



Gaining Momentum

Refining Corequisite Learning Support
to Boost Student Success
in the First Year and Beyond

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tbr | THE COLLEGE SYSTEM
of TENNESSEE



Photo: Roane State Community College 2019

3 SUMMARY

5 BUILDING MOMENTUM

- 6 Introduction
 - 7 A History of Reform
-

8 REFINING LEARNING SUPPORT

- 10 Improving Gateway Course Completion in Math, Reading, & Writing
 - 25 Promoting Access & Success Through Accuracy in Learning Support Placement
 - 41 Supporting Institutional Innovation & Autonomy
 - 62 Closing Equity Gaps in Retention & Graduation
-

70 GAINING MOMENTUM

- 71 Boosting Student Success in the First Year and Beyond
 - 74 List of Tables & Figures
-



Gaining Momentum

Refining Learning Support to Boost Student Success in the First Year and Beyond

Over the last decade, community colleges in Tennessee have reimagined remediation.

More than half of first-time students at Tennessee community colleges require remediation upon enrolling. Colleges provide these students with *learning support* in key gateway courses. To meet the needs of each student, Tennessee community colleges have led the way in implementing innovative strategies that provide students with timely, effective support. In 2015, TBR became the first college system in the nation to implement a *corequisite* model statewide. Through this reform, *every student* can access college-level courses during their first term of enrollment, while still receiving the additional support they need.

In Gaining Momentum, TBR seeks to build upon the momentum of a decade of successful reforms. The goal is to use data to refine learning support and boost student success in the first year and beyond.

Key Findings



Gateway course completion rates have doubled since corequisite reforms launched.

After the introduction of corequisite learning support in 2015, the proportion of students who completed gateway math, reading, and writing courses in their first year increased significantly. However, corequisite learning support had an uneven impact across colleges, and equity gaps have persisted.



Increased accuracy in learning support placement could boost student success.

Corequisite reforms reframed the stakes of learning support placement. However, research findings suggest that existing placement metrics may not accurately identify which students would benefit from learning support. Adding new placement metrics, like high school GPA, could increase accuracy in learning support placement.



Colleges have experimented with innovative & effective learning support models.

Each college has adapted the corequisite model to meet the needs of their students. Many colleges have developed innovative, effective models. Some colleges have built clear connections between college-level courses and paired learning support courses through learning communities or other techniques. These innovative models could be scaled systemwide to boost student success.



Equity gaps persist for Black & low-income students across the system.

Corequisite reform efforts have led to increased success for all students. However, corequisite reforms have not closed critical equity gaps. Low-income and Black learning support students completed gateway courses at lower rates, persisted at lower rates, and graduated at lower rates than other learning support students, even after the introduction of corequisite learning support.



BUILDING MOMENTUM

Learning Support Reform

INTRODUCTION

Over the last decade, community colleges in Tennessee have reimagined remediation.

More than half of first-time students at Tennessee community colleges require remediation, or *additional learning support*, upon enrolling. However, community colleges in Tennessee have led the way in implementing innovative strategies to address students' levels of academic preparation.

First, through SAILS ([Seamless Alignment and Integrated Learning Support](#)), Tennessee shifted the timing of learning support by introducing a remedial math curriculum in the high school senior year. Next, colleges implemented a series of guided pathways and advising reforms that promote first-year momentum ([Jenkins, et al., 2018](#)). Lastly, through *corequisite learning support*, all students can enroll in college-level coursework in their first year.

These efforts helped students build early momentum toward success.

Students who complete college-level general education courses, or *gateway courses*, during their first year are more likely to persist and graduate. Since 2010, the proportion of first-time college students who pass gateway math and English courses in their first year has more than doubled, and three-year graduation rates have increased from 14% to 26%.

However, more work must be done to help each student find success.

Despite the clear gains made by these reforms, gaps persist for Black students and low-income students. Recent research shows that existing efforts alone may be insufficient to improve success ([Ran & Lin, 2019](#)).

Over the past decade, Tennessee's community colleges have sharpened their focus on promoting student success and closing equity gaps. Now, Tennessee can refine these efforts by identifying the next wave of strategies to promote student success.

Through research, this project seeks to develop a body of actionable information about how to refine learning support, close equity gaps, and promote strong momentum toward success for students in their first year of enrollment.

