

## Introduction

The purpose of this study is to determine if there is a significant difference in the on-time degree completion rates for students who take developmental courses when compared to students that do not. The data for this study includes only students who graduated from a North Dakota high school in the spring of 2012, 2013, 2014, or 2015 and enrolled in the North Dakota University System in the fall immediately following high school graduation. Students were only included if they were not found to have transferred out of the University System, to avoid incorrectly identifying a student as not completing a degree on-time.

For the purposes of this study, a student completing a degree "on-time" is considered to be an Associate degree within 3 years of enrollment in the University System, while an on-time Bachelor degree is completed within 6 years of enrollment in NDUS.

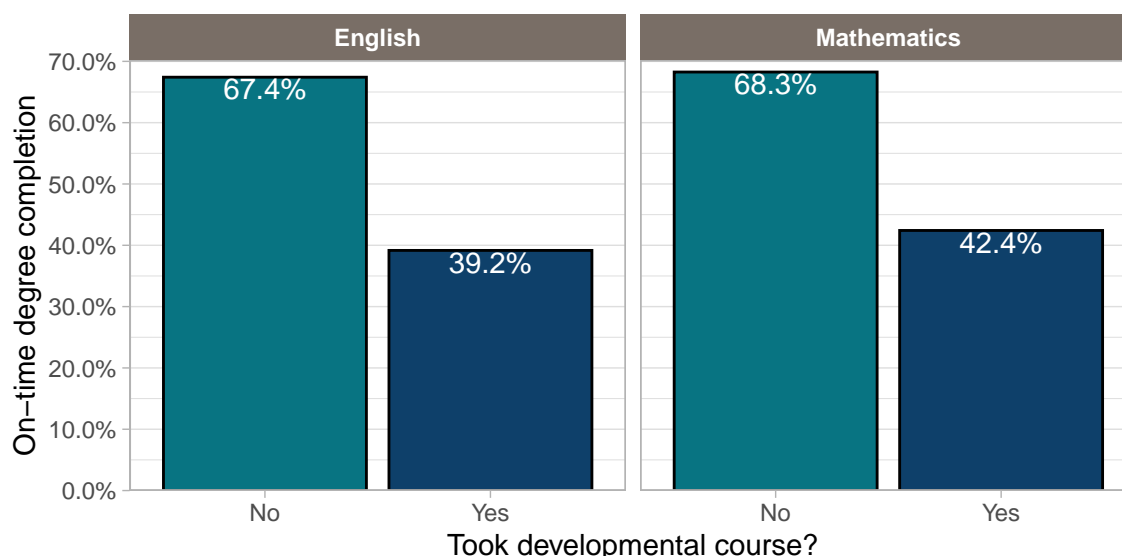


Figure 1: On-time degree completion rate by developmental course status and subject

However, simply looking at the on-time degree completion for students who did or did not take developmental courses does not show the whole picture. As table 1 illustrates below, there are significant underlying differences between the types of students who take and do not take developmental courses. Students who take developmental courses have, on average, a higher percentage of students on IEPs or free/reduced lunch in high school along with lower ACT and GPA scores.

Ever took developmental course	Count	IEP %	Free/Reduced %	ACT	GPA
No	6249	2.4%	11.6%	23.5	3.424
Yes	2812	11.3%	19.8%	18.1	2.854

Table 1: Summary statistics for students by developmental course status

In order to more directly compare the effects of developmental courses on degree completion, propensity score matching was used to compare developmental and non-developmental students. This procedure matches developmental students one-to-one with another comparable student who did not take developmental courses, creating similar groups.

## Summary of propensity score matching and results

	High School Information				
	Count	IEP %	Free/Reduced %	ACT	GPA
<i>Prior to creating matched groups</i>					
Developmental Students	2812	11.3%	19.8%	18.1	2.854
Non-Developmental Students	6249	2.4%	11.6%	23.5	3.424
<i>After creating matched groups</i>					
Developmental Students	1690	7.4%	17.5%	19.2	2.987
Non-Developmental Students	1690	6.3%	16.9%	19.2	2.968

Table 2: Academic information for matched groups of 2012-2015 North Dakota high school graduates immediately enrolling in NDUS

The propensity score matching procedure resulted in a far more comparable group of students on the basis of their academic performance in high school along with their demographic characteristics. As such, more accurate comparisons may now be made in regards to the effect that developmental coursework may or may not have in relation to on-time degree completion in the North Dakota University System.

	Developmental Student Group	
	On-Time Degree Completion	Not On-Time Degree Completion
<i>Non-Developmental Student Group</i>		
On-Time Degree Completion	488	439
Not On-Time Degree Completion	350	413

Table 3: On-time degree completion for matched pairs

Utilizing matched pairs of students allows the effect of developmental coursework to be better estimated. Students were matched with their academic "twin" (as it were) from the opposite group to compare their degree completion status. Table 3 shows the results of such pairings - for example, 488 of the pairs of students had both the developmental and non-developmental student completing their degree. Utilizing these results, the on-time degree completion rates between the group of students who had taken developmental courses and the non-developmental group of students can be compared. 49.6% of the students who had taken developmental courses earned degrees on-time, compared with 54.9% of the students who did not take developmental courses in NDUS.

Using a formal statistical method, McNemar's test, sheds further light on the significance of this result. With a p-value of 0.0015, the conclusion can be reached, on the basis of this sample, that taking developmental mathematics coursework is associated with a lower rate of on-time degree completion - an Associate degree in 3 or fewer years or a Bachelor degree in 6 or fewer years. Calculating a 95% confidence interval for the difference in on-time degree completion between the groups shows that, on the basis of this sample, the percentage of all students in developmental courses who complete their degree on time is between 2.0% and 8.5% percentage points lower than that of all students who do not take developmental courses.