

# Examining the English Language Arts Course Placement System at the College of the Marshall Islands

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See [Institute of Education Sciences website](#) for the full report.

## Appendix A. Additional context

### *Overview of the education system in the Republic of the Marshall Islands*

The Republic of the Marshall Islands (RMI), a sovereign country in the northern Pacific Ocean, about 2,300 miles (3,700 kilometers) from Hawaii, includes 23 inhabited atolls and 5 islands. Nearly 70 percent of the student population resides on the urban atolls of Majuro and Kwajalein (United States Department of Health and Human Services, 2021). The RMI education system includes elementary schools (grades K–8), high schools (grades 9–12), and higher education institutions. There are 79 public elementary schools, 14 private elementary schools, 7 public high schools, 11 private high schools, and 2 postsecondary institutions (Republic of the Marshall Islands Public School System, 2022). With a student population spread across 23 atolls and 5 islands, delivery of education is challenging. About 96 percent of residents speak Kajin Aelōñ Kein (Marshallese), an official language of RMI, as their primary language. Instruction in public K–12 schools is mostly in Kajin Aelōñ Kein in grades K–6 and switches to English in 50 percent of subjects in grades 7–12 (Ministry of Education, 2015). Instruction at the College of the Marshall Islands (CMI) is almost entirely in English. In 2018, only 27 percent of students in grades 10 and 12 were considered proficient in English (Republic of the Marshall Islands Public School System, 2018).

### *Public elementary and high school education*

During the 2022/23 school year, the RMI Public School System (RMI-PSS) served more than 12,000 students, more than two-thirds of them in elementary schools (Ministry of Education, 2023). Both the elementary school curriculum and the high school curriculum include English language arts (ELA), Marshallese language arts, math, science, and social studies/Marshallese studies (Republic of the Marshall Islands Public School System, 2018). Student performance is evaluated through standardized tests administered in grades 3, 6, and 8 in elementary school and in grades 10 and 12 in high school. To advance to high school, students must pass an assessment in grade 8 covering English reading, Marshallese reading, math, science, and social studies. On the ELA assessment in the 2022/23 school year, grade 10 students demonstrated proficiency on 23 percent of the benchmarks, and grade 12 students on 18 percent (Ministry of Education, 2023). About 66 percent of grade 12 students who were enrolled in RMI-PSS high schools during the 2021/22 school year graduated from high school in 2022.

## *English language arts course placement at the College of the Marshall Islands*

CMI is the largest higher education institution in the RMI. It is an accredited community college, offering high school equivalency, community extension, certificate programs, associate degrees in various content areas, and a bachelor's degree in elementary education. In spring 2024, CMI had 1,001 enrolled students, 62 percent enrolled full time and 38 percent part time (College of the Marshall Islands, 2024). Fifty-three percent of enrolled students were women and 47 percent were men, and their average age was 22. Ninety-nine percent of students identified as Pacific Islander. More than 60 percent of first-year students are graduates of RMI–PSS, and about 33 percent of grade 12 RMI–PSS students enroll at CMI.

CMI provides developmental and credit-bearing ELA courses to first-year students. The developmental courses are intended to prepare students for the credit-bearing courses. First-year ELA courses available to CMI students are:

- Level 2 (lower-level developmental courses):<sup>1</sup> English 086 (Intermediate Listening and Speaking) and English 087 (Intermediate Reading and Writing).
- Level 3 (higher-level developmental courses): English 096 (Introduction to Academic Listening and Speaking) and English 097 (Introduction to Academic Reading and Writing).
- Level 4 (credit-bearing courses): English 105 (Fundamentals of Speech) and English 111 (English Composition 1).

ELA faculty at CMI use both the ELA course placement test (which includes a multiple-choice component and a writing component) and a student's cumulative high school GPA to inform ELA course placement decisions (figure A1). This is a new process, revised after a previous REL Pacific study found that few students were placed into credit-bearing courses (Shannon et al., 2021a). As a result, CMI discontinued Level 1 (developmental) placements and revised the ELA course placement test to align with the content of the ELA courses. The new questions are based on the curricula for CMI's initial six ELA courses and assess students on three ELA competency domains: vocabulary, language use, and sentence meaning.

ELA faculty use the lower of the two placement test scores from the multiple-choice and writing test components to inform placement decisions. First, two-parameter unidimensional item response theory analyses are conducted to generate composite scores based on a student's performance across all three domains on the multiple-choice component. Then, the CMI Admissions Office calculates percentile ranks for students' multiple-choice test composite scores, which they use to place students into one of three groups with similar percentile ranks. These group levels (ranging from 2 to 4) serve as students' multiple-choice test component placement scores. Next, ELA faculty score students' writing tests.<sup>2</sup> These scores (ranging from 1 to 4) serve as students' writing test component placement scores. The lower of the multiple-choice test component and writing test component scores is considered the student's ELA course placement test result (possible scores are 1, 2, 3, or 4). If these two placement results differ by more than two levels (if one placement score corresponds to the highest-level course and the other placement score corresponds to the lowest-level course), ELA faculty determine course placement on a case-by-case basis.

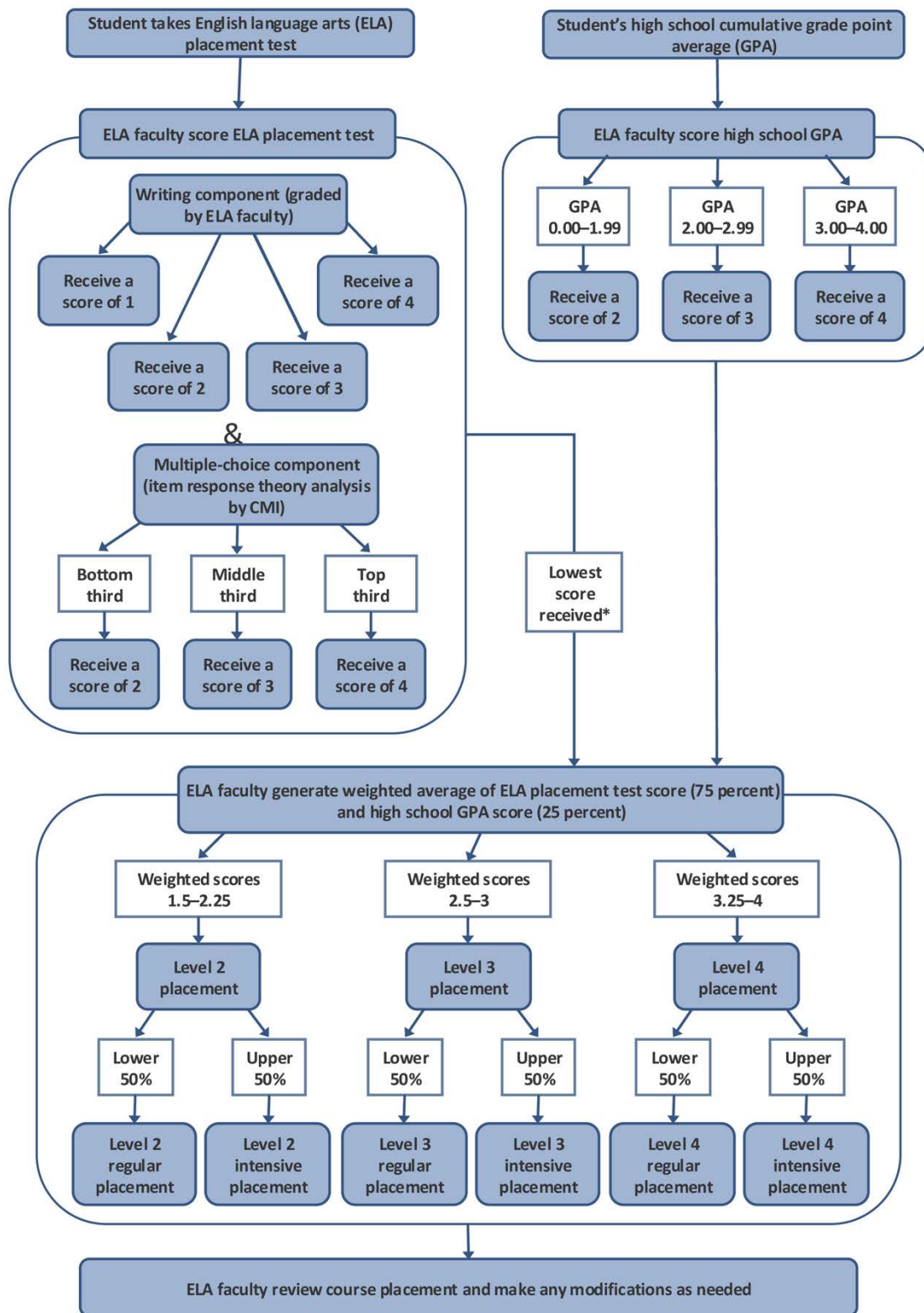
After the ELA course placement test groups are determined, ELA faculty assign scores for students' high school GPA. A GPA of 0.00–1.99 receives a score of 2, a GPA of 2.00–2.99 receives a score of 3, and a GPA of 3.00–4.00 receives a score of 4.

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<sup>1</sup> CMI no longer offers Level 1 but still uses the old naming convention.

<sup>2</sup> The same faculty members grade the placement tests every year using a rubric. They divide the tests up, so each test is scored by one faculty member. Prior to grading the test, the faculty go through a norming session.

**Figure A1. College of the Marshall Islands’ (CMI) English language arts course placement process as revised before the 2021/22 school year**



Note: Level 2 and Level 3 courses are developmental, and Level 4 courses are credit bearing. If a student’s multiple choice and writing scores differ by more than two levels, the ELA faculty determines course placement on a case-by-case basis.

Source: Authors’ construction based on data from the College of the Marshall Islands.

Next, ELA faculty calculate a weighted average of students' ELA course placement test score and high school GPA score to determine a student's final ELA course placement level. The ELA course placement test score (1–4 points) is weighted 75 percent, and the high school GPA score (2–4 points) is weighted 25 percent. Students with weighted scores of 1.5–2.25 are considered for Level 2 placement, students with scores of 2.5–3 are considered for Level 3 placement, and students with scores of 3.25–4 are considered for Level 4 placement. ELA faculty weight the placement test higher than the cumulative high school GPA, believing it to be a more consistent measure and a safeguard against variations in high school grading standards. The cutscores and weights used in student placement were selected by the CMI faculty based on their qualitative classroom experiences with students and have not been empirically validated.

Among students placed into each course level, approximately the higher-performing 50 percent (based on their weighted scores from the ELA course placement test and high school GPA) are offered the opportunity to participate in an accelerated course progression called an intensive pathway. In the intensive Level 2 pathway, students take Level 2 courses (English 086 and English 087) during the first half of the semester and Level 3 courses (English 096 and English 097) during the second half. In the intensive Level 3 pathway, students take the two Level 3 ELA courses during the first half of the semester and two Level 4 courses (English 105 and English 111) during the second half. In the Level 4 intensive pathway (which is limited primarily to liberal arts and business majors), students take English 105 and English 111 during the first half of the semester and another credit-bearing ELA course (which is not a general education requirement but is required only for liberal arts and business majors) during the second half of the semester. The course content is the same in both the intensive and regular pathways but compressed into a shorter time period in the intensive pathway to accelerate course completion. Students are also placed in a cohort with one faculty member teaching all general education ELA courses, regardless of the level.

Students who are placed into regular pathways take one set of ELA courses (Level 2, 3, or 4) during one semester and the next-level courses during another semester. In the regular Level 2 pathway, students take the Level 2 courses during the first semester, the Level 3 courses during the second semester, and the Level 4 courses during the third semester. In the regular Level 3 pathway, students take the Level 3 courses during the first semester and the Level 4 courses during the second semester. In the regular Level 4 pathway, students take the Level 4 courses during the first semester.

### *Additional research and discussion on the systemic changes made to student placement into English language arts courses by the College of the Marshall Islands*

Research conducted outside of the RMI suggests that systemic changes such as those made by CMI can help optimize student placement and improve student outcomes (Barnett et al., 2018; Ganga & Mazzariello, 2019; Hodora et al., 2012; Kopko et al., 2023). For example, using multiple measures, including high school GPA, to inform course placement decisions is generally more accurate and has been associated with higher course completion rates than relying on a single measure (Barnett et al., 2018; Ganga & Mazzariello, 2019; Kopko et al., 2023). Some research has shown that high school GPA by itself can adequately predict college success (Belfield & Crosta, 2012). However, caution is advised in generalizing from these studies. First, most research on college course placement procedures is focused on students in the United States (Bahr et al., 2016; Bracco et al., 2021; Scott-Clayton, 2012). Additionally, most of the research on placement tests is based on standardized tests, which differ from college-developed course placement tests such as CMI's (Naqvi et al., 2023). CMI's placement test is intended to align to CMI-specific ELA course objectives and competencies. Some college-developed placement tests, when aligned with a college's curriculum, successfully predicted students' course outcomes (Hodora et al., 2012), but prior research on college-developed course placement tests is limited.

