BARRIERS AND ENABLING FACTORS INFLUENCING HISPANIC/LATINO PARTICIPATION AND PERSISTENCE IN COMPUTER SCIENCE EDUCATION: A THEMATIC LITERATURE REVIEW

by

KIMBERLY ARSLAN-BERRY

M.S., Western Governors University, 2022

B.S., Western Governors University, 2020

A Research Paper Submitted to the School of Computing Faculty of

Middle Georgia State University in

Partial Fulfillment of the Requirements for the Degree

DOCTOR OF SCIENCE IN INFORMATION TECHNOLOGY

MACON, GEORGIA

2026

Barriers and factors influencing Hispanic/Latino participation and persistence in computer science education: A thematic literature review

Kimberly Arslan-Berry, *Middle Georgia State University, kimberly.arslanberry@mga.edu*

Abstract

In this study, persistence is conceptualized as continued engagement and progression through computer science educational pathways, including retention, degree completion, and transition into computing-related careers. Hispanic/Latino individuals remain underrepresented in computer science (CS) education and the broader technology workforce despite significant population growth and increasing demand for computing careers. Over the past decade, national efforts, such as Diversity, Equity, and Inclusion (DEI) initiatives, affirmative action policies, and the expansion of Hispanic-Serving Institutions (HSIs), have sought to broaden participation in STEM; however, factors influencing long-term persistence in computer science within this group remain insufficiently understood. This study conducts a thematic literature review of peer-reviewed research published between 2020 and 2026 to examine the barriers and enabling factors shaping Hispanic/Latino participation and persistence in CS education. Using Braun and Clarke's (2006) thematic analysis framework, thirteen studies were systematically coded and analyzed to identify recurring patterns. Findings validate known barriers rooted in systemic inequities, including limited access to early computer science education, digital inequities, underrepresentation, and less-understood psychosocial challenges such as impostor phenomenon and low self-efficacy within the field. Enabling factors were also identified, including family support, community cultural wealth, institutional interventions, and culturally responsive education, which play a critical role in supporting persistence among Hispanic/Latino individuals. These findings suggest participation and persistence in computer science are shaped by the interaction of structural, institutional, and sociocultural factors. Addressing these disparities requires coordinated efforts across educational systems, institutions, and communities to reduce barriers and leverage the existing strengths and assets of Hispanic/Latino students.

Keywords: computer science, STEM, Hispanic/Latino, underrepresented, education

Introduction

The demand for computer science (CS) and information technology (IT) professionals continues to grow rapidly, driven by technological advancement and evolving workforce needs (Armstrong et al., 2023; Zilberman & Ice, 2021). Despite these opportunities, Hispanic/Latino individuals remain underrepresented in computer science education and the broader technology workforce relative to their proportion of the U.S. population (Armstrong et al., 2023; Covarrubias et al., 2024; Pew Research Center, 2025). Positively, participation in STEM and computing fields has increased in recent years among Hispanic/Latinos, but disparities in access, persistence, and degree attainment persist, revealing a gap between interest and long-term outcomes (Chakraverty, 2022; Latino Donor Collaborative, 2024). This study adopts the U.S. Census Bureau and Office of Management and Budget (OMB) definition of "Hispanic or Latino" as individuals of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless

of race (U.S. Census Bureau, 2024). Recent national data indicate Hispanic/Latino students demonstrate sustained, and in some cases increasing, interest in computing and technology-related fields. However, this interest continues to outpace actual participation and persistence, highlighting a disparity between aspiration and attainment (Armstrong et al., 2023; Chakraverty, 2022). Emerging research suggests that this disparity is shaped by complex interactions among structural, institutional, and sociocultural conditions working together (Armstrong et al., 2023; Bates et al., 2023). These include inequities in K–12 educational access, disparities in school resources, limited exposure to computer science, and barriers within higher education systems that affect progression and retention. Socioeconomic constraints further restrict access to quality instruction, accessible technology, and enrichment opportunities, compounding inequities across educational pathways (Aubele et al., 2022; Armstrong et al., 2023).

