002 to 2021, moving from 3.9% to 7.5% (Figure 3.8).¹⁶

Trends are critical tools for gaining valuable insights into the future. The increasing number of U.S. Latinos earning engineering degrees across various education levels is essential to countering the imminent shortage in the engineering workforce that threatens U.S. competitiveness and quality of life. As we examine the rising involvement of U.S. Latinos in the workforce and education and compare it with their current presence in engineering and tech education and employment projections, the significant role of U.S. Latinos in fulfilling industry demands becomes evident. Having discussed Hispanic enrollment and trends in degrees earned, it is important to understand U.S. Latino educational aspirations to fully comprehend what can be expected.

Figure 3.7: Engineering Master's Degrees Awarded for Hispanics Only¹⁶

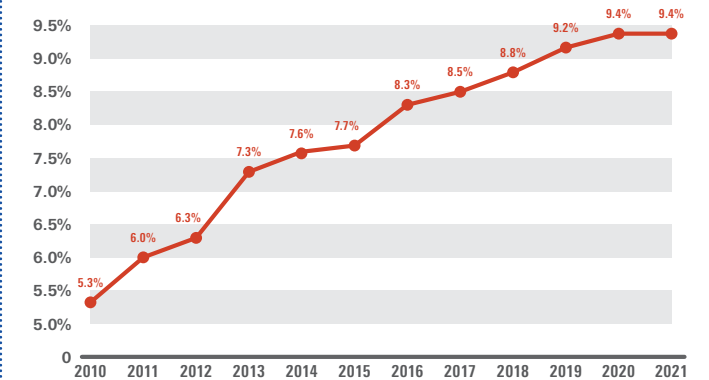


Figure 3.8: Engineering Doctorates Awarded Among Hispanics Only¹⁶

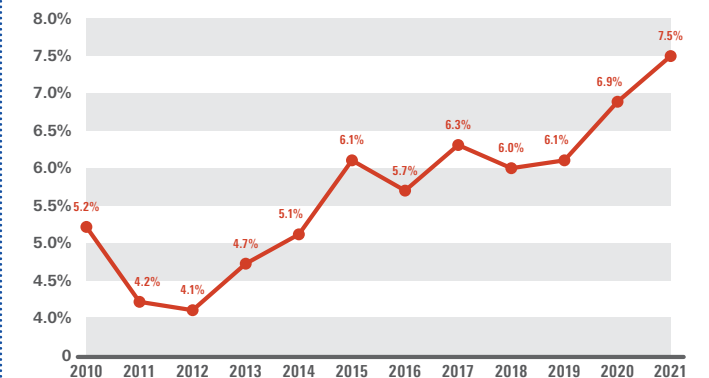


Figure 3.9: Highest Degree Undergraduate Students Want to Earn

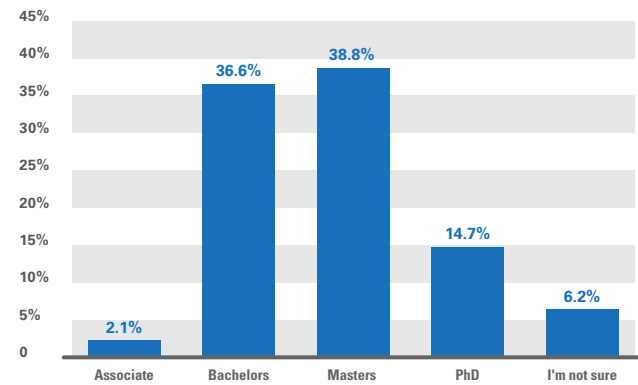
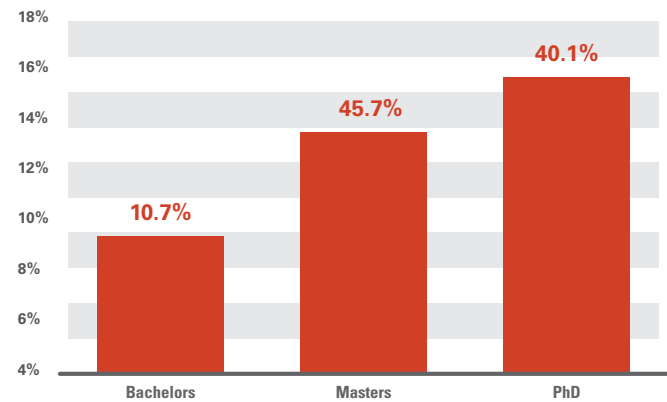


Figure 3.10: Highest Degree Graduate Students Want to Earn

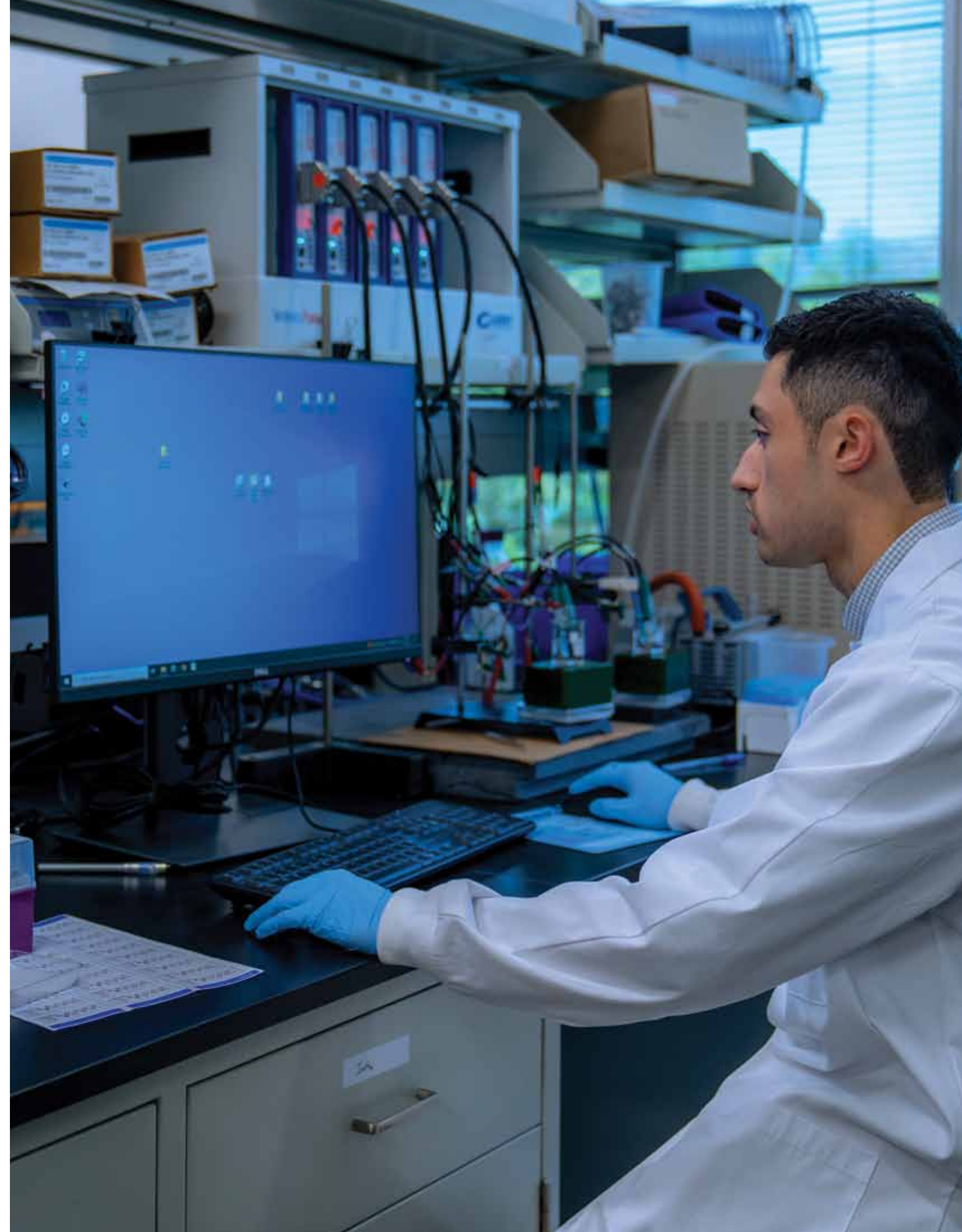


SHPE Student Members Pursue Higher Education Goals

Each year, SHPE surveys its members to better understand the needs, issues, and challenges that U.S. Latinos face as students and professionals in engineering and technology. The results are used to design programs and services to better support members' personal and professional growth and success.