Three previous REL Pacific studies conducted elsewhere in the Pacific region found that high school GPA was positively associated with early college outcomes at the College of Micronesia–FSM (COM-FSM), Palau Community College, the University of Guam, and Guam Community College (Rentz et al., 2021a; Rentz et al., 2021b; Shannon et al., 2021b). Research has found that accelerated developmental courses, like CMI's new intensive course pathways, are associated with positive outcomes such as higher course completion, retention, and

persistence rates, but this research has focused mainly on students in the United States (Boatman, 2021; Emblom-Callahan et al., 2019; Hern, 2012; Miller et al., 2021). An assessment of COM-FSM's Achieving College Excellence (ACE) program, which uses scores on a college-developed assessment to place students in accelerated six-week developmental ELA courses, found higher average completion rates for the ACE program than the regular developmental program (College of Micronesia-FSM, n.d.). The average completion rate of ACE Level 2 developmental ELA courses was 92 percent in fall 2015 and 89 percent in spring 2016, substantially higher than the completion rates for similar regular developmental courses.

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## Appendix B. Methods

This appendix provides further details on the study's data sources, analytic variables, data processing and determination of analytic samples, missing data, and analysis methods.

### *Data sources*

The College of the Marshall Islands (CMI) provided all of the study data:

- Enrollment and registration information: term start, English language arts (ELA) course placement and enrollment, and registration status.
- Demographic information: age, gender, ethnicity, citizenship, and high school attended.
- ELA course placement test results.
- ELA course grades.
- College persistence to a second year at CMI.
- Cumulative high school grade point average (GPA).

### *Analytic variables*

*English language arts course placement variables.* The following ELA course placement variables were used in the analyses:

- *ELA course level placement.* The course level a student placed into based on CMI's review of placement test results and cumulative high school GPA. Values included Level 2, Level 3, and Level 4.
- *ELA course pathway placement.* The course pathway a student placed into based on CMI's review of placement test results and cumulative high school GPA. Values included Level 2 regular, Level 2 intensive, Level 3 regular, Level 3 intensive, Level 4 regular, and Level 4 intensive.
- *Test item results on the multiple-choice component of the ELA course placement test.* Whether a student answered a test item correctly. Results for all 75 test items were used in the analyses. Values for each item included 1 (correct) and 0 (incorrect).

*Demographic and academic preparation variables.* The following demographic and academic preparation variables were used in the analyses:

- *Enrollment cohort.* The year and term a student enrolled at CMI for the first time. Values were coded as 0 (spring 2022), 1 (summer 2022), 2 (fall 2022), 3 (spring 2023), 4 (summer 2023), 5 (fall 2023), and 6 (spring 2024).
- *Cumulative high school GPA.* A student's unweighted cumulative high school GPA. Values ranged from 0 to 4.
- *Type of high school attended.* Values were coded as 0 (non–Republic of the Marshall Islands [RMI] high schools), 1 (high school equivalence), 2 (RMI private school), and 3 (RMI public school). The variables originally included an “unknown” category and a category that included only two students. These categories were coded as missing.

*Early college outcome variables.* The following early college outcome variables were used in the analyses:

- *Passing the English 105 credit-bearing course on first attempt.* Values included 1 (passed) and 0 (did not pass). These values were derived from a variable that indicated the course letter grades (A, B+, B, C+, C, D+, D, and F). Grades of A, B+, B, C+, and C were recoded as 1, and grades of D+, D, and F were recoded as 0 according to CMI's definition of passing for this course.

- *Passing the English 111 credit-bearing course on first attempt.* Values included 1 (passed) and 0 (did not pass). These values were derived from a variable that indicated the course letter grades (A, B+, B, C+, C, D+, D, and F). Grades of A, B+, B, C+, and C were recoded as 1, and grades of D+, D, and F were recoded as 0 according to CMI's definition of passing for this course.
- *College persistence.* Whether a student persisted to a second year of college at CMI. Values included 1 (persisted) and 0 (did not persist).
- *ELA performance.* A statistical estimate of a student's performance on the multiple-choice component of the ELA course placement test generated by the item response theory (IRT) analyses used for research question 4 (see section below on analysis methods). Values were centered at 0 in the IRT model and represent standardized scores (z-scores).
- *ELA performance percentiles.* A statistical estimate of a student's performance on the multiple-choice component of the ELA course placement test generated by transforming the ELA performance z-scores using a normal distribution. Values ranged from 0 to 100. Because z-scores have a theoretically infinite range, a performance percentile of 0 represents 3.16712E-05 (the percentile transformation of the lowest z-score observed in the study: -4), and a performance percentile of 100 represents 0.99996833 (the percentile transformation of the highest z-score observed in the study: 4).
- *ELA writing scores.* Students' performance on the writing component of the ELA course placement test, which is scored by CMI ELA faculty. Values included 1, 2, 3, and 4.

### *Data processing and determination of the analytic samples*

There were two main analytic samples for the study. The first was the population of students who took the ELA course placement test between spring 2022 and spring 2024. This sample was used to answer research question 4 on the extent to which the individual items of the CMI ELA course placement test measure ELA performance overall and by specific ELA domain (vocabulary, language use, and sentence meaning). The second was a sample of these students who enrolled at CMI for the first time between spring 2022 and spring 2024. This sample was used to answer the other research questions:

- Percentage of students placed into each level and pathway (research question 1).
- Percentage of students placed into each pathway at each level who passed the credit-bearing courses on their first attempt (research question 2).
- Percentage of students placed into each pathway at each level who persisted to a second year of college at CMI (research question 3).
- Extent to which the ELA course placement test, cumulative high school GPA, and type of high school attended predict a student's probability of passing the credit-bearing ELA courses (research question 5).

The study team processed and cleaned the data provided by CMI, including recoding the categorical variables and outcome variables that were used in the logistic regression models (described above in the analytic variables section). Next, the study team identified the students for the two analytic samples. In total, the study team received data for 1,101 students. Three students were removed from the data due to duplicate entries or errors that CMI could not resolve. The first analytic sample included 1,098 unique students with ELA course placement test data. The second analytic sample included the 1,019 students from the first analytic sample who enrolled at CMI for the first time between spring 2022 and spring 2024.

Analyses that used the second analytic sample (research questions 1, 2, 3, and 5) had different sample sizes due to the specific variables included in each analysis:

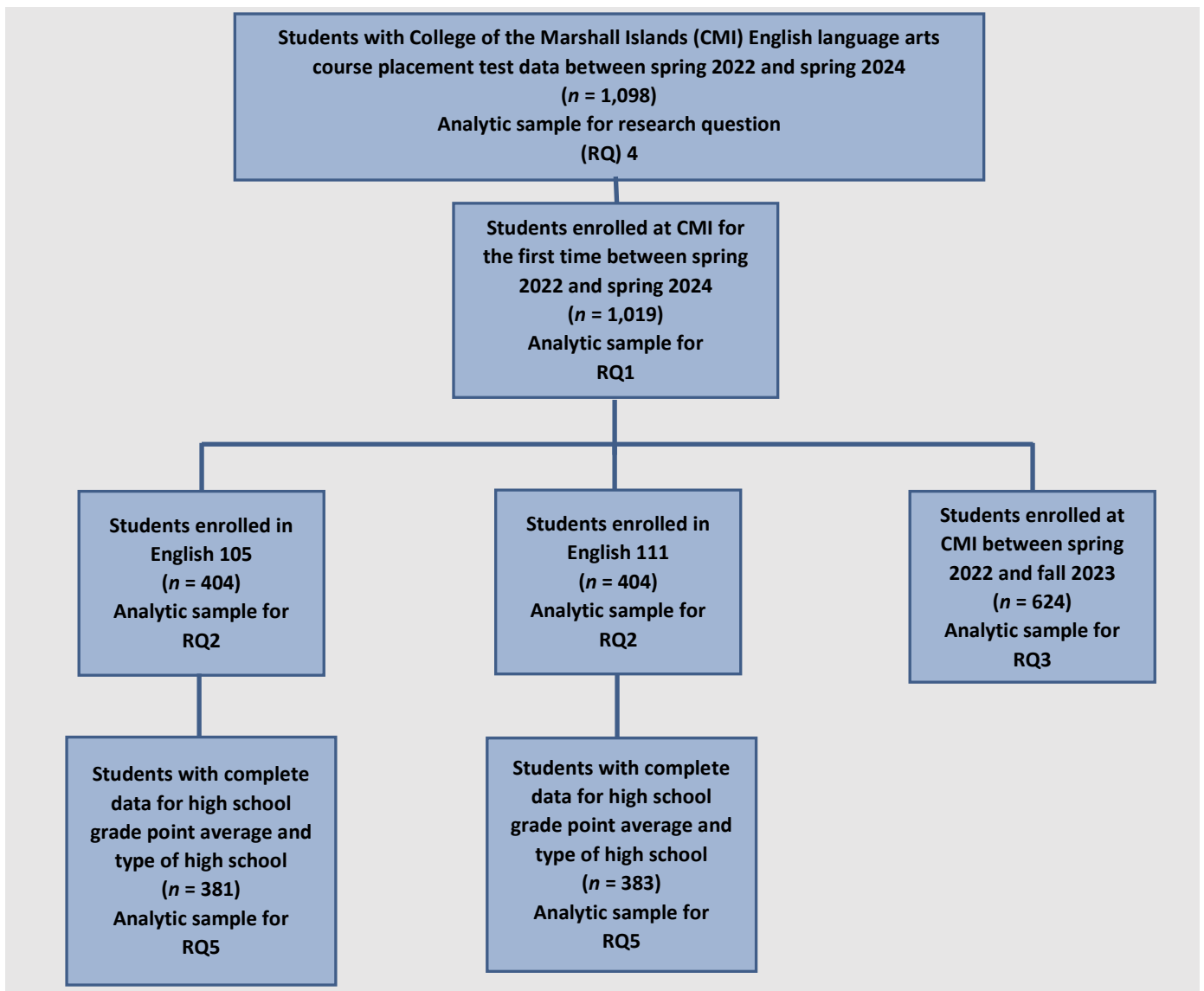
- Research question 1: all 1,019 students in the second analytic sample.

- Research question 2: 404 students who enrolled in English 105, and 404 students who enrolled in English 111 during the study period.
- Research question 3: in cohorts with at least one year of data, 624 students who were initially placed into regular or intensive pathways of ELA courses.
- Research question 5: 381 students who enrolled in English 105 and were not missing data for high school GPA and type of high school attended, and 383 students who enrolled in English 111 and were not missing data for high school GPA and type of high school attended.

### Missing data

There were no missing outcome data for any of the research questions because the samples were defined to include only students with data on the outcomes in question (table B1).

**Figure B1. Overview of analytic samples for students who took the College of the Marshall Islands English language arts placement test between spring 2022 and spring 2024**



Source: Authors' analysis of data from the College of the Marshall Islands.

For research question 4, all 1,098 students had ELA course placement test data, but some students had skipped individual test items. Consistent with standard IRT approaches, the IRT models estimated for this study ignored missing values when calculating test item-level parameters. However, when calculating students' individual-level ELA course placement test performance scores, the study team used the expected a posteriori method, which CMI also uses and which takes into account the number of missing test item values. The higher the number of missing values, the greater the uncertainty of the score for that individual.

For research question 5, students were missing some data for high school GPA and type of high school attended for the two regression models. Due to the small amount of missingness, complete case analysis was used for the logistic regression models.

**Table B1. Percentage of missing data by research question and variable**

Variable	Missing data (%)
<b>Research question 1</b>	
English language arts (ELA) course placement	.00
<b>Research question 2</b>	
ELA course placement	.00
Passed English 105	.00
Passed English 111	.00
<b>Research question 3</b>	
ELA course placement	.00
Persist to second year at College of the Marshall Islands	.00
<b>Research question 4</b>	
ELA course placement test data	.00
<b>Research question 5, English 105 regression</b>	
ELA course placement test performance	.00
ELA writing score	.00
High school grade point average (GPA)	.05
Type of high school	.01
Passed English 105	.00
<b>Research question 5, English 111 regression</b>	
ELA course placement test performance	.00
ELA writing score	.00
High school GPA	.05
Type of high school	.01
Passed English 111	.00

Source: Authors' analysis of data from the College of the Marshall Islands.

### *Analysis methods*

*Descriptive analyses for research questions 1, 2, and 3.* The study team used R (R Core Team, 2022) to calculate the frequencies and percentages of students who were placed into the different ELA course levels and pathways, who passed the credit-bearing courses on their first attempt, and who persisted to a second year of college at CMI. Additionally, chi-square tests were conducted to examine whether the percentage of students differed statistically significantly by initial ELA course pathway placement (research questions 2 and 3) and cohort (research questions 1 and 3).

The variables included in these descriptive analyses are defined in the analytic variables section above.