The goal of this effort is to develop a deep understanding of how colleges have implemented corequisite learning support reforms, identify promising learning support innovations from community colleges across the state, and identify refinements to policy and practice that would promote student success in the first year and beyond.

About Strong Start to Finish

The Education Commission of the States selected TBR as a *Strategy Site* for advancing the work of the **Strong Start to Finish (SSTF)** project. The SSTF project seeks to increase the number and proportion of low-income students, students of color, and returning adults who succeed in college math and English in their first year.

While reform in Tennessee community colleges has led to substantial increases in student success, data also highlights areas for growth. As part of the SSTF project, TBR analyzed campus learning support practices and outcomes. This work helped the system learn more about how corequisite learning support was implemented and where it can be improved, especially for Black students and low-income students.



A HISTORY OF REFORM

Over the past decade, Tennessee community colleges have significantly reformed the delivery of learning support. However, efforts to implement innovative learning support practices have been part of Tennessee's history for nearly four decades.

TBR implemented remediation as a result of the Comprehensive Education Reform Act of 1984, which required that college-level work be based upon minimum standards for preparation. In response to this legislation, TBR colleges created a program of developmental studies that included systemwide assessment procedures and mandatory design features (Bader & Hardin, 2002). The guidelines that were outlined in 1984 still serve as the foundation for modern learning support policy (TBR, 2019a).

Remediation in Tennessee was significantly shaped by *Geier v. Tennessee*, a suit that sought to desegregate public higher education in the state. The initial 1984 Stipulation of Settlement in the *Geier* case required colleges to establish remedial courses to support students admitted under "alternative standards" (Geier v. Alexander, 1984).

However, by the early 2000s, it was clear that remediation needed reform: 74% of students enrolling at community colleges required learning support, costing the state \$25 million a year and delaying graduation (Berryman & Short, 2010). What followed was a reimagining of learning support which was fueled by other policy reforms.

Developmental studies were redesigned.

Starting in 2006, six TBR institutions piloted reforms through the Developmental Studies Redesign initiative (Crandall & Soares, 2015). Austin Peay State University's "just-in-time" model stood out; the university eliminated prerequisite remediation courses and enrolled students into credit-bearing, college-level courses alongside remediation. This model would become the inspiration for TBR's corequisite initiative.

Tennessee invested in higher education.

Innovation in learning support was supported by a larger commitment from the state to invest in higher education. In 2010, the state adopted the Complete College Tennessee Act (CCTA), which aimed to increase student success and degree completion and created an outcomes-based funding formula (CCTA, 2010). Additionally, in 2012, TBR colleges piloted the [Seamless Alignment and Integrated Learning Support \(SAILS\)](#) program, which brought the learning support curriculum to high school seniors who had not yet achieved college-readiness benchmarks.

Corequisite reforms were implemented.

With promising results from the Developmental Studies Redesign and increased state support, TBR embarked on a redesign of learning support.

Corequisite Learning Support Pilots

During the 2014-2015 academic year, community colleges implemented corequisite learning support pilots. Rather than enrolling in prerequisite learning support courses, some students were enrolled in college-level gateway courses alongside a simultaneous corequisite learning support course. These learning support courses offered up to three credit hours of support to help students develop the skills needed to complete the gateway courses.

Scaling Corequisite Learning Support

With successful results from the pilots, Tennessee moved to scale corequisite learning support statewide. The 2015 changes to the learning support policy made TBR the first college system in the nation to implement a corequisite model statewide. The policy allowed colleges to customize the model based on their unique institutional context, refining and adapting the model to best suit their needs (TBR, 2019a).



A History of Reform

60% of students (including 74% of community college students) required developmental education, costing the state \$25 million a year and students \$1,300 to \$4,100 a year.

Remediation Reform Pilots

Six institutions began pilot programs under the Developmental Studies Redesign initiative.

SAILS in Southeast Tennessee

The SAILS program was piloted to address remediation needs during student's high school senior year.

Piloting Corequisite Support

TBR colleges began corequisite pilots.

Gateway Academy

Faculty gathered to redesign gateway courses with a focus on equity.



The Roots of Reform

TBR mandated a program of remedial and developmental studies that included mandatory assessment procedures and a comprehensive support system. In the same year, the initial *Geier* settlement aimed to desegregate higher education and required developmental education to support students admitted under "alternative standards."