Recent workforce data indicate that Hispanic/Latino participation in technology fields, including emerging areas such as artificial intelligence, has increased over the past decade. This data highlights not just a demographic trend but a broader narrative of how AI is becoming an integral tool for empowerment and innovation among Latino youth, positioning them at the forefront of the digital revolution (Latino Donor Collaborative, 2024). However, representation remains disproportionately low relative to population size and is often concentrated in entry-level roles, with continued underrepresentation in advanced technical and leadership positions (Latino Donor Collaborative, 2024). This pattern underscores a critical tension: while access and participation are expanding, structural inequities continue to shape who successfully enters, advances, and persists within computer science pathways (Armstrong et al., 2023; Bates et al., 2023). These trends suggest that access-focused initiatives alone are insufficient to address the systemic, deeply embedded barriers that influence long-term participation.

A growing body of literature has shifted from deficit-based perspectives toward asset-based frameworks including community cultural wealth. These approaches emphasize the strengths and adaptive strategies that students bring to their educational experiences (Pitarresi et al., 2024). Concepts including aspirational and navigational capital highlight how Hispanic/Latino students persist despite systemic barriers by leveraging resilience, social networks, and institutional knowledge (Yosso, 2005; Pitarresi et al., 2024).
The purpose of this study is to conduct a reflective thematic literature review of peer-reviewed research published between 2020 and 2026 to identify and synthesize the key barriers and enabling factors influencing Hispanic/Latino participation and persistence in computer science education in the long term. By organizing the literature into dominant thematic categories, this study examines how current factors shape persistence across educational pathways. This study addresses the following research question:

RQ: What themes emerge in peer-reviewed literature (2020–2026) regarding barriers and enabling factors influencing Hispanic/Latino participation and persistence in computer science education?

Literature Review

Hispanics/Latinos represent approximately 19% of the U.S. population (Pew Research Center, 2025; U.S. Census Bureau, 2024), yet they remain persistently underrepresented in Science, Technology, Engineering, and Mathematics (STEM) fields, receiving only 13.5% of STEM degrees. However, there are great signs of progress: Latinos increased their share of these degrees from 9.2% in 2012-2013 to 13.5% by 2021-2022 (Haddad et al., 2025). Despite modest gains in participation over the last decade, including reported growth in technical roles highlighted by Latino Donor Collabrative (2024), significant gaps remain, and further

research is still needed. Given the continued growth of the Hispanic/Latino population, participation in computer science presents both an opportunity and an economic imperative (Armstrong et al., 2023; Haddad et al., 2025). The existing literature consistently demonstrates that underrepresentation is not attributable to individual deficits but rather to several inequities embedded in educational and professional pathways (Bates et al., 2023; Neally, 2022). Themes were identified by highlighting enabling and inhibiting factors in articles related to Hispanic students' participation. Initial coding identified multiple recurring concepts, which were iteratively refined into three overarching themes: (1) structural and institutional barriers, (2) identity and culture, and (3) pathways and supports. These themes organize the literature and are discussed in detail in the Results section.

Methodology

Research Design

This study uses a qualitative method employing Braun and Clarke's (2006) reflexive thematic analysis (RTA) to identify, analyze, and report current themes in the literature on Hispanic/Latino participation in computer science (CS). This approach was selected because it supports the identification of recurring patterns across existing research while allowing the researcher to interpret how barriers and enabling factors are represented across the literature.

Search Strategy

A Boolean search was conducted using Middle Georgia State University's GALILEO database, Google Scholar, Semantic Scholar, ProQuest, and additional academic databases to identify peer-reviewed journal articles published in English that examined Hispanic/Latino populations in CS education, participation, or workforce outcomes. The search strategy combined terms related to computing disciplines, including "computer science," "information technology," and "STEM," with demographic identifiers, including "Hispanic," "Latino," and "Latinx."

Inclusion and Exclusion Criteria

Articles were included if they were peer-reviewed, published in English, published between 2020 and 2026, and focused on Hispanic/Latino populations in computer science education, participation, or closely aligned computing-related pathways. Articles published in 2026 that relied on data from 2020 to 2026 were also included. Political articles, non-peer-reviewed sources, and studies not directly related to computer science or closely aligned computing disciplines were excluded from the analysis. Studies focusing primarily on other STEM disciplines, such as mathematics or general science education, were also excluded.

