

# The Impact of College Success Courses for Low-Income, First-Generation, Students of Color to Promote the Pursuit of Science, Technology, Engineering, and Mathematics (STEM) in Higher Education

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## Abstract

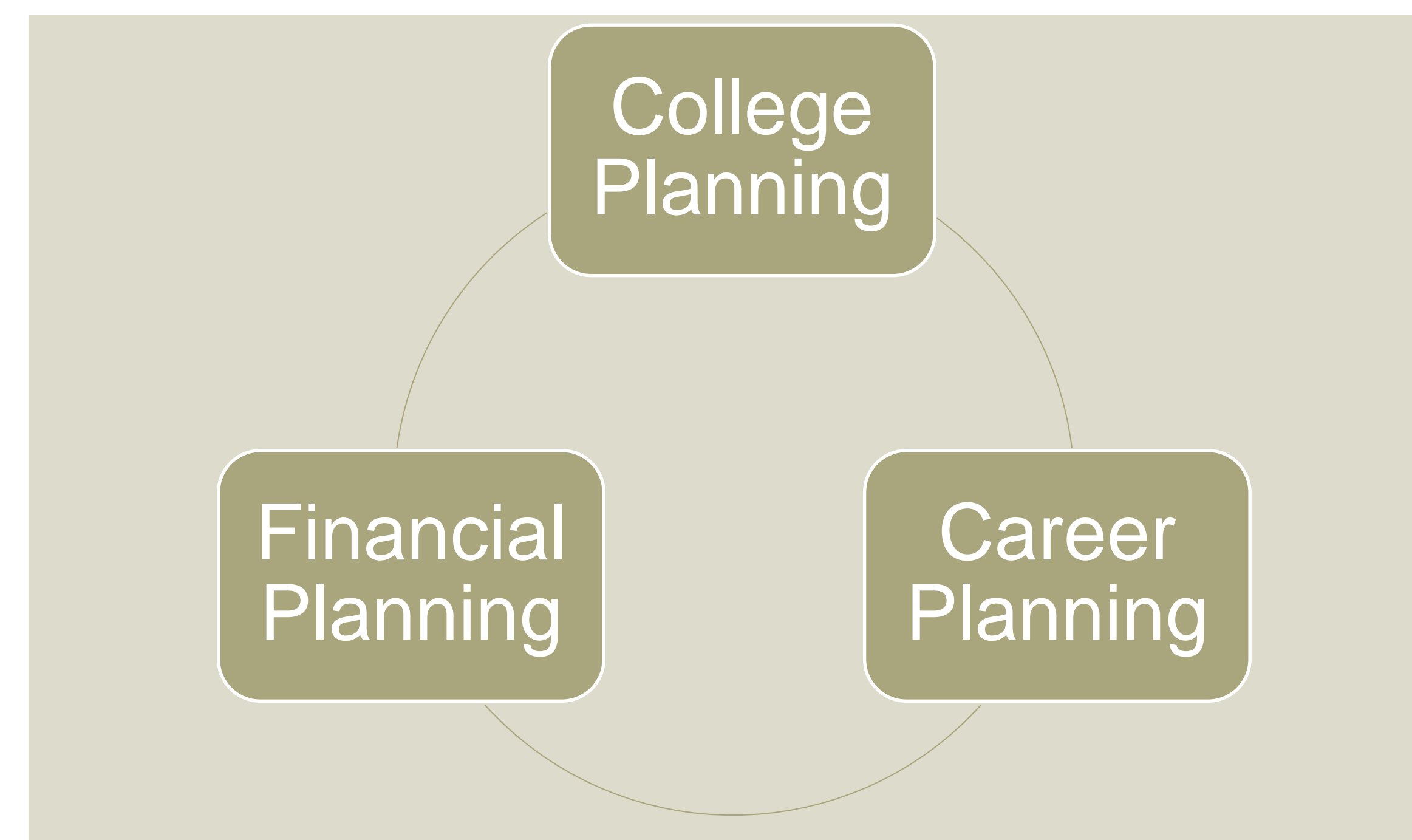
To eliminate barriers to entrance, retention, and success in Science, Technology, Engineering, and Mathematics (STEM) fields in higher education, the Level Playing Field Institute has developed a programmatic intervention for underrepresented students of color. The College Success Course, taking place within an out-of-school STEM summer program, was developed to prepare underrepresented high school students for the college-going process. The College Success Course focuses on eliminating barriers facing low-income, first-generation students by focusing on college planning, financial planning, and career planning. Evaluation findings demonstrate increased college preparation and postsecondary enrollment outcomes for this population, particularly within STEM fields of study. This course has implications for improving STEM higher education outcomes for underrepresented students of color.

