

Career-Ready in Tech: Empowering Low-Income and Underrepresented Students Through the REP Scholarship Program

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Abstract

This case study highlights the impact of the National Science Foundation–funded Rebooting through EmTech Program (REP) at Miami Dade College between 2023 and 2025. REP provides financial support, mentorship, and professional development to students pursuing degrees in cybersecurity, data analytics, and information systems technology. Many REP Scholars are from historically underrepresented backgrounds in STEM, and the program has been instrumental in helping them persist through academic, financial, and personal challenges. Evaluation methods included student surveys, faculty mentor focus groups, post-graduation surveys, and institutional data on GPA, persistence, and course pass rates. Results show that REP strengthens student achievement and confidence. Scholars reported greater self-efficacy, stronger persistence, and increased readiness to pursue technology careers. One student noted that mentors “made me feel like I truly belong in tech,” reflecting the program’s impact on both skill and identity. Faculty mentorship emerged as a central strength, offering technical guidance alongside career navigation, encouragement, and psychosocial support. The findings also revealed areas for student growth, with some students reporting difficulty balancing academics with work or family obligations, others described a weaker sense of campus belonging, and a few experienced less engaging mentorship experiences. Program recommendations included structured mentor training, expanded undergraduate research, and clearer communication about campus resources. The most significant outcome is that REP has helped students stay in school, build confidence, and see themselves as future leaders in technology. Building on these results, this case study will highlight successes, share lessons learned, and explore strategies to strengthen equity, mentorship, and career readiness in STEM education.

Keywords: career readiness, community college, computing education, mixed methods research, self-efficacy, student persistence, underrepresented students

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Introduction

The rapid growth of cybersecurity, data analytics, and information systems careers has intensified the demand for a diverse and highly skilled technology workforce. Labor market projections continue to show sustained expansion in computing occupations, particularly in cybersecurity and data science roles (U.S. Bureau of Labor Statistics [BLS], 2023). Even with such demands, participation and completion rates in computing disciplines remain uneven across socioeconomic and racial/ethnic groups. Students from low-income and historically underrepresented backgrounds in STEM face persistent structural barriers, including financial instability, competing employment demands, limited access to professional networks, and reduced social capital (Carnevale et al., 2020; National Academies of Sciences, Engineering, and Medicine [NASEM], 2016).

Financial strain is among the most significant predictors of attrition in STEM pathways (Chen, 2013; Goldrick-Rab et al., 2016). However, recent scholarship suggests that financial aid alone may be insufficient to address the layered academic and psychosocial challenges experienced by underrepresented students (Castleman & Long, 2016; Nguyen et al., 2019). Interventions that integrate financial support with structured mentorship and career-focused professional development may better support persistence and career readiness by simultaneously addressing economic, psychosocial, and professional barriers (Crisp et al., 2017; Estrada et al., 2016).

The Rebooting through EmTech Program (REP), funded in part by the National Science Foundation, was developed at Miami Dade College as a comprehensive intervention model. Between Fall 2023 and Spring 2025, REP provided scholarships, faculty mentorship, and structured professional development workshops to 74 scholars pursuing bachelor's degrees in cybersecurity, data analytics, and information systems technology. The program sought to reduce financial strain, strengthen academic confidence, foster belonging within computing, and increase readiness for workforce entry. To this end, REP was designed as an integrated support model combining three core components: financial scholarships to reduce employment burdens, faculty mentorship to support academic and professional development, and career-focused workshops addressing technical interviewing, resume preparation, networking, and certification pathways. Together, these components were intended to create a structured ecosystem supporting student persistence and career readiness in emerging technology fields.

To evaluate the effectiveness of this integrated intervention, the present study examines REP's influence on academic persistence, psychosocial development, and career readiness among participating scholars through three research questions:

- **RQ1:** To what extent does participation in REP influence academic persistence and performance?
- **RQ2:** How does REP participation affect scholars' self-efficacy, confidence, and sense of belonging in emerging technology fields?
- **RQ3:** In what ways does REP contribute to career readiness and early workforce outcomes?