Screening and Selection Process

The initial database search yielded approximately 35,829 articles. This number was reduced to 1,513 articles after filtering for peer-reviewed journal articles published within the last six years, from 2020 to 2026. Titles and abstracts were screened for relevance, followed by full-text reviews to ensure alignment with the research question. Approximately 100 articles were retained after the initial review stage. Following a more detailed review of abstracts and article summaries, the pool was reduced to 30 studies. The remaining 13 articles were selected for thematic analysis.

Data Organization and Coding

Relevant excerpts from each article were coded and documented in an Excel spreadsheet and a supporting Word document to organize the data. During the review process, sentences and passages related to the research question were highlighted and documented to support coding and analysis. Each article was read multiple times to develop familiarity with the content and identify significant findings.

Data Analysis

The 13 selected articles were analyzed using Braun and Clarke's (2006) reflexive thematic analysis framework. Consistent with reflexive thematic analysis, the researcher actively engaged in iterative interpretation while maintaining awareness of positionality and its influence on coding decisions. Codes were reviewed and refined across the selected studies to identify recurring patterns related to barriers and enabling factors influencing Hispanic/Latino participation and persistence in computer science education.

Results

The analysis revealed that Hispanic/Latino underrepresentation in computer science is shaped by several intersecting factors that often emerge early in students' educational experiences and accumulate over time, with challenges related to access, exposure, and support persisting from K–12 through higher education (Bates et al., 2023; Covarrubias et al., 2021). Through iterative comparison and consolidation, identified themes were refined into two overarching domains: barriers and enabling factors. Within these domains, ten core themes were identified, including five barrier themes and five enabling factor themes. The ten core themes included structural inequities, digital access disparities, socioeconomic constraints, belonging, impostor phenomenon, familismo, community cultural wealth, institutional support systems, culturally responsive pedagogy, and experiential learning pathways. The core themes were further grouped into the three themes below. These findings indicate that participation and persistence are shaped by the interaction of structural, institutional, and sociocultural influences. While the literature identifies a range of challenges and supports, further research is needed to determine which interventions are most effective in addressing these factors and improving long-term outcomes.

Theme 1: Structural and Institutional Barriers (Structural Inequities, Access, Socioeconomic Constraints)

The first theme, Barriers, captures the structural and systemic constraints that continue to limit access to and persistence in computer science pathways (Neally, 2022; Brar, 2024). These themes are related to structural inequities in education systems, digital and resource access disparities (Aubele et al., 2022), and socioeconomic and first-generation constraints (Pitarresi et al., 2024). Collectively, the literature demonstrates that these barriers are not isolated factors but operate in a compounding manner, shaping the conditions under which Hispanic/Latino students encounter computer science. Inequities in K–12 educational resources, disparities in access to technology and broadband infrastructure, and financial or familial obligations associated with first-generation status further restrict early opportunities for engagement (Aubele et al., 2022; Martins & Wangenheim, 2023; Chakraverty, 2022). Aubele et al. (2022) reported that although inequalities in device ownership and internet access have lessened over time, a first-level digital divide persists, particularly among low-income and racially and ethnically diverse families. The report also shows that more than 40% of households earning below $30,000 lack broadband service or a traditional computer. These structural conditions often precede individual choice, reinforcing the understanding that underrepresentation is rooted in systemic dynamics rather than individual deficit.

Theme 2: Identity and Culture (Belonging, Psychosocial Factors, Familismo, Cultural Wealth)

The second theme, Identity and Culture, reflects the sociocultural and psychosocial dimensions that influence how Hispanic/Latino students experience and interpret their participation in computing environments. These themes include underrepresentation and a sense of lack of belonging (Kikuchi, 2024), psychosocial barriers such as impostor phenomenon and self-efficacy, as well as culturally grounded constructs such as familismo and community cultural wealth (Chakraverty, 2022; Covarrubias et al., 2024; Pitarresi et al., 2024). The literature indicates that experiences of isolation and marginalization within academic and professional spaces can negatively impact persistence, particularly when students do not see their identities reflected in the field (Bates et al., 2023). However, cultural assets, such as strong family support systems and forms of community-based knowledge and resilience, serve as critical counterbalances. This domain highlights culture's dual role as both a source of challenge and strength, shaping identity formation, motivation, and persistence in complex ways.

