

RESEARCH BRIEF

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Achievement Gap Analysis Series – Two-Year Success in Developmental Math: Fall 2013 through Fall 2015

NOVA's participation in the Achieving the Dream (ATD) National Reform Network demonstrates the College's commitment to student success.¹ ATD is a comprehensive nationwide reform movement for improving student success in community colleges. NOVA has been a member of ATD since 2007 and was named a Leader College in 2010. NOVA's participation in ATD encourages continuous monitoring of student outcomes in order to identify areas for improvement. Such attempts are based on data-driven research on policies and interventions that lead to improved student success and closing achievement gaps.

This Brief examines achievement gaps in two-year developmental math success rates of three fall cohorts of first-time to NOVA (FTTN) students in the Fall 2013 through Fall 2015². Data is disaggregated and analyzed by the following student demographics: enrollment status (full-time versus part-time), gender, age, race/ethnicity, and program placement.³

Key Findings

- Overall, achievement gaps in two-year developmental math success rates were found when data was disaggregated by student **enrollment status, gender, age, race/ethnicity, and program placement.**
- The demographic groups with the highest two-year developmental math success rates were **full-time** students, **female** students, students **age 22 and older**, **Asian or White** students, and students enrolled in an **A.A. or A.S.** program as compared to their counterparts within each disaggregated group.

¹ See <http://achievingthedream.org/> for more information about ATD.

² In this Brief, success in developmental math focused on the rate at which students who enrolled in developmental math in their first term received a grade of "S" (Satisfactory) within two years. Fall 2016 cohort will have complete two-year data in Fall 2018.

³ All demographics are as of the student's first term.

Section 1. Achievement Gaps in Developmental Math Success

In this section, two-year success rates are presented for FTTN students in the Fall 2013 through Fall 2015 cohorts who enrolled in a developmental math course during their first term. Success in developmental math is defined as a student receiving a grade of “S” (Satisfactory) within two academic years. Students who met this definition of success may not have completed their entire developmental math sequence, as some students are required to take more than one developmental math course. Students who enrolled in more than one developmental math course in their first term were counted as successful if they succeeded in at least one of those courses.

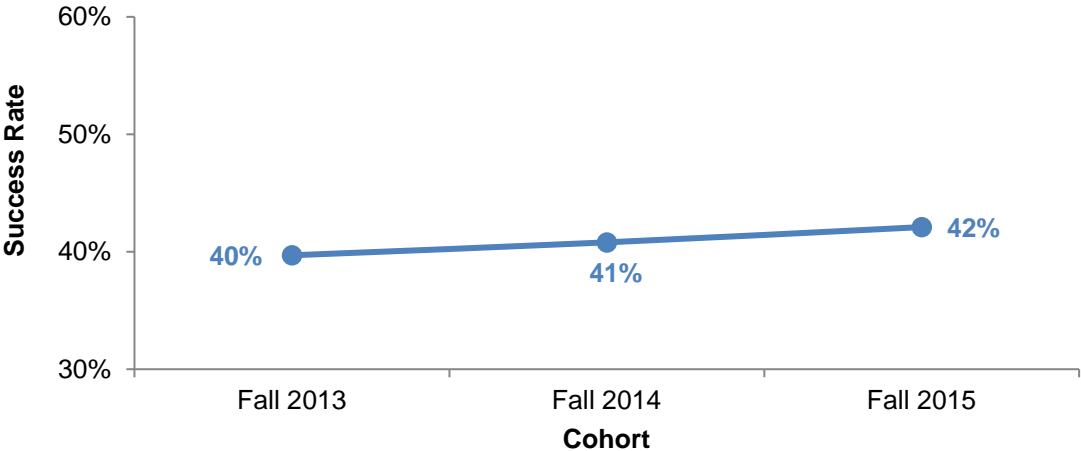
NOVA offered a redesigned developmental math curriculum starting in Fall 2011. In mid-Fall of the same year, a new statewide test for developmental math placement was introduced, the Virginia Placement Test for Math (VPT-Math). Fall 2012 was the first Fall semester in which most students were placed using the VPT-Math. Furthermore, in Spring 2012 a once again revised developmental math curriculum format was adopted.