This paper makes three contributions to research on computing education and STEM student success. First, it provides empirical evidence that integrated scholarship programs combining financial support, mentorship, and professional development can improve persistence and academic engagement among low-income and underrepresented computing students. Second, it demonstrates how cohort-based mentoring structures support self-efficacy and belonging within technology programs, reinforcing theoretical predictions from Social Cognitive Career

Theory and student integration research. Third, it shows how structured professional development activities—including workshops and certification pathways—translate academic preparation into measurable career readiness outcomes. These findings highlight the potential of integrated support ecosystems to strengthen equity and workforce preparation in emerging technology education, positioning REP as a model for understanding how integrated supports can improve persistence and career readiness in computing education.

Related Work

Self-Efficacy and STEM Persistence

Self-efficacy theory posits that individuals' beliefs in their capability to perform tasks influence motivation, resilience, and academic persistence and performance (RQ1) (Bandura, 1997). In computing education, technical self-efficacy has been repeatedly associated with continuation in the major and academic achievement (Lewis et al., 2021; Ramalingam et al., 2004). Students from historically underrepresented groups in STEM frequently report lower levels of academic confidence, often shaped by stereotype threat, limited representation in technical fields, and structural barriers within educational environments (NASEM, 2016; Ong et al., 2018).

Prior research suggests that interventions that strengthen technical competence and reinforce professional identity can significantly improve persistence in computing disciplines. Mentorship, exposure to role models, and structured opportunities to practice technical skills have been shown to reinforce students' belief in their ability to succeed in STEM fields (Estrada et al., 2016). These mechanisms highlight the importance of environments that actively cultivate confidence and professional identity (RQ2) development among computing students.

Belonging and Identity in Computing

Building on self-efficacy, belonging and social integration represent a second critical mechanism influencing students' confidence, sense of belonging, and persistence. Belongingness theory suggests that feeling accepted and valued within an academic community is a key predictor of persistence and academic success (Walton & Cohen, 2011). In computing education, students' sense of belonging has been strongly linked to continuation in the major, particularly among students from minoritized backgrounds (Barker et al., 2009; Lewis et al., 2021).

Structured mentorship programs and cohort-based learning communities have been shown to strengthen students' connection to academic programs and reduce feelings of isolation often experienced in computing fields (Crisp et al., 2017). Such environments can foster a sense of shared identity and collective support, which may be particularly important for students navigating disciplines where they are historically underrepresented.

Research further suggests that mentorship relationships can function as mechanisms of social integration, helping students develop both academic networks and confidence in their role within the computing community (RQ2).

Career Readiness and Human Capital

Career readiness frameworks emphasize experiential learning, certification attainment, professional networking, and skill demonstration as mechanisms for workforce alignment and

early career outcomes (RQ3) (National Association of Colleges and Employers [NACE], 2023). Certifications and industry exposure are particularly salient in cybersecurity and information technology fields, where employers often evaluate candidates based on demonstrable competencies in addition to formal degrees (Carnevale et al., 2020).

Within computing education, career preparation initiatives that integrate industry certifications, internship preparation, and professional networking opportunities have been shown to strengthen students' transition from academic programs into technology careers and workforce entry (RQ3). These experiences allow students to accumulate forms of human capital that signal technical competence to employers while also helping students better understand professional expectations within the technology workforce.

Despite growing research on mentorship, financial support, and career preparation individually, fewer studies have examined integrated intervention models that combine these elements within a single program structure. The present study addresses this gap by evaluating the impact of the Rebooting through EmTech Program (REP), which integrates financial support, faculty mentorship, and structured professional development within a unified intervention model.

Conceptual Framework

This study is guided by three complementary theoretical perspectives: Social Cognitive Career Theory (SCCT), Tinto's Student Integration Model, and research on student financial well-being. Together, these frameworks provide a comprehensive lens for understanding how scholarship programs integrating financial support, mentorship, and professional development may influence students' persistence and career readiness in computing fields.