Theme 3: Pathways and Supports (Institutional Supports, Pedagogy, Early Exposure, Experiential Learning)

The third theme, Pathways and Supports, represents the institutional and developmental mechanisms that facilitate entry into and continued participation in computer science. This domain integrates themes related to institutional support systems, culturally responsive pedagogy, early exposure to computing, and experiential learning aligned with career pathways (Bates et al., 2023; Brady & Gallant, 2021; Martins & Wangenheim, 2023). The literature consistently emphasizes the importance of early and sustained engagement opportunities that are accessible, inclusive, and relevant to students' lived experiences, particularly for students from historically underrepresented backgrounds (Neally, 2022; Bates et al., 2023). Institutional interventions, such as mentorship programs, inclusive curricula, and structured experiential learning opportunities, play a critical role in mitigating barriers and reinforcing students' sense of belonging and competence (Brady & Gallant, 2021; Bates et al., 2023; Ballen et al., 2023). Importantly, this domain underscores that exposure alone is insufficient; rather, meaningful engagement must be reinforced with supportive environments and clear connections to future career trajectories (Armstrong et al., 2023; Bonilla et al., 2025).

Taken together, these three Themes provide a cohesive framework for understanding how structural conditions, sociocultural experiences, and institutional supports interact to shape Hispanic/Latino participation and persistence in computer science.

Table 1. Recurring Themes Identified in the Literature

Source	Theme/s	Findings
Addressing Equity Gaps in STEM: A Self-Study	Theme 1, Theme 3	Latinx STEM majors experience lower retention rates; a 20% gap exists in credential attainment compared to White and Asian students.
A Qualitative Case Study of Historically Underserved Community College Students'	Theme 1, Theme 3	Frustration with inaccurate academic advising, struggles with self-directed online

Experiences in Information Technology Programs.		learning and limited hands-on experiences; Report interventions such as virtual coding labs, industry videos, and tutoring improved workforce preparation; these supports also increased students' self-efficacy and confidence in IT pathways.
Digital Divide Issues Affecting Undergraduates at a Hispanic-Serving Institution during the Pandemic: A Mixed-Methods Approach	Theme 1	A persistent first-level digital divide disproportionately affects low-income and racially diverse students; lack of broadband and reliable computing devices is linked to lower GPA outcomes.
English Language Learners in Computer Science Education: A Scoping Review	Theme 1, Theme 3	English Language Learner (ELL) students are perceived as equally capable; however, English-dominant instructional materials and structural language demands create barriers that necessitate intentional efforts to expand equitable access and participation in computer science
Examining What, Why, and How of Multilingual Student Identify Development in Computer Science	Theme 2, Theme 3	Underrepresented students face access, representation, and belonging barriers in computing, but inclusive practices and support systems improve persistence and engagement.
"I know what I need to learn": The intersection of aspirational and navigational capitals for marginalized-identity students	Theme 2	Aspirational and navigational capital overlap as MI students combine goal-driven persistence with strategic use of social networks to navigate structurally inequitable STEM institutions
Impostor Phenomenon Among Hispanic/Latino Early Career Researchers in STEM Fields	Theme 2	Impostor phenomenon among Hispanic/Latino STEM scholars is linked to identity-based marginalization, first-generation status, and diminished psychological well-being, highlighting how structural underrepresentation and ethnic identity shape belonging in STEM
Inclusion in Practice: A Systematic Review of Diversity-focused STEM Programming in the United States	Theme 1, Theme 3	Systemic underfunding and unequal pre-college preparation contribute to minoritized students' attrition from STEM, while diversity-focused programs (e.g., mentorship, bridge programs, financial aid, skill-building) serve as institutional supports designed to address these structural failures