Developmental Studies Redesigns

TBR received a three-year grant from the US Department of Education to work with NCAT and ECS to redesign developmental education.

Complete College Tennessee Act

The Complete College Tennessee Act aimed to increase student success and degree completion and created an outcomes-based funding formula.

SAILS Statewide

SAILS program began expanding statewide.

Tuition-Free College Statewide

The first cohort of Tennessee Promise students began.

Corequisite Learning Support

TBR expanded the corequisite model system-wide.

Corequisite Placement Pilot

A pilot allowed students to be placed based on high school GPA.



REFINING LEARNING SUPPORT

Core Principles
of Corequisite Learning Support

CORE PRINCIPLES OF LEARNING SUPPORT

When community colleges implemented corequisite learning support in 2015, the system's learning support policy stated that this reform "*reflected the commitment of the College System of Tennessee and its institutions to enhance access to and success in postsecondary education for all students*" ([TBR, 2019a](#)).

Corequisite learning support is defined as "the linking of learning support courses or experiences with an appropriate college-level course...so that the student is enrolled concurrently in both learning support and appropriate college-level courses" ([TBR, 2019a](#)).

TBR's corequisite learning support policy ensures that every student can access college-level courses during their first year of enrollment. Additionally, by providing "just in time" learning support with college-level courses, "the co-requisite experience serves the dual purpose of supporting and illuminating the skills and concepts of the college-level credit-bearing course while also providing instruction for students to remediate" core competencies ([TBR, 2015](#)).

Four core principles guide the work of corequisite learning support at Tennessee community colleges.



Improving Gateway Course Completion in Math, Reading, & Writing

Gateway course completion is a critical leading indicator of student success and a core goal of the corequisite reforms ([TBR, 2019a](#)). After the systemwide implementation of corequisite learning support in 2015, gateway course completion rates for students placed into learning support doubled in math, reading, and writing. However, gateway course improvements were uneven across the system, and equity gaps persist.

[Go to this Section](#)



Promoting Access & Success through Accuracy in Learning Support Placement

To ensure student success in gateway courses, colleges must use the appropriate metrics to identify who needs learning support, how much support they need, and what kind of support they need. According to current policy, students are placed out of learning support using standardized test scores or by completing SAILS. However, research suggests using test scores alone can result in misassignment to learning support.

[Go to this Section](#)



Supporting Institutional Innovation & Autonomy

Institutional innovation and autonomy drive learning support reforms in Tennessee. When corequisite learning support was implemented systemwide in 2015, TBR policy gave community colleges the ability to adapt the corequisite model to best fit the needs of their students, within specific guidelines ([TBR, 2019a](#)). This resulted in a range of innovative practices. However, to date, little research exists about the effectiveness of specific features of the corequisite model.

[Go to this Section](#)



Closing Equity Gaps in Retention & Graduation

Tennessee's community colleges are committed to closing equity gaps. This commitment means "ensuring that each student has access to a high-quality education and that each student receives what they need to be successful through the intentional design of the college experience" ([TBR, 2019b](#)). However, low-income and Black learning support students completed gateway courses at lower rates, persisted at lower rates, and graduated at lower rates than other students.

[Go to this Section](#)



IMPROVING GATEWAY COURSE COMPLETION IN MATH, READING, & WRITING

Gateway course completion is a critical leading indicator of student success. Student enrollment and success in entry-level college courses is a key measure of the success of learning support.

Students who complete college-level general education gateway courses during their first year are more likely to persist and graduate ([Jenkins & Bailey, 2017](#)). In fact, colleges' efforts to improve student success in gateway math, reading, and writing courses sparked the implementation of corequisite learning support systemwide in 2015.

The proportion of students who complete gateway courses in their first year has increased significantly, giving students strong momentum toward a credential.

In 2013, nearly three-fourths of all TBR first-time freshmen were placed into learning support for at least one subject. Typically, these students were required to complete remedial courses through a prerequisite model before enrolling in college-level courses. Only 15% of these students completed gateway math in their first year, and only 29% completed a gateway writing course.

After the implementation of corequisite learning support at Tennessee community colleges in 2015, completion rates for learning support students *doubled* in gateway courses.

