IES Institute of Education Sciences

Using High School Data to Predict College Readiness and Early College Success on Guåhan (Guam)

Regional Educational Laboratory Pacific

At McREL International

REL 2021–073
U.S. DEPARTMENT OF EDUCATION

A Publication of the National Center for Education Evaluation and Regional Assistance at IES

Using High School Data to Predict College Readiness and Early College Success on Guåhan (Guam)

Lisa Shannon, Anne Cosby, Bradley Rentz, Molly Henschel, Sheila A. Arens, and Samantha E. Holquist April 2021

On Guåhan (Guam), the large percentages of students enrolling in non-credit-bearing courses at Kulehon Kumunidåt Guåhan (Guam Community College) and Unibetsedåt Guåhan (University of Guam) have raised concerns about college readiness and early college success. Without adequate research on predictors of college readiness and early success among students on Guåhan, educators and other stakeholders find it difficult to identify and support students at risk of being underprepared for college. This study examined which student characteristics predicted college readiness and early college success among students who graduated from Guåhan high schools and enrolled at Kulehon Kumunidåt Guåhan or Unibetsedåt Guåhan between 2012 and 2015. Students' college readiness and early college success were assessed using three indicators: enrolling in only credit-bearing math and English courses during the first year of college, earning all credits attempted during the first semester of college, and persisting to a second year of college. About 23 percent of students met all three indicators and were thus classified as demonstrating college readiness and early college success. The percentages of students who met each individual indicator varied: 30 percent enrolled in only credit-bearing math and English courses, 43 percent earned all the credits they attempted, and 74 percent persisted to a second year. Various student characteristics predicted meeting all three indicators and each individual indicator. Graduates of John F. Kennedy High School and male students were the most likely to meet all three indicators and were the most likely to enroll in only credit-bearing math and English courses. Completing a high-level math course during high school positively predicted meeting the composite indicator of college readiness and early college success and of enrolling in only credit-bearing math and English courses and earning all credits attempted. A higher cumulative high school grade point average also positively predicted meeting all three indicators and each individual indicator. Kulehon Kumunidåt Guåhan enrollees were more likely than Unibetsedåt Guåhan enrollees to earn all credits attempted during their first semester.

Why this study?

Kulehon Kumunidåt Guåhan (Guam Community College), Unibetsedåt Guåhan (University of Guam), and the Guam Department of Education are concerned that many Guåhan (Guam) public high school graduates may be underprepared for college.[1] Among students entering Kulehon Kumunidåt Guåhan in 2018, 57 percent placed into developmental math courses and 74 percent placed into developmental English courses (Guam Community College, 2018; O'Connor, 2016; see box 1 for definitions of key terms used in the report). In 2016 nearly 70 percent of students entering Unibetsedåt Guåhan placed into developmental math courses.[2] This suggests that Guåhan high school graduates might not be academically prepared for college.

Guåhan is a United States territory 3,700 miles west-southwest of Hawai'i. It has a single school district with 40 primary and secondary schools (Guam Department of Education, 2020). During the 2018/19 school year the Guam Department of Education's six public high schools served 9,528 students. Guåhan also has two

For additional information, including additional context for the study, technical methods, supporting analyses, and sensitivity analyses, access the report appendixes at https://go.usa.gov/xstj5.

1. This report uses Indigenous names for the geographic locations and institutions included in the study: Guåhan (Guam), Kulehon Kumunidåt Guåhan (Guam Community College), and Unibetsedåt Guåhan (University of Guam).
2. The most recent data on placement in developmental courses at Unibetsedåt Guåhan are from 2016 because in 2017 Unibetsedåt Guåhan stopped offering developmental English courses.

Box 1. Key terms

Advanced Placement English course completion. Students who enrolled in and received full credit for at least one Advanced Placement English course were classified as having completed an Advanced Placement English course. Guåhan public high schools offer Advanced Placement English Language and Composition and Advanced Placement English Literature and Composition. To earn full high school credit for these courses, students must pass their Advanced Placement course and take the Advanced Placement exam. Students who receive passing scores on the Advanced Placement exam can earn college-level credit, depending on the institution they attend after high school. (See appendix B for more information.)

Advanced Placement math course completion. Students who enrolled in and received full credit for at least one Advanced Placement math course were classified as having completed an Advanced Placement math course. Guåhan public high schools offer Advanced Placement Statistics and Advanced Placement Calculus. To earn full credit in high school for these courses, students must pass their Advanced Placement course and take the Advanced Placement exam. Students who receive passing scores on the Advanced Placement exam can earn college-level credit, depending on the institution they attend after high school. (See appendix B for more information.)

Average predicted probability. The average predicted probability reflects how the statistical model developed in this study would estimate a typical student's expected likelihood of meeting the outcome of interest. The value can range from 0 to 1.0 and can be expressed as a percentage. For example, an average predicted probability of 0.25 indicates that overall, students had a 25 percent expected likelihood of meeting the indicator.

Composite indicator of college readiness and early college success. A composite indicator comprising three individual indicators: enrolling in only credit-bearing math and English courses during the first year of college, earning all credits attempted during the first semester of college, and persisting to a second year of college. Students who met the composite indicator were classified as demonstrating college readiness and early college success.

Credit-bearing courses. Courses that allow students to earn credits that apply toward a degree or certificate.

Developmental courses. College courses for which students earn no credit that applies toward a degree or certificate. Many such courses are considered remedial.

Earning all credits attempted during the first semester of college. Successfully receiving credit for all credit-bearing courses in which a student enrolled during their first semester of college.

Enrolling in only credit-bearing math and English courses during the first year of college. Enrolling in only math and English courses in which credit is earned that can apply toward a degree or certificate during the first year of college.