For SHPE undergraduate students in engineering and technology fields, 53.5% want to achieve a master's or doctoral degree (Figure 3.9); among graduate students, a robust 40.1% want to achieve a doctorate (Figure 3.10)

These numbers are impressive and hold substantial significance, particularly considering that 52.8% of respondents in this survey were the first in their families to pursue a college education. A broader study in the U.S. general population highlighted that "first-generation students have a 92.2% higher dropout rate than students whose parents had bachelor's degrees or a higher level of education attainment."¹⁹ Experts affirm that first-generation-to-college students, both generally and among Latino students, confront notably more challenges in their education and careers than those whose parents hold bachelor's degrees or higher. Despite these added challenges, many Latino students participating in this survey express the determination to pursue advanced degrees.





SHPE'S Vital Role in Cultivating Success

SHPE recognized the significant influence of U.S. Latinos in both present and future engineering and tech sectors long ago, and has played a pivotal role in identifying and addressing the challenges faced by U.S. Latinos in these fields so that this cohort realizes their full potential.

With a membership of 14,351 students and professionals in 2023, SHPE plays a central role in facilitating student graduation via a wide array of programs and scholarships. This is of particular significance given the U.S. general population's engineering graduation rate of around 50% versus the impressive 87.7% graduation rate among the organization's members.

A significant majority of SHPE members expressed satisfaction with the organization's work, with an overwhelming portion indicating their readiness to recommend SHPE to others; specifically, 81.2% of respondents expressed an inclination to recommend SHPE membership. This statistic underscores the invaluable support that SHPE offers to U.S. Latinos in engineering and tech. The positive influence is reflected in robust endorsements and enthusiastic participation in SHPE's chapters, programs, and events.

SHPE's overarching mission to cater to the needs of this critical segment within the engineering and tech sectors is a pivotal driver of the United States' economic well-being and competitive edge. SHPE's commitment to empowering and equipping U.S. Latinos with the necessary tools to succeed directly contributes to a diverse, capable, and innovative workforce. In the upcoming section, we will delve deeper into the key findings that illuminate the specific needs of this group, further underscoring the significance of SHPE's role in advancing both individual aspirations and the nation's collective prosperity.



Figure 3.11: Hispanic Workforce, Engineering Enrollment, and Degrees Awarded (Projections)* 12,16

*SHPE operationalized this goal by adapting an approach used by SHPE member Dr. Christopher J. Hernández to project the timing of parity.

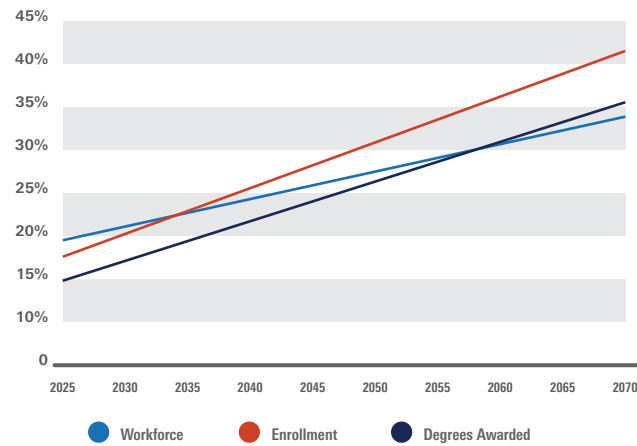
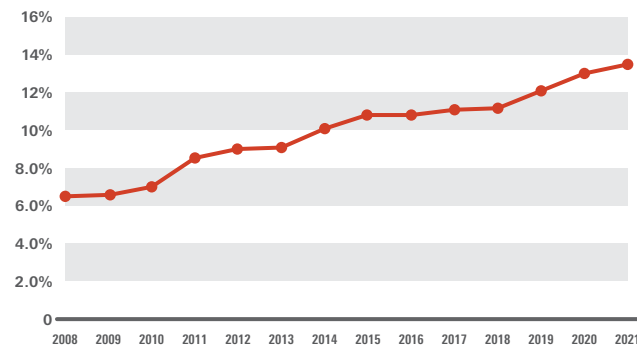


Figure 3.12: Undergraduate Engineering Degrees Awarded to Hispanic Students¹⁶



SHPE's Goal Statement

SHPE's overarching goal is to expedite the achievement of parity in engineering degrees awarded to Hispanic students and the proportion of Hispanic workers in the U.S. workforce. In all other LDC research, when parity is discussed the reference point is with the U.S. population, not the U.S. workforce. For the purposes of SHPE's parity goal, the U.S. workforce is a more relevant comparison metric because it does not include younger U.S. Latinos ineligible to work and older U.S. Latinos who no longer work. This is particularly important because of the youthfulness of U.S. Latinos. In establishing SHPE's goal, the workforce participation data illustrated in Figure 3.1, the enrollment data found in Figure 3.4, and the degrees earned data portrayed in Figure 3.5 were utilized and modeled with linear regression to project what is likely expected in the future for Hispanic population growth, enrollment, and degrees earned. This analysis determines enrollment is expected to reach parity with workforce numbers by 2035 and engineering degrees awarded will reach parity with workforce projections by 2060 (Figure 3.11). SHPE's overarching aspiration is for parity in engineering degrees awarded to occur well before 2060.

The pursuit of this goal is underpinned by a careful examination of historical data, which illustrates encouraging trends in the representation of Hispanic students in engineering. A pivotal moment occurred between 2010 and 2011 when a significant 1.5% increase was observed (Figure 3.12). This served as a beacon of possibility and inspires our commitment to drive further progress.

SHPE's strategy to realize this ambition is holistic and multifaceted, encompassing all stages of the education-to-career journey. They are resolute in their determination to make a meaningful impact through a set of interlinked initiatives:

Through **educational outreach**, SHPE aims to ignite the spark of curiosity and passion for engineering in Hispanic students at an early age. They recognize the potential to expand the pool of aspiring engineers.

Retention is key to achieving SHPE's mission. Again, enrollment reaches parity with the Hispanic workforce numbers by 2035. SHPE is committed to implementing retention efforts that address the unique challenges Hispanic students face during their academic journey. By providing necessary support, we aim to ensure their persistence and success in engineering and tech programs.

Scholarship support is a pivotal component of SHPE's strategy. They firmly believe that financial constraints should never hinder talented Hispanic students from pursuing engineering degrees. SHPE is dedicated to increasing access to higher education through its scholarship programs.