However, while gateway course completion rates have improved since the implementation of corequisite learning support, the impact of these reforms differed by students' academic preparation and by college. Plus, gaps still exist for Black and low-income students.

The following section explores how the implementation of corequisite learning support affected student enrollment and success in gateway courses. Additionally, perspectives of community college faculty help to highlight the mechanism by which the corequisite model is effective as well as areas for improvement in its implementation.



How did gateway course **enrollment** change after corequisite learning support was implemented?

Did gateway course **success** improve after corequisite learning support was implemented?

How do faculty perceive the **effectiveness** of corequisite learning support?

How did gateway course enrollment change after corequisite learning support was implemented?

Under the prerequisite learning support model in place before fall 2015, few learning support students completed key gateway courses in their first year, in part because they were unable to even enroll in these courses. Since students were required to complete learning support courses (and often, several learning support courses) *before* enrolling in credit-bearing, college-level courses, only a small minority of learning support students attempted gateway courses in their first year, as **Figure 1** shows.

The corequisite model allows students to enroll in gateway courses during the first year while still receiving learning support. **Figure 2** shows how the implementation of corequisite learning support in 2015 corresponded with increases in the proportion of first-time freshmen who attempted gateway courses by the end of their first year. In three gateway subject areas, the proportion of first-time freshmen who attempted college-level gateway courses by the end of their first year of enrollment increased significantly.¹

The proportion of students who were able to enroll in college-level gateway courses tripled in math and doubled in reading and writing.

For students who were placed into learning support math, the proportion who attempted a college-level gateway math course by the end of their first year increased from 20% in 2013 to 68% in 2015, as shown in **Figure 3**. For students placed into learning support reading, the proportion who attempted a college-level, reading-intensive course by the end of their first year rose from 45% in 2013 to 90% in 2015. For writing, the proportion who attempted a college-level writing course by the end of their first year rose from 41% in 2013 to 85% in 2015.

Figure 1: First-Time Freshmen Enrolled in Learning Support in their First Term

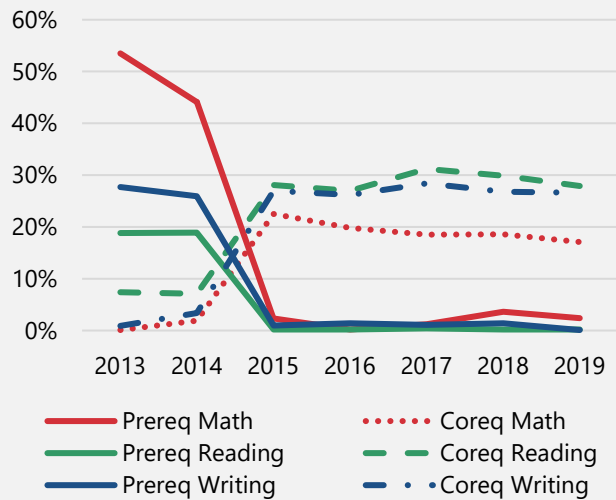


Figure 2: First-Time Freshmen Who Attempted College-Level Gateway Courses by the End of their First Year

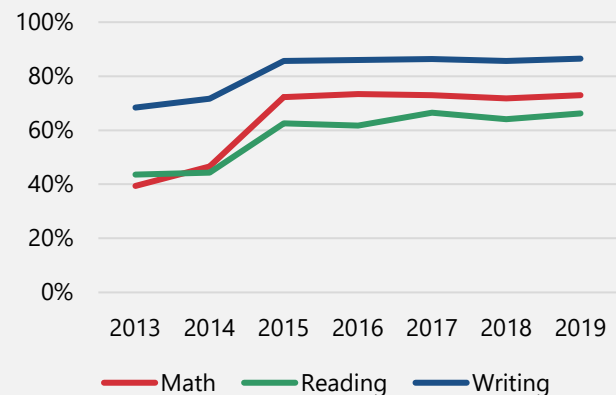
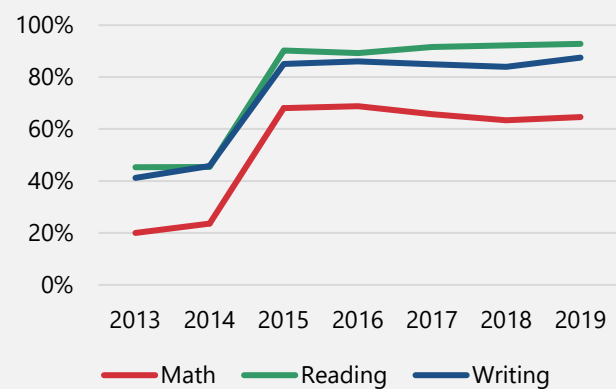


Figure 3: First-Time Freshmen in Learning Support Who Attempted College-Level Gateway Courses by End of their First Year



¹ For this analysis, students who completed SAILS are excluded in calculations of students who required learning support.