*IRT analyses for research question 4.* The study team used the R (R Core Team, 2022) package *mirt* (Chalmers, 2012) to estimate a two-parameter bifactor IRT model. IRT is a statistical approach used to model the relationship between the test taker's ability or performance that is being measured by the assessment and correctly answering assessment items. This method is used to evaluate standardized assessment items, as well as to provide precise measures of the test taker's performance.

A bifactor model was used because these models assume that there are multiple dimensions underlying the overall ELA performance measured by the test and therefore model the different dimensions of performance as well as performance overall (Gibbons et al., 2009; Toland et al., 2017). Because unidimensional IRT would allow for measurement only of ELA performance overall, bifactor IRT was considered more appropriate for evaluating both ELA performance overall and by domain. The multiple-choice component of the ELA course placement test had 75 items and was intended to measure students' ELA performance overall, as well as their performance in the three ELA domains: vocabulary, language use, and sentence meaning. Twenty-five items were designed to measure each domain. The study team treated the groups of items associated with each ELA domain as separate dimensions of the test. The test items were dichotomous (students' responses to the test items were correct or incorrect).

The two-parameter bifactor IRT model for each test item is summarized as follows (Immekus et al., 2019):

$$p(u_i = 1 | \theta_j, a_i, d_i) = \frac{e^{(a_i \theta_j + d_i)}}{1 + e^{(a_i \theta_j + d_i)}}$$

where  $p(u_i = 1 | \theta_j, a_i, d_i)$  represents the probability of a correct response for item  $I$ ,  $\theta_j$  is a coefficient that represents individual  $j$ 's ELA performance (overall and domain-level),  $a_i$  is a coefficient that represents item  $i$ 's discrimination parameters (slopes for ELA performance overall and by domain), and  $d_i$  is a coefficient that represents item  $i$ 's difficulty parameter (threshold).

Additionally, the bifactor model generated loadings for test items, which measure the extent to which a test item contributes to the measurement of ELA performance overall and by domain. These loadings are equivalent to factor loadings generated within a confirmatory factor analysis framework. For each test item, the model estimated the extent to which the item contributed to the measurement of ELA performance overall. Then, the model estimated the extent to which the item contributed to the measurement of the specific ELA domain that the test item was intended to measure. In estimating the domain-level loadings, the model used unique variance that is not accounted for by the performance overall loadings. Therefore, performance overall loadings tend to be higher than domain-level loadings (Immekus et al., 2019; Reise et al., 2013).

Model fit statistics were calculated to examine the extent to which the bifactor model fit the data. Two incremental fit indices were estimated: the Comparative Fit Index (CFI) and Tucker Lewis Index (TLI). The CFI and TLI estimate the goodness of fit of a model by calculating its differences from a null model, with the TLI controlling for the degrees of freedom in each model. Higher CFI and TLI values signify better model fit. Specifically, CFI and TLI values  $> .95$  indicate good model fit (Hu & Bentler, 1999). Additionally, the root mean square error of approximation (RMSEA) statistic was calculated, which estimates the lack of fit of a model by calculating its differences from a saturated model. RMSEA values range from 0 to 1, and higher values signify worse model fit. Specifically, RMSEA  $< .05$  indicates good model fit, and RMSEA  $< .08$  indicates fair model fit (Hu & Bentler, 1999; Steiger, 1998).

Additionally, a test information curve and standard error of measurement plot for the bifactor model were generated. The test information curve provides an estimate of how much measurement precision the model provides across different levels of ELA performance. The study team used item-level parameter estimates from the bifactor model to calculate item information functions, summarized as follows:

$$FI_i(\theta) = D^2 a_i^2 P_i(\theta) * [1 - P_i(\theta)]$$

where  $FI_i(\theta)$  represents the measurement precision for item  $I$ ,  $D$  is the constant,  $a_i$  represents item  $i$ 's intercept, and  $P_i(\theta)$  represents the probability of a correct response on item  $i$  given the level of ELA performance. The sum of item-level information functions represents the overall test information function, which the study team used to generate a plot that depicts the ELA course placement test's measurement precision across levels of ELA performance.

The standard errors of measurement—which represent the amount of measurement error of the model across levels of ELA performance—can be derived from the test information functions, as follows:

$$SE_i(\theta) = \frac{1}{\sqrt{FI_i(\theta)}}$$

where  $SE_i(\theta)$  represents the measurement error for item  $i$ , and  $FI_i(\theta)$  represents the measurement precision for item  $i$ . The sum of the standard error of measurement functions represents the standard errors of measurement for the overall test, which the study team used to generate a plot that depicts the ELA course placement test's measurement error across levels of ELA performance.

The study team also estimated each student's ELA performance based on the bifactor model to use in other research questions (described in the variables section above). The study team used the default expected a posteriori method in the *mirt* R package to calculate ELA performance (Chalmers, 2012; R Core Team, 2024).

*Logistic regression analyses for research question 5.* The study team used R (R Core Team, 2024) to run two logistic regression models to answer research question 5. Logistic regression was used because the outcome variables—passing the English 105 credit-bearing course on first attempt and passing the English 111 credit-bearing course on first attempt—were dichotomous.

The following logistic regression model was used to answer research question 5:

$$\ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \omega_1$$

where  $p_i$  is the log odds of passing the credit-bearing ELA course,  $\beta_0$  is the probability of passing the credit-bearing ELA course when all predictors are 0 (the intercept),  $\beta_1$  is the coefficient representing the relationship between ELA performance values (based on the multiple-choice component of the ELA course placement test) and the log odds of passing the credit-bearing ELA course,  $X_1$  is student ELA performance values,  $\beta_2$  is the coefficient representing the relationship between writing scores (based on the writing component of the ELA course placement test) and the log odds of passing the credit-bearing ELA course,  $X_2$  is student writing scores,  $\beta_3$  is the coefficient representing the relationship between high school GPA and the log odds of passing the credit-bearing ELA course,  $X_3$  is student high school GPA value,  $\beta_4$  is the coefficient representing the relationship between the type of high school a student graduated from and the log odds of passing the credit-bearing ELA course,  $X_4$  is an indicator for the type of high school, and  $\omega_1$  is an indicator variable to account for cohort effects. The study team ran this model once for English 105 and once for English 111.<sup>3</sup> The study team also generated standardized regression coefficients for the continuous variables in the model (ELA performance, writing scores, and high school GPA) using the `standardized parameters()` function of the *effectsize* R package (Ben-Shachar et al., 2020).

After the regression models were run, predicted probabilities (marginal means) were calculated for each of the predictors using the `emmeans()` function of the *emmeans* R package (Lenth, 2024). The `emmeans()` function estimates the marginal means or, in the context of logistic or ordinal logistic regressions, provides the estimated marginal probabilities.

To identify outliers, the study team examined  $z$ -scores for each observation for the continuous predictor variables in the regression analyses (ELA performance, writing scores, and high school GPA) and determined that no scores were greater than 3.29, meaning that there were no outliers. The study team also examined the variance inflation

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<sup>3</sup> The study team chose not to include first-year ELA course level placement as a predictor in the logistic regression analyses because it could account for most of the variance for ELA course placement test performance. It was important to focus on the predictive ability of the ELA course placement test (which will be associated with first-year course placement). Because of this, it is possible that the relationships between the predictors and passing the credit-bearing ELA courses were weakened if taking the developmental courses has substantial impacts on the outcome.

factor (VIF) values of the predictor variables while running the regression analyses. None of the VIF values were greater than 10, indicating that multicollinearity was not a concern.

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## Appendix C. Supporting analysis

This appendix details the full results of the analyses for the study’s research questions.

### *Detailed results of the demographic characteristics of the study sample*

This section provides an overview of the final samples (tables C1–C3). The students in the study samples were primarily Native Hawaiian or Other Pacific Islander (97–99 percent).

**Table C1. Number and percentage of students in the study samples for categorical demographic characteristics for students with English language arts (ELA) placement test data and for students who enrolled for the first time at the College of the Marshall Islands (CMI) between spring 2022 and spring 2024**

Characteristic	Students with CMI ELA course placement test data ( <i>N</i> = 1,098)		Students enrolled at CMI for the first time ( <i>n</i> = 1,019)	
	Number	Percent	Number	Percent
<b>Gender</b>				
Female	569	51.8	541	53.1
Male	494	45.0	472	46.3
<b>High school type</b>				
Republic of the Marshall Islands (RMI) public school	703	64.0	670	65.8
RMI private school	185	16.8	181	17.8
RMI high school equivalent	115	10.5	111	10.9
Non-RMI high school	52	4.7	51	5.0

Note: Ethnicity was excluded from the analysis because 97–99 percent of students in the study sample were Native Hawaiian or Other Pacific Islander. Percentages might not sum to 100 because of rounding and missing data.

Source: Authors’ analysis of data from the College of the Marshall Islands.

**Table C2. Means and standard deviations of continuous demographic characteristics for students with English language arts (ELA) placement test data and for students enrolled for the first time at the College of the Marshall Islands (CMI) between spring 2022 and spring 2024**

Characteristic	Students with CMI ELA course placement test data ( <i>N</i> = 1,098)		Students enrolled at CMI for the first time ( <i>n</i> = 1,019)	
	Mean	Standard deviation	Mean	Standard deviation
Age	20.1	3.7	19.6	2.8
Cumulative high school grade point average	2.7	0.6	2.7	0.6

Source: Authors’ analysis of data from the College of the Marshall Islands.

**Table C3. Mean and interquartile range (IQR) for high school grade point average (GPA) and scores on English language arts (ELA) placement test components for students enrolled for the first time at the College of the Marshall Islands between spring 2022 and spring 2024, by first-year ELA course level and pathway placement and cohort**

Measure and cohort	Level 2 regular pathway		Level 2 intensive pathway		Level 3 regular pathway		Level 3 intensive pathway		Level 4 regular pathway		Level 4 intensive pathway	
	Mean	IQR	Mean	IQR	Mean	IQR	Mean	IQR	Mean	IQR	Mean	IQR
<b>High school GPA</b>												
Spring 2022 (n = 110)	2.3	0.3	2.4	0.6	2.8	1.0	a	a	a	a	a	a
Summer 2022 (n = 130)	2.5	0.6	2.8	1.1	2.9	0.9	3.0	0.6	3.1	0.6	a	a
Fall 2022 (n = 280)	2.4	0.5	2.4	0.6	2.9	0.8	3.5	0.5	a	a	3.1	0.4
Spring 2023 (n = 100)	2.3	0.6	2.3	0.4	2.6	0.8	3.1	0.7	a	a	a	a
Summer 2023 (n = 50)	a	a	a	a	3.2	0.7	3.2	0.4	3.6	0.5	a	a
Fall 2023 (n = 230)	2.4	0.5	2.5	0.5	3.0	0.5	2.9	0.7	a	a	3.4	0.9
Spring 2024 (n = 110)	2.4	0.7	2.3	0.4	2.8	0.4	2.8	0.8	a	a	a	a
Across cohorts (n = 1,019)	2.4	0.6	2.5	0.7	2.9	0.8	3.1	0.6	3.1	0.7	3.2	0.7
<b>Score on multiple-choice component of ELA course placement test</b>												
Spring 2022 (n = 110)	2.2	0.0	2.2	0.0	3.2	1.0	a	a	a	a	a	a
Summer 2022 (n = 130)	2.2	0.0	2.4	1.0	3.0	0.0	3.1	0.0	3.9	0.0	a	a
Fall 2022 (n = 280)	2.0	0.0	2.0	0.0	2.7	1.0	3.4	1.0	a	a	3.9	0.0
Spring 2023 (n = 100)	2.0	0.0	2.0	0.0	3.2	0.0	3.2	1.0	a	a	a	a
Summer 2023 (n = 50)	a	a	a	a	3.0	0.5	3.0	0.6	4.0	0.0	a	a
Fall 2023 (n = 230)	2.1	0.0	2.0	0.0	2.6	1.0	3.3	0.3	a	a	3.6	0.0
Spring 2024 (n = 110)	2.4	0.0	2.0	0.0	2.6	1.0	2.9	0.0	a	a	a	a
Across cohorts (n = 1,019)	2.1	0.0	2.1	0.0	2.8	1.0	3.1	0.5	4.0	0.0	3.9	0.0
<b>Score on writing component of ELA course placement test</b>												
Spring 2022 (n = 110)	2.0	0.0	2.3	0.5	3.6	1.0	a	a	a	a	a	a
Summer 2022 (n = 130)	2.1	0.0	2.0	1.0	2.3	1.0	2.3	0.3	3.1	0.0	a	a
Fall 2022 (n = 280)	2.0	0.0	2.0	0.0	2.1	0.0	2.2	0.0	a	a	3.0	0.0
Spring 2023 (n = 100)	1.7	0.8	2.0	0.0	2.1	0.0	2.1	0.0	a	a	a	a
Summer 2023 (n = 50)	a	a	a	a	2.5	1.0	2.3	1.0	3.0	0.0	a	a
Fall 2023 (n = 230)	2.1	0.0	2.0	0.0	2.3	1.0	2.6	1.0	a	a	3.2	1.0
Spring 2024 (n = 110)	2.3	0.0	2.0	0.0	2.3	1.0	2.4	1.0	a	a	a	a

Measure and cohort	Level 2 regular pathway		Level 2 intensive pathway		Level 3 regular pathway		Level 3 intensive pathway		Level 4 regular pathway		Level 4 intensive pathway	
	Mean	IQR	Mean	IQR	Mean	IQR	Mean	IQR	Mean	IQR	Mean	IQR
Across cohorts (n = 1,019)	2.1	0.0	2.1	0.0	2.2	0.0	2.3	1.0	3.1	0.0	3.2	0.0

Note: Courses in Levels 2 and 3 are developmental, and courses in Level 4 are credit bearing.

a. Data are suppressed because of small sample size ( $n < 10$ ) to protect student anonymity. Subsample sizes have been rounded to the nearest 10 so that suppressed data cannot be calculated.