## Background

Projections indicate that the fastest-growing and highest-paying jobs of the future are in the fields of Science, Technology, Engineering, and Mathematics (STEM; U.S. Department of Labor, 2009; U.S. Department of Commerce, 2011). However, African Americans and Latinos combined earn just 9% of all science and engineering degrees and represent only 11% of the entire science and engineering workforce (NSF, 2011). In order to increase STEM higher education participation for underrepresented students of color, it is critical to not only address disparities in academic preparation, but also disparities in knowledge about the college-going process.

College success courses thus comprise a key component in comprehensive efforts to diversify STEM fields of study. Because many low-income, first-generation students of color attend under-resourced high schools (Friedlaender & Darling-Hammond, 2007), they have less access to college counselors, private tutors and advisors, cultural/familial capital, and ultimately lack access to knowledge on how to apply for college and financial aid (Hoxby & Turner, 2013; Lareau, 2005). This can be a significant barrier for students who have the aptitude to pursue STEM studies but lack vital information and resources about the college-going process. Hence, this STEM intervention program sought to provide underrepresented students of color with a foundation in college planning and preparation in order to improve college-going outcomes and access to STEM fields of study and careers.

## College Success Components



The College Success curriculum contains 3 components:

**College Planning** provides students with vital college preparatory information, including:

- Goal setting
- College research
- Creating lists of potential colleges
- Understanding of UC/CSU A-G entrance requirements
- College entrance exams (SAT/ACT)
- Personal statements

**Financial Planning** provides students knowledge about how and where to access financial support for college, including:

- Financial aid
- FAFSA
- Scholarships and grants

**Career Planning** provides students with knowledge about STEM career pathways and career counseling, including:

- STEM speakers and field trips
- STEM role models of color (instructors and speakers)
- STEM industry mentorships and internships.
- Interview techniques and resume writing

## Methods and Findings

### Methods

Collected data from 207 current students and 90 SMASH alumni, utilizing pre-and post- program student surveys and alumni surveys.

### Findings

#### Knowledge of College Application Process

- ✦ Students' knowledge of the college application process increased significantly from pre-SMASH (Mean=3.88) to post-SMASH (Mean=4.05),  $p \leq .05$ .
- ✦ Students increased by 20 pct. points in their preparedness for successfully completing college applications and by 6 pct. points in their understanding of the UC/CSU "A-G" college entrance requirements.

#### Familiarity with Financial Aid

- ✦ Students demonstrated a significant increase in their familiarity with financial aid, increasing from an average score of 3.11 to 3.73 from pre-post,  $p \leq .05$ .
- ✦ Students demonstrated a 31 pct. point increase in knowledge about scholarships, a 24 pct. point increase in knowledge about student loans, and a 20 pct. point increase in knowledge about how to apply for financial aid.

#### STEM College and Career Aspirations

- ✦ 81% of students planned to declare a STEM major.
- ✦ 84% of students planned to pursue a career in STEM.

#### STEM Role Models

- ✦ Students significantly increased in access to role models in STEM fields from pre-post (Mean=3.62 to 3.86),  $p \leq .05$ .
- ✦ Students demonstrated an 8 pct. point increase in access to STEM role models of color and a 9 pct. point increase in access to female role models in STEM.

#### Post-Secondary Data

- ✦ 100% of SMASH alumni graduated from high school, 93% are enrolled in a four-year university, and 67% have declared STEM majors.
- ✦ 43% are enrolled in a "top 50 highest-ranked" university.

## Recommendations

### K-12 education:

- Increase availability of college counselors, college preparation activities, and incorporate a college-going culture across the curriculum.
- Increase collaborations with higher education institutions, including bridge opportunities and networks of role models/mentors.

### College and career engagement in out-of-school STEM settings:

- Increase availability of programs to assist students in college and financial aid planning during out-of-school time.
- Increase collaborations between K-12 and higher education institutions to provide college mentorships and STEM role models.