Mentorship plays a vital role in guiding and nurturing the aspirations of future engineers. SHPE will strengthen its mentorship programs to connect aspiring Hispanic engineers with seasoned professionals, fostering a supportive ecosystem.

To prepare students for success beyond graduation and professionals for success in the workplace, SHPE will invest in **professional development** initiatives. This will equip Hispanic engineering students with the skills and confidence required to excel in their careers.

SHPE's vision extends beyond statistics and projections. By consistently improving educational outreach, scholarship support, mentorship, and professional development, and advocating for equitable hiring practices and retention efforts, they aim to create a more inclusive and diverse engineering and tech community. SHPE's efforts are dedicated to realizing a future where Hispanic students not only enroll in engineering programs but also confidently graduate with engineering degrees, ready to contribute their talents and perspectives to the engineering and technology workforce.



SHPE's efforts are dedicated to realizing a future where Hispanic students not only enroll in engineering programs but also confidently graduate with engineering degrees, ready to contribute their talents and perspectives to the engineering and technology workforce



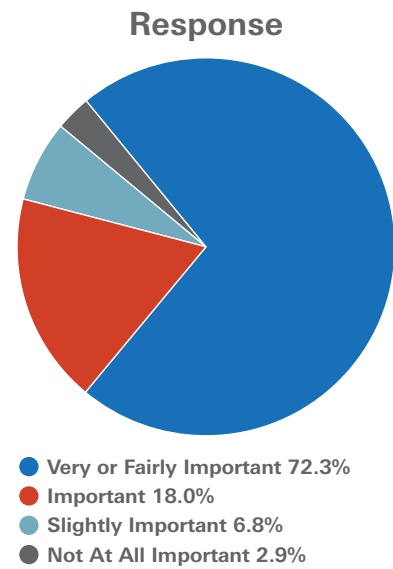
Survey Results: Insights from SHPE Members

The data shows that Latino engineering and tech students and professionals are on a constant positive trend and that the industry understands their value and their ability to help fill a much-needed void in the supply and demand of engineering and tech labor. Yet, U.S. Latinos face various challenges. Despite this, U.S. Latinos are continuing to persist and with demographic trends, they become even more important to these fields.

SHPE's survey asked respondents about their field of expertise/study and the question allowed respondents to select more than one option. 80.2% of respondents self-identified as being in an engineering field. Respondents were offered the options of computer science (CS) focused technology and non-CS focused technology; 26.6% and 10.0% identified with these options, respectively. The sample sizes for science and math were relatively small, and is the basis by which it is considered reasonable to generalize results effectively to the domains of engineering and tech.



Figure 3.13: Response for: “How important is it to see others like you pursuing STEM careers?”



1 The Importance of Role Models and Mentors

Mentors in all professional fields are critical to the growth of young entrants into the workforce. Having a strong mentor helps demystify many of the concerns that someone may have as they enter an unknown space.

Pew Research states that “Around half of Latinos also see lack of access to quality education to prepare for STEM fields (49%) or not having a mentor encouraging them to pursue a STEM degree (47%) as major reasons young people choose not to study STEM subjects in higher education. A majority of Hispanic adults with a postgraduate (56%) or college degree (57%) say not having mentors to encourage them is a major reason young people do not pursue STEM degrees.”²⁰

“It has inspired me that there are other people like me doing great things in the industry.”

Talking about SHPE members, 72.3% of them say that having role models pursuing STEM careers is either “fairly important” or “very important.” (Figure 3.13). Further, research shows that students from minoritized group backgrounds achieve better academic outcomes when they learn from faculty from similar backgrounds.²¹

Sizeable shares of U.S. Latino adults also say that more representation—having at least several Latino students in STEM degree programs at the typical university—would significantly help young Latinos pursue college degrees in STEM (40%). In addition, 35% think that having a Latino high school teacher in STEM subjects would also make a difference.²⁰

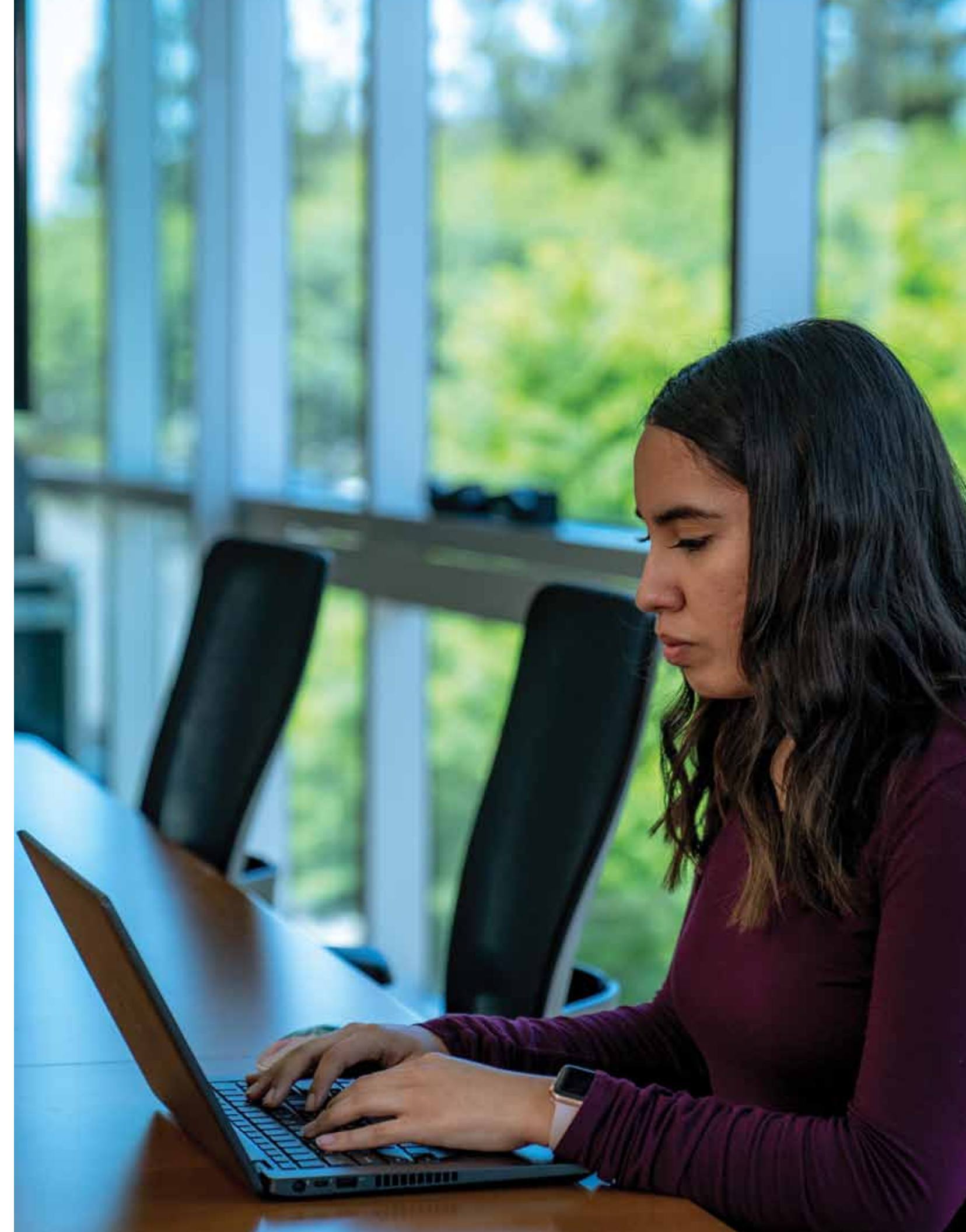
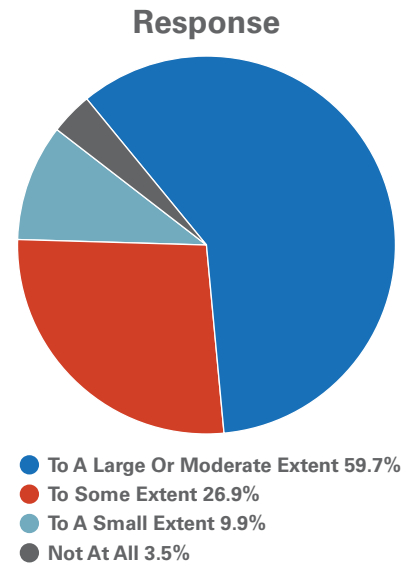


Figure 3.14: Response for: "To what extent does SHPE provide you with the opportunity to see others like you pursuing STEM careers?"