High-level math course completion. Students who enrolled in and received full credit for at least one high-level math course during high school were classified as having completed a high-level math course. High-level math courses included Elementary Functions, Elementary Functions Honors, Pre-Calculus, Pre-Calculus Honors, Advanced Placement Calculus, and Advanced Placement Statistics.

Persisting to a second year of college. Continuing to a second year of college after completing a first year at that college.

public college-level institutions, Kulehon Kumunidåt Guåhan and Unibetsedåt Guåhan, which served 6,135 students in 2017/18 (Guam Community College, 2019; University of Guam, 2018).

Students who place into developmental courses may face several obstacles. They might experience frustration because they must postpone their credit-bearing courses (Deil-Amen & Rosenbaum, 2002; Jaggars & Stacey, 2014; Mejia et al., 2016). They might face additional financial burdens because they must bear the cost of, and successfully complete, supplemental courses before they can proceed to credit-bearing courses. They tend to be less successful in college than their peers in credit-bearing courses, taking longer to graduate and graduating at lower rates (Bailey, 2009a, 2009b; Herman, Carreon, et al., 2017; Jaggars & Stacey, 2014). Therefore, stakeholders are interested in improving academic preparation among Guåhan public high school students who enroll in college.

Previous research suggests several student demographic and academic preparation characteristics that might relate to college readiness and early college success. In the Commonwealth of the Northern Mariana Islands, high school grade point average, enrollment in high-level math classes, enrollment in Advanced Placement courses, and standardized test scores were found to be related to college readiness (Herman, Carreon, et al., 2017). High school context and standards are related to college readiness in some contexts (ACT, 2005), and lower socioeconomic status and racial/ethnic minority status tend to be associated with higher placement in developmental courses, lower college persistence, and lower average grades in the first year of college (Byun et al., 2012; Chen, 2016; Herman, Scanlan, & Carreon, 2017; Plucker et al., 2006; Wolniak & Engberg, 2010).

This study aimed to meet stakeholders' needs by identifying student characteristics that predict college readiness and early college success among recent high school graduates on Guåhan. College readiness and early college success were assessed using three research-based indicators: enrolling in only credit-bearing math and English courses during the first year of college, earning all credits attempted during the first semester of college, and persisting to a second year of college (Hein et al., 2013; Porter & Polikoff, 2012; Stephan et al., 2015). The study examined each indicator individually as well as a composite indicator comprising all three. Students who met the composite indicator were classified as demonstrating college readiness and early college success. (See appendix A for additional information about the study's context.)

The study's findings might help educators on Guåhan by identifying factors associated with higher risk of students being underprepared for college. Knowing these factors could help educators more proactively support students before they face the challenges of college. This study's findings could inform ongoing or new policies and practices to support the college readiness and early college success of Guåhan students.

Research questions

The study examined the relationship between various student characteristics and four indicators of college readiness and early college success (three individual indicators and one composite indicator). The student characteristics examined were demographics, academic preparation, and college attended. The three individual indicators of college readiness and early college success were enrolling in only credit-bearing math and English courses during the first year of college, earning all credits attempted during the first semester of college, and persisting to a second year of college. The composite indicator identified students who met all three individual indicators. The study sample consisted of students who graduated from Guåhan public high schools between spring 2012 and spring 2015 and enrolled in either Kulehon Kumunidåt Guåhan or Unibetsedåt Guåhan for the first time between fall 2012 and fall 2015. Three research questions guided the study:

1. What percentage of students demonstrated college readiness and early college success by meeting the study's composite indicator, and what percentage met each individual indicator?

2. How did students' demographic and academic preparation characteristics predict their college readiness and early college success, after other student demographic characteristics, academic preparation characteristics, and college attended were controlled for?

3. How did the college that students attended predict their college readiness and early college success, after student demographic and academic preparation characteristics were controlled for?

See box 2 for a summary of the data sources, sample, and methods used in the study and appendix B for a detailed discussion.

Box 2. Data sources, sample, and methods

Data sources. The Guam Department of Education provided student demographic and academic preparation data. Kulehon Kumunidåt Guåhan and Unibetsedåt Guåhan also provided student demographic and academic preparation data as well as college outcome data. See appendix B for a complete list of variables.

Sample. The analytic sample consisted of students who graduated from one of five Guåhan public high schools between spring 2012 and spring 2015 and enrolled as full-time, first-time students at Kulehon Kumunidåt Guåhan or Unibetsedåt Guåhan during the fall immediately following their high school graduation (between fall 2012 and fall 2015).[1] The sample was limited by the data provided by the Guam Department of Education, Kulehon Kumunidåt Guåhan, and Unibetsedåt Guåhan. Importantly, the analytic sample excludes 56 percent of Kulehon Kumunidåt Guåhan students and 3 percent of Unibetsedåt Guåhan students for whom outcome data were missing. The sample was also limited because students had to be matched across the three datasets.[2] The final analytic sample included 1,226 students seeking an associate or bachelor's degree (240 students at Kulehon Kumunidåt Guåhan and 986 students at Unibetsedåt Guåhan).[3] Of these, 550 had complete data and 676 were missing data for one or more demographic or academic preparation characteristics. No students in the final analytic sample were missing data for the college readiness and early college success indicators. To preserve the study's sample size, missing data were imputed. For additional details, see appendix B.

Methodology. To address research question 1, the study team calculated descriptive statistics (percentages, means, and standard deviations) across all cohorts of students in the final analytic sample. These analyses showed the extent to which students met the composite indicator and the three individual indicators of college readiness and early college success (enrolling in only credit-bearing math and English courses during the first year of college, earning all credits attempted during the first semester of college, and persisting to a second year of college).