Table 1 and Figure 1 show the two-year developmental math success rates of FTTN students from Fall 2013 through Fall 2015. The success rates for each cohort increased slightly from 40 percent in Fall 2013 to 42 percent in Fall 2015.

**Table 1. Two-Year Developmental Math Success Rates of FTTN Students:
Fall 2013 through Fall 2015 Cohorts**

Fall 2013 Cohort			Fall 2014 Cohort			Fall 2015 Cohort		
Total Enrolled	Successful		Total Enrolled	Successful		Total Enrolled	Successful	
	#	%		#	%		#	%
1,762	700	39.7%	2,311	944	40.8%	2,190	922	42.1%

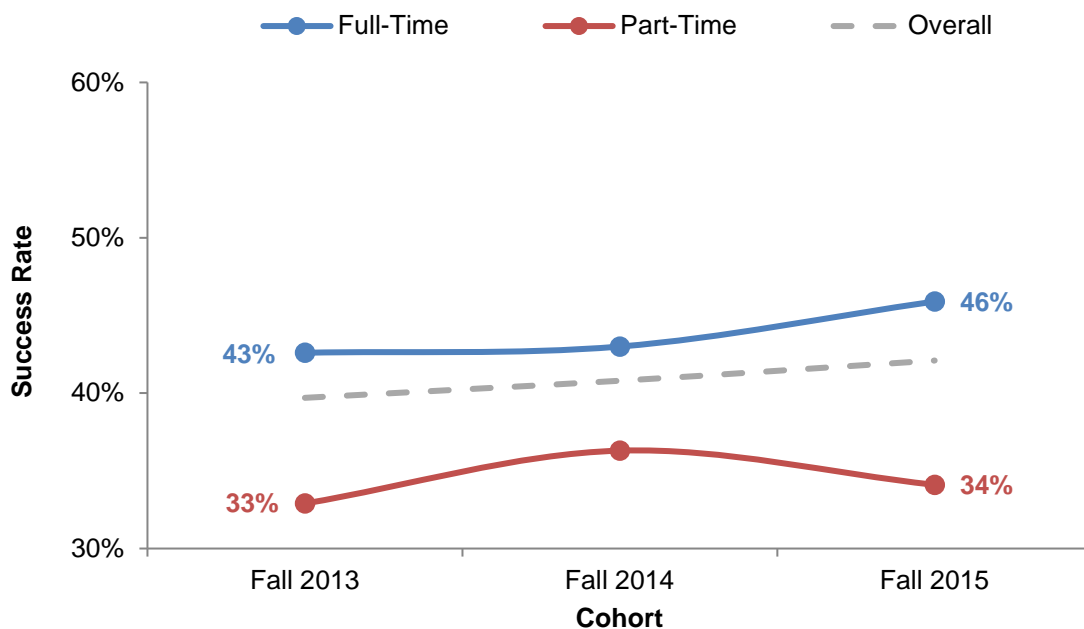
**Figure 1. Two-Year Developmental Math Success Rates of FTTN Students:
Fall 2013 through Fall 2015 Cohorts**



Enrollment Status

From Fall 2013 through Fall 2015, data show an achievement gap in the two-year developmental math success rates of FTTN students by enrollment status. Notably, success in developmental math was between 10 and 12 percentage points higher for full-time students than part-time students. Further, full-time students' developmental math success increased by 3 percentage points, 43 to 46 percent, from the Fall 2013 to Fall 2015 cohorts. However, part-time students' developmental math success rates only increased by 1 percentage point from 33 to 34 percent (Figure 2).