"SHPE allows me to meet professionals and learn from their experiences as well as meet with other aspiring engineers in my position that are willing to bond over the struggles we have endured."

On average, 60% of SHPE members say SHPE provides them with role models pursuing STEM careers, and most agree that because of SHPE, they are better informed about successful U.S. Latinos (Figure 3.14).

For the survey respondents who are professionals and professionals in graduate school, mentoring opportunities are among the top five most important needs for U.S. Latinos to succeed in the STEM industries, with 53.6% and 44.3% respectively agreeing.

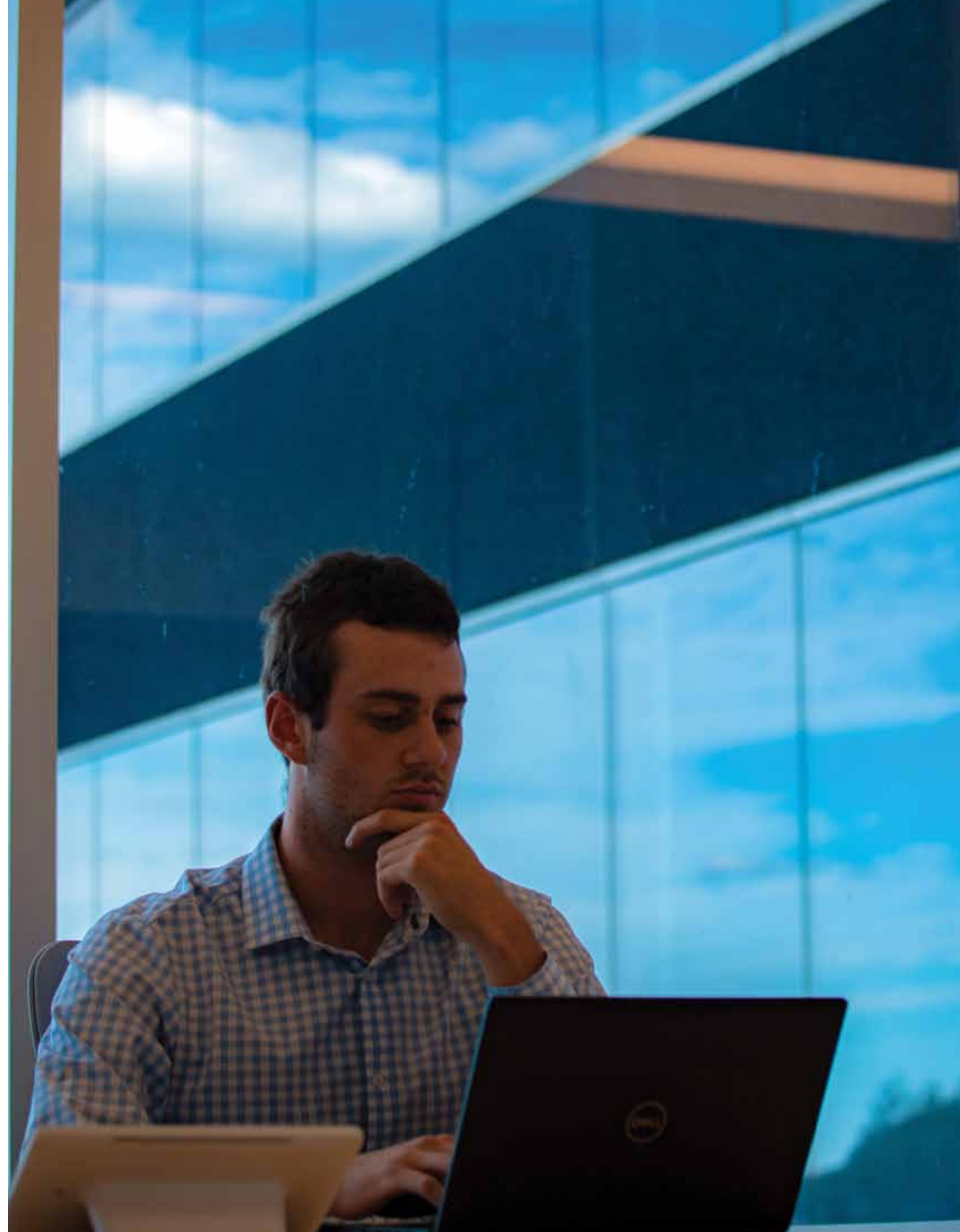
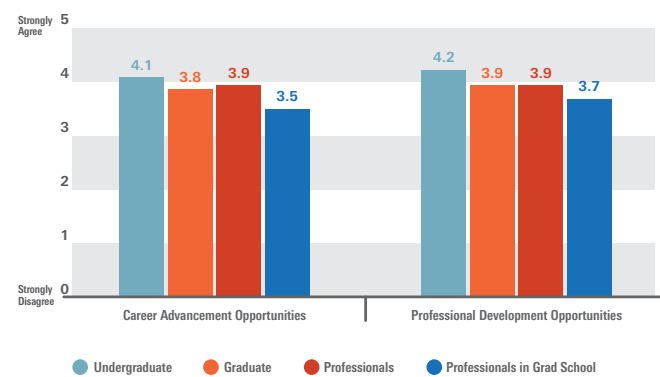


Table 3.4: Top 3 SHPE Member Needs

Undergraduate n-2,148	Graduate n-452	Professionals n-1,262	Professionals in Graduate School n-119
Internship/co-op opportunities	Academic career paths	Career planning	Career planning
Job search skill development	Academic skill development	Networking opportunities	Academic skill development
Scholarship opportunities	Assistantship opportunities	Professional skill development	Certifications

Figure 3.15: Member Experience: “Because SHPE, I am better informed about...”



2 Career and Academic Advancement and Tools

In all groups analyzed, the top three needs (Table 3.4) focus on career and academic advancement.

These needs are met by some of SHPE’s programs, resulting in exceptional results exemplified by the impressive graduation rate of its members (87.7% vs. 50% national average), more so considering the majority are first-generation-to-college U.S. Latinos.

“SHPE plays an integral role in my college journey by providing a supportive community, invaluable resources, and empowering experiences. With their unwavering support, I am equipped to overcome challenges, excel academically, and make meaningful contributions both in and beyond the college environment.”

As seen in Figure 3.15, SHPE members credit the organization for being informed about career advancement and professional development opportunities.