Increasing Hispanic STEM Majors' Persistence to Degree: An Initiative to Harness Family Support	Theme 2, Theme 3	Examines how family support initiatives improve persistence and degree completion among Hispanic students pursuing STEM majors.
Increasing Access to STEM: Lessons Learned About What Worked in Lab Courses During COVID-19	Theme 1, Theme 3	Holistic accessibility—through course design, instructional practices, and instructor interaction—improves STEM lab learning, while technological, organizational, and communication barriers hinder access.
Teaching Computing to Middle and Highschool Students from a Low Socio-Economic Status Background: A systematic Literature Review.	Theme 1, Theme 3	Despite strong workforce demand in computing, research has largely neglected structural barriers affecting low-SES students in K–12 computing education, with most inequity studies focused on higher education rather than early access and preparation.
What Motivates First-generation College Students to Consider an IT Career? An Integrative Perspective	Theme 1, Theme 3	First-generation students—disproportionately Latino/Hispanic—experience higher and earlier attrition rates in postsecondary education, contributing to underrepresentation in IT and highlighting the need for targeted motivational and support mechanisms
"Without My Family, I Don't Know If I Would Be Here": The Role of Families in Supporting Latinx Computer Science Students at HSIs	Theme 2	Limited pre-college exposure to computer science contributes to impostor feelings among Latinx students, while family networks provide motivation, validation, and guidance that reinforce belonging and persistence in computing fields.

Note: Theme 1 = Structural and Institutional Barriers, including inequities in educational access, socioeconomic constraints, digital divides, and systemic limitations affecting participation and persistence.
Theme 2 = Identity and Culture, including belonging, impostor phenomenon, familismo, community cultural wealth, and psychosocial experiences shaping identity formation and persistence.
Theme 3 = Pathways and Supports, including institutional interventions, mentorship, culturally responsive pedagogy, early exposure, and experiential learning opportunities that support persistence and advancement in computer science pathways.

Conclusion & Discussion

The current literature indicates that Hispanic/Latino populations have made measurable progress in advancing within computer science fields, including emerging technological areas such as artificial intelligence (AI) in the United States (Latino Donor Collaborative, 2024; National Science Board, 2024). However, despite these gains, they remain underrepresented relative to their proportion of the broader U.S.

population (Gayfield & Martines, 2024; Pew Research Center, 2025). In response, federal and institutional efforts have expanded, resulting in a growing number of diversity-focused policies, educational initiatives, and support programs. These include after-school programs, community-based organizations, and targeted academic resources designed to increase participation (Bates et al., 2023; Brady & Gallant, 2021). While such efforts have improved access, the extent to which they enable sustained progression at the pace of technological advancement remains uneven. There is a need to encourage and sustain competitiveness in the United States, regardless of background, to navigate a technology-infused world.

A critical insight across the literature is limited access to coursework and technology, which does more than constrain opportunity; it shapes how students perceive themselves in relation to the field (Aubele et al., 2022; Martins & Wangenheim, 2023). Persistent underrepresentation and restricted access contribute to diminished belonging (Neally, 2022), reinforcing impostor phenomenon and lowering self-efficacy (Chakraverty, 2022). At the same time, sociocultural assets, including familismo and community cultural wealth, serve as important countervailing forces. These constructs provide emotional support, motivation, and resilience, particularly when institutional systems fall short (Covarrubias et al., 2024; Pitarresi et al., 2024). Strengthening family awareness and engagement can further reinforce these benefits, enabling students to navigate academic and professional pathways with greater support.

Culturally responsive interventions emerge as a key mechanism for addressing these disparities (Allen & Lei, 2022; Bates et al., 2023). Bilingual and community-centered programming, including both in-person and virtual afterschool initiatives, can mitigate logistical barriers such as transportation. Within institutional contexts, particularly Hispanic-Serving Institutions (HSIs), structured mentorship and guided academic pathways are essential for supporting underrepresented students from entry through career transition (Ballen et al., 2023; Brady & Gallant, 2021). In addition, the availability of low-cost and no-cost technological resources can provide practical avenues for increasing hands-on learning and technical skill development. The widespread availability of online knowledge repositories further supplements these opportunities, enabling self-directed learning and problem-solving.

