Supporting Low-Income Students' Pathways to Graduate Education in Computing: Findings from the Flit-GAP Project

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Background

Efforts to broaden participation in computing have traditionally focused on increasing access at the K-12 and undergraduate levels, often emphasizing disparities related to race, gender, and early exposure to computing [1], [2], [3], [4], [5], [6], [7]. While these initiatives have led to meaningful progress, comparatively less attention has been given to inequities in access to graduate education in computing and related fields. Graduate study plays a critical role in shaping advanced technical careers, research trajectories, and leadership opportunities, yet pathways into graduate school remain unevenly visible and accessible [8], [9]. For students from low-income backgrounds, decisions about graduate school are shaped by more than academic preparation alone [10]. Financial constraints, family responsibilities, limited access to insider knowledge, and uncertainty about graduate school processes can make graduate education appear risky or unattainable [11], [12], [13]. Without clear information or trusted guidance, capable students may choose not to explore graduate pathways, even when they have the interest and ability to succeed. The National Science Foundation's Scholarships in Science, Technology, Engineering & Mathematics (S-STEM) program [14] seeks to address these inequities by combining financial support with programmatic interventions that promote persistence and advancement in STEM education. The Florida IT Graduate Attainment Pathways (Flit-GAP) project builds on this mission by focusing specifically on low-income students in computing-related majors and supporting their consideration of graduate education as a viable pathway.

Purpose

The purpose of this paper is to showcase our recent qualitative findings from the Flit-GAP regarding how low-income computing students reason about graduate school. We specifically ask the following research question:

1. What individual experience and programmatic support factors impact the decision of lower income students to attend graduate school?

Program Context & Overview

Flit-GAP was launched in September 2021 as an NSF-funded S-STEM collaborative scholarship and educational research effort at three public research universities in the Southeast United States. Florida International University (FIU), University of Central Florida (UCF), and University of South Florida (USF) are all large public universities classified as "R1: Doctoral Universities —Very high research activity."

Flit-GAP is designed to support low-income students pursuing a degree in a computing field, including computer science, information technology, cybersecurity, and computer engineering. The scholarship component of the program offers junior-level students up to 10 thousand dollars per year based on their unmet financial need to support them in completing a bachelor's degree within three years of entering the program. Additionally, the program can include up to 10 thousand dollars to support participants for one year of graduate studies in a computing field at one of the participating universities. In addition to financial support, Flit-GAP offers a variety of co-curricular opportunities to participants, including the selection of a career pathway experience

that reflects their interests. Each participant has the opportunity to explore either an internship (professional pathway), research (graduate pathway), or entrepreneurship pathway based on their interest. Program activities are held on-campus and virtually as collaborative events with scholars at other institutions. Events and activities promote community building, expanding the scholars' networking and learning space, and supporting their chosen pathways. Activities and events include informational events, an annual symposium, job search support, networking, mentoring, and online elective courses.

Methods

Participants and Recruitment

Participants were recruited through participation in the Flit-GAP program. The interviews were conducted in Spring 2025 with 11 students who had completed or were nearing completion of their undergraduate degrees and had either enrolled in or graduated from graduate programs. This group included both returning participants from the initial cohort and additional participants from later cohorts across all three institutions. Participants were compensated with a $20 gift card for their time.

Data Collection

Data was collected through semi-structured interviews conducted via Zoom and lasting approximately 40-60 minutes. All interviews were audio-recorded with participant consent and transcribed for analysis using otter.ai. Interviews focused on their trajectories, emphasizing decision-making processes, sources of support, and changes in how they understood graduate pathways over time. Interview transcripts were reviewed and manually corrected for accuracy. De-identified data and analytic materials were stored on secure, password-protected institutional systems in accordance with IRB-approved data management protocols.

Data Analysis

The research team analyzed the interview data to identify recurring patterns using a reflexive thematic analysis [15] in surfacing project-wide findings related to perceived opportunity costs, understanding of graduate school processes, and the role of mentors, peers, and program structures. Our analytic approach emphasized identifying cumulative insights that emerged across cohorts, institutions, and time points. Patterns were iteratively reviewed and refined through team discussion to ensure consistency and relevance to program design and practice. We present selective findings in this short paper to reflect the full duration of the Flit-GAP project and are intended to inform institutional and programmatic efforts to expand equitable graduate pathways in computing.

Findings/ Discussion

Our research question examines the individual experience and programmatic support factors impacting the decision of lower income students to attend graduate school. The participants highlighted multiple Flit-GAP components as key to their decision to attend graduate schools, notably financial assistance, proximity to professors, dedicated contact person or advisors, and peer mentoring.

The Flit-GAP scholarship funds were a prominent influence on graduate school attendance. Evan, for example, elaborated on his own decision-making process for attending graduate school in the following:

> So, I had been thinking about it for a long time, but I realized it'd be expensive. So then when I got the Flit-GAP scholarship and realized that it could continue into the graduate program, whereas pretty much every other form of financial aid does not, that's when I really started to consider, you know, doing it as an actual possibility. (Evan-post)

The continuation (from undergraduate financial aid through to graduate school financial aid) was a key feature of the Flit-GAP, and this seems to have been particularly influential in helping Evan consider graduate school attendance. Since Flit-GAP spanned both undergraduate and graduate school, Evan was already a member and the inertia of his continual attendance in both graduate school and Flit-GAP was made easier. In addition to students mentioning the prominent influence of financial resources, students noted how the program offers chances to present and meet with industry leaders, and that this was a challenge and growth opportunity for them. For instance, Julia explains,

> I would say that I'm pretty introverted and I'm not as social well. I used to not be as social as I guess I'm supposed to, but I would say, you know, it kind of made me come out my shell a little more, especially, we did an end of your presentation where we talked about either our internships or, I guess, whatever pathway we chose and did presentations to, like, certain leaders of certain companies. And it kind of just made me a little more confident. (Julia-post)

Across our participants, we notice that Flit-GAP offers a number of direct and indirect influences on the students' decision to attend graduate school. Most prominently, financial support was the catalyst for most students. We infer that financial support both supplements students' lack of economic capital and became a trigger for considering graduate school as a real possibility. In addition to the finances, we see the importance of the Flit-GAP community and social connections. Students also note the power of support received from the community, advisors, students, and mentors, and the ability to provide centralized resources and knowledge. In addition, students seem to have taken new risks to try new experiences that were uncommon for their personality, tendencies, or life opportunities at that point. By growing through the experiences, they challenged themselves to have, through the Flit-GAP, they found out more of what they were capable of doing.

Implications & Conclusion

Our findings suggest that financial support plays a crucial role in making graduate education feasible, but it is most effective when paired with clear communication about graduate school funding structures and expectations. Mentorship, peer interaction, and community-based programming also emerged as central to widening access. Opportunities to engage with faculty, graduate students, and near peers helped students imagine themselves as legitimate participants in graduate education and reduced uncertainty about the process. These interactions provided both informational clarity and affective support, reinforcing students' confidence to consider graduate pathways. As Flit-GAP concludes its funding period, these lessons offer actionable guidance for institutions and funding agencies aiming to create more equitable, transparent, and supportive graduate pathways in computing.

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