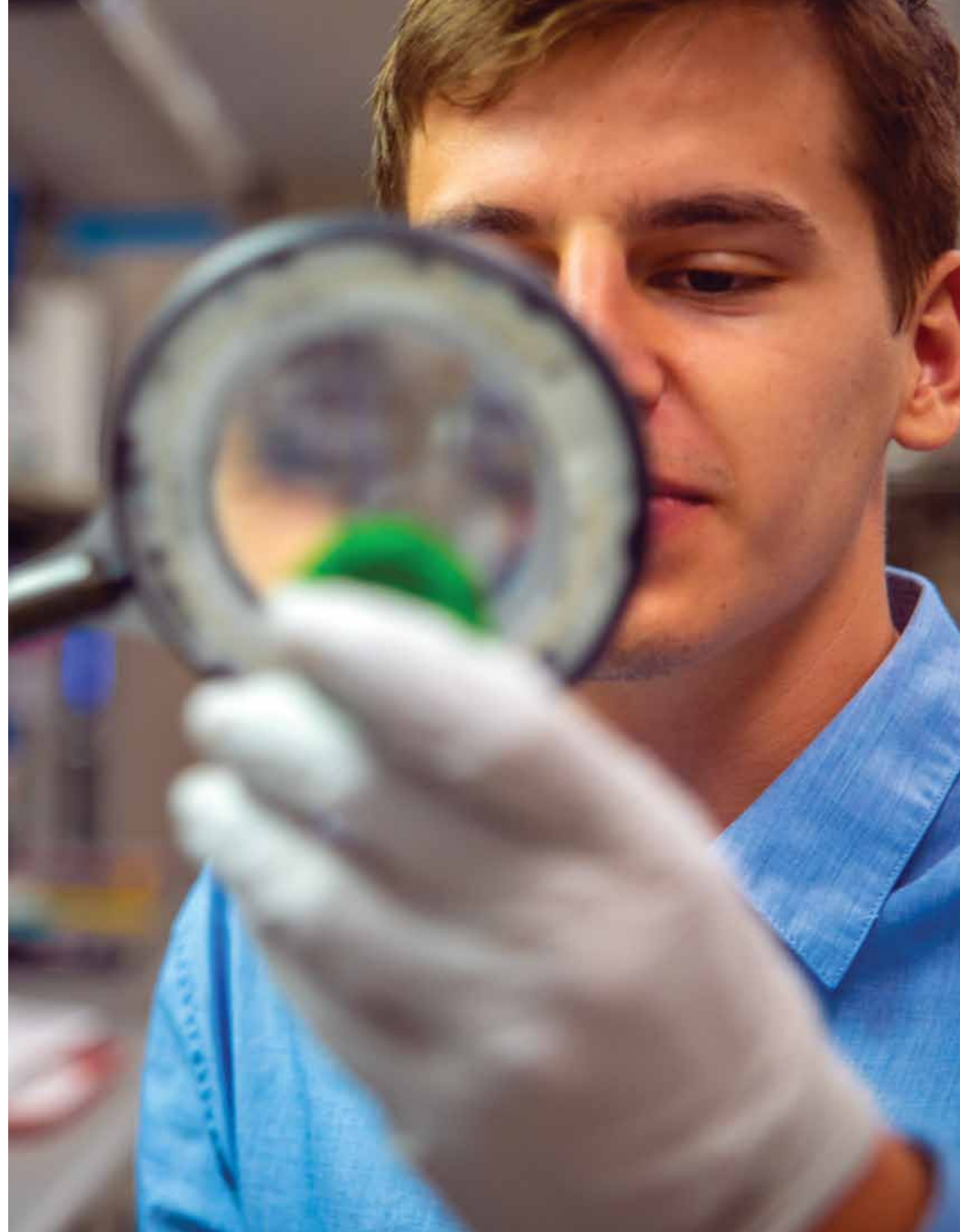


Figure 3.16: Top 10 Needs Identified in the Survey Group, with a Focus on Financial Requirements

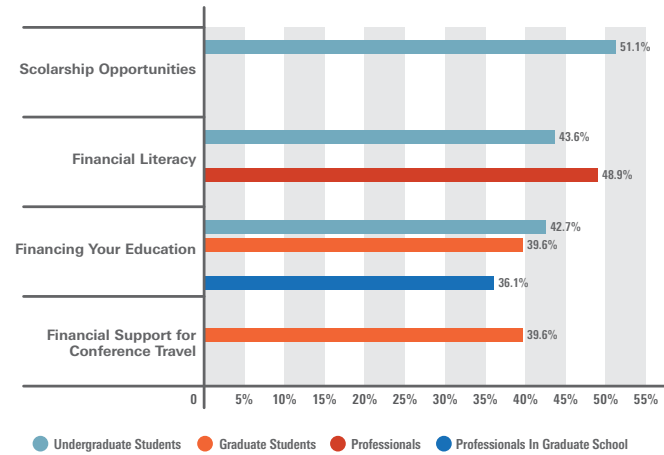
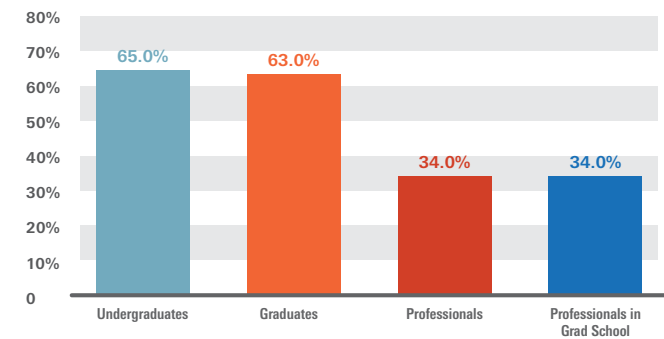


Figure 3.17: Percentage by Group that Reported Financial Struggles



3 Financial Assistance And Literacy

Financial literacy is crucial for underserved communities including first-generation-to-college U.S. Latino students. It empowers individuals to make informed financial decisions, break poverty cycles, contribute to the economy, and avoid debt traps.

The detailed analysis of the top 10 needs by groups in this report (Appendix I) makes financial assistance and literacy concerns apparent. Undergraduates are most concerned with scholarship opportunities, financial literacy, and paying for their education. Graduate students' needs are focused on financing their education and financial support for conference travel. Professionals are mostly focused on financial literacy and professionals in graduate school require financing for their continued education (Figure 3.16).

Research consistently reveals a noteworthy connection between financial constraints and degree completion, implying that economic limitations can hinder a student's progress toward graduation. These constraints manifest in lower degree completion rates, heightened dropout frequencies, prolonged timeframes for degree achievement, and even ramifications for academic performance. The critical role of financial aid and support programs is evident in mitigating the adverse impact of financial obstacles to the pursuit of a degree.²²

Among the four surveyed groups, 65% of undergraduate and 63% of graduate students encounter the most pronounced financial challenges (Figure 3.17). Statistical analysis highlights differences between undergraduate and graduate students versus professionals, with the latter group experiencing comparatively reduced financial safety concerns. This observation underscores the significant upward mobility available to Latinos in engineering careers. SHPE programs and other financial aid and perks can play a pivotal role in fostering higher education accessibility for members.

Among the surveyed groups, the needs for U.S. Latinos to achieve success in STEM careers can effectively be targeted by organizations such as SHPE.

SHPE offers programs and initiatives that provide financial education and assistance to help individuals achieve economic independence, access financial services, and build wealth. It also offers resources like scholarships and conference support, which alleviate financial challenges and promote overall well-being.

"I received a generous scholarship and was able to obtain an internship for the Summer of 2023 thanks to a great program that they set up."

