



What is the Role of Mathematics Proficiency on Academic and Labour Market Outcomes of College Students?

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Recent reports affirm concerns about the numeracy and math skills of Canadians, pointing to a decline in skills or performance at a level too low for what is needed for a productive labour force. Most of these studies were conducted at a national or provincial level and did not control for individual sociodemographic characteristics or math skills at college entry. The study for this report was unique in approach: it tracked the progress of students at a large Toronto college, using student-level data that included math performance and course selection in high school, program selection and standardized math testing at college entry, progress to college graduation, and labour market and further education outcomes.

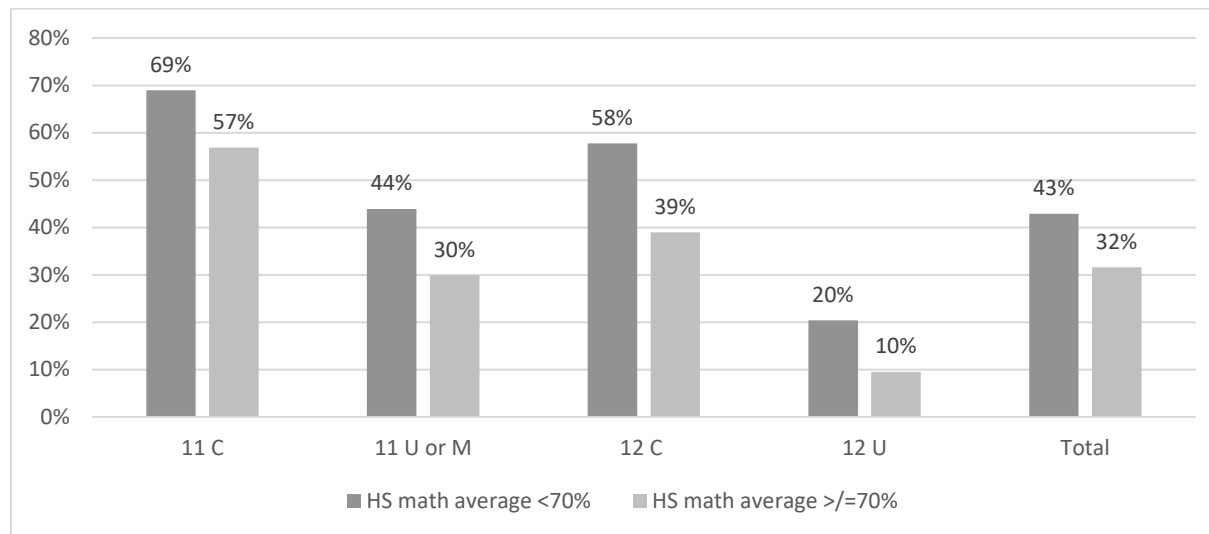
The study focussed on students who entered a diploma or certificate program at Seneca College between 2007 and 2014 and were under 23 years old at entry. The total sample contained 44,613 entrants and 9,414 graduates.

KEY RESULTS:

What effect does high school math have on college performance?

For the population in the sample who attended an Ontario high school, students who obtained a higher math average in high school or took university preparation high school math courses were more likely to select a college program requiring math or a technology program, and to perform better on college math placement tests, with less likelihood of being placed in foundation math. The figure below shows that, for example, only 10% of students who obtained over a 70% in university preparation math were placed in foundation math. In contrast, 39% who obtained over a 70% in college preparation math were tested below the level required for college math. Once in college, the effects of high school math continue, resulting in higher first-year college math averages, higher overall college GPAs and higher graduation rates.

Percentage of Seneca students placed in foundation math by math course taken in high school and high school math average, Seneca entrants, 2007-2014



What role does performance in math assessment tests play?

Seneca College requires students to take assessment tests to determine whether students can directly enter college level math, or whether a foundation course is required. As with HS grades and courses, higher standardized test scores result in higher first-year math grades, higher overall college GPAs and higher graduation rates.

Does Math proficiency matter after college graduation?

Graduates with a higher first-year college math average were more likely to transfer to university, to be employed, to have a job related to their field of study, and were less likely to be overqualified, but did not earn more than others.

Do student characteristics matter?

Sociodemographic and other characteristics interacted in complex ways on college program selection, math proficiency and graduate outcomes.

Gender: Male students were more likely than female students to take university preparation courses in high school and to enter a program requiring math particularly in technology field. Even among students who took similar courses and achieved similar grades in math in high school, males were still more likely to choose a math-required program, particularly technology. Despite this, females obtained higher first-year college math averages, higher overall college GPAs, and were more likely to graduate.

Canadian citizenship: For the most part, Canadian citizens did not perform as well as international students and permanent residents. They were less likely to select a program requiring math, obtained lower scores on college math placement tests, lower college math averages in first year, lower overall college GPAs, and had lower odds of graduation. After graduation, Canadian citizens were more likely than non-Canadians to be employed, but less likely to have a job related to their college studies, and were more likely to be overqualified.

Neighbourhood income and parent's education: Students from low income neighbourhoods and those who had a parent with a degree were more likely to enter a technology field. When controlling for

parental education, students from high income neighbourhoods had higher scores on college math placement tests, higher math averages in first year, higher overall college GPAs, and higher graduation rates.

SUMMARY

This study clearly shows the long-term repercussions of weak math proficiency on college program selection, academic performance and post-graduation outcomes. Students with weak math skills are less likely to enter college programs requiring math; they obtain lower college math and lower college grades overall, and are less likely to graduate and to obtain a job related to their program of study.