Research Brief: Replication of Math 1050 Utah's College Algebra

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This research brief presents results from a replication analysis of a previous UEPC study on Math 1050. The previous study explored the ability of 13 factors to predict earned credit in Math 1050 (college Algebra). The results showed that when all factors were considered simultaneously, three factors predicted earned credit. These predictors were:

- First-time enrollment in Math 1050,
- Overall high school Grade Point Average (GPA), and
- Concurrent enrollment (taking Math 1050 during high school through the state's concurrent enrollment program).

Our goal in replicating the study was to determine whether the findings were generalizable after consideration of a different sample of students.

Predictors of Earned Credit in Math 1050

The previous study analyzed data from a cohort of 3,033 students who took Math 1050 during the fall of 2011. In the current replication, we utilized data from the cohort of 3,459 students who took Math 1050 during the fall of 2008. We first tested for simple relationships between the 13 predictors and earned credit in Math 1050, just as we did in the previous study. Eight predictors had significant simple relationships with earned credit and five did not (see Table 1). These results were largely consistent with the previous study, except that Pre-Algebra CRT and English language status did not predict earned credit in this replication. This difference appears to be an artifact of data limitations due to data available for the sample for the replication. That is, Pre-Algebra CRT tests are typically taken in 7th or 8th grade. Data are available beginning in 2004; therefore, Pre-Algebra scores were only available for students taking Math 1050 as juniors or seniors in high school and not for students who took the class in college. Similarly, we could not go back as far to look at time variant demographic variables such English Language Learner (ELL) status. It is important to note, in this study, students were considered English Language Learners if they are flagged as such in any year of their record. The current study had fewer years available for a student to be identified as ELL (2004-2008) than the previous study (2004-2011).

Table 1. Individual Factors that Predicted Success in Math 1050

Factors that predicted earned credit when considered as individual predictors:		Factors that did not predict earned credit:
• ACT (met math benchmark or not) • Age (continuous) • Cumulative H.S. GPA (continuous) • Algebra CRT (proficient or not) • Geometry CRT (proficient or not)	• First time Math 1050 enrollment (first time enrollee or not) • Math 1050 enrollment (concurrent or not) • Race/ethnicity (white or not)	• Pre-Algebra CRT (proficient or not) • Language (English learner or not) • Gender • Economic disadvantage (free/reduced lunch or not) • Special education

As with the previous study, we ran a final statistical prediction that included all of the factors together. We found that **High School GPA** and **Concurrent Enrollment** (taking the course in high school rather than college) predicted earned credit over and above all other factors. The previous study found that a third factor, first time enrollment, also predicted earned credit. In the present replication however, less than 1% (12) of the students taking Math 1050 in high school had been previously enrolled in Math 1050. The failure of first time enrollment to predict earned credit for Math 1050 in the replication, over and above all other factors, is due to the small number of students who re-enrolled in Math 1050 while still in high school. More technically, concurrent enrollment and first enrollment were collinear.

Our conclusion from this replication is that the findings from the previous study are not likely to be the result of Type I errors and thus are likely to generalize to other groups of students and years of data. Students enrolled in Math 1050 through concurrent enrollment and students with higher high school GPAs are more likely to earn credit in the class than other students with similar demographics and similar proficiency in math.

Data for this research was accessible through Utah's state longitudinal data system database administered by the Utah Data Alliance. The Utah Data Alliance (UDA) and its partners (Utah State Office of Education, Utah System of Higher Education, Utah College of Applied Technology, the Utah Department of Workforce Services, Utah Education Network, and the Utah Education Policy Center), do not endorse or sanction any part of this research including the methods, results, and conclusions. All errors are the responsibility of the author.