Despite these advancements, there remains a need to better understand the current experiences of Hispanic/Latino individuals in computer science and broader STEM fields. Much of the literature reflects generalized or retrospective perspectives, highlighting the importance of capturing contemporary voices. Systematically surveying and engaging with current Hispanic/Latino students and professionals would provide insight into entry pathways, perceived barriers, effective supports, and unmet needs. Additionally, examining parallels with other underrepresented groups may yield transferable strategies for improving participation and persistence. At the policy and workforce levels, the findings point to the importance of continuity in educational and professional pathways (Ballen et. al., 2023; National Science Board, 2024). The findings suggest that workforce development initiatives integrating skill-building and employer-supported education can reduce fragmentation between academic preparation and career advancement. Importantly, these supports should be accessible in ways that allow individuals to seek additional support while promoting equitable professional growth for everyone.

While these factors have been widely documented, recent literature underscores the need to evaluate not only the presence of interventions but also their effectiveness and impact across contexts. This review contributes to the field by synthesizing findings from the past six years into three overarching Themes, offering a more integrated understanding of participation and persistence.

Limitations

This study is subject to several limitations. As a reflexive thematic analysis, the findings reflect interpretive engagement with the data rather than objective extraction. The author of this thematic review is Hispanic

and may have subconscious bias. To mitigate potential bias, coding decisions were documented systematically, and themes were derived through iterative comparison across sources. As a thematic literature review, the findings are inherently shaped by the scope and quality of existing research. Variability in how Hispanic/Latino populations are defined across studies, along with limited disaggregation of data, may obscure important subgroup differences. Additionally, publication bias may influence the prominence of certain findings. Consistent with reflexive thematic analysis, the synthesis presented here is interpretive, reflecting the researcher's analytical perspective while adhering to methodological rigor.

Future Research

Future research should further examine Hispanic/Latino participation and persistence in computer science using current, disaggregated, and student-centered data. Additional studies should explore how barriers and supports differ by gender, socioeconomic status, first-generation status, language background, and Hispanic/Latino subgroup (Jacob et al., 2022). Longitudinal and mixed-methods research would also help determine which interventions, such as mentorship, family engagement, culturally responsive pedagogy (Allen & Lei, 2022), early exposure, and experiential learning, are most effective in improving retention, degree completion, and career transition. As technology and workforce needs continue to evolve, future research should also consider how emerging tools, including artificial intelligence and online learning platforms, shape access, confidence, belonging, and persistence in computer science pathways.

References

Allen, M., & Lei, Y. (2022). English language learners in computer science education: A scoping review. In proceedings of the 53rd ACM Technical Symposium on Computer Science Education *1,* 57–63. *Association for Computing Machinery.* doi:10.1145/3478431.3499299

Armstrong, D., Deng, X., & Zaza, S. (2023). What motivates First-Generation college students to consider an IT career? An integrative perspective. *Communications of the Association for Information Systems, 52(1),* 51–78. doi:10.17705/1CAIS.05203

Aubele, J., Bell, T., & Perruso, C. (2022). Digital divide issues affecting undergraduates at a Hispanic-Serving Institution during the pandemic: A mixed-methods approach. *Education Sciences 12(2)*, 115. doi:10.3390/educsci12020115

Ballen, C. J., Burkholder, E., Costello, R. A., & Salehi, S. (2023). Pathways of opportunity in STEM: Comparative investigation of degree attainment across different demographic groups at a large research institution. *International Journal of STEM Education*, *10(46),* https://link.springer.com/article/10.1186/s40594-023-00436-5

Bates, M., Cashdollar, S., Chu, C., Deangelo, S., & Palid, O. (2023). Inclusion in practice: A systematic review of diversity-focused STEM programming in the United States. *International Journal of STEM Education, 10(2).* https://doi.org/10.1186/s40594-022-00387-3

Bonilla, A., Hernandez, P. R., Schultz, W., & Woodcock, A. (2025). Digital outcomes of communal goal mismatch: A longitudinal study of underrepresented students in STEM. *Frontiers in Psychology*, *16,* 1483396. https://doi.org/10.3389/fpsyg.2025.1483396

