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Unveiling FlitGap's Program Success for Increasing Non-Dominant Group Participation in Computer Science Disciplines

Emmanuel Nti-Asante, Stephen Secules
entia001@fiu.edu, ssecules@fiu.edu
Florida International University

Abstract: This study investigates the contextual practices driving the success of the Flit-GAP (Florida IT Graduation Attainment Pathways) project, a collaborative initiative funded by the NSF involving Florida International University, University of Central Florida, and University of South Florida. Despite the diminished attraction towards diversity, equity, and inclusion (DEI) projects and initiatives in the state, Flit-GAP has exhibited resilience in recruiting, retaining, and supporting academically talented yet financially challenged students, particularly those from non-dominant groups, to increase their participation in computing disciplines. By analyzing audio recordings, videos, and field notes from two case studies within Flit-GAP, this research systematically unveiled the critical roles of social and academic integration in driving the project's effectiveness in supporting students from diverse backgrounds in the computing field. Therefore, prioritizing both academic and social integration is recommended as valuable guidance for improving practices in other struggling contexts.

Introduction

In American mainstream STEM classrooms, students from non-dominant communities, such as African Americans, frequently face significant hurdles (McGee & Martin, 2011). These challenges, including managing stereotypes (McGee & Martin, 2011), along with resistance to diversity, equity, and inclusion (DEI) initiatives aimed at addressing their needs, contribute to their difficulties and a noticeable lack of interest, ultimately resulting in limited participation in STEM education and careers. Despite these obstacles, some initiatives such as the NSF-sponsored FlitGap program, stands out as an exemplary model, showcasing remarkable success in graduating students from non-dominant groups, especially in computing disciplines. Impressively, within its initial three-year project, known as Flitpath, it achieved a retention rate of 76% among its 128 third-year students in computing disciplines, compared to a mere 59% for a comparable group of 1,184 students. Moreover, the graduation rates within one year for Cohort B students were double those of the comparison group. Among the 224 second-year students, 93.3% successfully graduated, while 6.7% remained enrolled in computing disciplines for the Fall 2020 semester, resulting in a 100% retention/graduation rate of students. The evident success of FlitPath led to an extension of NSF funding, resulting in the current program named FlitGap. We contend that comprehending the practices that underpin FlitGap's success is crucial for informing interventions in challenging contexts, particularly within mainstream STEM classrooms, and for advancing the success of diverse student populations.

Theoretical Framework

Our study is grounded in integration theory, which emphasizes academic and social integration, as well as the concept of learning communities, as crucial elements that significantly assist students in navigating systematic structures to attain their educational objectives (Engstrom & Tinto, 2007). According to Engstrom and Tinto, academic integration entails activities such as attending classes, completing courses, interacting with faculty, and engaging in study groups. They further define social integration as involving participation in campus-related activities and perceived social integration. Additionally, Engstrom and Tinto elaborate that learning communities facilitate both academic and social integration concurrently, providing students with opportunities to interact with peers, faculty, and the curriculum.

Research Design and Methods

We conducted two case studies (Merriam, 1998) within the FlitGap program to uncover its success factors. The first involved a three-hour annual Zoom orientation session where graduating students shared their experiences with new students. The second was a semester-long, weekly specialized academic advising program pairing faculty with students. Through deductive analysis of recorded observations and field notes, we examined what elements of integration theory define FlitGap's contextual strategies in facilitating the integration of students from non-dominant backgrounds into their program, ensuring successful graduation, and expanding their involvement in STEM Education and related career paths. As highlighted in Table 1, our report concentrates on two of the three constructs within integration theory: social and academic integration. We intentionally exclude the third construct, learning communities, as it provides contextualization for the aforementioned two.

Findings

Table 1

Social and Academic Integration Practices of FlitGap

Integration Theory Construct	Definition and Supporting Quotes
Academic Integration	FlitGap tailors' guidance and support to students, fostering active academic engagement through coursework completion and participation in sponsored conferences with mentorship. Dr. Lorenges, a program professor, exemplified this by personally guiding his mentee, Nicky, recommending relevant books to aid her struggling homework. Dr. Lorenges bolstered Nicky's academic integration by providing personalized support, including curated lists of scholars aligned with her research interests and purchasing books pertinent to her studies. In a mentoring session captured on video, Dr. Lorenges emphasized the value of these resources, stating, *"I have bought these books for your use. They are helpful in your research, career, and coursework."*
Social Integration	FlitGap fosters a supportive environment for students to engage in campus activities and build connections within the program. Tania, a dedicated final year student and mentor, stressed the significance of networking: *"The new scholars can integrate into the pathway program through networking...by relying on and asking questions from the mentors, professors, clubs, and other potential avenues the program provides."* Louise, another final year student and mentor, stressed the value of connections: *"I made acquaintances with the many mentors, advisors, senior students, clubs, colleagues, and lecturers the pathway provides to seek advice..."*

Discussion and Conclusion

The study highlights FlitGap's success by highlighting its focus on prioritizing both social and academic integration. Insights from final year students and mentors Louise and Tania validate FlitGap's commitment to social integration and networking, pivotal for student success. Dr. Lorenges' specialized academic advising sessions exemplify FlitGap's dedication to academic integration, enriching students' understanding. These findings align with the accomplishments of the Kingsborough Opening Doors program, emphasizing support services and boosting graduation rates (Scrivener et al., 2008). Overall, the sudy highlight the critical importance of social and academic integration for non-dominant groups in STEM education and careers.

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