Source: Authors' analysis of data from the College of the Marshall Islands.

### *Detailed results from descriptive analyses for research questions 1, 2, and 3*

This section provides descriptive statistics (counts and percentages) and chi-square results for research question 1 (tables C4–C5), research question 2 (tables C6–C9), and research question 3 (tables C10–C11).

**Table C4. Number and percentage of students enrolled for the first time at the College of the Marshall Islands between spring 2022 and spring 2024, by first-year English language arts course level placement and cohort**

Cohort	Level 2 (developmental)		Level 3 (developmental)		Level 4 (credit bearing)	
	Number	Percent	Number	Percent	Number	Percent
Spring 2022 (n = 110)	70	61.7	30	28.6	10	10.7
Summer 2022 (n = 130)	60	42.1	50	40.6	20	17.3
Fall 2022 (n = 280)	150	52.7	110	39.8	20	7.5
Spring 2023 (n = 100)	40	42.0	50	47.0	10	11.0
Summer 2023 (n = 50)	a	a	30	58.5	10	24.5
Fall 2023 (n = 230)	120	50.6	90	39.9	20	9.4
Spring 2024 (n = 110)	70	60.6	30	31.2	a	a
Across cohorts (n = 1,019)	506	49.7	402	39.5	111	10.9

Note: Percentages might not sum to 100 because of rounding. A chi-square test indicated statistically significant [ $\chi^2(12) = 61.69, p < .001$ ] cohort differences between the observed and expected percentages of students placed into course levels.

a. Data are suppressed because of small sample size ( $n < 10$ ) to protect student anonymity. Subsample sizes have been rounded to the nearest 10 so that suppressed data cannot be calculated.

Source: Authors' analysis of data from the College of the Marshall Islands.

**Table C5. Number and percentage of students enrolled for the first time at the College of the Marshall Islands between spring 2022 and spring 2024, by first-year English language arts course level and pathway placement and cohort**

Cohort	Level 2 regular pathway		Level 2 intensive pathway		Level 3 regular pathway		Level 3 intensive pathway		Level 4 regular pathway		Level 4 intensive pathway	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Spring 2022 (n = 110)	45	40.2	23	20.5	25	22.3	a	a	a	a	a	a
Summer 2022 (n = 130)	22	16.5	34	25.6	38	28.6	16	12.0	22	16.5	a	a
Fall 2022 (n = 280)	121	43.4	26	9.3	94	33.7	17	6.1	a	a	13	4.7
Spring 2023 (n = 100)	24	24.0	18	18.0	32	32.0	15	15.0	a	a	a	a
Summer 2023 (n = 50)	a	a	a	a	13	24.5	18	34.0	13	24.5	0	0.0
Fall 2023 (n = 230)	92	39.5	26	11.2	77	33.1	16	6.9	a	a	20	8.6
Spring 2024 (n = 110)	47	43.1	19	17.4	21	19.3	13	11.9	a	a	a	a
Across cohorts (n = 1,019)	352	34.5	154	15.1	300	29.4	102	10.0	53	5.2	58	5.7

Note: Courses in Level 2 and Level 3 are developmental, and courses in Level 4 are credit bearing. Percentages might not sum to 100 because of rounding. A chi-square test indicated statistically significant [ $\chi^2(30) = 197.1, p < .001$ ] cohort differences between the observed and expected percentages of students placed into course pathways.

a. Data are suppressed because of small sample size ( $n < 10$ ) to protect student anonymity. Subsample sizes have been rounded to the nearest 10 so that suppressed data cannot be calculated.

Source: Authors' analysis of data from the College of the Marshall Islands.

**Table C6. Number and percentage of students enrolled for the first time at the College of the Marshall Islands between spring 2022 and spring 2024 who passed the English 105 credit-bearing course on their first attempt, by first-year English language arts course level placement and cohort**

Course placement and cohort	Number enrolled	Number passed	Percent passed <sup>a</sup>
<b>Level 2 (developmental)</b>			
Spring 2022	15	b	b
Summer 2022	22	b	b
Fall 2022	26	14	53.8
Spring 2023	b	b	b
Summer 2023	b	b	b
Fall 2023	17	10	58.8
Spring 2024	10	b	b
Across cohorts	96	50	52.1
<b>Level 3 (developmental)</b>			
Spring 2022	18	b	b
Summer 2022	34	18	52.9
Fall 2022	52	37	71.2
Spring 2023	21	15	71.4
Summer 2023	25	10	40.0
Fall 2023	36	25	69.4
Spring 2024	12	b	b
Across cohorts	198	124	62.6
<b>Level 4 (credit bearing)</b>			
Spring 2022	b	b	b
Summer 2022	23	12	52.2
Fall 2022	21	17	81.0
Spring 2023	11	10	90.9
Summer 2023	12	10	83.3
Fall 2023	22	16	72.7
Spring 2024	b	b	b
Across cohorts	110	83	75.5

a. Calculated as the number of students in each course level placement and in each cohort who passed English 105 on their first attempt, divided by the total number of students in each course level placement and cohort who enrolled in English 105, multiplied by 100. These totals do not include students who never enrolled in the English 105 course over the duration of the study. No chi-square analyses were conducted to examine cohort differences due to the different amount of time each cohort has to enroll in and pass English 105.

b. Data are suppressed because of small sample size ( $n < 10$ ) to protect student anonymity.

Source: Authors' analysis of data from the College of the Marshall Islands.

**Table C7. Number and percentage of students enrolled for the first time at the College of the Marshall Islands between spring 2022 and spring 2024 who passed the English 111 credit-bearing course on their first attempt, by first-year English language arts course level placement and cohort**

Course placement and cohort	Number enrolled	Number passed	Percent passed <sup>a</sup>
<b>Level 2 (developmental)</b>			
Spring 2022	13	b	b
Summer 2022	22	b	b
Fall 2022	27	b	b
Spring 2023	b	b	b
Summer 2023	b	b	b
Fall 2023	16	b	b
Spring 2024	b	b	b
Across cohorts	95	32	33.7
<b>Level 3 (developmental)</b>			
Spring 2022	17	b	b
Summer 2022	34	23	67.6
Fall 2022	52	35	67.3
Spring 2023	21	11	52.4
Summer 2023	25	13	52.0
Fall 2023	38	23	60.5
Spring 2024	12	b	b
Across cohorts	199	121	60.8
<b>Level 4 (credit bearing)</b>			
Spring 2022	12	11	91.7
Summer 2022	23	11	47.8
Fall 2022	21	17	81.0
Spring 2023	b	b	b
Summer 2023	12	b	b
Fall 2023	22	15	68.2
Spring 2024	b	b	b
Across cohorts	110	77	70.0

a. Calculated as the number of students in each course level placement and in each cohort who passed English 111 on their first attempt, divided by the total number of students in each course level placement and cohort who enrolled in English 111, multiplied by 100. These totals do not include students who never enrolled in the English 111 course over the duration of the study. No chi-square analyses were conducted to examine cohort differences due to the different amount of time each cohort has to enroll in and pass English 111.

b. Data are suppressed because of small sample size ( $n < 10$ ) to protect student anonymity.

Source: Authors' analysis of data from the College of the Marshall Islands.

**Table C8. Number and percentage of students enrolled for the first time at the College of the Marshall Islands between spring 2022 and spring 2024 who passed the English 105 credit-bearing course on their first attempt, by first-year English language arts course level and pathway placement and cohort**

Course placement and cohort	Number enrolled	Number passed	Percent passed <sup>a</sup>
<b>Level 2 (developmental) regular pathway</b>			
Spring 2022	b	b	75.0
Summer 2022	b	b	b
Fall 2022	12	b	b
Spring 2023	0	b	b
Summer 2023	b	b	b
Fall 2023	b	b	b
Spring 2024	10	b	b
Across cohorts	36	20	55.6
<b>Level 2 (developmental) intensive pathway</b>			
Spring 2022	11	b	b
Summer 2022	18	b	b
Fall 2022	14	b	b
Spring 2023	b	b	b
Summer 2023	b	b	b
Fall 2023	12	b	b
Spring 2024	0	0	na
Across cohorts	60	30	50.0
<b>Level 3 (developmental) regular pathway</b>			
Spring 2022	12	b	b
Summer 2022	18	b	b
Fall 2022	35	24	68.6
Spring 2023	b	b	b
Summer 2023	b	b	b
Fall 2023	21	11	52.4
Spring 2024	0	0	na
Across cohorts	102	56	54.9
<b>Level 3 (developmental) intensive pathway</b>			
Spring 2022	b	b	b
Summer 2022	16	11	68.8
Fall 2022	17	13	76.5
Spring 2023	13	12	92.3
Summer 2023	17	b	b
Fall 2023	15	14	93.3
Spring 2024	b	b	b
Across cohorts	96	68	70.8

Course placement and cohort	Number enrolled	Number passed	Percent passed <sup>a</sup>
<b>Level 4 (credit bearing)regular pathway</b>			
Spring 2022	b	b	b
Summer 2022	22	12	54.5
Fall 2022	b	b	b
Spring 2023	b	b	b
Summer 2023	12	10	83.3
Fall 2023	b	b	b
Spring 2024	b	b	b
Across cohorts	52	33	63.5
<b>Level 4 (credit bearing) intensive pathway</b>			
Spring 2022	b	b	b
Summer 2022	b	b	b
Fall 2022	13	13	100.0
Spring 2023	b	b	b
Summer 2023	0	0	na
Fall 2023	20	15	75.0
Spring 2024	b	b	b
Across cohorts	58	50	86.2

na indicates not applicable because no students in the cohort who placed into the course pathway enrolled in English 105.

a. Calculated as the number of students in each course pathway placement and in each cohort who passed English 105 on their first attempt, divided by the total number of students in each course pathway placement and cohort who enrolled in English 105, multiplied by 100. These totals do not include students who never enrolled in the English 105 course over the duration of the study. No chi-square analyses were conducted to examine cohort differences due to the different amount of time each cohort has to enroll in and pass English 105.

b. Data are suppressed because of small sample size ( $n < 10$ ) to protect student anonymity.

Source: Authors' analysis of data from the College of the Marshall Islands.

**Table C9. Number and percentage of students enrolled for the first time at the College of the Marshall Islands between spring 2022 and spring 2024 who passed the English 111 credit-bearing course on their first attempt, by first-year English language arts course level and pathway placement and cohort**

Course placement and cohort	Number enrolled	Number passed	Percent passed <sup>a</sup>
<b>Level 2 (developmental) regular pathway</b>			
Spring 2022	b	b	b
Summer 2022	b	b	b
Fall 2022	13	b	46.2
Spring 2023	b	b	b
Summer 2023	b	b	b
Fall 2023	b	b	b
Spring 2024	b	b	b
Across cohorts	36	14	38.9
<b>Level 2 (developmental) intensive pathway</b>			
Spring 2022	10	b	b
Summer 2022	18	b	b
Fall 2022	14	b	b
Spring 2023	b	b	b
Summer 2023	b	b	b
Fall 2023	11	b	b
Spring 2024	0	0	na
Across cohorts	59	18	30.5
<b>Level 3 (developmental) regular pathway</b>			
Spring 2022	11	b	b
Summer 2022	18	b	b
Fall 2022	35	22	62.9
Spring 2023	b	b	b
Summer 2023	b	b	b
Fall 2023	23	10	43.5
Spring 2024	0	0	na
Across cohorts	103	52	50.5
<b>Level 3 (developmental) intensive pathway</b>			
Spring 2022	b	b	b
Summer 2022	16	14	87.5
Fall 2022	17	13	76.5
Spring 2023	13	b	b
Summer 2023	17	10	58.8
Fall 2023	15	13	86.7
Spring 2024	b	b	b
Across cohorts	96	69	71.9

Course placement and cohort	Number enrolled	Number passed	Percent passed <sup>a</sup>
<b>Level 4 (credit bearing) regular pathway</b>			
Spring 2022	b	b	b
Summer 2022	22	10	45.5
Fall 2022	b	b	b
Spring 2023	b	b	b
Summer 2023	12	b	b
Fall 2023	b	b	b
Spring 2024	b	b	b
Across cohorts	52	26	50.0
<b>Level 4 (credit bearing) intensive pathway</b>			
Spring 2022	b	b	b
Summer 2022	b	b	b
Fall 2022	13	13	100.0
Spring 2023	b	b	b
Summer 2023	0	0	na
Fall 2023	20	15	75.0
Spring 2024	b	b	b
Across cohorts	58	51	87.9

na indicates not applicable because no students in the cohort who placed into the course pathway enrolled in English 111.

a. Calculated as the number of students in each course pathway placement and in each cohort who passed English 111 on their first attempt, divided by the total number of students in each course pathway placement and cohort who enrolled in English 111, multiplied by 100. These totals do not include students who never enrolled in the English 111 course over the duration of the study. No chi-square analyses were conducted to examine cohort differences due to the different amount of time each cohort has to enroll in and pass English 111.

b. Data are suppressed because of small sample size ( $n < 10$ ) to protect student anonymity.