Brady, A., & Gallant, D. (2021). STEM bridge program: Underrepresented minority students' perceptions of the Louis Stokes Alliance for minority participation program impact. *Journal of College Science Teaching*, *50(6),* 57–62 https://www.jstor.org/stable/27133131

Brar, P. K. (2024). *Addressing equity gaps in STEM: A self-study* (Doctoral dissertation, San José State University). SJSU ScholarWorks. https://doi.org/10.31979/etd.ryrf-9cvz

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3(2),* 77–101. https://doi.org/10.1191/1478088706qp063oa

Chakraverty, D. (2022). Impostor phenomenon among Hispanic/Latino early career researchers in STEM fields. *Journal of Latinos and Education*, *23(1),* 250–268. https://doi.org/10.1080/15348431.2022.2125394

Covarrubias, I., Rivera, J., & Núñez, A. (2024). "Without my family, I don't know if I would be here": The role of families in supporting Latinx computer science students at HSIs. *Education Sciences 14(8)*, 815. doi:10.3390/educsci14080815

Department of War. (2026). DoD Employers: Civilian Careers. https://www.dodciviliancareers.com/whoweare/dod-employers

Gayfield, A., Martinez, A. (2024). The intersectionality of sex, race, and Hispanic origin in the STEM workforce. *U.S. Census Bureau.* https://www.census.gov/library/working-papers/2019/demo/SEHSD-WP2018-27.html

Haddad, K., Hernandez, N. M., Hernandez, P. R., & Woodcock, A. (2025). Increasing Hispanic STEM majors' persistence to degree: An initiative to harness family support. *Journal of Hispanic Higher Education.* doi:10.1177/15381927251392122

Jacob, S. R., Montoya, J., Nguyen, H., Richardson, D., & Warschauer, M. (2022). Examining the what, why, and how of multilingual student identity development in computer science. *ACM Transactions on Computing Education*, *22(3),* 1-33. https://doi.org/10.1145/3500918

Kikuchi, E. (2024, Oct 15). *Most Hispanic Americans say increased representation would help attract more young Hispanics to STEM*. Pew Research Center. https://www.pewresearch.org/short-reads/2024/10/15/most-hispanic-americans-say-increased-representation-would-help-attract-more-young-hispanics-to-stem/

Latino Donor Collaborative. (2024). *U.S. Latinos in technology: AI report*. https://latinodonorcollaborative.org

Martins, R. & Wangenheim, C. (2023, May). Teaching computing to middle and high school students from a low Socio-Economic status background: A systematic literature review. *Informatics in Education*. *23(1),* doi:10.15388/infedu.2024.01.

National Science Board. (2024). The STEM labor force: Scientists, engineers, and skilled technical workers (NSB-2024-5). *National Science Foundation.* https://ncses.nsf.gov/pubs/nsb20245/assets/nsb20245.pdf

Neally, K. (2022). Underrepresentation of minoritized groups in STEM education: A meta-synthesis review. *Journal of STEM Teacher Education*, *57*, 44–59. https://ir.library.illinoisstate.edu/cgi/viewcontent.cgi?article=1485&context=jste

Pew Research Center. (2025). *Key facts about U.S. Latinos*. https://www.pewresearch.org/short-reads/2025/10/22/key-facts-about-us-latinos/

Pitarresi, J., Sausner, E., & Wentzel, C. (2024). I know what I need to learn: The intersection of aspirational and navigational capitals for marginalized-identity students. *Journal of Engineering Education 113(2)*, 488–508. doi:10.1002/jee.20595.

U.S. Census Bureau. (2024, September 30). Hispanic origin. https://www.census.gov/data/academy/resources/one-pagers/hispanic-origin.html

Yosso, T. (2005) Whose culture has capital? A critical race theory discussion of community cultural wealth, *Race Ethnicity and Education*, 8(1), 69-91. doi:10.1080/1361332052000341006

Zilberman & Ice (2021). Why computer occupations are behind strong STEM employment growth in the 2019–29 decade. *U.S. Bureau of Labor Statistics. 10(1)*, https://www.bls.gov/opub/btn/volume-10/why-computer-occupations-are-behind-strong-stem-employment-growth.htm