Social Cognitive Career Theory (SCCT) explains how career development is shaped by the interaction between self-efficacy beliefs, outcome expectations, and environmental supports (Lent et al., 1994). Within the context of STEM education, SCCT suggests that mentorship, skill-building opportunities, and exposure to professional pathways can strengthen students' confidence in their abilities and increase their likelihood of persisting in technical fields. In the REP program, professional development workshops and faculty mentorship serve as environmental supports enhancing students' career self-efficacy and readiness for technology careers.

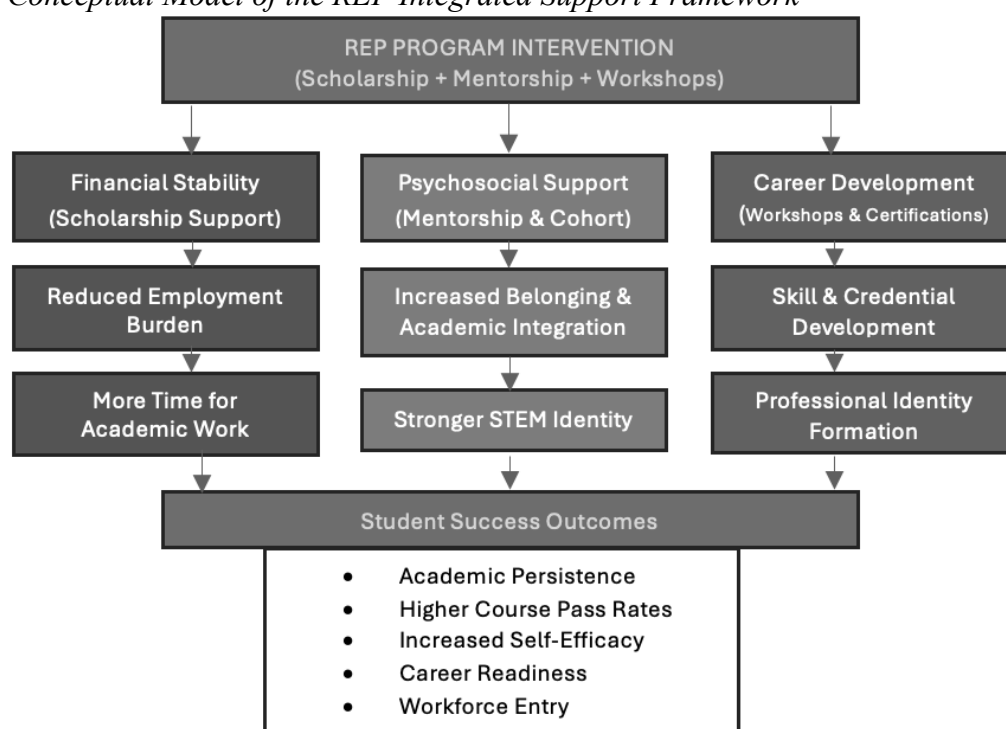
Tinto's Student Integration Model emphasizes the importance of academic and social integration in promoting student persistence in higher education (Tinto, 1994). Students who feel connected to their academic community and supported by faculty and peers are more likely to remain enrolled and complete their degrees. REP's cohort-based structure and mentorship activities are designed to foster such integration by building relationships among scholars and faculty mentors while strengthening students' sense of belonging within computing programs.

Finally, research on student financial well-being highlights how financial insecurity can negatively affect academic engagement and persistence (Goldrick-Rab et al., 2016). Scholarship programs can alleviate the financial pressures often requiring students to work long hours while enrolled. By reducing employment time burdens, financial support allows students to devote greater time and cognitive resources to academic work and professional preparation.