To address research questions 2 and 3, the study team ran four logistic regression models. The logistic regression models included the following predictor variables: student demographics (high school graduation cohort, gender, race/ethnicity, Pell Grant status), academic preparation (high school attended, whether a student completed a high-level math course during high school, whether a student completed an Advanced Placement math course during high school, whether a student completed an Advanced Placement English course during high school, cumulative high school grade point average), and the college in which a student enrolled.

Two student demographic variables—race/ethnicity and home language—were highly correlated. Because race/ethnicity varied more than home language, it was included in the logistic regression models and home language was excluded.

After running logistic regression models to determine which characteristics were significant predictors of each outcome of interest, the study team calculated the predicted probability of each outcome. Specifically, for each characteristic, the regression results were used to calculate predicted probabilities for each student given specific values for that characteristic, while other characteristics were held fixed at their observed values in the data. Average predicted probabilities were then calculated across students for each characteristic value. The findings section discusses the differences in average predicted probabilities across all values of characteristics for which any value was statistically significant in the original logistic regression model. Differences in predicted probabilities between pairs of categories are classified as minor if smaller than 5 percentage points and major if 5 percentage points or greater.[4]

Because the number of Kulehon Kumunidåt Guåhan enrollees was small and stakeholders were interested in predictors of college readiness and early college success across institutions, most analyses were run for the entire sample (students enrolled at either Kulehon Kumunidåt Guåhan or Unibetsedåt Guåhan) rather than by institution. The study examined how the analytic sample differed from high school students who did not enroll in either Kulehon Kumunidåt Guåhan or Unibetsedåt Guåhan (covered under research question 3; see tables C9–C12 in appendix C). See appendix B for additional details on methodology.

The study team also conducted sensitivity analyses to determine whether findings were consistent across methods used to handle missing data (see appendix D). There were some differences, likely because the main analyses included 1,226 students and the sensitivity analyses included 550 students. Because Kulehon Kumunidåt Guåhan was missing more data, the main analyses include more students from that institution than the sensitivity analyses did.

Notes

1. The sample excluded three students from a sixth public high school, Tiyan High School for privacy reasons, because the small sample could make it possible to identify individual students.

2. About 18 percent of Guåhan public high school students from the Guam Department of Education dataset could be matched with corresponding data in the Kulehon Kumunidåt Guåhan or Unibetsedåt Guåhan datasets.

3.For Kulehon Kumunidåt Guåhan, students in the final analytic sample represent about 21 percent of the total student enrollment for 2012 through 2015 (Peterson's, 2020a). For Unibetsedåt Guåhan, students in the final analytic sample represent about 54 percent of the total student enrollment for 2012 through 2015 (Peterson's, 2020b). These percentages were derived from enrollment numbers that do not indicate whether an individual was a full-time or first-time student—criteria for inclusion in the final analytic sample—so the analytic sample might reflect a larger percentage of each institution's total full-time enrollment.

4. The 5 percentage point threshold was chosen because stakeholders would likely view a difference of this size as meaningful.

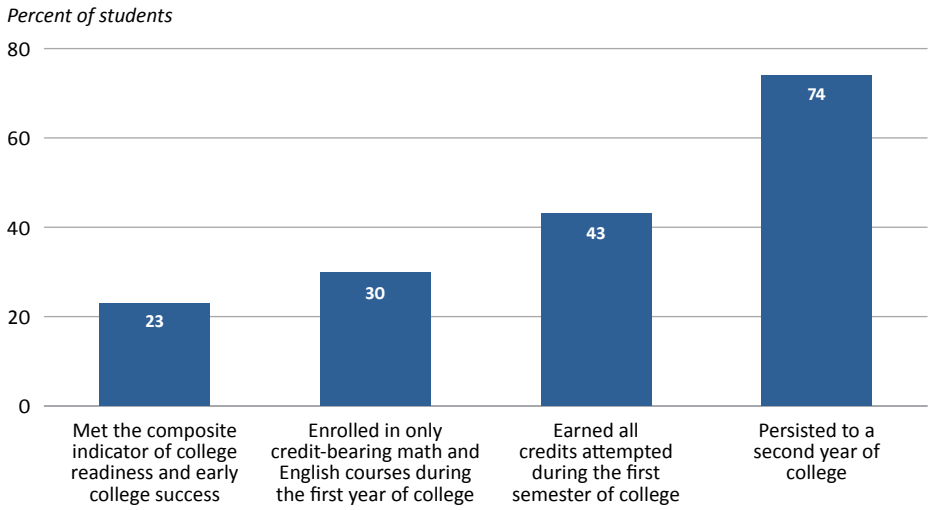
What the study found

This section describes key findings. (See tables C3–C8 in appendix C for additional details.)

Fewer than one-fourth of graduates of Guåhan public high schools who enrolled in Kulehon Kumunidåt Guåhan or Unibetsedåt Guåhan between fall 2012 and fall 2015 met the composite indicator of college readiness and early college success, and the percentages who met each individual indicator varied

About 23 percent of graduates of Guåhan public high schools who enrolled in Kulehon Kumunidåt Guåhan or Unibetsedåt Guåhan between fall 2012 and fall 2015 met the composite indicator of college readiness and early college success (figure 1).[3] The percentages who met each individual indicator varied. About 30 percent enrolled in only credit-bearing math and English courses during their first year of college, 43 percent earned all credits attempted in their first semester of college, and 74 percent persisted to a second year of college.