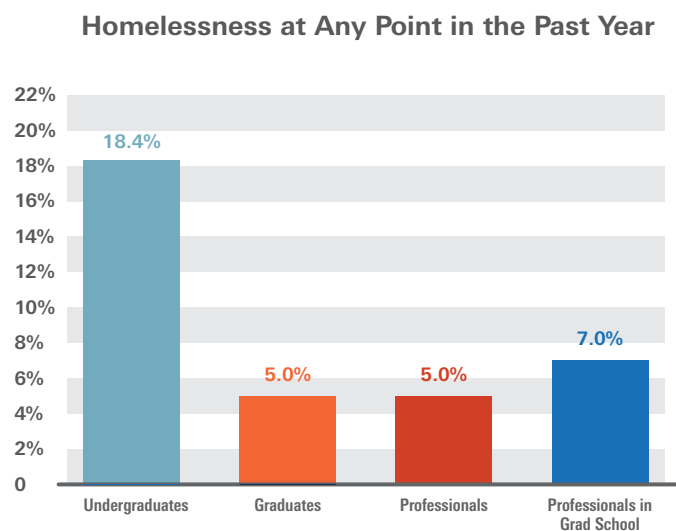
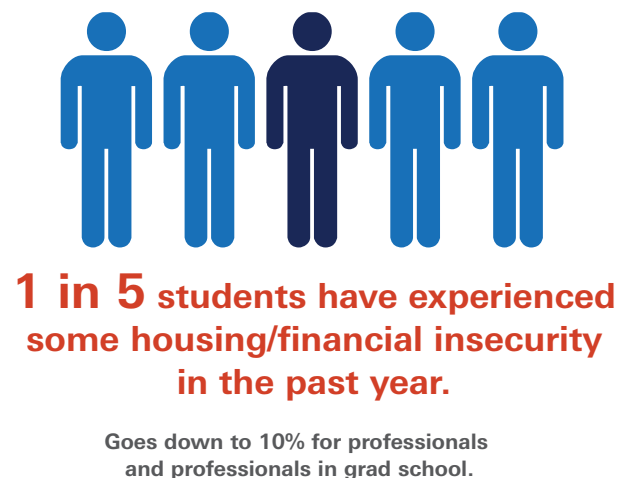




4 Challenges Regarding Homelessness

In addition to young Latinos struggling with various financial challenges, many also have to contend with the issue of homelessness. The Hope Center reports that a staggering 43% of U.S. students attending four-year colleges and universities report experiencing homelessness.²³ Additionally, 20% of the undergraduate SHPE member students reported having experienced some housing/financial insecurity in the past year (Figure 3.18).

Figure 3.18: Housing/Financial Insecurity Among SHPE Members



5 Physical and Mental Health Challenges

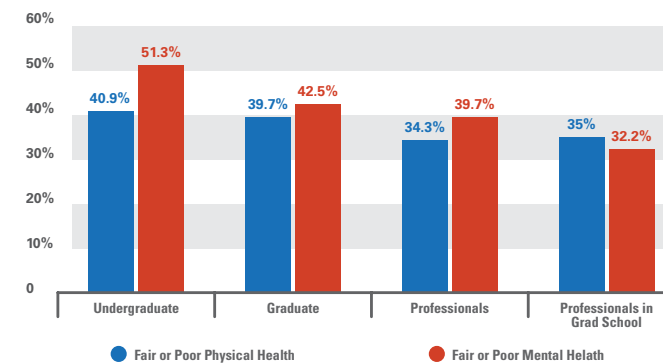
SHPE survey respondents were asked about their physical and mental health; a significant percentage reported challenges. When asked, 51.3% of undergraduates, 42.5% of graduate students, 39.7% of professionals, and 32.2% of professionals attending graduate school reported having “fair” or “poor” mental health. Concurrently, the reported numbers regarding “fair” or “poor” physical health were 40.9%, 39.7%, 34.3%, and 35.0%, respectively (Figure 3.19).

Further, data from the National Alliance on Mental Illness (NAMI) shows that among young U.S. Latino adults aged 18–25, over half of Latinos with serious mental illness receive no treatment. This puts them at a higher risk for more severe and persistent problems, as untreated mental health conditions tend to worsen. Barriers such as stigmas, awareness gaps, finances, and cultural factors likely contribute. Addressing this requires culturally sensitive, early interventions involving families and communities and educational efforts to improve mental health access and awareness within the U.S. Latino community.²⁴

“It makes me feel as if I do have a place at the table even when most of my interactions with others haven’t been as ideal as I’d like them to be. It’s the light at the end of the tunnel that keeps telling me to keep trying even if I feel like no one is on my side.”



Figure 3.19: Individuals Reporting Physical and Mental Health Challenges





Latinos are also less likely to seek mental health treatment compared to other American cohorts, and they encounter increased disparities to access these treatments and even quality of treatment. Anglo-Americans are 60% more likely to reach out for mental health treatment than the U.S. Latino population.²⁵

According to NAMI, 35.1% of U.S. Latino adults with mental illness receive treatment each year compared to the U.S. average of 46.2%.²⁴

Incorporating mental health considerations into educational environments supports students and contributes to a more compassionate and productive society. As is rightly concluded, multiple organizations and the data in this report underscore the crucial nature of this topic. The U.S. Latino community encounters barriers when facing mental health that no other cohorts in America experience, and it is pivotal to identify and address them to allow future generations a brighter future within demanding careers such as the ones in the engineering and technology fields.

“It’s the only Latino community I have. It’s the only support system I have. It’s the only place where I feel like I belong and am understood. Without SHPE I would have never made it to my fourth year of my STEM major.”

Conclusions

In our increasingly interconnected and technologically advanced world, the United States cannot afford to lag on the global stage if it wishes to retain its competitive edge. The significance of Latinos in engineering and tech is pivotal, not only for economic progress but also for safeguarding the nation’s security interests. Meeting the growing demand for a skilled workforce has become a pressing priority.

As this report demonstrates, U.S. Latinos are an essential and growing demographic. Compelling statistics underscore this importance: (1) Latinos constitute a substantial 19.1% of the overall U.S. population,² (2) Latinos represent 25% of young Americans aged 18 and under,³ (3) Latinos account for 73% of the growth in U.S. labor force participation from 2010 to 2020,¹¹ and (4) Latinos are increasing their undergraduate and graduate degree participation at higher rates than any other group.

The presence of Latinos in engineering and technology is an essential requirement, especially given the surge in STEM job opportunities and their increasing participation in education and the workforce.

This report also highlights critical needs and opportunities for organizations like SHPE to significantly contribute to supporting and empowering U.S. Latino students and professionals in engineering and tech. The potential of this cohort to boost these industries in the country is proven and available, but there are still roadblocks specific to the U.S. Latino cohort that prevent its members from reaching optimal efficiency. However, organizations like SHPE have identified these social and financial hurdles and have been working to build programs to provide the necessary funds and resources for U.S. Latinos to thrive. We must continue to find ways to tap the massive potential of the U.S. Latino community to realize their fullest potential contributing to the essential industries that require expertise. U.S. Latinos are essential to meeting engineering and tech workforce growth needs and will position the nation as unstoppable in the global landscape.

Latinos are poised to assume pivotal roles, making substantial contributions to the nation’s technological trajectory. The words of Sonia Sotomayor are appropriate in this conclusion: “It’s because until you reach that equity in education, we can’t reach equity in the larger society.” After reviewing this powerful data from SHPE, one can, without a doubt, conclude that its members are on a proper path to change the world.