Together, these frameworks inform the conceptual model guiding this study. The model proposes that REP influences student outcomes through three interconnected pathways: financial stability, psychosocial development through mentorship and belonging, and career competency development through professional preparation activities. As illustrated in Figure 1, these pathways are expected to support both academic persistence and career readiness among students pursuing degrees in emerging technology fields.

Figure 1

Conceptual Model of the REP Integrated Support Framework



In the context of STEM retention, financial aid alone is a necessary but insufficient mechanism for long-term student success. Students from historically underrepresented backgrounds often navigate a “double bind” of financial pressure and psychosocial isolation that can undermine persistence even when academic ability is strong (Ong et al., 2018). REP is therefore conceptualized not as a stand-alone scholarship program but as an integrated support ecosystem designed to address financial stability, psychosocial development, and professional identity formation simultaneously.

This integrated framework draws upon three complementary theoretical pillars—SCCT, Tinto’s Student Integration Model, and financial well-being research. Table 1 summarizes the central mechanisms of each framework and how they are operationalized within the REP program.

Table 1*Theoretical Foundations Informing the REP Conceptual Framework*

Theory Name	Core Mechanism	Application in REP
Social Cognitive Career Theory (SCCT)	Focuses on self-efficacy beliefs and environmental supports to shape career development.	Faculty mentorship and professional workshops serve as environmental supports to build technical confidence.
Tinto's Student Integration Model	Emphasizes that academic and social integration are primary predictors of student retention.	Cohort-based programming and mentor-led engagement foster a sense of belonging within the computing community.
Financial Well-being Research	Analyzes how reducing economic strain frees cognitive bandwidth for academic focus.	Stipends facilitate debt reduction and allow scholars to "keep bills afloat," reducing the need for non-tech employment.

By addressing the material realities of student life alongside academic and professional preparation, REP functions as a structured ecosystem for systemic equity rather than a simple financial transfer. Conceptually, the program proposes that financial support reduces economic barriers to persistence, mentorship strengthens students' sense of belonging and academic confidence, and professional development activities build career competencies that facilitate workforce entry. Guided by this integrated logic model, the study employs a mixed-methods design to examine whether these proposed pathways are reflected in scholars' academic, psychosocial, and career outcomes.

Methodology

To capture a holistic understanding of the REP scholar experience, this study employed a mixed-methods evaluation design integrating quantitative institutional data with qualitative student and mentor perspectives. This triangulated approach allows the study to measure program outcomes while also capturing the lived experiences underlying student persistence and career development.

Participants

REP supported a total of 74 scholars between Fall 2023 and Spring 2025. Each semester's survey response counts were:

- Fall 2023 (N = 48)
- Spring 2024 (N = 62)
- Fall 2024 (N = 49)
- Spring 2025 (N = 39)

All surveys achieved 100% response rates.

An additional master's graduate survey included 41 respondents. Approximately half identified as Hispanic/Latino(a/x), and approximately one-fifth identified as Black/African American. The majority of the scholars were Pell-eligible.

Data Sources

Data sources included the following:

- Semester scholar surveys tracking financial stress, academic confidence, and belonging
- Graduate outcome surveys capturing employment and certification attainment
- Faculty mentor focus groups and surveys examining mentoring practices
- Institutional academic records including GPA, course pass rates, and persistence

Analytic Procedures

Paired-samples t-tests assessed changes in self-rated knowledge following workshops. Logistic regression examined semester-to-semester retention (binary outcome). Multiple regression modeled GPA as a function of demographic variables and program participation. Qualitative data were analyzed using inductive thematic analysis (Braun & Clarke, 2006).

Statistical significance was set at $p < .05$.

The mixed-methods design enabled triangulation between statistical trends and qualitative insights, strengthening interpretation of the mechanisms through which REP influences student persistence and career readiness. The following section presents findings aligned with the three research questions and interpreted through the integrated support framework described above.