Source: Authors' analysis of data from the College of the Marshall Islands.

**Table C10. Number and percentage of students enrolled for the first time at the College of the Marshall Islands (CMI) between spring 2022 and spring 2024 who persisted to a second year of college at CMI, by first-year English language arts course level placement and cohort**

Course placement and cohort	Number placed	Number persisted	Percent persisted <sup>a</sup>
<b>Level 2 (developmental)</b>			
Spring 2022	68	33	48.5
Summer 2022	56	27	48.2
Fall 2022	147	55	37.4
Spring 2023	42	18	42.9
Across cohorts	313	133	42.5
<b>Level 3 (developmental)</b>			
Spring 2022	32	14	43.8
Summer 2022	54	29	53.7
Fall 2022	111	51	45.9
Spring 2023	47	25	53.2
Across cohorts	244	119	48.8
<b>Level 4 (credit-bearing)</b>			
Spring 2022	12	b	b
Summer 2022	23	b	b
Fall 2022	21	14	66.7
Spring 2023	11	b	b
Across cohorts	67	41	61.2

a. Calculated as the number of students in each course level placement and in each cohort who persisted to a second year of college, divided by the total number of students in each course level placement and cohort, multiplied by 100. These totals do not include students in the summer 2023, fall 2023, and spring 2024 cohorts since they did not have one year of data as of this analysis. A chi-square test indicated no statistically significant [ $\chi^2(3) = 0.92, p = .820$ ] cohort differences between the observed and expected percentages of students persisting to a second year of college.

b. Data are suppressed because of small sample size ( $n < 10$ ) to protect student anonymity.

Source: Authors' analysis of data from the College of the Marshall Islands.

**Table C11. Number and percentage of students enrolled for the first time at the College of the Marshall Islands (CMI) between spring 2022 and spring 2024 who persisted to a second year of college at CMI, by first-year English language arts course level and pathway placement and cohort**

Course placement and cohort	Number placed <sup>a</sup>	Number persisted	Percent persisted <sup>b</sup>
<b>Level 2 (developmental) regular pathway</b>			
Spring 2022	50	20	44.4
Summer 2022	20	c	c
Fall 2022	120	42	34.7
Spring 2023	20	10	41.7
Across cohorts	212	81	38.2
<b>Level 2 (developmental) intensive pathway</b>			
Spring 2022	20	13	56.5
Summer 2022	30	18	52.9
Fall 2022	30	13	50.0
Spring 2023	20	c	c
Across cohorts	101	52	51.5
<b>Level 3 (developmental) regular pathway</b>			
Spring 2022	30	c	c
Summer 2022	40	20	52.6
Fall 2022	90	42	44.7
Spring 2023	30	16	50.0
Across cohorts	189	87	46.0
<b>Level 3 (developmental) intensive pathway</b>			
Spring 2022	c	c	c
Summer 2022	20	c	c
Fall 2022	20	c	c
Spring 2023	20	c	c
Across cohorts	55	32	58.2
<b>Level 4 (credit bearing) regular pathway</b>			
Spring 2022	c	c	c
Summer 2022	20	c	c
Fall 2022	c	c	c
Spring 2023	c	c	c
Across cohorts	37	16	43.2
<b>Level 4 (credit bearing) intensive pathway</b>			
Spring 2022	c	c	c
Summer 2022	c	c	c
Fall 2022	10	10	76.9
Spring 2023	c	c	c
Across cohorts	30	25	83.3

a. Subsample sizes have been rounded to the nearest 10 so that suppressed data cannot be calculated.

b. Calculated as the number of students in each course pathway placement and in each cohort who persisted to a second year of college, divided by the total number of students in each course pathway placement and cohort, multiplied by 100. These totals do not include students in the summer 2023, fall 2023, and spring 2024 cohorts since they did not have one year of data as of this analysis, or students who initially placed into the credit-bearing course.

c. Data are suppressed because of small sample size ( $n < 10$ ) to protect student anonymity.

Source: Authors' analysis of data from the College of the Marshall Islands.

*Descriptive statistics of students’ English language arts placement test performance and high school grade point average by course level placement eligibility*

This section provides descriptive statistics (means, standard deviation, and range) for students’ performance on the ELA course placement test and cumulative high school GPA by the course level students are eligible to enroll in based on the placement procedures of the College of the Marshall Islands (CMI) (table C12).

**Table C12. Descriptive statistics for components of the English language arts (ELA) placement test and high school grade point average (GPA) for students enrolled for the first time at the College of the Marshall Islands between spring 2022 and spring 2024, by ELA course level placement eligibility**

Score	Level 2 (developmental)		Level 3 (developmental)		Level 4 (credit-bearing)	
	Mean (standard deviation)	Range	Mean (standard deviation)	Range	Mean (standard deviation)	Range
Performance percentile on multiple-choice component of the ELA test ( <i>n</i> = 1,019)	32.28 (22.27)	3.02–99.22	60.00 (24.23)	5.28–99.22	87.40 (12.57)	51.22–99.52
Score on written component of the ELA test ( <i>n</i> = 1,019)	2.02 (0.22)	1–3	2.31 (0.49)	1–4	3.20 (0.40)	3–4
High school GPA ( <i>n</i> = 983)	2.33 (0.35)	0.70–3.80	3.06 (0.48)	1.40–4.00	3.35 (0.42)	2.16–4.00

Source: Authors’ analysis of data from the College of the Marshall Islands.

*Detailed results from item response theory analyses for research question 4*

This section provides model fit statistics, parameter estimates, loadings, and standard errors for the two-parameter bifactor item response theory (IRT) model estimated to answer research question 4 (tables C13 and C14; figures C1–C4).

Model fit statistics were estimated to examine the extent to which the model fit the data. The model fit statistics suggested that the bifactor IRT model fit the data well, with Comparative Fit Index and Tucker Lewis Index values greater than .95 and a root mean square error of approximation value smaller than .05 (see top portion of table C13; Hu & Bentler, 1999; Steiger, 1998). The analysis yielded intercepts for each test item, which indicate the logit value a person with average ELA performance<sup>4</sup> has of answering the item correctly. These intercepts were converted to probabilities. For example, a person with average ELA performance has a 33 percent probability of getting the first test item in the vocabulary domain correct. The analysis also yielded discrimination parameters (slopes) for each test item, which indicate the extent to which the item differentiates between individuals with different levels of ELA performance overall and by domain.

For each item, the analysis also yielded loadings for ELA performance overall and by domain (see table C14 and figures C1 and C2). The loadings are statistical estimates of how much a test item contributes to the measurement of ELA performance overall and by domain. Loadings in bifactor IRT models typically range from 0 to 1 and allow for multidimensional assessment of test item contributions to both performance overall and domain performance. Negative loadings suggest that getting the test item correct is associated with lower ELA performance. Item loadings for ELA performance overall and domain performance are uncorrelated in the bifactor IRT analyses.

Previous research has used a threshold of .6 to indicate a strong loading for overall test performance and .3 to indicate a strong loading for domain performance for bifactor IRT models (Immekus et al., 2019; Reise et al., 2012). Of the 75 test items on the multiple-choice component of the ELA placement test, 46 had ELA performance overall loadings greater than .6, and 29 had loadings that ranged from .34 to .59 (see figure C1).

<sup>4</sup> A statistical estimate of a student’s performance on the multiple-choice component of the ELA course placement test generated by the item response theory (IRT) analyses used for research question 4. Values were centered at 0 in the IRT model and represent standardized scores (z-scores).

**Table C13. Model fit and parameter estimates for the two-parameter bifactor item response theory model, by domain and test item on the multiple-choice component of the College of the Marshall Islands English language arts (ELA) placement test**

Statistic	Model fit statistic		
	Comparative Fit Index	Tucker Lewis Index	Root mean square error of approximation
Bifactor model fit	.99	.99	.02

ELA course placement test domain and item number	Model parameter estimate				
	Intercept (logit)	Probability of getting the item correct for a student of average ELA performance (%)	ELA performance overall slope	Vocabulary slope	Sentence meaning slope
<b>Vocabulary domain</b>					
Vocabulary item 1	-0.71	33	1.57	-0.32	
Vocabulary item 2	0.09	52	0.93	0.11	
Vocabulary item 3	0.51	62	1.27	0.10	
Vocabulary item 4	-0.02	50	1.01	0.06	
Vocabulary item 5	-0.73	33	0.92	-0.07	
Vocabulary item 6	-1.26	22	1.14	0.10	
Vocabulary item 7	2.11	89	0.84	-0.05	
Vocabulary item 8	0.42	60	0.76	-0.17	
Vocabulary item 9	-0.33	42	0.67	0.00	
Vocabulary item 10	1.23	77	1.27	0.06	
Vocabulary item 11	3.35	97	2.14	-0.05	
Vocabulary item 12	1.42	81	1.49	0.09	
Vocabulary item 13	1.63	84	2.14	-0.23	
Vocabulary item 14	3.09	96	1.66	0.17	
Vocabulary item 15	2.10	89	1.97	0.20	
Vocabulary item 16	0.71	67	0.67	0.06	
Vocabulary item 17	0.98	73	1.50	0.31	
Vocabulary item 18	2.25	90	2.10	0.55	
Vocabulary item 19	2.25	90	1.97	0.43	
Vocabulary item 20	0.67	66	1.40	0.06	
Vocabulary item 21	0.76	68	0.77	1.04	
Vocabulary item 22	1.74	85	2.05	1.23	
Vocabulary item 23	3.61	97	2.74	2.41	
Vocabulary item 24	1.69	84	2.10	1.25	
Vocabulary item 25	1.24	78	1.00	0.40	
<b>Language use domain</b>					
Language use item 1	-0.26	44	1.90		-0.22
Language use item 2	1.82	86	1.54		0.03
Language use item 3	0.41	60	1.92		-0.01
Language use item 4	1.50	82	1.61		-0.01
Language use item 5	0.79	69	1.25		-0.03
Language use item 6	0.75	68	0.98		-0.06
Language use item 7	1.69	84	1.56		-0.02
Language use item 8	0.64	65	1.97		-0.05
Language use item 9	-0.33	42	0.86		0.05

ELA course placement test domain and item number	Model parameter estimate				
	Intercept (logit)	Probability of getting the item correct for a student of average ELA performance (%)	ELA performance overall slope	Vocabulary slope	Sentence meaning slope
Language use item 10	3.20	96	2.06		0.11
Language use item 11	0.32	58	1.44		0.19
Language use item 12	0.24	56	0.95		-0.17
Language use item 13	5.06	99	4.38		0.18
Language use item 14	0.98	73	1.10		0.09
Language use item 15	1.67	84	1.21		-0.04
Language use item 16	1.43	81	1.16		0.51
Language use item 17	1.15	76	1.63		0.31
Language use item 18	3.72	98	6.47		8.80
Language use item 19	1.38	80	1.03		0.82
Language use item 20	0.27	57	1.24		0.03
Language use item 21	-0.42	40	1.09		0.07
Language use item 22	0.48	62	1.31		0.06
Language use item 23	1.53	82	1.60		0.06
Language use item 24	2.08	89	1.22		-0.21
Language use item 25	0.88	71	0.62		0.13
<b>Sentence meaning domain</b>					
Sentence meaning item 1	1.35	79	1.68		-0.27
Sentence meaning item 2	1.25	78	1.94		-0.13
Sentence meaning item 3	1.08	75	1.80		-0.23
Sentence meaning item 4	1.39	80	0.95		0.18
Sentence meaning item 5	0.76	68	1.48		-0.08
Sentence meaning item 6	2.37	91	1.28		0.16
Sentence meaning item 7	1.76	85	1.48		0.00
Sentence meaning item 8	2.15	90	1.51		0.41
Sentence meaning item 9	1.22	77	1.28		0.28
Sentence meaning item 10	0.82	69	0.93		0.07
Sentence meaning item 11	-1.09	25	0.74		0.01
Sentence meaning item 12	0.76	68	1.68		-0.07
Sentence meaning item 13	-0.02	50	1.72		0.02
Sentence meaning item 14	0.57	64	1.79		-0.15
Sentence meaning item 15	0.61	65	1.28		0.09
Sentence meaning item 16	1.31	79	1.38		0.44
Sentence meaning item 17	0.17	54	1.07		0.82
Sentence meaning item 18	2.07	89	1.60		0.64
Sentence meaning item 19	0.20	55	1.62		1.66
Sentence meaning item 20	1.15	76	1.85		0.95
Sentence meaning item 21	-0.46	39	0.92		-0.12
Sentence meaning item 22	0.55	63	1.28		-0.06
Sentence meaning item 23	-0.33	42	1.46		0.29
Sentence meaning item 24	0.59	64	1.94		0.02
Sentence meaning item 25	1.05	74	1.37		-0.13

Note:  $n = 1,098$ . The probability of getting the item correct for a student of average ELA performance was calculated by taking the reciprocal of  $e$  to the power of the negative intercept value, plus 1.