Recommendations

Call to Action to Industry & Corporate Foundations

- ✓ Actively seek diverse talent from the U.S. Latino community by implementing inclusive hiring practices, promoting diversity in leadership roles, and providing equal opportunities for career advancement.
- ✓ Support initiatives promoting a diverse and inclusive workplace that genuinely embrace Latino engineers' authenticity.
- ✓ Collaborate with SHPE and sponsor or participate in their programs, available in their opportunity guide.
- ✓ Include U.S. Latinos in your promotional materials in diverse leadership roles.
- ✓ Join SHPE's Industry Partnership Council (IPC). <https://shpe.org/support/join-ipc/>

Call to Action to Academia

- ✓ Enhance support systems for U.S. Latino students in engineering, such as mentorship programs, academic advising, and targeted resources to promote retention and success.
- ✓ Actively seek out and recruit qualified Latino candidates for faculty positions in engineering and technology.
- ✓ Foster a culturally competent educational environment, promoting the inclusion of Latino perspectives and contributions in engineering and technology.
- ✓ Encourage research and scholarship on U.S. Latino issues in engineering and technology fields that advance knowledge and understanding of Hispanic experiences, contributions, and challenges.
- ✓ Provide access to research opportunities for Hispanic students.
- ✓ Join SHPE's Academic Partnership Council (APC). <https://shpe.org/support/join-apc/>

Call to Action to Government

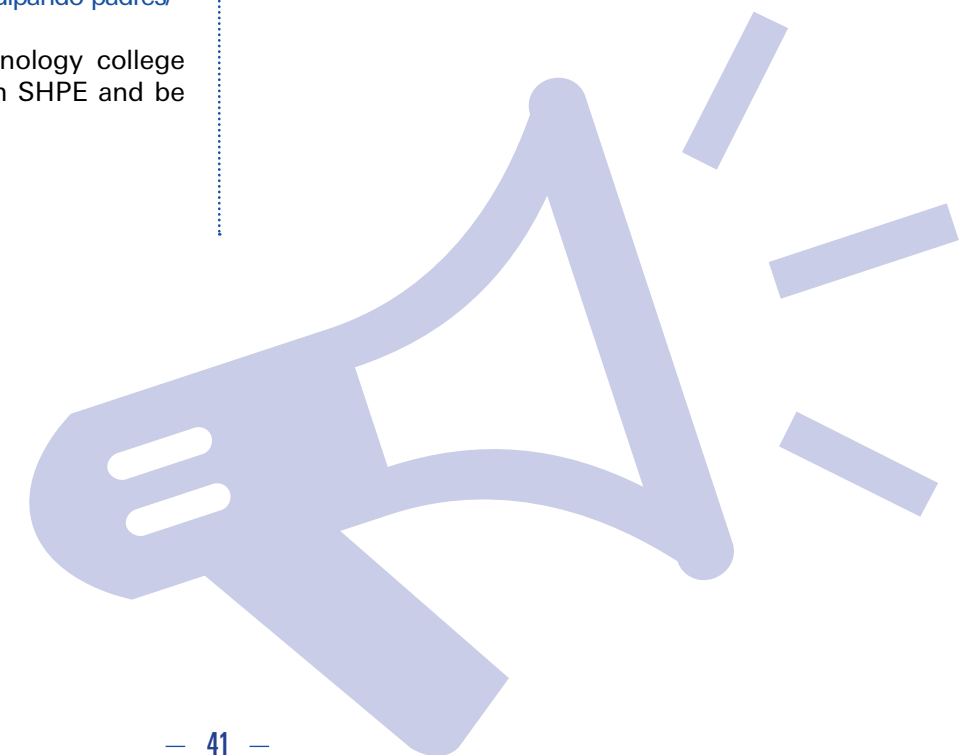
- ✓ Allocate resources and invest funding to support initiatives that enhance representation and opportunities for Latinos in engineering and technology, such as research grants and workforce development programs.
- ✓ Advocate for policies that promote diversity and inclusion in engineering and technology and efforts that eliminate systemic barriers and provide equitable access to resources.
- ✓ Collaborate with SHPE and support their programs for its members to see career paths in government agencies.

Call to Action to Individuals

- ✓ Encourage and inspire individuals from the U.S. Latino community to pursue and persist in engineering and technology education and careers by highlighting success stories, sharing personal experiences, and providing guidance on available resources and support networks.
- ✓ Encourage other Latino engineers and technicians in your network to embrace leadership roles, participate in research, and pursue entrepreneurship.
- ✓ Ask the Latino children in your life if they have considered engineering and tech.
- ✓ Encourage the Latino children in your life to join SHPE's virtual STEM labs. <https://shpe.org/engage/programs/virtual-stem-labs/>
- ✓ Encourage parents of first-generation-to-college engineering students to participate in Equipando Padres. <https://shpe.org/engage/programs/equipando-padres/>
- ✓ Encourage engineering and technology college students and professionals to join SHPE and be active in their chapter.
- ✓ If you can, donate to SHPE. <https://shpe.org/support/>

Call to Action for Latinos

- ✓ Speak up and support organizations that include Latinos in engineering and tech.
- ✓ Help other Latinos within your field.
- ✓ Mentor a Latino student or ask someone in your network to mentor you.
- ✓ Know the numbers of the Latino economic contributions to the U.S. and the value of U.S. Latinos in engineering and tech.
- ✓ Become a SHPE member! Engage in their programs as a participant and/or volunteer. <https://shpe.org/membership/become-a-member/>
- ✓ If you can, please donate. <https://shpe.org/support/>





Methodology

In 2022, SHPE undertook a comprehensive needs assessment for the first time, with the primary objective of gaining deeper insights into the specific needs, challenges, and issues faced by their members. The overarching aim of this endeavor was to identify opportunities to enhance the support provided to members, thereby facilitating their personal and professional growth and success.

Survey Design and Administration

The needs assessment survey utilized in this study was meticulously designed and administered using the Survey Monkey platform. The survey instrument consisted of a total of 54 questions, covering a wide range of topics relevant to SHPE members' needs and experiences. On average, participants required approximately 17 minutes to complete the survey.

Expert Involvement

The questions included in the survey were crafted by a team of research and data analysis experts within SHPE's Research and Impact team. Furthermore, the survey underwent rigorous scrutiny and refinement through collaboration with an external evaluator, ensuring the validity and reliability of the instrument.

Survey Recipients

A diverse pool of recipients, consisting of both past and current SHPE members, was targeted for participation in the needs assessment. A total of 36,186 individuals were invited to take the survey.

Survey Participation Rates

The invitation to participate achieved an impressive opening rate of 59.3%. Among those who opened the invitation, 12.2% proceeded to attempt the survey. This resulted in a total of 4,416 survey submissions. Of these submissions, 81.6% were deemed complete while the remainder were categorized as partial submissions.

The information presented in this report is derived primarily from SHPE's 2022 Needs Assessment. However, data related to basic needs and role modeling is sourced from SHPE's 2023 Needs Assessment, which encompasses a sample size of 2,288 respondents.