Findings

This section presents findings organized by the study's three research questions: academic persistence and performance (RQ1), psychosocial development and belonging (RQ2), and career readiness outcomes (RQ3). Results draw from survey data, institutional records, workshop assessments, graduate surveys, and qualitative feedback from scholars and faculty mentors.

Academic Persistence (Retention) and Performance (RQ1)

RQ1: Retention

Logistic regression analysis indicated that REP participation significantly increased the likelihood of semester-to-semester retention compared to non-scholar peers enrolled in the same computing programs. The model controlled for race/ethnicity, gender, and residency status.

Across all survey semesters, 88–98% of scholars rated the scholarship as “very” or “extremely important” to their academic success, suggesting that financial support played a central role in enabling continued enrollment.

Scholars also reported consistently strong expectations of academic success. Across survey waves, 90% or more agreed or strongly agreed that they expected to succeed in upper-division EmTech coursework, indicating high levels of academic self-efficacy.

These findings align with prior research suggesting that comprehensive financial and academic support structures improve persistence in STEM pathways (Castleman & Long, 2016).

RQ1: Employment Burden

As seen in Table 2, one of the most notable program impacts was a substantial decline in full-time employment among scholars during the intervention period.

Table 2

Full-Time Employment Statistics

Semester	Percentage Employed Full-Time
Fall 2023	42%
Spring 2024	48%
Fall 2024	12%
Spring 2025	18%

The sharp reduction in full-time employment suggests that scholarship funding helped alleviate financial pressures that often require students to maintain demanding work schedules while enrolled in college. Focus group participants confirmed this interpretation, with several scholars reporting the scholarship enabled them to reduce work hours and devote more time to coursework and professional development activities.

Consistent with financial well-being research, the reduction in employment burden likely freed cognitive resources students could redirect toward academic performance (Goldrick-Rab et al., 2016).

Self-Efficacy, Confidence, and Belonging (RQ2)

RQ2: Self-Efficacy

Scholars reported consistently high confidence in their ability to succeed in EmTech coursework. Agreement with the statement “*I expect to do well in my EmTech courses*” remaining strong across semesters as shown in Table 3:

Table 3

Self-Efficacy Survey Results

Semester	Agreement
Fall 2023	96%
Spring 2024	92%
Fall 2024	84%
Spring 2025	90%

No statistically significant differences were observed across gender or degree programs.

These findings suggest that REP participation reinforced students’ academic confidence, consistent with research linking mentorship and self-efficacy to STEM persistence (Estrada et al., 2016).

Confidence in Professional Competencies

Scholars also reported high levels of confidence across key professional competencies.

- 96–100% reported confidence in producing high-quality work
- 97.4% reported confidence working with people from diverse backgrounds

- 94.9% reported confidence adapting to changing circumstances

By Spring 2025, no scholar reported being “not at all confident” in any assessed competency, suggesting strong professional self-confidence among participants.

RQ2: Belonging

Faculty support ratings remained consistently high, with 92–100% of scholars reporting strong agreement that faculty were supportive of their success, with only a small proportion of students reporting weaker peer connections:

- 8% in Fall 2023
- 7% in Spring 2024

Qualitative findings revealed an important nuance: scholars reported strong belonging within the REP cohort but a weaker connection to the broader institutional environment. Because MDC is a commuter college without on-campus housing, opportunities for broader institutional integration may be comparatively limited. This distinction suggests that the program itself functions as an important community of support for students navigating computing programs.

This aligns with prior research indicating that structured mentoring communities can mitigate feelings of isolation experienced by underrepresented students in STEM fields (Ong et al., 2018).

Career Readiness and Workforce Outcomes (RQ3)

Career readiness in this study was conceptualized as a multidimensional construct encompassing skill development, credential attainment, professional engagement, and employment outcomes.

RQ3: Career Competency Gains

Professional development workshops produced statistically significant gains in self-reported knowledge across all topics, as shown in Table 4.