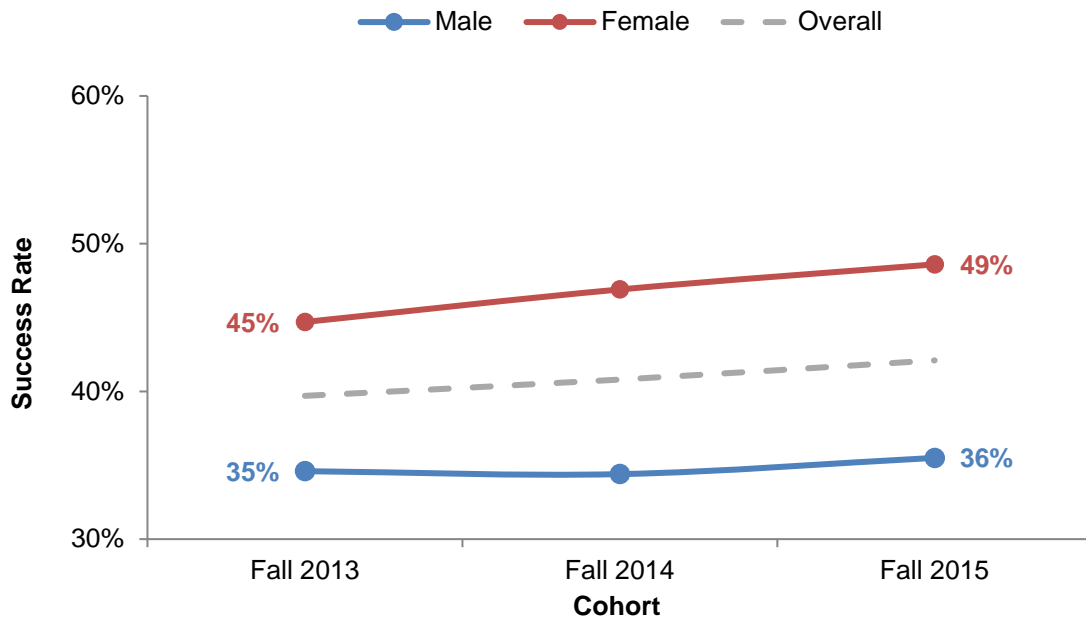
Figure 2. Two-Year Developmental Math Success Rates of FTTN Students by Enrollment Status: Fall 2013 through Fall 2015 Cohorts



Gender

From Fall 2013 through Fall 2015, the data shows an achievement gap in two-year developmental math success rates of FTTN students by gender. Across these three cohorts, female students had consistently higher developmental math success rates (averaging 47 percent) compared to male students (averaging 35 percent). Compared to female students, male students' show a sizable achievement gap: success in developmental math was 10 percentage points lower for the Fall 2013 cohort and 13 percentage points lower in the Fall 2015 cohort (Figure 3, next page).

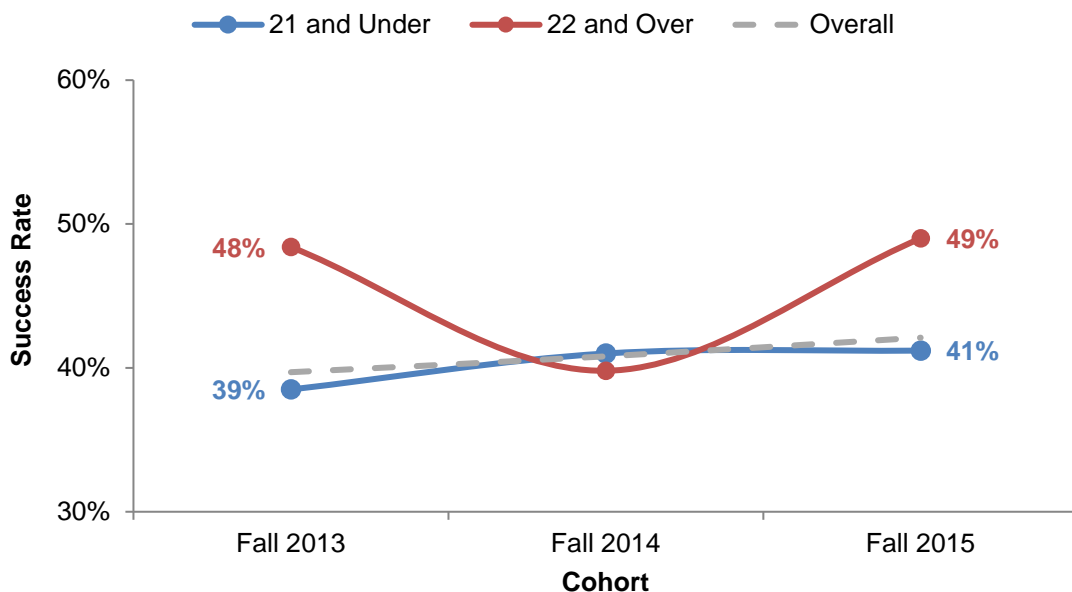
Figure 3. Two-Year Developmental Math Success Rates of FTTN Students by Gender: Fall 2013 through Fall 2015 Cohorts



