


THE IMPACT OF DIFFERENT  
**EARLY-COLLEGE / DUAL-ENROLLMENT**  
PROGRAMS ON MINORITY  
STUDENT PERSISTENCE IN  
SCIENCE DISCIPLINES



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# OUTLINE

1. **Introductions**
2. **Background**
  1. **Minorities in STEM**
  2. **Benefits of dual enrollment**
3. **Our research**
4. **Discussion**



# MINORITIES' UNDER-REPRESENTATION IN STEM

- 1. Lack of preparation among under-represented minority groups in the early elementary grades:**
  - a) undermines enrollment and success in secondary-school programs, and*
  - b) in college and career choices later.*

(Clark, 1999)



# MINORITIES' UNDER-REPRESENTATION IN STEM (CONTINUED)

2. **African-American and Hispanic students begin college interested in majoring in STEM fields at rates similar to those of White and Asian American students, AND:**
  - a) persist in these fields through their third year of study, BUT:
  - b) they do not earn their bachelor's degrees at the same rate as their peers.

(ACE, 2006)



# MINORITIES' UNDER-REPRESENTATION IN STEM (CONTINUED)

3. **Whites continue to be far more likely than blacks to earn doctorates in the natural sciences.**
  - a) In 2006, 13.1% of doctorates awarded to whites were in physical sciences.
  - b) This is nearly triple the percentage for African Americans, which stood at 4.4% in 2006.

(JBHE, 2007)



# FACTORS THAT INFLUENCE MINORITY STUDENT ACHIEVEMENT IN SCIENCE AND MATH

1. **Disenfranchising stereotypes have a negative impact on students' learning and participation in science and mathematics classes.**
2. **Meaningful student-teacher relationships have a positive impact on students' learning and participation in science and mathematics classes.**
3. **High achieving students struggled to distinguish themselves from negative stereotypes and struggled to prevent these images from affecting their self-esteem.**
4. **Science and mathematics are perceived as subjects that only “smart” people can succeed in, and this often discourages minority students from choosing STEM careers.**

(Brand et al., 2006)



# WHY MINORITIES LEAVE SCIENCE AND MATH MAJORS

## I. Factors shared by white students:

- a) having chosen a major for inappropriate reasons (e.g. to please other people in their lives);
- b) inadequate pre-college preparation for those coming from high schools deficient in facilities, funding, or teaching quality;
- c) social class, which entails a financial burden for those from lower income families.

**(Seymour and Hewitt, 1997)**



# WHY MINORITIES LEAVE SCIENCE AND MATH MAJORS (CONTINUED)

## 2. Other factors are specific to students of color:

- a) *Lack of structural coherence among advisory, tutorial, financial, and mentoring functions of the institution.*
- b) *Conflict between cultural values of the student and the demands of college science and math.*
- c) *Programs for minority retention that misunderstand a student's sub-culture.*
- d) *Racism.*

(Seymour and Hewitt, 1997)





# THE BENEFITS OF DUAL ENROLLMENT

1. **Dual enrollment is positively related to a student's likelihood of:**
  - a) *Earning a high-school diploma,*
  - b) *Enrolling in a four-year institution,*
  - c) *Persisting to a second semester and second year in college,*
  - d) *And achieving better college grades than non-dual enrollment students.*
2. **Benefits for male and low-income students were even more substantial than for their peers.**

(NRCCTE, 2007)



# ALL THIS SHOWS THAT...

*There is a need for research on persistence in STEM and the effects of dual enrollment.*



# OUR RESEARCH ON DUAL ENROLLMENT IN SCIENCE

## **Context: The Minority Student Pipeline MSP, or (MSP)<sup>2</sup>**

- ▶ Partners include colleges, universities, and a very large, majority-minority, K-12 school district.
- ▶ We run two different models of dual enrollment:
  1. *A 3-year, summer, residential program for students from any high school in the district, on the campus of Bowie State University; and*
  2. *Semester-long courses during the school year in 5 different high schools, taught by faculty from Prince George's Community College.*



# OUR RESEARCH ON DUAL ENROLLMENT IN SCIENCE (CONTINUED)

## Our approach:

1. Track students into college (longitudinal).
2. Measure students' interest in pursuing science (right now).
3. Examine the *college decision-making process* through surveys, focus groups, and individual interviews.



# OUR RESEARCH ON DUAL ENROLLMENT IN SCIENCE (CONTINUED)

## Interviews on the college decision-making process examined:

- 1) **Predisposition** – students tentatively decide whether or not they will pursue postsecondary education
- 2) **Search** – students collect information about colleges
- 3) **Choice** – students evaluate their options and select a college or university to which to apply and enroll



# OUR RESEARCH ON DUAL ENROLLMENT IN SCIENCE (CONTINUED)

## Categorizing students by type of predisposition:

- ▶ **Knowers** – have always recognized they would attend college; usually come from families who have set the expectation and it's automatically assumed the child would attend college
- ▶ **Seekers** – students who, between 1<sup>st</sup> and 5<sup>th</sup> grade, have identified that college attendance is possible and a goal
- ▶ **Dreamers** – begin considering postsecondary plans between 7<sup>th</sup> and 12<sup>th</sup> grades, but are much less likely to believe college is an option

(Freeman, 2005)



# OUR RESEARCH ON DUAL ENROLLMENT IN SCIENCE (CONTINUED)

**We interviewed ten 12<sup>th</sup>-grade students in one of our programs and categorized them:**

- ▶ **1 *Knower*** – focused, intrinsically motivated, encouraged by family
- ▶ **7 *Seekers*** – varying degrees of focus and knowledge about the college-going process
- ▶ **2 *Dreamers*** – two of the best prepared and most focused participants



# OUR RESEARCH ON DUAL ENROLLMENT IN SCIENCE (CONTINUED)

## General themes from the interviews:

- ▶ ***“Hopefully, I’ll get money”*** – financial considerations
- ▶ ***“I’ll hold it together”*** – feeling unprepared for college work
- ▶ ***“It would have been good to know earlier”*** – desire to know more, sooner
- ▶ ***“They’re going too”*** – peers
- ▶ ***“My teachers are good at that stuff”*** – resources





# OUR RESEARCH ON DUAL ENROLLMENT IN SCIENCE (CONTINUED)

## Focus groups brought more insight:

- ▶ Five focus groups of 4-6 students in our concurrent enrollment courses

## Key findings:

1. Students are positive about the prospect of attending college. However, they are somewhat anxious about choosing the college that best suits their needs. Students do not think that high schools have an atmosphere that supports discussions about college and life after high school with teachers or other students.
2. Students see family and media/marketing as important factors in the college choice process.
3. Students are focused on college as a path to expanded career opportunities. Their top reasons for going to college are directly related to enhancing their opportunities for career and earning power.



# OUR RESEARCH ON DUAL ENROLLMENT IN SCIENCE (CONTINUED)

## What's important to consider in follow-up research?

1. The *choice* phase of college decision-making
2. The impact of the dual enrollment program
  - a) Major
  - b) Preparation for college-level work
3. Retention



# DISCUSSION



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