Source: Authors' analysis of data from the College of the Marshall Islands.

Within ELA domains, item loadings were more varied (see table C 14). For the vocabulary domain, 6 of the 25 test items had negative loadings, suggesting that getting those questions correct negatively predicted students' vocabulary performance. Only four vocabulary domain test items had loadings of .3 or greater (see figure C2). Of the 25 language use test item loadings, 10 were negative, and only 2 had loadings of .3 or larger. Of the 25 sentence meaning test item loadings, 9 were negative and only 3 had loadings of .3 or greater.

**Table C14. Loadings generated by the bifactor item response theory model for English language arts (ELA) performance overall and by domain on the multiple-choice component of the College of the Marshall Islands ELA course placement test, by ELA course placement test domain and test item**

ELA course placement test domain and item number	ELA performance overall loading	ELA domain performance loading
<b>Vocabulary domain</b>		
Vocabulary item 1	.67 <sup>a</sup>	-.14
Vocabulary item 2	.48	.06
Vocabulary item 3	.60 <sup>a</sup>	.05
Vocabulary item 4	.51	.03
Vocabulary item 5	.48	-.04
Vocabulary item 6	.56	.05
Vocabulary item 7	.44	-.03
Vocabulary item 8	.41	-.09
Vocabulary item 9	.37	.00
Vocabulary item 10	.60 <sup>a</sup>	.03
Vocabulary item 11	.78 <sup>a</sup>	-.02
Vocabulary item 12	.66 <sup>a</sup>	.04
Vocabulary item 13	.78 <sup>a</sup>	-.08
Vocabulary item 14	.70 <sup>a</sup>	.07
Vocabulary item 15	.76 <sup>a</sup>	.08
Vocabulary item 16	.37	.03
Vocabulary item 17	.66 <sup>a</sup>	.14
Vocabulary item 18	.76 <sup>a</sup>	.20
Vocabulary item 19	.75 <sup>a</sup>	.16
Vocabulary item 20	.64 <sup>a</sup>	.03
Vocabulary item 21	.36	.48 <sup>b</sup>
Vocabulary item 22	.70 <sup>a</sup>	.42 <sup>b</sup>
Vocabulary item 23	.68 <sup>a</sup>	.60 <sup>b</sup>
Vocabulary item 24	.71 <sup>a</sup>	.42 <sup>b</sup>
Vocabulary item 25	.50	.20
<b>Language use domain</b>		
Language use item 1	.74 <sup>a</sup>	-.09
Language use item 2	.67 <sup>a</sup>	.01
Language use item 3	.75 <sup>a</sup>	.00
Language use item 4	.69 <sup>a</sup>	-.01
Language use item 5	.59	-.02
Language use item 6	.50	-.03
Language use item 7	.68 <sup>a</sup>	-.01
Language use item 8	.76 <sup>a</sup>	-.02
Language use item 9	.45	.03
Language use item 10	.77 <sup>a</sup>	.04
Language use item 11	.64 <sup>a</sup>	.08
Language use item 12	.49	-.09
Language use item 13	.93 <sup>a</sup>	.04

ELA course placement test domain and item number	ELA performance overall loading	ELA domain performance loading
Language use item 14	.54	.04
Language use item 15	.58	-.02
Language use item 16	.55	.24
Language use item 17	.69 <sup>a</sup>	.13
Language use item 18	.59	.80 <sup>b</sup>
Language use item 19	.48	.38 <sup>b</sup>
Language use item 20	.59	.01
Language use item 21	.54	.03
Language use item 22	.61 <sup>a</sup>	.03
Language use item 23	.68 <sup>a</sup>	.03
Language use item 24	.58	-.10
Language use item 25	.34	.07
<b>Sentence meaning domain</b>		
Sentence meaning item 1	.70 <sup>a</sup>	-.11
Sentence meaning item 2	.75 <sup>a</sup>	-.05
Sentence meaning item 3	.72 <sup>a</sup>	-.09
Sentence meaning item 4	.49	.09
Sentence meaning item 5	.66 <sup>a</sup>	-.04
Sentence meaning item 6	.60 <sup>a</sup>	.07
Sentence meaning item 7	.66 <sup>a</sup>	.00
Sentence meaning item 8	.65 <sup>a</sup>	.18
Sentence meaning item 9	.60 <sup>a</sup>	.13
Sentence meaning item 10	.48	.04
Sentence meaning item 11	.40	.01
Sentence meaning item 12	.70 <sup>a</sup>	-.03
Sentence meaning item 13	.71 <sup>a</sup>	.01
Sentence meaning item 14	.72 <sup>a</sup>	-.06
Sentence meaning item 15	.60 <sup>a</sup>	.04
Sentence meaning item 16	.62 <sup>a</sup>	.20
Sentence meaning item 17	.49	.38 <sup>b</sup>
Sentence meaning item 18	.66 <sup>a</sup>	.26
Sentence meaning item 19	.56	.58 <sup>b</sup>
Sentence meaning item 20	.69 <sup>a</sup>	.35 <sup>b</sup>
Sentence meaning item 21	.47	-.06
Sentence meaning item 22	.60 <sup>a</sup>	-.03
Sentence meaning item 23	.65 <sup>a</sup>	.13
Sentence meaning item 24	.75 <sup>a</sup>	.01
Sentence meaning item 25	.63 <sup>a</sup>	-.06

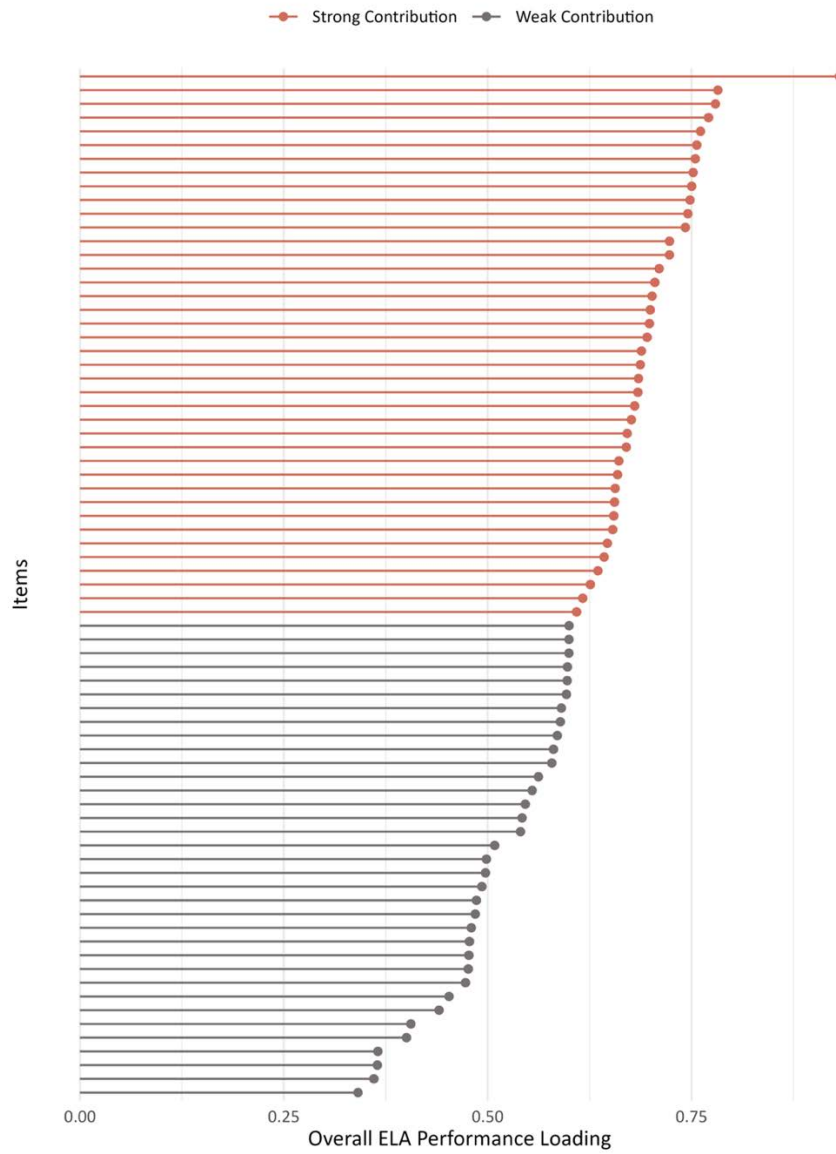
Note:  $n = 1,098$ . Each item had only one domain-level loading.

a. Indicates a strong loading ( $\geq .6$ ) on ELA performance overall.

b. Indicates a meaningful loading ( $\geq .3$ ) on ELA domain performance.

Source: Authors' analysis of data from the College of the Marshall Islands.

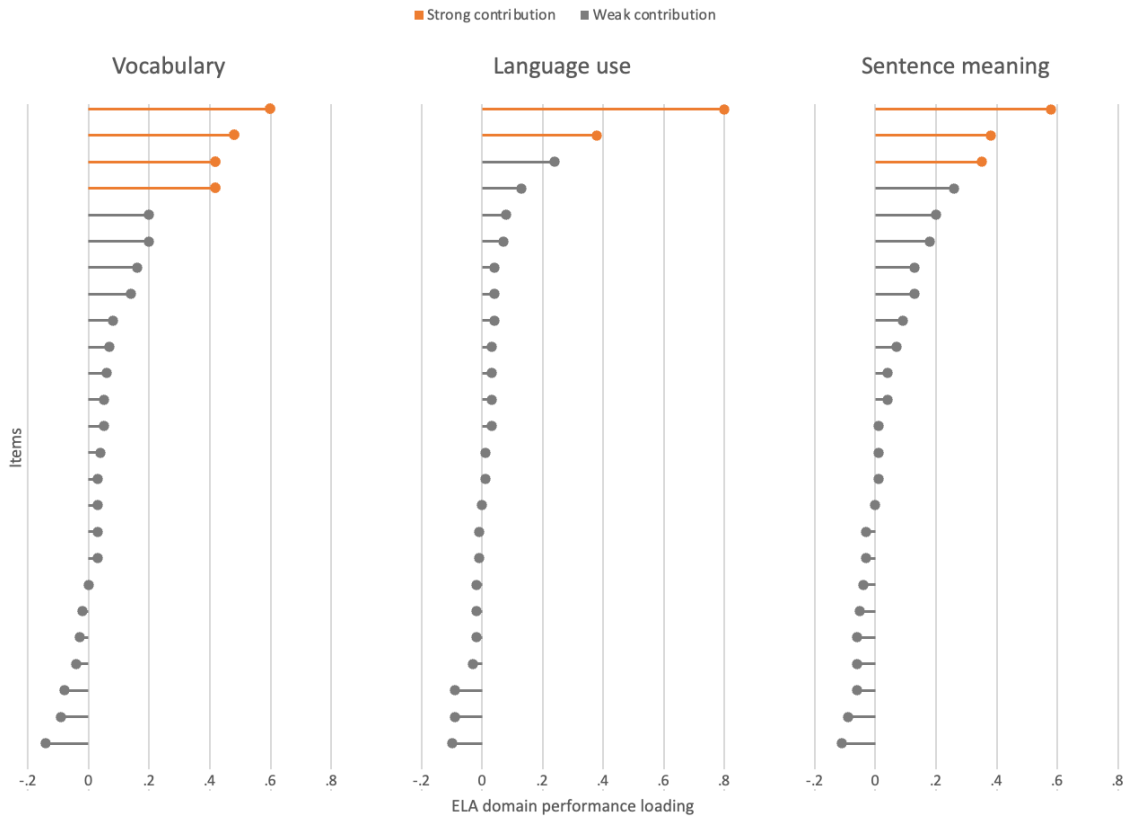
**Figure C1. Of 75 items on the multiple-choice component of the College of the Marshall Islands English language arts (ELA) placement test, 46 made strong contributions to ELA performance overall**



Note: Strong contribution for overall English language arts performance loadings is .6 or higher. A threshold of 16 was used to represent high measurement precision (the point at which the test has high certainty) around estimates of ELA performance.