Age

In the Fall 2013 and Fall 2015 cohorts, the data shows an achievement gap in two-year developmental math success rates of FTTN students by age group. Students age 22 and over had developmental math success rates that were up to 9 percentage points higher than students 21 and under. However, the achievement gap between these two age groups decreased slightly: 9 percentage points for the Fall 2013 cohort to 8 percentage points for the Fall 2015 cohort.

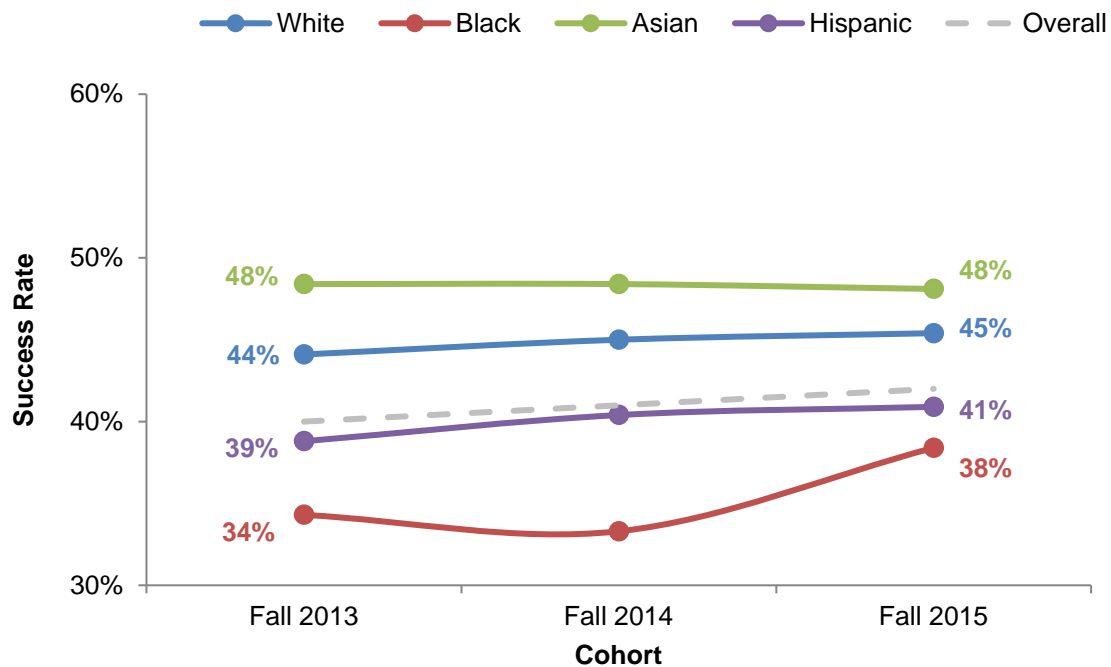
Figure 4. Two-Year Developmental Math Success Rates of FTTN Students by Age: Fall 2013 through Fall 2015 Cohorts



Race/Ethnicity

From Fall 2013 through Fall 2015, the data shows an achievement gap in two-year developmental math success rates of FTTN students by race/ethnicity. In the Fall 2015 cohort, Asian students had the highest success rates (48 percent), followed by White students (45 percent). Hispanic students' success rates were similar to the overall rate (41 percent). The success rate of Black students was the lowest, but increased from 34 percent for the Fall 2013 cohort to 38 percent for the Fall 2015 cohort.