Did gateway course success improve after corequisite learning support was implemented?

After corequisite reforms were implemented, gateway course completion rates doubled.

Figures 4-6 on the following page show gateway course success rates for students who were placed into learning support relative to those who were not placed into learning support for that subject. After the introduction of corequisite learning support, the proportion of first-time students placed into learning support who attempted and completed a college-level, gateway course by the end of their first year increased significantly. Gateway course completion rates did not significantly change for non-learning support students during this period.

Completion Rates versus Pass Rates

The figures on the following page show gateway course *completion* rates (in the first term or first year) as well as gateway course *pass* rates.²

For the purposes of this report:

- **Gateway course completion rates** reflect the number of first-time freshmen who successfully completed a gateway course with a grade of D or better, divided by the number of total students.
- **Gateway course pass rates** reflect the number of first-time freshmen who successfully completed a gateway course with a grade of D or better, divided by the number of students in the cohort *who attempted the course*.
- While course pass rates reflect students' success in courses (when they attempt the course), gateway course completion rates reflect both students' course *success* as well as increased *access* to college-level coursework.

Course Completion in Math

The proportion of first-time students completing a gateway math course by the end of their first year *doubled* after the introduction of corequisite learning support. Only **15%** of learning support math students who entered college in 2013 completed a college-level math course by the end of their first year. By 2019, this number rose to **36%**. During the same period, gateway course completion rates fell slightly for students who were not in learning support math.³

Course Completion in Reading

Learning support students' gateway reading pass rates followed similar patterns as in math but were slightly higher overall. In 2013, **32%** of learning support reading students completed a college-level reading course in their first year. By 2019, that rose to **64%**.⁴

Course Completion in Writing

Similar trends emerged for gateway writing courses. In 2013, **29%** of first-time freshmen who were placed into learning support for writing completed a gateway writing course by the end of their first year. By 2019, this number rose to **56%**.

Course Pass Rates

Of course, gateway course *pass rates* declined after the introduction of corequisite learning support, as **Figure 6** shows. Before 2015, under the prerequisite learning support model, few students were able to advance to college-level courses, so pass rates reflected outcomes for more prepared students. For this reason, gateway course *completion* rates (which reflect both access and success) may be more appropriate measures.⁵

² This analysis focuses on student outcomes in credit-bearing, college-level courses, rather than outcomes in learning support sections. In most cases, learning support students who complete the college-level gateway course have fulfilled their learning support requirements, even if they do not pass the learning support course. Therefore, this analysis focuses on outcomes in gateway courses rather than outcomes in learning support courses.

³ SAILS completers are excluded in calculations of students who required learning support and included among those who did *not* require learning support.

⁴ Many non-learning support students do not take college-level reading courses in their first year, so completion rates for these students are less comparable.

⁵ However, even after the introduction of corequisite learning support, gateway course *pass* rates remained above 50% for learning support students.