Source: Authors' analysis of data from the College of the Marshall Islands.

**Figure C2. Few items on the multiple-choice component of the College of the Marshall Islands English language arts (ELA) placement test made strong contribution to students' ELA domain performance independent of their ELA performance overall**

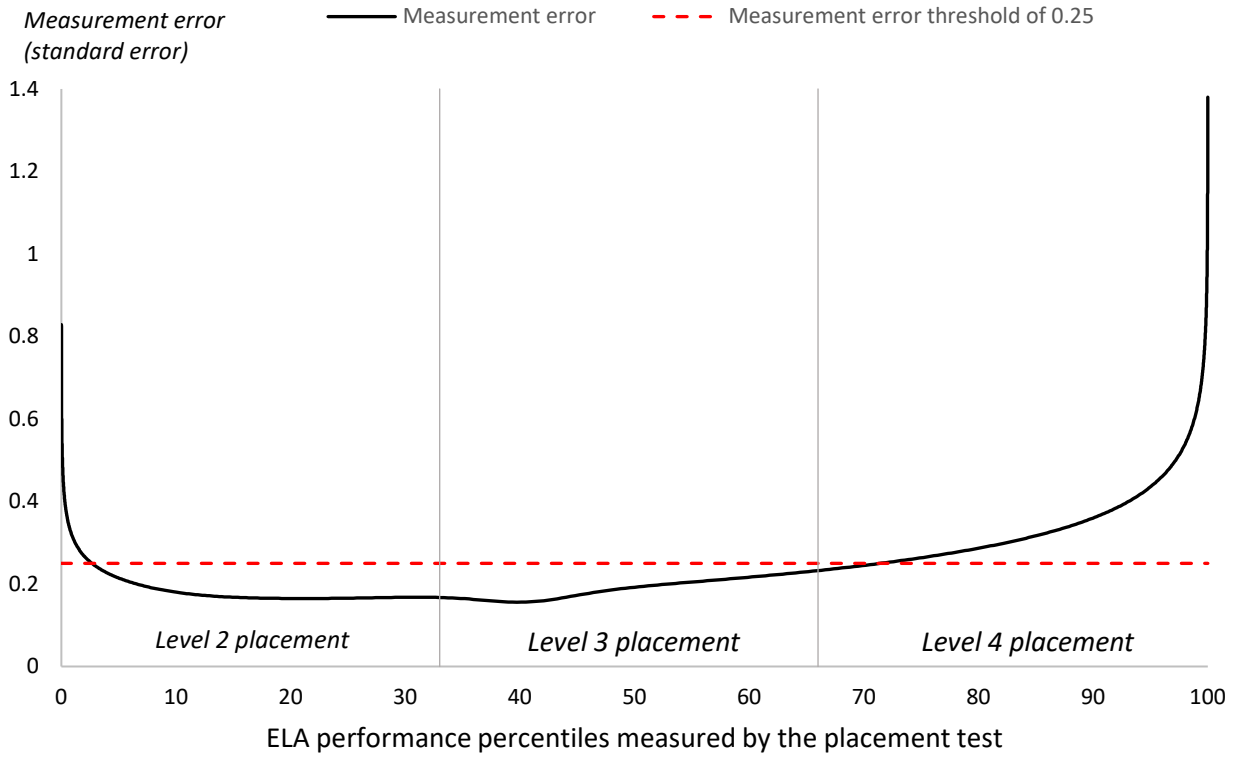


Note: Strong contribution for domain-level performance loadings is .3 or higher.  
 Source: Authors' analysis of data from the College of the Marshall Islands.

The bifactor model also yielded standard errors of measurement across levels of student ELA performance. Standard errors of measurement represent the amount of uncertainty (error) in the estimation of a student's ELA performance. Low standard errors of measurement indicate high measurement precision (the point at which the test has high certainty, represented by a threshold of 16). There are no universally agreed on thresholds for a low standard error of measurement, but research standards suggest that they should be very low for tests used to make important decisions (American Educational Research Association et al., 2014).

The study team determined that standard errors of measurement under 0.25 (which corresponds to a measurement precision value of 16) would be considered low measurement error. Based on this threshold, the placement test had low measurement error for students who demonstrated low to above average ELA performance (see figures C3 and C4). Specifically, the standard error of measurement was below 0.25 for ELA performance percentiles (ranging from 3 to 66) that would place a student into developmental (Level 2 or Level 3) courses. The placement test had higher measurement error for ELA performance percentiles that would place a student into credit-bearing (Level 4) courses. Specifically, the standard error of measurement ranged from 0.25 to 1.38 for students whose performance was in the 72nd to 100th percentiles.

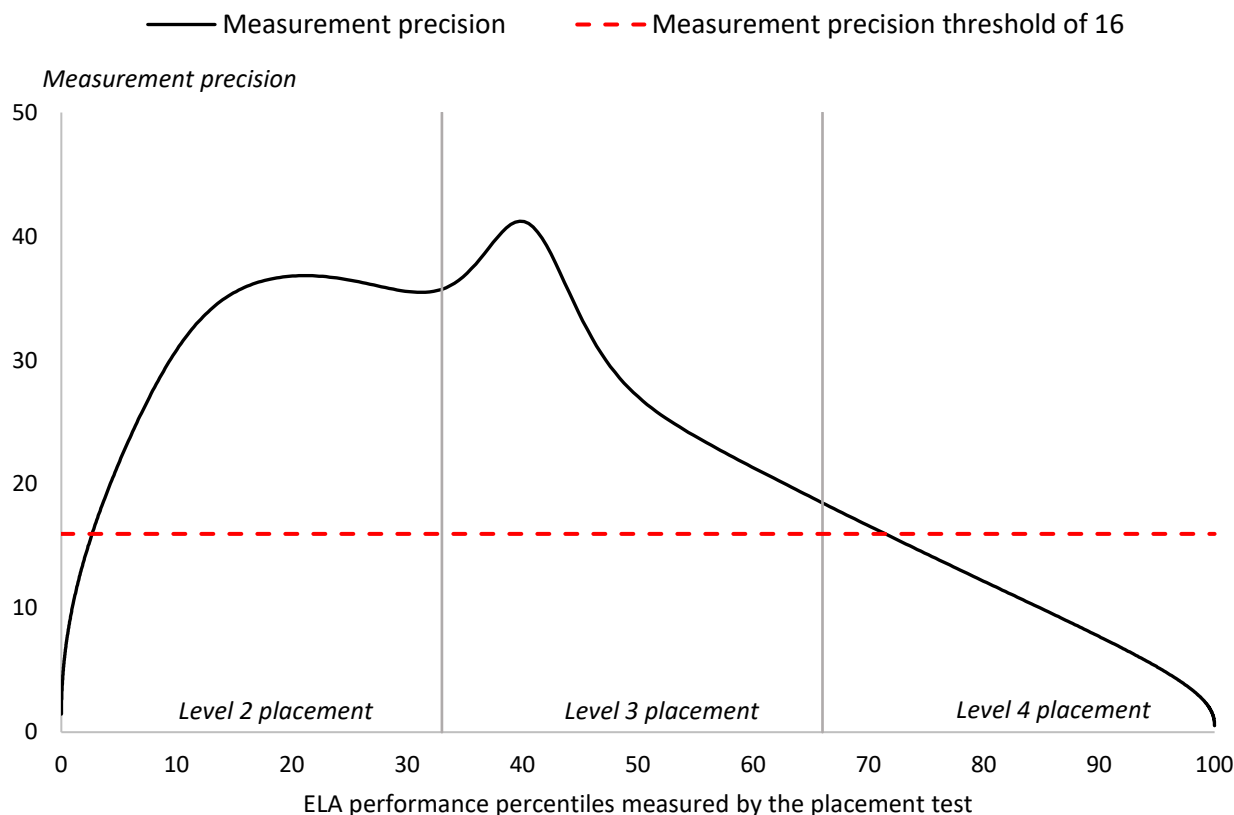
**Figure C3. The College of the Marshall Islands English language arts (ELA) placement test had low measurement error for students who would place into developmental ELA courses**



Note: Courses in Levels 2 and 3 are developmental, and courses in Level 4 are credit bearing.

Source: Authors' analysis of data from the College of the Marshall Islands.

**Figure C4. The College of the Marshall Islands English language arts (ELA) placement test more accurately measured ELA performance for students who would place into developmental ELA courses than for students who would place into credit-bearing courses**



Note: Courses in Levels 2 and 3 are developmental, and courses in Level 4 are credit bearing. The curve illustrates how precise the ELA course placement test is at different levels of students' ELA ability. High measurement precision for the study was defined as values of 16 or higher, which corresponds to a standard error of 0.25 or lower.

Source: Authors' analysis of data from the College of the Marshall Islands.

### *Detailed results from analyses for research question 5*

This section provides the coefficients, standard errors, *p*-values, and odds ratios for the logistic regression analyses examining student ELA performance measures—both components of the CMI ELA course placement test, high school GPA, and type of high school attended—as predictors of the likelihood of passing the credit-bearing courses after student cohort effects are accounted for (tables C15 and C16).

For continuous predictors, the unstandardized coefficient reflects the expected change in the log odds of passing the credit-bearing courses corresponding to a 1-unit increase in the predictor of interest, with other predictors in the model held constant. The standardized coefficient reflects the expected change in the log odds of passing the credit-bearing courses corresponding to a 1 standard deviation increase in the predictor of interest, with other predictors in the model held constant. The odds ratio reflects how a 1-unit increase in the predictor of interest corresponds to a change in the likelihood of passing the credit-bearing courses. For example, for a 1-unit increase in a student's performance on the multiple-choice component of the ELA course placement test, a student's log odds increase by 0.62 for passing English 105 (see table C15) and by 0.57 for passing English 111 (see table C16), while a student's odds ratio increases by 1.85 for passing English 105 and by 1.77 for passing English 111, with other predictors in the model held constant.

For categorical predictors, the unstandardized coefficient reflects the expected change in the log odds of passing the credit-bearing courses associated with having a particular characteristic, relative to a reference group, for that

predictor. Thus, the odds ratio reflects changes in the likelihood of passing the credit-bearing courses associated with having that particular characteristic, relative to a reference group, for that predictor. For example, graduating from an RMI public high school is associated with a 1.05 decrease in the log odds of passing English 105 (see table C15) and a 0.66 decrease in the log odds of passing English 111 (see table C16) compared with students who graduated from non-RMI high schools, with the other predictors in the model held constant.

**Table C15. Estimated coefficients, statistical significance, and odds ratios of the logistic regression results for student performance on both components of the English language arts (ELA) placement test, high school grade point average (GPA), and high school type predicting the log odds of passing English 105 after student cohort effects are accounted for**

Variable	Unstandardized coefficient		Standardized coefficient		Statistical significance		Odds ratio	
	<i>b</i>	Standard error ( <i>b</i> )	<i>B</i>	95 Percent confidence interval	<i>z</i> -score	<i>p</i>	Odds ratio	95 percent confidence interval
Intercept	-0.12	1.04			-0.11	.911	0.89	[0.12, 7.09]
ELA performance***	0.62	0.18	1.13	[0.48, 1.80]	3.37	.001	1.85	[1.30, 2.68]
ELA writing test score	-0.41	0.25	-0.52	[-1.14, 0.09]	-1.66	.097	0.66	[0.40, 1.07]
High school GPA***	0.93	0.25	1.06	[0.50, 1.64]	3.64	<.001	2.53	[1.55, 4.21]
High school type (compared with non–Republic of the Marshall Islands [RMI] high schools)								
High school equivalence	-1.05	0.69			-1.54	.124	0.35	[0.09, 1.31]
RMI private high school	-0.09	0.53			-0.17	.864	0.91	[0.31, 2.52]
RMI public high school*	-1.05	0.52			-2.01	.045	0.35	[0.12, 0.94]
Cohort (compared with the spring 2022 cohort)								
Summer 2022**	-1.47	0.47			-3.11	.002	0.23	[0.09, 0.57]
Fall 2022	-0.34	0.47			-0.72	.470	0.71	[0.28, 1.76]
Spring 2023	0.12	0.59			0.20	.842	1.12	[0.36, 3.63]
Summer 2023*	-1.52	0.62			-2.46	.014	0.22	[0.06, 0.72]
Fall 2023	-0.32	0.47			-0.67	.503	0.73	[0.28, 1.82]
Spring 2024	-1.02	0.55			-1.84	.065	0.36	[0.12, 1.06]

\* Significant at  $p < 0.05$ ; \*\* significant at  $p < 0.01$ ; \*\*\* significant at  $p < 0.001$ .

Note:  $n = 381$ . ELA performance is a statistical estimate of a student’s performance on the multiple-choice component of the ELA course placement test generated by the item response theory analyses. These analyses yielded  $z$ -scores that were continuous and that followed a standard normal distribution, centered at 0 and generally ranging from -4 to 4.