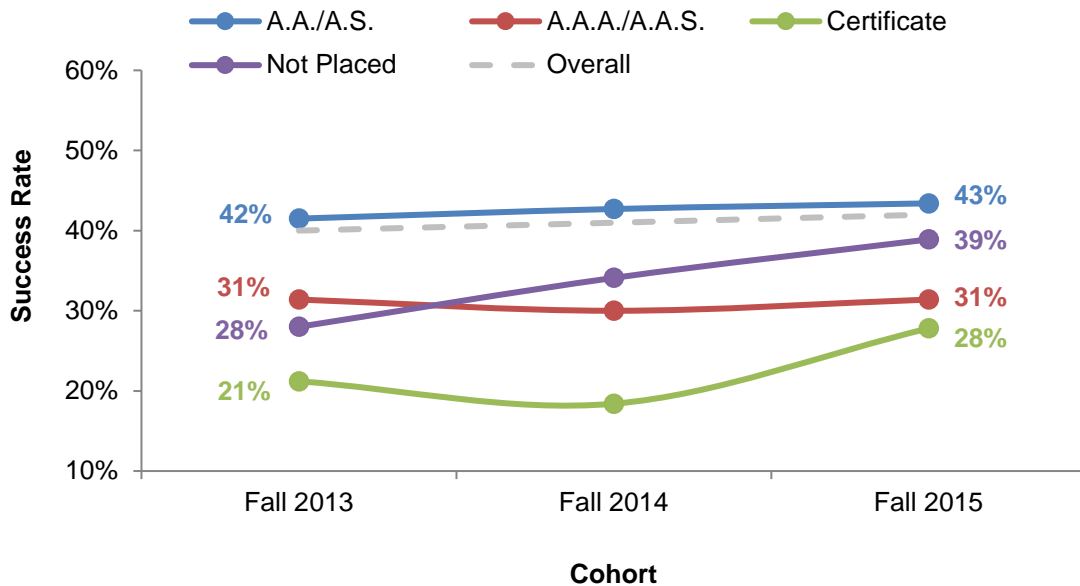
Figure 5. Two-Year Developmental Math Success Rates of FTTN Students by Race/Ethnicity: Fall 2013 through Fall 2015 Cohorts



Program Placement

From Fall 2013 through Fall 2015, the data shows an achievement gap in two-year developmental math success rates by a students' choice of degree or certificate program. Over half of FTTN students in Fall 2015 were enrolled in either an A.A. or A.S. degree program. Of these students, 43 percent were successful in developmental math, which was the highest success rate among all degree groups. The lowest success rates were among A.A.A. or A.A.S. degree students (31 percent) and Certificate students (28 percent). Students who were not enrolled in any degree or certificate program (Not Placed) had success rates of 39 percent.

Figure 6. Two-Year Developmental Math Success Rates of FTTN Students by Program Placement: Fall 2013 through Fall 2015 Cohorts



Section 2. Discussion of Findings

Data presented in this Research Brief reveal a number of achievement gaps among FTTN students in terms of success in developmental math. Success rates were highest among students who were enrolled full-time, age 22 and older, female, White or Asian, and were enrolled in an A.A. or A.S. degree program. The achievement gap between full- and part-time students increased slightly over time, while the gap between Asian and Black students decreased from a 14 percentage point difference in Fall 2013 to a 10 percentage point difference in Fall 2015.

These findings mirror national trends. Current research shows that male persistence and achievement lags behind that of female students.⁴ The gender gap is most pervasive among Black students, with Black female students earning 68 percent of all associate degrees awarded to Black students.⁵ In addition, national data shows that Black and Hispanic students trail Asian and White students on a number of student success metrics. As of 2008, only 30 percent of African Americans and 20 percent of Latinos between the ages of 25 and 34 had attained an associate degree or higher compared to 49 percent of White students and 71 percent of Asian students.⁶

⁴ Lee, J. M., & Ransom, T. (2011). The educational experience of young men of color: A review of research, pathways, and progress. Retrieved from College Board website:

<http://youngmenofcolor.collegeboard.org/sites/default/files/downloads/EEYMCResearchReport.pdf>.