Figure 4: First-Time Freshmen Who Completed a Gateway Course by their First Term

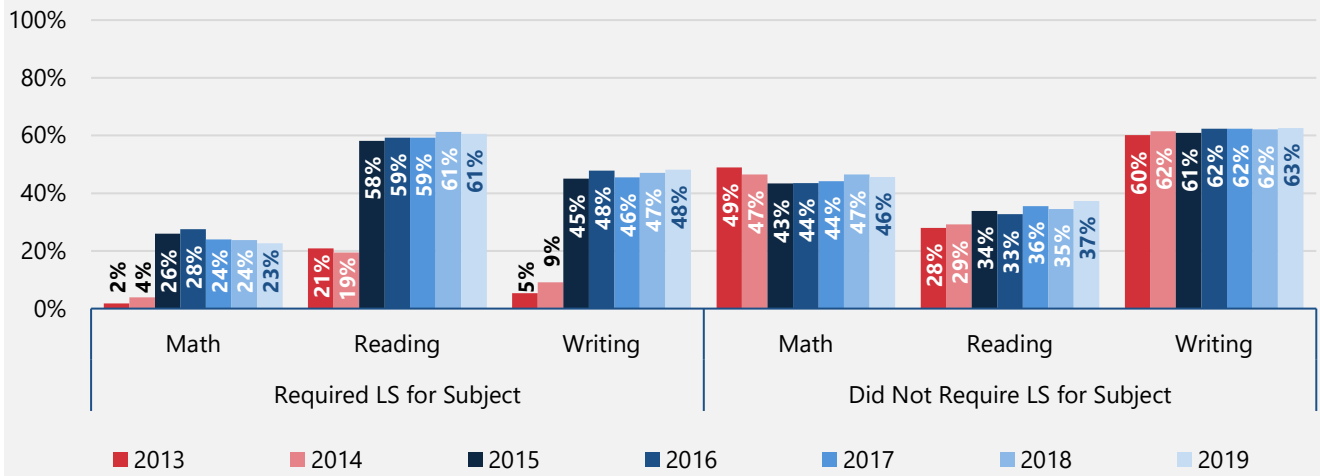


Figure 5: First-Time Freshmen Who Completed a Gateway Course by their First Year

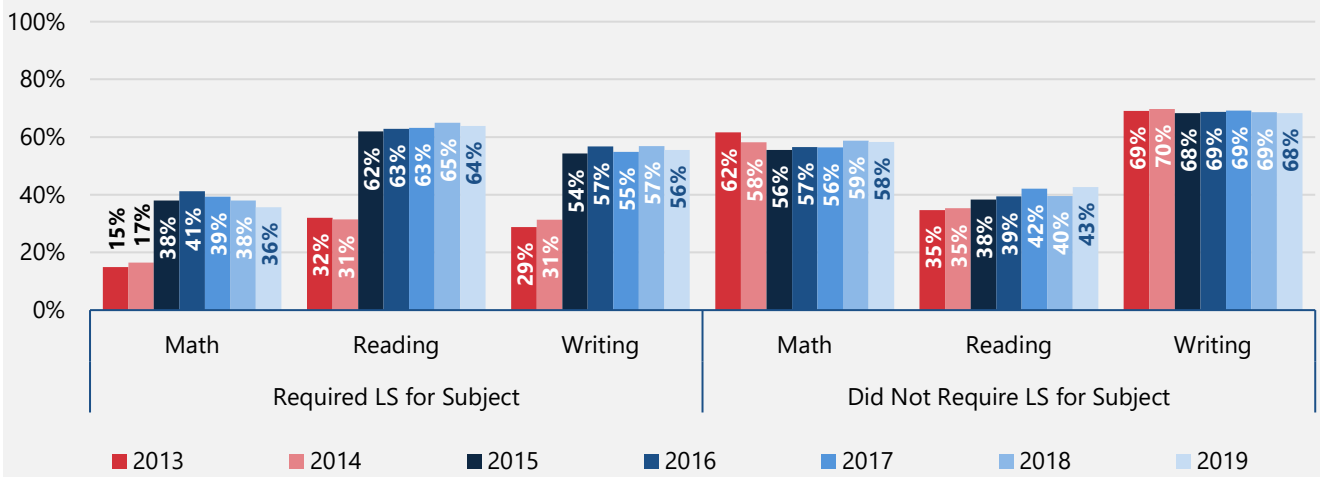
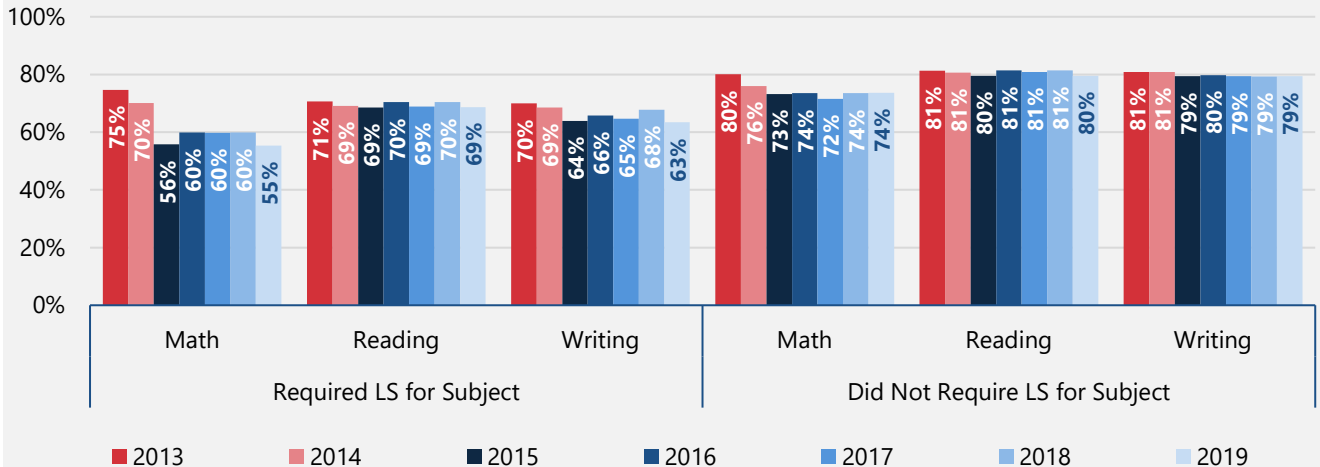