Figure 1. About 23 percent of Guåhan public high schools who enrolled in Kulehon Kumunidåt Guåhan or Unibetsedåt Guåhan between fall 2012 and fall 2015 met the composite indicator of college readiness and early college success, and the percentages who met each individual indicator varied



Note: *n* = 1,226. Individual indicators are not mutually exclusive. For more information, see table C3 in appendix C.

Source: Authors' calculations based on data from Kulehon Kumunidåt Guåhan and Unibetsedåt Guåhan.

3. For descriptive statistics on the analytic sample, see tables C1 and C2 in appendix C.

Graduates of John F. Kennedy High School were more likely than graduates of other high schools to meet the composite indicator of college readiness and early college success and to enroll in only credit-bearing math and English courses during their first year of college

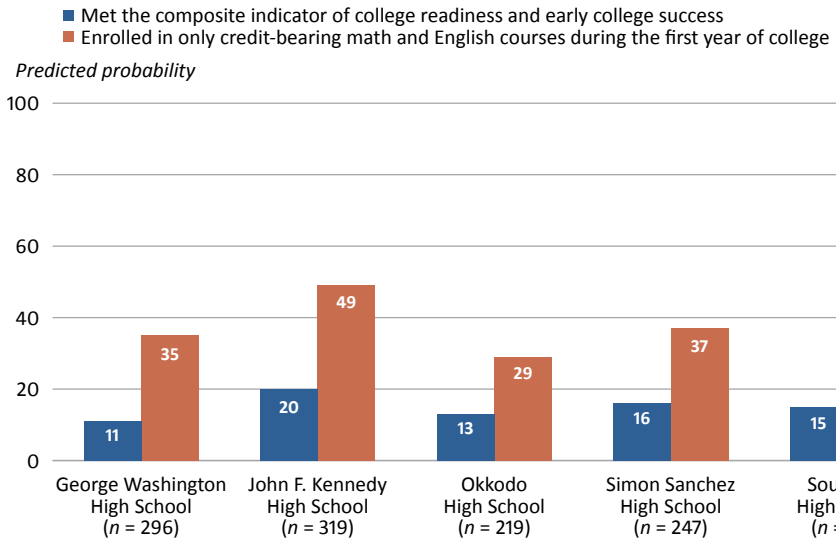
Graduates of John F. Kennedy High School had the highest probability of meeting the composite indicator of college readiness and early college success, after other student characteristics were accounted for (figure 2). Graduates of John F. Kennedy High School had a 20 percent probability of meeting the composite indicator compared with 11–16 percent for graduates of other high schools. The difference in probability between graduates of John F. Kennedy High School and graduates of Simon Sanchez High School is classified as minor. The differences in probability between graduates of John F. Kennedy High School and graduates of the other high schools are classified as major.

Graduates of John F. Kennedy High School had the highest probability of enrolling in only credit-bearing math and English courses during their first year of college (49 percent) compared with 29–37 percent for graduates of the other high schools (see figure 2). The differences in probability between graduates of John F. Kennedy High School and graduates of other high schools are classified as major.

Male students were more likely than female students to meet the composite indicator of college readiness and early college success and to enroll in only credit-bearing math and English courses during their first year of college

Male students had a higher probability of meeting the composite indicator of college readiness and early college success (18 percent) than female students did (12 percent; figure 3). The difference is classified as major.

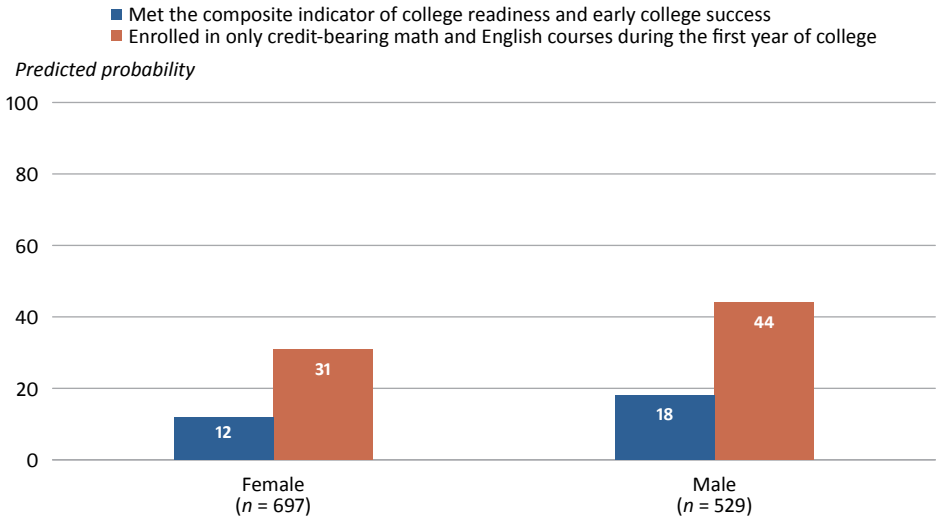
Figure 2. Graduates of John F. Kennedy High School who enrolled in Kulehon Kumunidåt Guåhan and Unibetsedåt Guåhan between fall 2012 and fall 2015 had the highest probability of meeting the composite indicator of college readiness and early college success and of enrolling in only credit-bearing math and English courses during their first year of college



Note: *n* = 1,226 students. Predicted probabilities were calculated for each student using the coefficients for each high school, with the student's other characteristics held fixed at their observed values. Average predicted probabilities for each high school were calculated across all students, including those that attended the other high schools. This figure displays only the two indicators of college readiness and early college success that were significantly predicted by high school attended. For details on the relationship between high school attended and the other indicators, see tables C4–C8 in appendix C.

Source: Authors' calculations based on data from the Guam Department of Education, Kulehon Kumunidåt Guåhan, and Unibetsedåt Guåhan.