Source: Authors’ analysis of data from the College of the Marshall Islands.

**Table C16. Estimated coefficients, statistical significance, and odds ratios of the logistic regression results for student performance on both components of the English language arts (ELA) placement test, high school grade point average (GPA), and high school type predicting the log odds of passing English 111 after student cohort effects are accounted for**

Variable	Unstandardized coefficient		Standardized coefficient		Statistical significance		Odds ratio	
	<i>b</i>	Standard error ( <i>b</i> )	$\beta$	95 percent confidence interval	<i>z</i> -score	<i>p</i>	Odds ratio	95 percent confidence interval
Intercept	-1.84	0.98			-1.87	.062	0.16	[0.02,1.10]
ELA performance***	0.57	0.17	0.52	[0.22, 0.83]	3.31	<.001	1.77	[1.27,2.50]
ELA writing test score	0.01	0.23	<0.01	[-0.28, 0.29]	0.03	0.978	1.01	[0.64,1.59]
High school GPA***	0.88	0.23	0.49	[0.27, 0.76]	3.76	<.001	2.40	[1.53,3.82]
High school type (compared with non–Republic of the Marshall Islands [RMI] high schools)								
High school equivalence	-0.47	0.66			-0.71	.476	0.62	[0.16,2.25]
RMI private high school	-0.10	0.48			-0.22	.828	0.90	[0.35,2.25]
RMI public high school	-0.66	0.48			-1.38	.166	0.52	[0.20,1.29]
Cohort (compared with the spring 2022 cohort)								
Summer 2022	-0.68	0.46			-1.47	.140	0.51	[0.20,1.24]
Fall 2022	-0.15	0.45			-0.34	.732	0.86	[0.35,2.06]
Spring 2023	-0.50	0.53			-0.93	.352	0.61	[0.21,1.72]
Summer 2023	-0.74	0.60			-1.24	.216	0.48	[0.14,1.54]
Fall 2023	-0.40	0.46			-0.88	.380	0.67	[0.27,1.63]
Spring 2024	-0.75	0.55			-1.36	.176	0.48	[0.16,1.39]

\*\*\* significant at  $p < .001$ .

Note:  $n = 383$ . ELA performance is a statistical estimate of a student’s performance on the multiple-choice component of the ELA course placement test generated by the item response theory analyses. These analyses yielded  $z$ -scores that were continuous and that followed a standard normal distribution, centered at 0 and generally ranging from -4 to 4.

Source: Authors’ analysis of data from the College of the Marshall Islands.

Tables C17 and C18 present the results of the marginal means for the logistic regression analyses examining student ELA performance, as measured by predictors of the likelihood of passing the credit-bearing courses (ELA course placement test, high school GPA, and type of high school attended), after student cohort effects are accounted for. The marginal means represent the probability of the outcome occurring at specified levels of the predictor after other predictors in the model are accounted for. For example, a student with a high school GPA of 2.00 is predicted to have a 48 percent probability of passing English 105 (see table C17) and a 39 percent probability of passing English 111 (see table C18) after ELA test performance is accounted for and averaged across types of high school attended and cohorts.

**Table C17. Estimated marginal means of the logistic regression results for student English language arts (ELA) placement test performance, high school grade point average (GPA), and high school type predicting the log odds of passing English 105 after student cohort effects are accounted for**

Variable	Predicted probability of passing	Standard error (effect)
<b>ELA performance percentile</b>		
0	11	0.09
10	40	0.10
20	47	0.09
30	52	0.08
40	56	0.07
50	60	0.06
60	63	0.05
70	67	0.05
80	71	0.04
90	77	0.04
100	95	0.03
<b>ELA writing test score</b>		
1	81	0.07
2	74	0.05
3	65	0.05
4	55	0.10
<b>High school GPA</b>		
0.00	13	0.08
1.00	27	0.09
2.00	48	0.07
3.00	70	0.04
4.00	85	0.05
<b>High school type</b>		
Non–Republic of the Marshall Islands (RMI) high school	80	0.08
RMI high school equivalence	58	0.13
RMI private high school	78	0.05
RMI public high school	58	0.04
<b>Cohort</b>		
Spring 2022	81	0.06
Summer 2022	50	0.07
Fall 2022	75	0.06
Spring 2023	83	0.07
Summer 2023	49	0.12
Fall 2023	76	0.06
Spring 2024	61	0.10

Note:  $n = 381$ .

Source: Authors' analysis of data from the College of the Marshall Islands.

**Table C18. Estimated marginal means of the logistic regression results for student English language arts (ELA) placement test performance, high school grade point average (GPA), and high school type predicting the log odds of passing English 111 after student cohort effects are accounted for**

Variable	Predicted probability of passing	Standard error (effect)
<b>ELA performance percentile</b>		
0	9	0.07
10	33	0.09
20	39	0.08
30	43	0.07
40	47	0.06
50	51	0.06
60	54	0.05
70	58	0.05
80	62	0.04
90	68	0.05
100	91	0.05
<b>ELA writing test score</b>		
1.00	60	0.10
2.00	60	0.06
3.00	60	0.05
4.00	60	0.09
<b>High school GPA</b>		
0.00	10	0.06
1.00	21	0.07
2.00	39	0.06
3.00	60	0.05
4.00	79	0.06
<b>High school type</b>		
Non–Republic of the Marshall Islands (RMI) high school	67	0.09
RMI high school equivalence	56	0.13
RMI private high school	65	0.06
RMI public high school	51	0.04
<b>Cohort</b>		
Spring 2022	70	0.08
Summer 2022	55	0.07
Fall 2022	67	0.06
Spring 2023	59	0.09
Summer 2023	53	0.12
Fall 2023	61	0.07
Spring 2024	53	0.11

Note:  $n = 381$ .

Source: Authors' analysis of data from the College of the Marshall Islands.

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## Appendix D. Supplemental analyses

This appendix presents the results of the findings of a supplemental logistics regression analysis.

The study team conducted a supplemental logistics regression that included students' performance on the multiple-choice component of the English language arts (ELA) placement test, cumulative high school grade point average (GPA), and type of high school attended as predictors of the likelihood of passing the credit-bearing courses after cohort effects are accounted for. These analyses differ from the analyses conducted for research question 5 in that they do not include test scores on the writing component of the ELA placement test as a predictor (see tables C15 and C16 in appendix C). This section provides the coefficients, standard errors, *p*-values, and odds ratios for these analyses (tables D1 and D2).

For continuous predictors, the unstandardized coefficient reflects the expected change in the log odds of passing the credit-bearing courses corresponding to a 1-unit increase in the predictor of interest, with other predictors in the model held constant. The standardized coefficient reflects the expected change in the log odds of passing the credit-bearing courses corresponding to a 1 standard deviation increase in the predictor of interest, with other predictors in the model held constant. To obtain standardized coefficients, the study team reran the regression analyses with *z*-score transformations of the continuous predictor variables (student ELA performance<sup>5</sup> and high school GPA). The odds ratio reflects how a 1-unit increase in the predictor of interest corresponds to a change in the likelihood of passing the credit-bearing courses. For example, for a 1-unit increase in a student's performance on the multiple-choice component of the ELA course placement test, a student's log odds increase by 0.47 for passing English 105 (see table D1) and by 0.57 for passing English 111 (see table D2), while a student's odds ratio increases by 1.61 for passing English 105 and by 1.77 for passing English 111, with the other predictors in the model held constant.

For categorical predictors, the unstandardized coefficient reflects the expected change in the log odds of passing the credit-bearing courses associated with having a particular characteristic, relative to a reference group, for that predictor. Thus, the odds ratio reflects how the likelihood of passing the credit-bearing courses changes associated with having a particular characteristic, relative to a reference group, for that predictor. For example, graduating from a Republic of the Marshall Islands (RMI) public high school is associated with a 0.93 decrease in the log odds of passing English 105 (see table D1) and a 0.66 decrease in the log odds of passing English 111 (see table D2) compared with students who graduated from non-RMI high schools, with the other predictors in the model held constant.

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<sup>5</sup> A statistical estimate of a student's performance on the multiple-choice component of the ELA course placement test generated by the item response theory (IRT) analyses used for research question 4. Values were centered at 0 in the IRT model and represent standardized scores (*z*-scores).

**Table D1. Estimated coefficients, statistical significance, and odds ratios of the logistic regression results for student performance on the multiple-choice component of the English language arts (ELA) placement test, high school grade point average (GPA), and high school type predicting the log odds of passing English 105 after student cohort effects are accounted for**

Variable	Unstandardized coefficient		Standardized coefficient		Statistical significance		Odds ratio	
	<i>b</i>	Standard error ( <i>b</i> )	$\beta$	Standard error ( $\beta$ )	Wald $\chi^2$	<i>p</i>	Odds ratio	95 percent confidence interval
Intercept	-1.20	0.81			-1.48	.139	0.30	[0.06,1.51]
ELA performance**	0.47	0.16	0.43	0.15	2.98	.003	1.61	[1.18,2.21]
High school GPA***	0.90	0.25	0.51	0.14	3.56	<.001	2.45	[1.51,4.05]
High school type (compared with non–Republic of the Marshall Islands [RMI] high schools)								
High school equivalence	-0.93	0.68			-1.37	.170	0.39	[0.10,1.46]
RMI private high school	-0.02	0.53			-0.04	.966	0.98	[0.33,2.68]
RMI public high school	-0.93	0.52			-1.80	.072	0.39	[0.13,1.05]
Cohort (compared with the spring 2022 cohort)								
Summer 2022**	-1.30	0.46			-2.82	.005	0.27	[0.11,0.66]
Fall 2022	-0.16	0.46			-0.35	.728	0.85	[0.34,2.06]
Spring 2023	0.27	0.58			0.47	.639	1.31	[0.43,4.17]
Summer 2023*	-1.36	0.61			-2.24	.025	0.26	[0.08,0.83]
Fall 2023	-0.26	0.47			-0.55	.584	0.77	[0.30,1.93]
Spring 2024	-0.97	0.55			-1.74	.081	0.38	[0.13,1.12]

\* Significant at  $p < .05$ ; \*\* significant at  $p < .01$ ; \*\*\* significant at  $p < .001$ .

Note:  $n = 381$ . This analysis excludes student performance on the writing test component of the ELA course placement test (see table C15 for comparison). ELA performance is a statistical estimate of a student's performance on the multiple-choice component of the ELA course placement test generated by the item response theory analyses. These analyses yielded  $z$ -scores that were continuous and that followed a standard normal distribution, centered at 0 and generally ranging from -4 to 4.

Source: Authors' analysis of data from the College of the Marshall Islands.

**Table D2. Estimated coefficients, statistical significance, and odds ratios of the logistic regression results for student performance on the multiple-choice component of the English language arts (ELA) placement test, high school grade point average (GPA), and high school type predicting the log odds of passing English 111 after student cohort effects are accounted for**

Variable	Unstandardized coefficients		Standardized coefficients		Statistical significance		Odds ratios	
	<i>b</i>	Standard error ( <i>b</i> )	$\beta$	Standard error ( $\beta$ )	Wald $\chi^2$	<i>p</i>	Odds ratio	95 percent confidence interval
Intercept*	-1.82	0.77			-2.37	.018	0.16	[0.04,0.73]
ELA performance***	0.57	0.15	0.52	0.14	3.80	.000	1.77	[1.33,2.40]
High school GPA***	0.88	0.23	0.50	0.13	3.77	.000	2.40	[1.53,3.82]
High school type (compared with non–Republic of the Marshall Islands [RMI] high schools)								
High school equivalence	-0.48	0.66			-0.72	.472	0.62	[0.16,2.24]
RMI private high school	-0.10	0.47			-0.22	.826	0.90	[0.35,2.24]
RMI public high school	-0.66	0.47			-1.40	.163	0.52	[0.20,1.28]
Cohort (compared with the spring 2022 cohort)								
Summer 2022	-0.68	0.45			-1.51	.130	0.51	[0.21,1.21]
Fall 2022	-0.16	0.44			-0.36	.721	0.86	[0.36,2.00]
Spring 2023	-0.50	0.52			-0.95	.342	0.61	[0.21,1.69]
Summer 2023	-0.75	0.60			-1.25	.211	0.48	[0.15,1.52]
Fall 2023	-0.40	0.46			-0.88	.378	0.67	[0.27,1.62]
Spring 2024	-0.75	0.55			-1.36	.175	0.47	[0.16,1.39]

\* Significant at  $p < .05$ ; \*\*\* significant at  $p < .001$ .

Note:  $n = 383$ . This analysis excludes student performance on the writing test component of the ELA course placement test (see table C16 for comparison). ELA performance is a statistical estimate of a student's performance on the multiple-choice component of the ELA course placement test generated by the item response theory analyses. These analyses yielded  $z$ -scores that were continuous and that followed a standard normal distribution, centered at 0 and generally ranging from -4 to 4.

Source: Authors' analysis of data from the College of the Marshall Islands.