Table 4

Professional Development Analysis

Workshop Title	t-statistic	Effect Size (Cohen's d)
Resume Development	t(53) = 10.51	1.43
Technical Interviewing	t(31) = 7.98	1.41
Financial Literacy	t(50) = 8.11	1.14
Internship & Job Search	t(55) = 9.76	1.30
LinkedIn Optimization	t(53) = 8.90	1.22
CodePath Interview Prep	t(20) = 4.51	0.98

All effect sizes exceeded 0.80, indicating large practical impacts (Cohen, 1988). The magnitude of change suggests that workshops facilitated meaningful skill development in competencies directly related to hiring processes in computing industries, including resume preparation, interview performance, and networking strategies (NACE, 2023).

RQ3: Certification Attainment and Skill Capital

Among graduates surveyed (N = 41):

- 61% used scholarship funds for certification programs
- 37% participated in field-specific workshops
- 27% developed professional portfolios or resumes
- 20% attended networking events

Scholar certification, as part of the focus on job skills and attainment, was encouraged by professors and the program. The resulting impact in certification shows a substantial increase, from 13% prior to the program to 37% among program graduates.

One scholar explained: “For the NSF REP scholarship, I was able to complete certifications in cybersecurity that will help me secure a job.”

These credentials function as observable signals of technical competence that are valued by employers in cybersecurity and IT fields (Carnevale et al., 2020).

RQ3: Employment Outcomes

Graduate survey data also provided insight into early workforce entry. Scholar employment roles included positions such as Cybersecurity Analyst and Data Analyst, indicating job attainment aligned with their computing-related career pathways.

Importantly, employment outcomes were not concentrated in temporary or unrelated positions. As seen in Table 5, the majority of employed graduates held permanent and full-time roles, suggesting stable workforce entry. Nearly all employed respondents reported that REP had adequately prepared them for technology careers, highlighting the program’s role in bridging academic preparation and labor market expectations.

Table 5

Workforce Entry

Outcome	Percentage
Employed	56%
Permanent roles	83% of employed
Full-time (30+ hours)	78% of employed

Taken together, these findings suggest that REP influenced student success through multiple interactive mechanisms rather than through financial aid alone.

Discussion

In this study, the findings provided strong evidence that integrated support programs can significantly influence student persistence, psychosocial development, and career readiness in computing education. The results support the multidimensional conceptual framework guiding this research, demonstrating that financial stability, psychosocial support, and professional preparation interact to influence student success outcomes.

Financial Stability and Academic Persistence

Findings related to RQ1 suggest that REP's financial support played a critical role in improving academic persistence by reducing students' employment burden. The substantial decline in full-time employment—from 42–48% during the early program period to 12–18% during later semesters—indicates that scholarship funding enabled students to devote more time and cognitive energy to coursework.

These results align with research on student financial well-being, which suggests that financial stress functions as a “cognitive tax” that diverts attention away from academic tasks (Goldrick-Rab et al., 2016). By alleviating financial pressure, the REP scholarship allowed students to redirect their focus toward academic achievement and professional preparation. This shift likely contributed to observed improvements in course pass rates and retention.

From a theoretical perspective, these outcomes reinforce the financial stability pathway proposed in the conceptual framework. Financial support alone may not guarantee persistence; however, when paired with structured mentorship and professional development, it creates conditions in which students can fully engage in their academic programs.

Psychosocial Development and STEM Identity

Results related to RQ2 highlight the importance of psychosocial support mechanisms in strengthening students' confidence and sense of belonging within computing disciplines. Scholars consistently reported high levels of self-efficacy, with over 90% expecting to succeed in upper-division coursework.

These findings are consistent with Social Cognitive Career Theory (SCCT), which emphasizes the role of self-efficacy and environmental supports in shaping career trajectories (Lent et al., 1994). Faculty mentorship, cohort interactions, and professional development activities functioned as environmental supports that reinforced students' technical confidence and professional identity.