Figure 3. Male graduates of Guåhan public high schools who enrolled in Kulehon Kumunidåt Guåhan or Unibetsedåt Guåhan between fall 2012 and fall 2015 had a higher probability of meeting the composite indicator of college readiness and early college success and of enrolling in only credit-bearing math and English courses during their first year in college than female graduates did



Note: *n* = 1,226 students. Predicted probabilities were calculated for each student using the coefficients for each gender, with the student's other characteristics held fixed at their observed values. Average predicted probabilities for gender were calculated across all students. This figure displays only the two indicators of college readiness and early college success that were significantly predicted by gender. For details on the relationship between gender and the other indicators, see tables C4–C8 in appendix C.

Source: Authors' calculations based on data from the Guam Department of Education, Kulehon Kumunidåt Guåhan, and Unibetsedåt Guåhan.

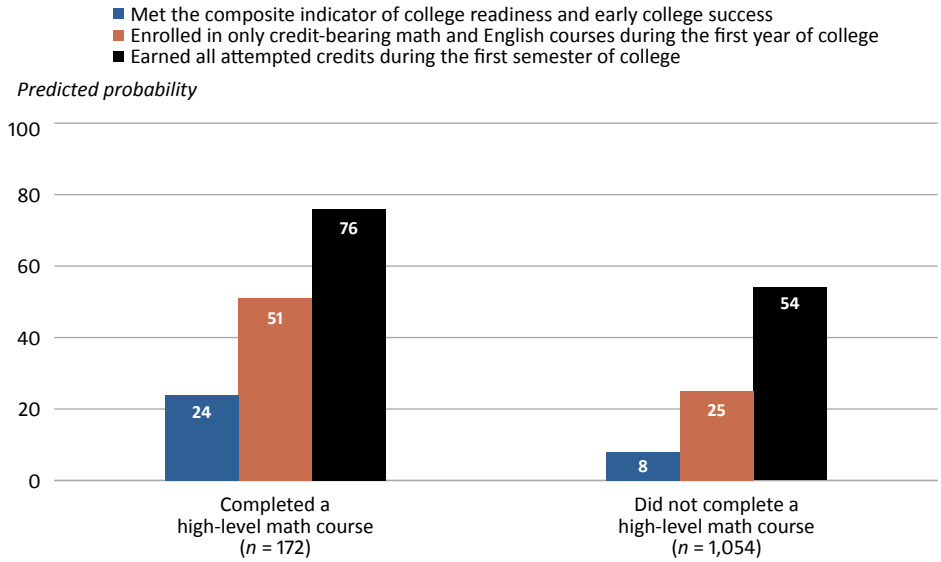
Male students also had a higher probability of enrolling in only credit-bearing math and English courses during their first year of college (44 percent) than female students did (31 percent; see figure 3). The difference is classified as major.

Students who completed a high-level math course during high school were more likely than other students to meet the composite indicator of college readiness, to enroll in only credit-bearing math and English courses during the first year of college, and to earn all credits attempted during the first semester of college

Students who completed a high-level math course during high school had a higher probability of meeting the composite indicator of college readiness and early college success than did students who did not complete a high-level math course, after other student characteristics were accounted for (figure 4). Students who completed a high-level math course during high school had a 24 percent probability of meeting the composite indicator compared with 8 percent for students who did not complete a high-level math course. The difference in probability is classified as major.

Students who completed a high-level math course also had a higher probability of meeting two individual indicators than did students who did not complete a high-level math course. Students who completed a high-level math course had a 51 percent probability of enrolling in only credit-bearing math and English courses during their first year of college and a 76 percent probability of earning all credits attempted during their first semester of college. Conversely, students who did not complete a high-level math course had a 25 percent probability of enrolling in only credit-bearing courses and a 54 percent probability of earning all credits attempted (see figure 4). The differences in probability are classified as major.

Figure 4. Graduates of Guåhan public high schools who completed a high-level math course during high school and enrolled in Kulehon Kumunidåt Guåhan or Unibetsedåt Guåhan between fall 2012 and fall 2015 had a higher probability of meeting the composite indicator of college readiness and early college success, of enrolling in only credit-bearing math and English courses during their first year of college, and of earning all credits attempted during their first semester of college



Note: *n* = 1,226 students. Predicted probabilities were calculated for each student using the coefficients for whether a student completed a high-level math course, with the student's other characteristics held fixed at their observed values. Average probabilities for whether a student completed a high-level math course were calculated across all students. This figure displays only the three indicators of college readiness and early college success that were significantly predicted by whether a student completed a high-level math course. For details on the relationship between completing a high-level math course and the other indicator, see tables C4–C8 in appendix C.

Source: Authors' calculations based on data from the Guam Department of Education, Kulehon Kumunidåt Guåhan, and Unibetsedåt Guåhan.