⁵ Center for Community College Student Engagement. (2014). Comprehensive Fact Sheet: Men of Color in Higher Education. Retrieved from: http://www.ccsse.org/docs/MoC_Long_Fact_Sheet.pdf?ts=20170113182911.

⁶ Lee & Ransom 2011.

Closing Achievement Gaps at NOVA

Nationally, about 60 percent of community college students are referred to remedial coursework. At NOVA, around 45 percent of students are placed in remedial math alone. Many NOVA students have a desire to attend college and earn a degree or other credentials, but are not college-ready in math. Studies have shown that of pre-college curricula, completing higher levels of mathematics curricula is associated with completing a college degree (Adelman 2006).⁷Therefore, it is critical for NOVA to better understand the impact of remedial mathematics design on student success and evaluate ways other than traditional remedial math courses to get students up to speed.

Based on the above trends and ATD's recommendations, NOVA began teaching a redesigned developmental math curriculum in Fall 2011. The redesign aimed to lessen the need for developmental math for NOVA students by reducing the time to complete the requirements to one academic year. In addition to the new curriculum, in mid-Fall of the same year, a new statewide placement test, the Virginia Placement Test for Math (VPT-Math), was introduced. NOVA also introduced adaptive learning for developmental math in 2012. The redesigned developmental math sequence included modularized units that focused on specific mathematical concepts instead of semester-long courses, and innovative technology that teaches students in the National Center for Academic Transformation (NCAT) Emporium style. Under the new model, students study only concepts for which they do not demonstrate mastery on the placement test, and instructors provide more personal attention to their students through individualized instruction.

This Brief focused on the impact of the redesigned remedial mathematics courses on student success. The proportion of students passing developmental math within two years increased slightly between Fall 2013 and Fall 2015. However, it is evident that the redesign has not fully addressed achievement gaps. Achievement gaps remained prevalent or even widened when looking at certain student groups. A closer look at the data revealed that younger, part-time, minority, and male students are less successful in developmental math than their counterparts. The impact of this gap is that students in these groups may be more likely to spend valuable time and resources on developmental courses that do not count toward a degree or transfer.

NOVA mandated placement testing and enrollment in developmental courses as part of its Start Strong policy changes, launched in Fall 2014. These policy changes were the result of recommendations from NOVA's ATD Core Team. These policy changes aim to help close the prevailing achievement gaps described in this Brief. For first-time in college students ages 17-24, NOVA also mandated attendance at student orientation, participation in advising, and enrollment in a Student Development course. The goal of targeting this population is to help students succeed in college by fostering early connections with professional advisors and faculty who help students plan for and attain their academic goals.

⁷ Adelman, C. (2006). *The Toolbox Revisited: Paths to Degree Completion From High School Through College*. Washington, D.C.: U.S. Department of Education.

NOVA also participates in the Survey of Entering Student Engagement (SENSE), developed by the University of Texas, which provides additional insight into how NOVA might approach closing achievement gaps. SENSE provides benchmark data in several areas that helps the College better understand students' critical early experiences and improve policies and practices that affect student success in the first year. Results of the 2015 SENSE indicated that, relative to other community colleges nationwide, NOVA is underperforming in the "High Expectations and Aspirations," "Engaged Learning," and "Academic and Social Support Network" benchmarks. NOVA must continue to explore the implications of these benchmark scores and identify intervention strategies to help boost student success.

Finally, one of ATD's six capacity areas for student success is *Equity*. This capacity area is used as a framework for faculty-led programs that focus on teaching and learning and promote equitable outcomes for all students. NOVA faculty on ATD teams are examining strategies to improve equity in the classroom through teaching and learning.

Future research on achievement gaps at NOVA should take a comprehensive approach to data analysis by combining student data with surveys, focus groups, and outside research on community college best practices. Future studies on achievement gaps should focus on practices that could increase the completion rate in redesigned developmental math courses. Other research initiatives could compare NOVA's VPT-Math placement data and completion of developmental courses with those of other Virginia Community College System colleges to determine the effectiveness of the placement test in improving developmental math success relative to NOVA's peers.