At the same time, qualitative findings revealed an important nuance: many students reported stronger belonging within the REP cohort than within the broader institutional environment. This phenomenon reflects what might be described as a “belonging paradox,” in which program-level communities successfully foster inclusion even when broader institutional climates remain less supportive.

This observation aligns with prior research demonstrating that structured mentoring communities can buffer underrepresented students from experiences of marginalization in STEM fields (Crisp et al., 2017; Ong et al., 2018).

Career Readiness and Human Capital Development

Findings addressing RQ3 demonstrate that REP substantially strengthened scholars' career readiness. Workshop assessments revealed statistically significant gains across all professional development topics, with large effect sizes (Cohen's $d > 0.80$). These results indicate that the program did more than simply expose students to career information; it facilitated meaningful skill development aligned with hiring practices in computing industries.

Certification attainment increased from 13% to 37%, reflecting significant growth in the accumulation of career-relevant human capital. Certifications in areas such as cybersecurity and cloud administration serve as observable signals of technical competence, which are often valued by employers alongside formal degrees (Carnevale et al., 2020).

Graduate outcomes further support this interpretation. More than half of surveyed graduates reported employment shortly after graduation, and the majority of those employed held permanent, full-time positions in technology-related roles. These outcomes suggest that REP successfully translated internal confidence and academic preparation into external labor market opportunities.

From a theoretical perspective, these findings reinforce the career development pathway proposed by Social Cognitive Career Theory. By strengthening both self-efficacy and exposure to professional pathways, REP helped students transition from viewing themselves as learners to recognizing themselves as emerging technology professionals.

Integrated Support as a Mechanism for Equity

Taken together, the results demonstrate that the effectiveness of REP lies not in any single intervention, but in the integration of multiple support structures. Financial support reduces structural barriers, mentorship fosters belonging and identity formation, and professional development translates academic preparation into workforce readiness.

This integrated model aligns with emerging research suggesting that comprehensive support systems are more effective than isolated interventions in promoting persistence among underrepresented STEM students (Estrada et al., 2016). By addressing financial, psychosocial, and professional dimensions simultaneously, REP functions as a structured ecosystem for equity rather than simply a scholarship program.

Implications for Practice

The findings from the REP program suggest several practical strategies for institutions seeking to strengthen persistence and career readiness among students from low-income and historically underrepresented backgrounds in computing disciplines. The results indicate that effective interventions must provide integrated support systems that address financial stability, psychosocial development, and professional preparation simultaneously.

Integrated Support Models Are More Effective Than Single Interventions

One of the most important implications of this study is that financial aid alone is insufficient to address the complex barriers that underrepresented students face in STEM pathways. While scholarship funding reduced employment burdens and improved academic focus, the program's impact was amplified by the combination of mentorship and structured professional development activities.

Institutions designing scholarship programs should therefore consider implementing integrated support models that combine financial support with mentorship networks, career development workshops, and opportunities for professional engagement. These multi-dimensional interventions help create the conditions necessary for both academic persistence and workforce readiness.

Faculty Mentorship Plays a Critical Role in STEM Identity Formation

Faculty mentors emerged as a central component of the REP program's effectiveness. Beyond traditional academic advising, mentors served as cultural translators who helped students navigate the unwritten expectations of technology careers. Through individualized guidance, mentors helped scholars address technical skill gaps, overcome imposter syndrome, and understand industry expectations.

Institutions seeking to replicate successful mentorship models should prioritize structured mentor training and onboarding. Standardizing mentorship practices (e.g., encouraging open-ended problem exploration, adaptive mentoring strategies, and communication skill development) may improve the consistency and effectiveness of scholar mentorship experiences.

Professional Development Activities Should Be Embedded in Academic Programs

The impacts observed in workshop knowledge gains demonstrate that targeted professional development activities can significantly strengthen career readiness. Workshops focused on resume development, technical interviewing, networking, and certification pathways directly address competencies valued by technology employers and needed by scholars at the conclusion of their educational pathways.

