

# Latino STEM Students in Undergraduate Research

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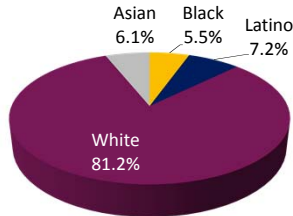
## Abstract

This poster provides a comprehensive overview of the undergraduate research (UR) experience for senior Latino students in STEM majors. The poster also offers context regarding the representation of these students in STEM fields, while featuring engagement findings from the National Survey of Student Engagement (NSSE). Results from a logistic regression and some t-tests reveal relationships between participation in undergraduate research and certain student characteristics and engagement levels. Finally, this poster suggests practices for fostering participation in undergraduate research and includes other implications for practices.

## Composition of Sample

The data used for this study are from the 2013 administration of the *National Survey of Student Engagement* (NSSE). The 2013 NSSE administration included 30,155 senior students who major in a STEM field at 563 U.S. institutions. The five most popular STEM majors are biology, mechanical engineering, computer science, electrical engineering, and mathematics. The race/ethnicity composition for the respondents can be seen below. In particular, this study focuses on Latino STEM students (N = 2,174).

The Percentage of Students by Race

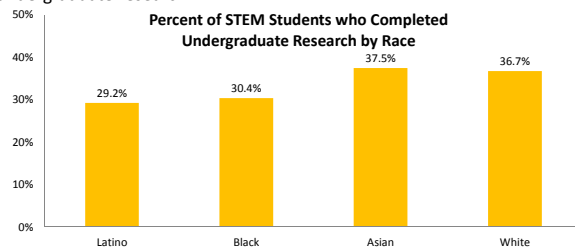


## Enrolling in STEM

Looking at either the racial representation among the STEM students in this analysis or the racial representation among Bachelor's Degrees recipients in 2010-2011 (IPEDS), it is evident that Latino students are underrepresented in STEM (7.2%) compared among the general population (9.3%). In contrast, White students who comprise 81.2% of the STEM students are overrepresented, as they only were granted 71.1% of the Bachelor's degrees from four-year institutions in 2010-2011.

## Participating in Research

Not only were Latino students structurally underrepresented in STEM majors, but the Latino students in these fields are less likely to participate in undergraduate research.



## Logistic Regression of Student Odds of Completing UR

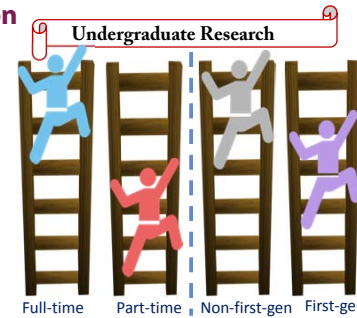
Student Characteristics	Odds Ratio
Male	.885
Enrolled Full Time	1.90*
First Generation	0.81
Grades "B"	0.63*
Grades "C"	0.26*
Transfer	0.62*
Live on Campus	1.39*
Work	1.00

\* p < 0.05

## Influencing STEM Participation

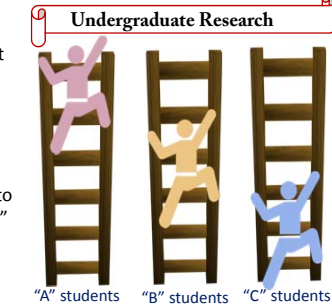
### Full Time and First Generation

Based on the odds ratio in the above table, students who were enrolled full time were almost twice as likely to participate in undergraduate research than part time students. First-generation college students were four-fifths as likely to participate in undergraduate research. Conversely, this implies that, non-first-generation students were about 25% more likely to participate in undergraduate research.



### Student Grades

The odds ratio in the above table indicates that grades were also significant predictors of student participation in undergraduate research. Compared to "A" students, students who received mostly "B" grades were about two-thirds as likely to participate in undergraduate research. Similarly, compared to "A" students, students who received mostly "C" grades were only one quarter as likely to participate in undergraduate research.



### Transfer Students and Living on Campus

Transfer students were two-thirds as likely to participate in undergraduate research than non-transfer students. Students who lived on campus were nearly two-fifths more likely to participate in undergraduate research, compared to students who lived off campus.

## Independent Samples T-Test of Research Participation v. Engagement

	UR Done or In Progress (n = 627)	UR Not Done (n = 1519)	Sig.	Effect Size
Quantitative Reasoning	38.39	32.40	0.00	0.36*
Student-Faculty Interaction	34.83	18.55	0.00	1.05***
Supportive Environment	36.33	31.27	0.00	0.33*

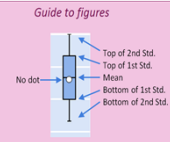
Note: \* medium effect size, \*\*\* very large effect size.

Conceptualizing effect size is based on NSSE's *Contextualizing NSSE Effect Sizes: Empirical Analysis and Interpretation of Benchmark Comparisons and Cohen's (1988) effect size*. Find more information at [http://nsse.iub.edu/pdf/effect\\_size\\_guide.pdf](http://nsse.iub.edu/pdf/effect_size_guide.pdf) and Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

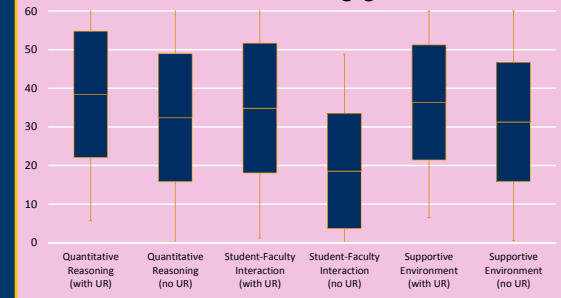
## Levels of Engagement

NSSE survey items are grouped into Engagement Indicators, which serve as summative measures of various aspects of student engagement. Items are converted to a 60-point scale, averaged together, and then weighted to accommodate differences in gender and enrollment status.

NSSE includes ten Engagement Indicators, three of the more relevant ones for this analysis include quantitative reasoning, student-faculty interaction, and supportive environment.



## Standard Deviation of Engagement Levels



## Recommendation for Action

### Intervene Early

It is not surprising that transfer students and students with lower grades are less likely to participate in undergraduate research. However, these characteristics are easily identifiable early in a student's academic career. Therefore, institutions that desire to promote participation in undergraduate research among Latino STEM students should offer low-grade and transfer Latinos additional academic resources (like tutoring) and targeted opportunities for students who are new to campus (like orientations for transfer students or meetings with advisors trained to work with STEM transfer students).

### Increase Intentional Financial Aid

Like transfer status and student grades, it's not a surprise that students who live off campus or are enrolled part time are less likely to participate in undergraduate research. However, for departments that are interested in increasing the participation of undergraduate research among Latino STEM students, investing in students to stay on campus or increase their credit hours per semester might increase participation. Those departments should consider establishing scholarships that provide either housing or tuition waivers for Latino seniors aspiring to participate in undergraduate research.