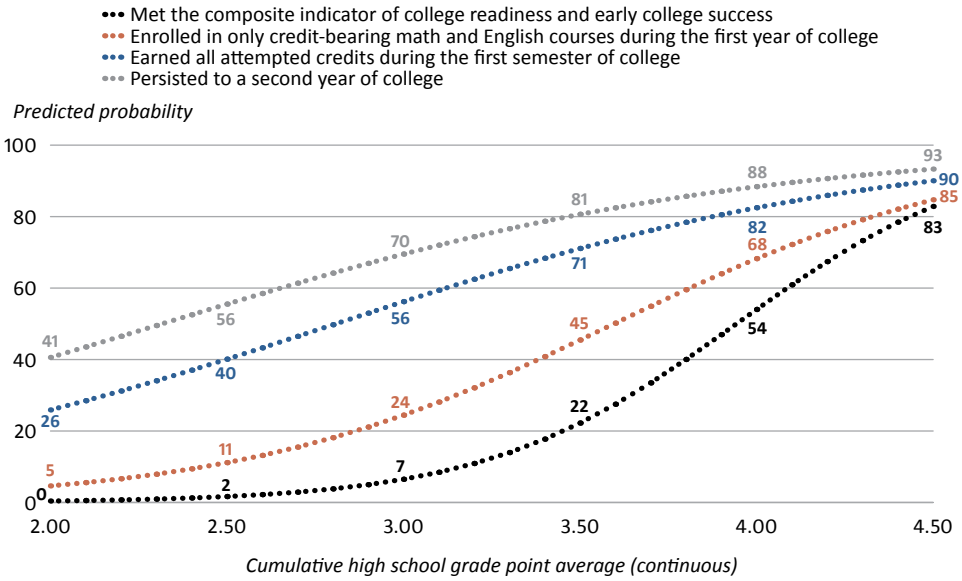
Students with higher cumulative high school grade point averages were more likely than students with lower grade point averages to meet the composite indicator and each individual indicator of college readiness and early college success

Students with higher cumulative high school grade point averages had a higher probability of meeting the composite indicator of college readiness and early college success than did students with lower grade point averages, after other student characteristics were accounted for (figure 5). Students with a cumulative high school grade point average of 4.50 had an 83 percent probability of meeting the composite indicator compared with 54 percent for students with a cumulative high school grade point average of 4.00.[4] The probability of meeting the composite indicator fell as cumulative high school grade point average fell.

Students with higher cumulative high school grade point averages also had higher probabilities of meeting each individual indicator of college readiness and early college success (see figure 5). The differences in probability of meeting each individual indicator between students with higher grade point averages and students with lower grade point averages are classified as major.

4. Guåhan public high schools use a 5-point scale for honors and Advanced Placement courses, so some students' cumulative high school grade point averages were higher than 4.00. Students who did not take any honors or Advanced Placement courses have grade point averages based on the unweighted standard 4-point scale.

Figure 5. Graduates of Guåhan public high schools who had higher cumulative high school grade point averages and enrolled in Kulehon Kumunidåt Guåhan or Unibetsedåt Guåhan between fall 2012 and fall 2015 had a higher probability of meeting the composite indicator and each individual indicator of college readiness and early college success than did students with lower grade point averages



Note: *n* = 1,226. Cumulative high school grade point averages ranged from 1.44 to 4.58. Predicted probabilities were calculated for each student using the coefficients for each level of cumulative high school grade point average, with the student's other characteristics held fixed at their observed values. Average predicted probabilities for each cumulative high school grade point average were calculated across all students. For continuous predictor variables, the study team calculated average predicted probabilities at specific values. Because few students had a high school grade point average below 2.00 (3 percent of students) or above 4.50 (fewer than 1 percent of students), average predicted probabilities were calculated only for cumulative grade point averages between 2.00 and 4.50 (at .50 intervals). For more information, see tables C4–C8 in appendix C.

Source: Authors' calculations based on data from the Guam Department of Education, Kulehon Kumunidåt Guåhan, and Unibetsedåt Guåhan.

Students who attended community college were more likely than students who attended a four-year college to earn all credits attempted during their first semester of college

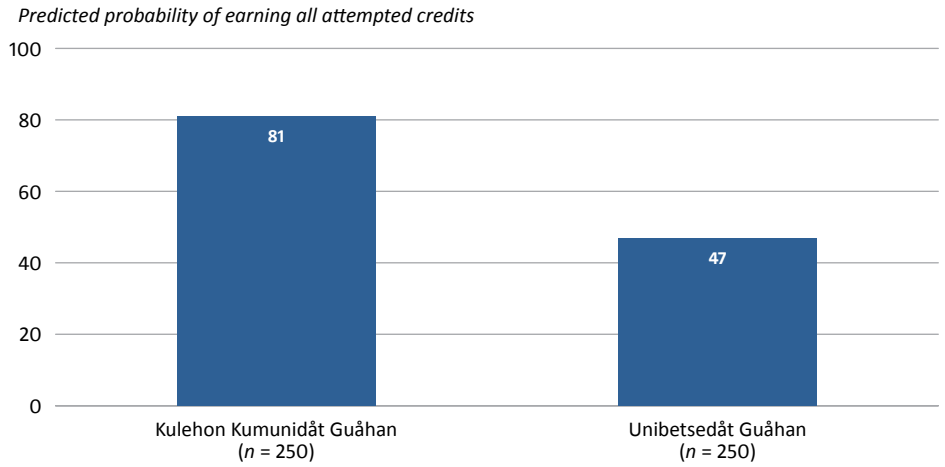
Students who attended Kulehon Kumunidåt Guåhan had a higher probability of earning all credits attempted during their first semester (81 percent), after other demographic and academic preparation characteristics were accounted for, than did students who attended Unibetsedåt Guåhan (47 percent; figure 6). The difference in probability is classified as major.

Limitations

One limitation of this study is its limited sample. The study was limited to four cohorts of students who graduated from Guåhan public high schools from spring 2012 through spring 2015 and enrolled at Kulehon Kumunidåt Guåhan or Unibetsedåt Guåhan during the fall immediately following their high school graduation. Because the study's most recent cohort graduated from high school in 2015, the results might not generalize to more recent cohorts.