Figure 6: First-Time Freshmen Who Passed a Gateway Course by their First Year, Limited to Those who Attempted



Outcomes by College

The success of corequisite learning support in improving gateway course completion rates varies somewhat by college. **Table 1** below shows the proportion of all learning support students who completed a gateway course in their learning support subject area by the end of their first year. This analysis includes all first-time freshmen who were placed into learning support from fall 2015 to 2019. Gateway course completion rates in math ranged from 50% at Roane to 30% at Volunteer. Gateway course completion rates for reading and writing students were high everywhere, but significant differences still exist across the system.

Table 1: Learning Support Students Who Completed a Gateway Course by their First Year, 2015-2019

College	Math	Reading	Writing
Chattanooga	40%	55%	56%
Cleveland	31%	59%	56%
Columbia	50%	57%	56%
Dyersburg	38%	77%	57%
Jackson	32%	69%	46%
Motlow	43%	69%	67%
Nashville	35%	59%	53%
Northeast	37%	67%	57%
Pellissippi	45%	57%	56%
Roane	50%	67%	49%
Southwest	36%	69%	61%
Volunteer	30%	57%	56%
Walters	35%	64%	45%
All Colleges	40%	55%	56%

About the Data

The dataset for this analysis uses the end-of-term enrollment data and course data to explore outcomes for first-time freshmen.

Learning support placement is based upon the subjects for which students qualify for support, not enrollments in learning support. Comparisons between learning support and other students are made at the subject-level without respect to other placements.

SAILS completers are generally included in this analysis alongside students who did not require learning support, except where noted otherwise.

Gateway courses are college-level courses that students typically take in their first year. For math, this includes all 1000-level math courses. For writing, this is English 1010. For reading, this includes courses that are paired with learning support reading. These courses differ by college and change over time but typically include classes like English 1010, first-year seminars, or other general education courses.

Student outcomes are analyzed at the conclusion of the student's first academic year as a first-time freshman, including the preceding summer, fall, spring, and trailing summer, as well as any known prior credit from dual enrollment at community colleges.

Gateway Course Enrollment: Reflects the proportion of first-time freshmen who attempted a college-level gateway course in the subject area.

Gateway Course Pass Rates: Reflects the proportion of first-time freshmen who passed the college-level course with a grade of D or better. This is calculated as the number of students who passed the course divided by the number of students who attempted the course.

Gateway Course Completion: Reflects the proportion of first-time freshmen who attempted and passed the college-level course with a grade of D or better. This is calculated as the number of students who passed the course divided by the total number of students.

Retention Rates: Reflects the proportion of first-time freshmen who returned as a student at any TBR community the following spring or fall, or who earned a degree or certificate prior to the start of the following spring or fall.

Graduation Rates: Reflects the proportion of first-time, full-time students who earned a credential at any TBR community college within three years of first enrolling.