Data Analysis

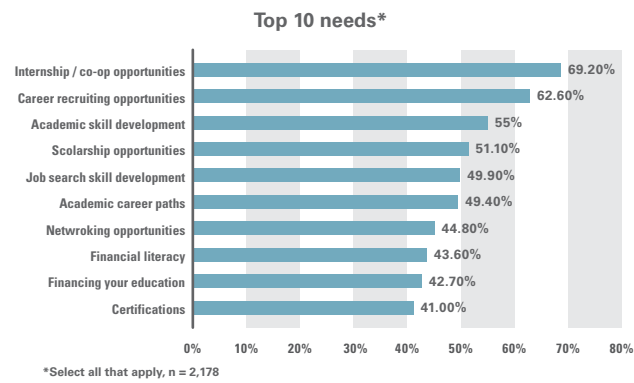
To extract meaningful insights from the survey data, a multifaceted approach to analysis was employed. Descriptive statistics were utilized to summarize and present the key characteristics of the dataset. Additionally, statistical inference techniques were applied to draw meaningful conclusions and make informed recommendations based on the collected data.

The methodology described above underscores the rigor and comprehensiveness of SHPE's needs assessment. By leveraging these findings, SHPE has been able to design tailored programs and services aimed at better supporting the personal and professional growth and success of their members.

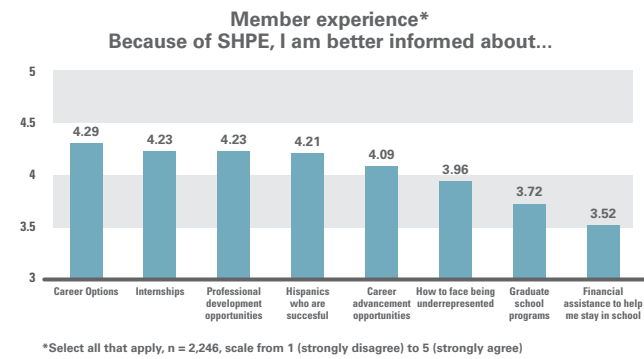
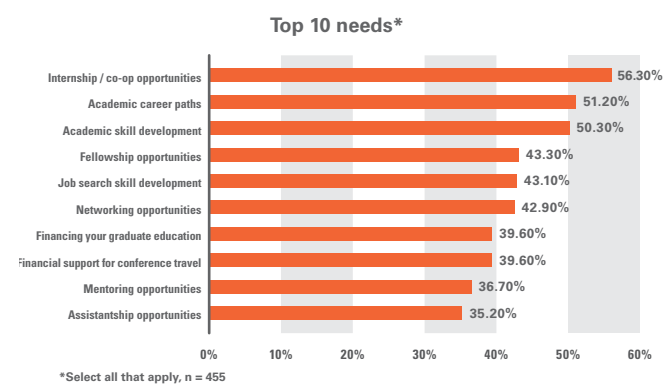
Appendix I

Top 10 Needs Identified for Each Surveyed Group, Alongside SHPE's Addressing Contributions

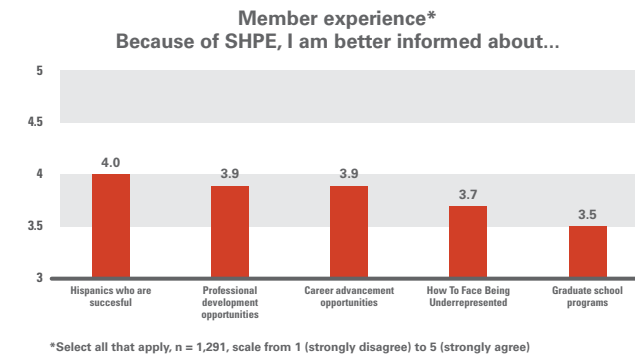
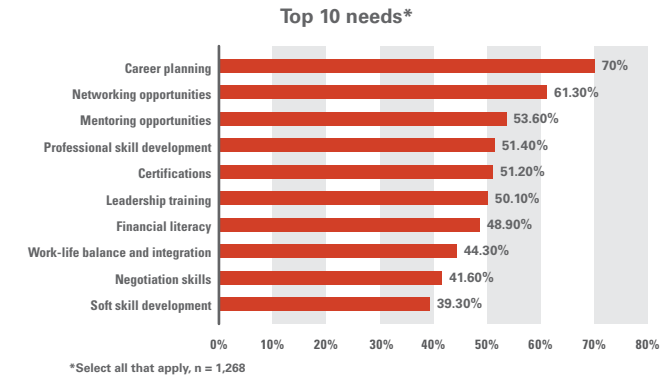
For undergraduate students, eight out of the top 10 needs involve career and academic advancement tools.



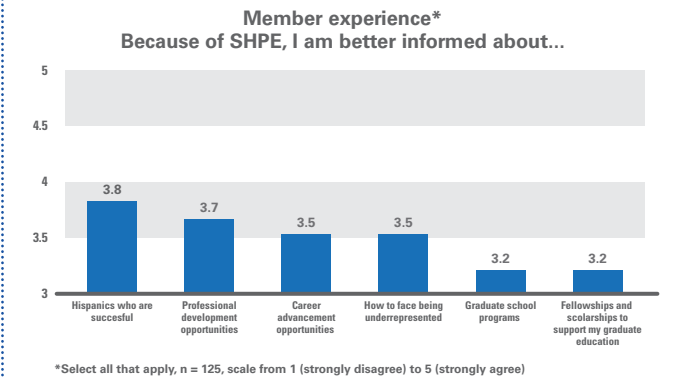
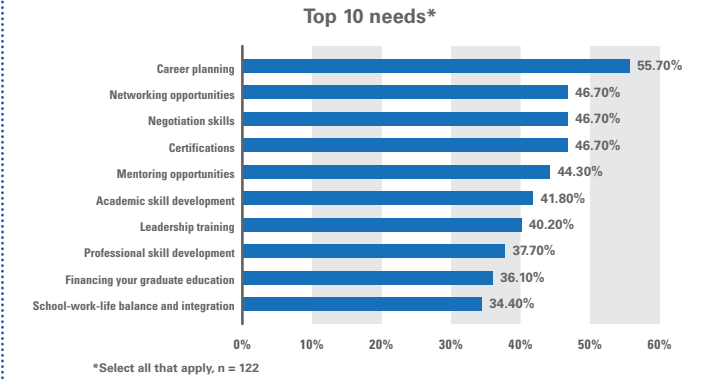
For graduate students, eight out of the top 10 needs involve career and academic advancement tools.



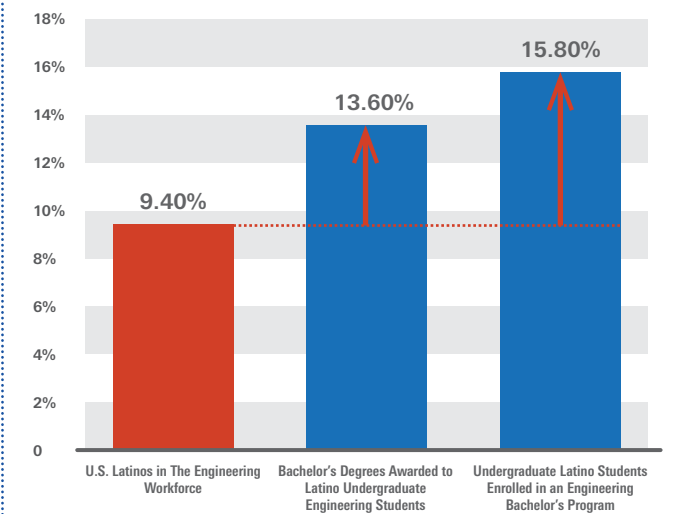
For professionals, seven out of the top 10 needs involve career and academic advancement tools.



For professionals in graduate school, eight out of the top 10 needs involve career and academic advancement tools.



U.S. Latinos in Workforce Compared to Bachelor's Degrees Awarded and Undergraduate Enrollment of Latino Engineering Students in 2021



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