The sample was further restricted to students who could be matched across three datasets and for whom outcome data were available. Some 5,746 high school graduates could not be matched and were excluded from the study. Many of these students were likely not matched because they did not enroll in either Kulehon Kumunidåt Guåhan

Figure 6. Graduates of Guåhan public high schools who enrolled in Kulehon Kumunidåt Guåhan between fall 2012 and fall 2015 had a higher probability of earning all credits attempted during their first semester of college than did graduates who enrolled in Unibetsedåt Guåhan



Note: *n* = 1,226. Predicted probabilities were calculated for each student using the coefficients for each institution attended, with the student's other characteristics held fixed at their observed values. Average predicted probabilities for each institution attended were calculated across all students. This figure displays only the indicator of college readiness and early college success that was significantly predicted by college attended. For details on the relationship between college attended and the other indicators, see tables C4–C8 in appendix C.

Source: Authors' calculations based on data from the Guam Department of Education, Kulehon Kumunidåt Guåhan, and Unibetsedåt Guåhan.

or Unibetsedåt Guåhan following high school graduation.[5] The study also excluded students who graduated from nonpublic high schools; students who enrolled in other colleges; and students who were not full-time, first-time college students seeking an associate or bachelor's degree. The study's findings might not generalize to students not in the study sample.

This study was also limited by its reliance on available data on students' demographic and academic preparation characteristics. The study likely does not capture several factors that could help explain why students do or do not meet the indicators of college readiness and early college success considered. For example, students might have different personal circumstances, including major life events, that affect their motivation and ability to prepare for and succeed in college. Similarly, they could experience different levels of support during high school and early college that contribute to their being adequately prepared for the challenges of college. Examining the potential role of these variables was beyond the scope of this study, but they could be examined in future studies.

Finally, the study offers an initial look at the relationships between students' demographic characteristics, academic preparation characteristics, and college attended and their college readiness and early college success, but it does not provide evidence of causal relationships. It cannot be inferred that the characteristics found to predict college readiness and early college success played a causal role in the outcomes. Other factors, such as differences in motivation, personal circumstances, and academic support, might also have contributed to those relationships. Although examining the role of those other factors in college readiness and early college success was beyond the scope of this study, future studies could examine whether and how these factors contribute to college readiness and early college success among students on Guåhan.

5. Student names were used to match students across datasets. Therefore, it is possible that some students could not be matched because their names varied across datasets due to misspellings or name changes.

Implications

This is the first study to examine predictors of college readiness and early college success among Guåhan public high school graduates who enrolled at either Kulehon Kumunidåt Guåhan or Unibetsedåt Guåhan. By identifying predictors of college readiness and early college success, it can help educators assess where students stand, track their progress, and provide tailored supports at the earliest suitable time in order to turn college aspirations into college success. In light of these findings, the Guam Department of Education, Kulehon Kumunidåt Guåhan, and Unibetsedåt Guåhan might consider:

- *Creating an early warning system to monitor academic progress among public high school students.* Guåhan education leaders might consider using cumulative grade point average and completion of a high-level math course to assess students' college readiness at high school graduation. Monitoring academic performance early in high school could support efforts to intervene well before graduation in order to maximize college readiness and early college success.
- *Examining differences in academic preparation across public high schools.* Further examination of variations in academic practices, such as courses offered or supplemental instructional support, across public high schools could help generate hypotheses as to why graduates of John F. Kennedy High School were more likely than graduates of other high schools to demonstrate college readiness and early college success and to enroll in only credit-bearing math and English courses during the first year of college.
- *Providing additional supports based on high school performance for students who enroll in college on Guåhan.* Because high school grade point average was a positive predictor of college readiness and early college success, leaders at Kulehon Kumunidåt Guåhan and Unibetsedåt Guåhan might consider providing students with lower grade point averages with additional supports, such as mentoring programs or summer bridge programs, as they transition from high school to college. Such supports could guide students in building learning and relationship skills for completing college courses. College leaders might consider partnering with community-based organizations that provide services to students who attend their colleges to gain insights into and resources for increasing student supports (Saelua et al., 2016).
- *Reviewing differences in academic supports available to students in their first year of college.* Academic supports such as academic and career counseling are associated with increased student persistence through courses and with college completion (Turner & Berry, 2000). Further examination of differences in available academic supports could generate hypotheses as to why students at Kulehon Kumunidåt Guåhan are more likely than students at Unibetsedåt Guåhan to earn all credits attempted during their first semester.
- *Investigating the differences in factors related to earning all credits attempted during the first semester of college between students at Kulehon Kumunidåt Guåhan and students at Unibetsedåt Guåhan.* The two institutions differ in enrollment, types of courses and degrees offered, whether they provide residential living opportunities, and so on. Such differences could be related to the likelihood of students earning all credits attempted. The types of students attending each institution also differed in several demographic and academic preparation characteristics. Students with those characteristics might differ in other ways, such as their motivation and circumstances, that are related to the likelihood of students earning all credits attempted. Further examination of how differences between the institutions or the students who attend them contribute to student outcomes could help stakeholders. In addition, given the limited sample sizes of the current study, stakeholders might find it useful to work toward compiling sufficient data to support future research for each institution separately. Future research could explore whether the characteristics of each institution play a role in these relationships.

References

ACT. (2005). *Crisis at the core: Preparing all students for college and work access*. http://www.csun.edu/~rinstitute/Content/policy/Crisis%20at%20the%20Core.pdf.

Bailey, T. (2009a). Challenge and opportunity: Rethinking the role and function of developmental education at community college. *New Directions for Community Colleges, 145*(1), 11–30. https://doi.org/10.1002/cc.352.

Bailey, T. (2009b). *Rethinking remedial education in community college* (CCRC Brief No. 40). Columbia University Community College Research Center, Teachers College. http://eric.ed.gov/?id=ED504329.

