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The impact of understanding definitions in students' performances

"Linear algebra is so much different from the math that I have learned in high school." This is a sentence that was said by many university students in their first years. Previous studies have shown that understanding concepts, use of suitable notations in communicating ideas and attitude towards mathematics are major factors that contribute to learning linear algebra. In our study, quantitative and qualitative research is conducted on a class of first year students taking linear algebra at the University of Toronto, Scarborough in order to investigate the impact of mastery in reciting definitions, and the ability to identify and come up examples and counter examples for a particular concept in students' ability to communicate in mathematics. It is not surprising that significant correlations have been found between understanding definition and writing a proof in linear algebra. However, the story turns out to be more complicated and there are multiple factors with different levels of impact in the students' performance. Overall, even though our study supports definition focus approaches to linear algebra, it suggests that focusing on multiple representations on concepts can further improve students learning. In this talk, I will share the methodology and findings of our study. This talk is targeted to anyone with an interest in math education, especially first year instructors, and graduate students with TA responsibility can benefit from our findings.