Institutions should consider embedding career preparation programming within STEM degree pathways rather than offering it as optional extracurricular support. Integrating workshops, certification preparation, and networking opportunities into the curriculum may help students translate academic knowledge into workforce-relevant skills.

Cohort-Based Communities Can Strengthen Belonging in STEM

The findings suggest that cohort-based communities play an important role in fostering belonging among underrepresented students in computing fields. While scholars reported strong belonging within the REP program, some reported weaker connection to the broader institutional environment. This pattern suggests that structured learning communities can serve as protective spaces that support persistence even when broader institutional climates may be less inclusive.

Institutions may therefore benefit from implementing cohort-based learning models or scholarship communities that encourage peer support, collaborative learning, and shared professional development experiences.

Workforce Alignment Requires Early Career Exposure

Finally, the strong employment outcomes observed among graduates highlight the importance of connecting students with industry expectations early in their academic careers. Certifications, networking opportunities, and exposure to real-world career pathways helped scholars develop tangible signals of technical competence valued by employers.

Programs designed to support computing students should therefore prioritize industry engagement, including certification pathways, internship preparation, employer networking events, and career mentorship.

Limitations

Although the findings provide promising evidence regarding the effectiveness of the REP program, several limitations should be considered when interpreting the results.

Single-Institution Context

This study was conducted within a single institutional context—Miami Dade College. Institutional characteristics, such as student demographics, program structure, and regional workforce opportunities, may influence local outcomes. As a result, the findings may not fully generalize to other institutions with different student populations or program structures.

Future research should examine similar integrated programs across multiple institutions to determine whether the observed patterns hold across diverse educational contexts.

Self-Reported Survey Measures

Several outcomes—including self-efficacy, confidence, and perceptions of belonging—were measured using self-reported survey responses. While self-reported data are commonly used in educational research, they may be subject to response bias or social desirability effects. Students participating in scholarship programs may also feel motivated to report positive outcomes due to program affiliation.

To mitigate this limitation, the study triangulated survey responses with institutional academic data, workshop assessments, and graduate outcome surveys. Nonetheless, future research could strengthen measurement validity by incorporating additional behavioral indicators such as internship participation, portfolio development, or employer feedback.

Non-randomized Program Participation

REP participation was not randomly assigned. Students who applied for and received scholarships may differ in motivation, academic preparation, or career aspirations compared to non-participating students. Although statistical models controlled for several demographic variables, the possibility of selection bias remains.

Longitudinal or quasi-experimental research designs may help further isolate the causal effects of integrated support programs on student persistence and career outcomes.

Timing of Employment Outcomes

Employment outcomes were measured relatively soon after graduation. Because many graduates were still in the early stages of their career search at the time of the survey, the reported employment rates likely reflect early workforce entry rather than long-term career trajectories.

Future studies should examine longer-term career outcomes, including salary progression, career advancement, and continued engagement in technology fields.

These limitations do not diminish the value of the findings, but they do suggest that the results should be interpreted as strong evidence from a single institutional case rather than as universally generalizable outcomes.

Conclusion

The Rebooting through EmTech Program serves as a scalable framework for national STEM equity. By simultaneously addressing financial, psychosocial, and professional barriers, REP has fundamentally altered the career trajectories of its participants.

The human impact is summarized by the scholars themselves: “It changed my life entirely. I was able to graduate.” Another reflected on the importance of the mentorship model, stating that mentors “made me feel like I truly belong in tech.”

As the technology workforce continues to evolve, integrated support models—combining financial stability for debt reduction, expert mentorship for identity formation, and rigorous professional development—remain the most effective tools for ensuring underrepresented students become leaders in the digital economy.

Future research should examine whether the impacts observed in REP persist over time and can be replicated across other institutional contexts. Further longitudinal studies of graduates’ career trajectories, multi-institutional evaluations of integrated scholarship models, and qualitative investigations of mentor–student interactions would deepen understanding of how financial support, belonging, and professional identity formation operate together in emerging technology education.

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