Byun, S., Meece, J. L., & Irvin, M. J. (2012). Rural-nonrural disparities in postsecondary educational attainment revisited. *American Educational Research Journal, 49*(3), 412–437. https://doi.org/10.3102/0002831211416344.

Chen, X. (2016). *Remedial course taking at U.S. public 2- and 4-year institutions: Scope, experiences, and outcomes* (NCES No. 2016–405). U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. Retrieved April 13, 2020, from http://nces.ed.gov/pubsearch.

Deil-Amen, R., & Rosenbaum, J. (2002). The unintended consequences of stigma-free remediation. *Sociology of Education, 75*(3), 249–268. https://doi.org/10.2307/3090268.

Guam Community College. (2018). *Factbook 2017–2018*. https://guamcc.edu/sites/default/files/factbookvolume12_0.pdf.

Guam Community College. (2019). *Factbook 2018–2019*. https://guamcc.edu/sites/default/files/factbook_vol_13_1.pdf.

Guam Department of Education. (2020). *About GDOE*. Retrieved May 7, 2020, from https://www.gdoe.net/District/Portal/about-gdoe.

Hein, V., Smerdon, B., & Sambolt, M. (2013). *Predictors of postsecondary success*. American Institutes for Research.

Herman, P., Carreon, D., Scanlan, S., & Dandapani, N. (2017). *Using high school data to understand college readiness in the Northern Mariana Islands* (REL 2017–268). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Pacific. http://iec.ed.gov/ncee/edlabs.

Herman, P., Scanlan, S., & Carreon, D. (2017). *Comparing enrollment, characteristics, and academic outcomes of students in developmental courses and those in credit-bearing courses at Northern Marianas College* (REL 2017–269). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Pacific. https://ies.ed.gov/ncee/edlabs/regions/pacific/pdf/REL_2017269.pdf.

Jaggars, S., & Stacey, G. W. (2014). *What we know about developmental education outcomes*. Columbia University Community College Research Center, Teachers College. https://ccrc.tc.columbia.edu/media/k2/attachments/what-we-know-about-developmental-education-outcomes.pdf.

Mejia, M. C., Rodriguez, O., & Johnson, H. (2016). *Preparing students for success in California community college*. Public Policy Institute of California. https://www.ppic.org/content/pubs/report/R_1116MMR.pdf.

O'Connor, J. (2016, March 25). GDOE to tackle teacher shortage, college readiness. *The Guam Daily*. https://www.postguam.com/news/local/gdoe-to-tackle-teacher-shortage-college-readiness/article_c9a0d054-f1b5–11e5–8f80-f3529c025814.html.

Peterson's. (2020a). Guam Community College. *Admissions*. Retrieved September 29, 2020, from https://www.petersons.com/college-search/guam-community-college-000_10002330.aspx.

Peterson's. (2020b). University of Guam. *Admissions*. Retrieved September 29, 2020, from https://www.petersons.com/college-search/university-of-guam-000_10002975.aspx.

Plucker, J., Wongsarnpigoon, R., & Houser, J. (2006). Examining college remediation trends in Indiana. *Education Policy Brief, 4*(5), 1–7. Center for Evaluation and Education Policy. http://eric.ed.gov/?id=ED491597.

Porter, A. C., & Polikoff, M. S. (2012). Measuring academic readiness for college. *Educational Policy, 26*(3), 394–417. https://doi.org/10.1177/0895904811400410.

Saelua, N., Wright, E. K. A., Kukahiko, K. I. T., & Thornton, M. M. (2016). Pacific Islander education and retention: The development of a student-initiated, student-run outreach program for Pacific Islanders. In S. D. Museus, A. Agbayani, & D. Ching (Eds.), *Focusing on the underserved: Immigrant, refugee, and indigenous Asian American and Pacific Islanders in higher education* (pp. 121–137). Information Age Publishing, Inc.

Stephan, J. L., Davis, E., Lindsay, J., & Miller, S. (2015). *Who will succeed and who will struggle? Predicting college readiness with Indiana's student information system* (REL 2015–078). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Midwest. http://ies.ed.gov/ncee/edlabs.

Turner, A. L., & Berry, T. R. (2000). Counseling center contributions to student retention and graduation: A longitudinal assessment. *Journal of College Student Development, 41*(6), 627–636.

University of Guam. (2018). *2017–2018 factbook*. https://www.uog.edu/_resources/files/administration/_institutional_effectiveness/AY2017_2018_FactBook_final_8218_wBookmarkTOCLink.pdf.

University of Guam (2019). *2019–2020 undergraduate catalog*. https://www.uog.edu/_resources/files/admissions/AT-2019-2020-UOG-Undergraduate-Catalog-UPDATE-101019-WEB.pdf.

Wolniak, G. C., & Engberg, M. E. (2010). Academic achievement in the first year of college: Evidence of the pervasive effects of the high school context. *Research in Higher Education, 51*(5), 451–467. http://eric.ed.gov/?id=EJ891378.

REL 2021–073

April 2021

This report was prepared for the Institute of Education Sciences (IES) under Contract ED-IES-17-C-0010 by the Regional Educational Laboratory Pacific administered by McREL International. The content of the publication does not necessarily reflect the views or policies of IES or the U.S. Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

Shannon, L., Cosby, A., Rentz, B., Henschel, M., Arens, S. A., and Holquist, S. E. (2021). Using high school data to predict college readiness and early college success on Guåhan (Guam) (REL 2021–073). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Pacific. Retrieved from http://ies.ed.gov/ncee/edlabs.

This report is available on the Regional Educational Laboratory website at http://ies.ed.gov/ncee/edlabs.