### Higher education:

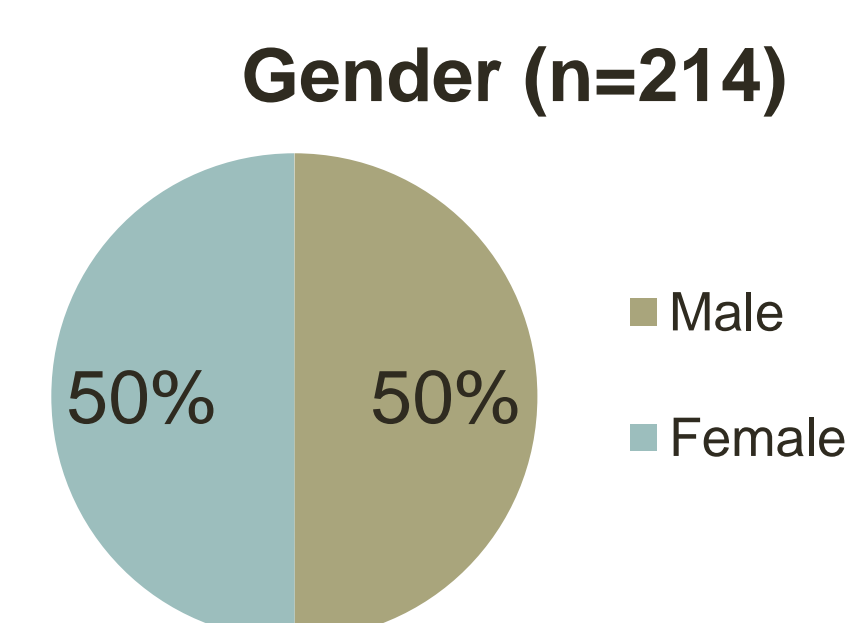
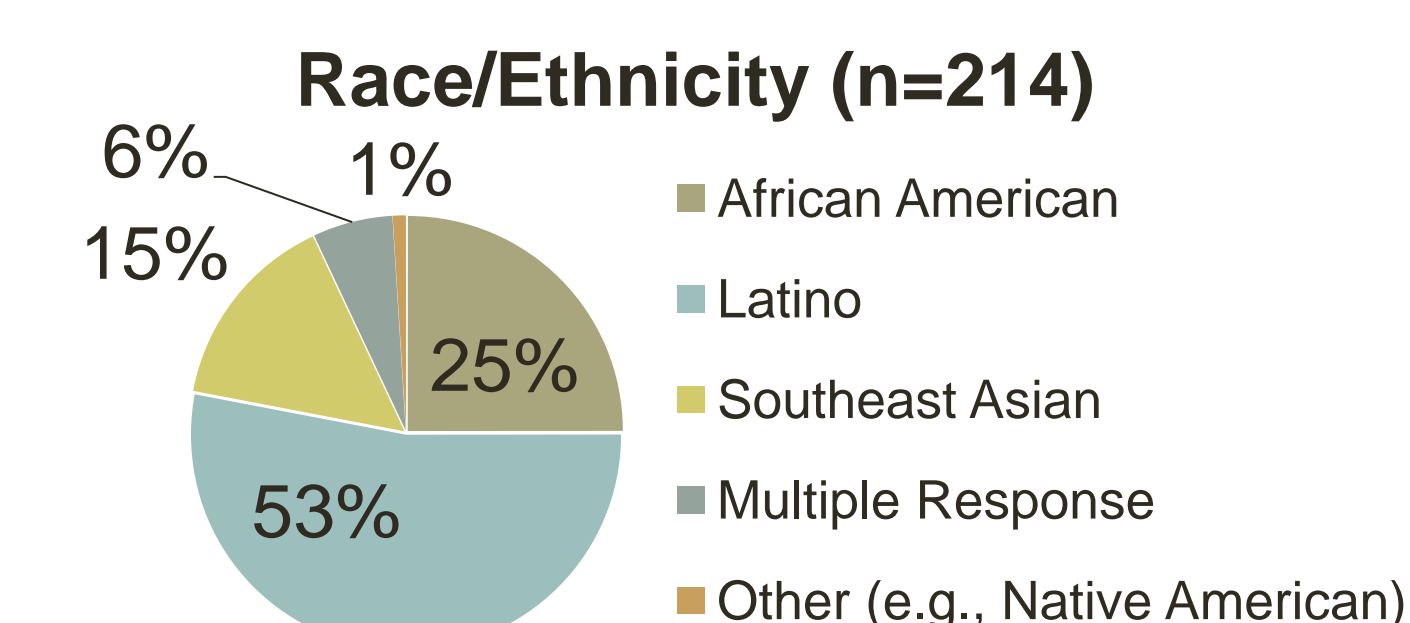
- Increase opportunities for students to experience college-level coursework and campus climates through university-led initiatives and/or partnerships with K-12 and non-profits.
- Create support networks of STEM peers and mentors for students from secondary education through graduate school.

## Context: SMASH ACADEMY

- o 5-week, 3-year summer residential program held at UC Berkeley, Stanford, UCLA and USC).
- o 214 students, 176 alumni
- o 76% FRPL-eligible, 78% First Generation College

### Program includes:

- (1) Accelerated STEM courses
- (2) Project-based and social justice-oriented curricula
- (3) College success courses
- (4) Exposure to STEM role models, professionals, and career opportunities
- (5) Community-building activities to promote networks of STEM peers of color
- (6) Coaching and tracking of alumni to ensure persistence in higher education



"Being exposed to different schools and STEM careers has allowed me to gain more understanding of what path I want to take." -3rd year SMASH student

"I learned so much about college. It will help me so much in the future when I start applying." -1st year SMASH student

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