[See more data definitions in the TBR glossary.](#)



A Closer Look at the Data

Community colleges implemented corequisite learning support with a clear goal—to increase the number of first-time students who completed gateway courses during their first year of enrollment. Analyses of descriptive data show this goal was achieved, as the proportion of first-time students in learning support who completed college-level gateway math, reading, and writing courses doubled.

However, descriptive analyses may obscure some differences in outcomes across student groups or the impact of other factors that influence course success. A closer look at data on gateway course completion will allow for a deeper understanding of corequisite learning support. Additionally, more rigorous methods (like difference-in-difference estimations and regression discontinuity techniques) allow for a more precise attribution of the gains in gateway course success to corequisite learning support.

For the regression discontinuity and difference-in-difference estimations, students who completed a corequisite course during corequisite pilots in 2014-2015 are excluded from the analysis. Additionally, students who completed a prerequisite learning support course after 2015 (due to delayed scaling of corequisite reforms) are also excluded. Visit the [Technical Appendix](#) to learn more about these models.

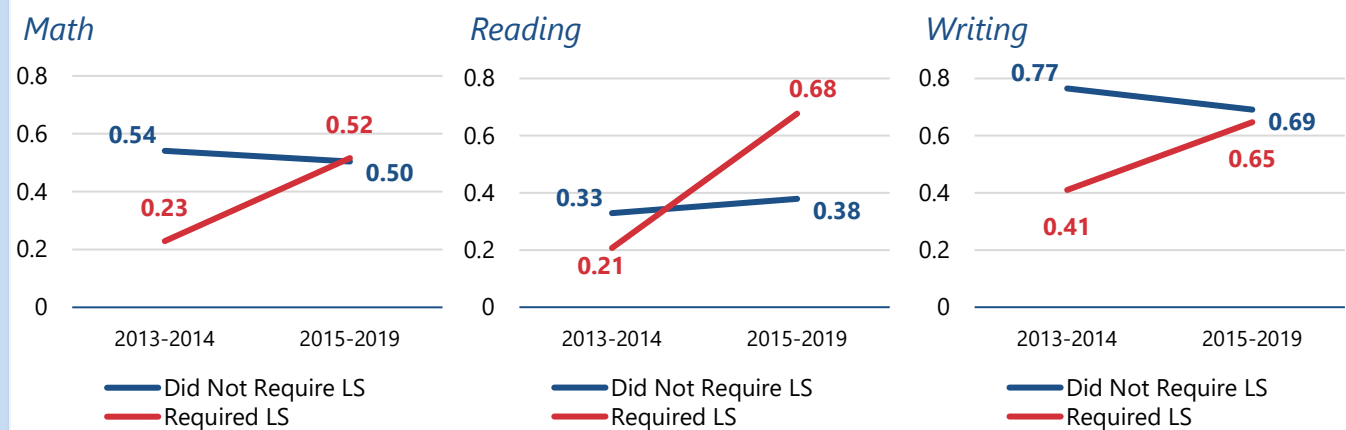
The probability of completing a gateway course rose for learning support students.

For students placed into learning support, the probability of completing a gateway course by the end of their first year of enrollment increased significantly after the introduction of corequisite learning support. These increases may be attributable, at least in part, to the corequisite reforms since similar increases were *not* observed for non-learning support students.

The results of a difference-in-difference estimation of the impact of corequisite learning support are shown in **Figure 7** below. This figure shows the probability of completing a gateway course before and after corequisite reforms in 2015. These probabilities are estimated when holding other variables (like full-time enrollment, gender, race, age, high school GPA, and ACT subject score) at mean values.

For learning support math students, the probability of completing a gateway math course rose from 0.23 to 0.52. However, the probability of gateway math completion for non-learning support students fell slightly. Similarly, the introduction of corequisite learning support was associated with a 0.42 increase in the probability of learning support students completing gateway reading and a 0.31 increase in the probability of completing writing.

Figure 7: Probability of Completing Gateway Course By First Year



Gateway course success rates rose at all levels of academic preparation. However, completion rates remain low for the least prepared students.

After the introduction of corequisite reforms in 2015, learning support students' probability of completing gateway math rose at all levels of academic preparation (as measured by the ACT subject scores). This was especially true for students whose ACT subject scores were just below the cut scores that are used for learning support placement.

Using regression discontinuity techniques, we compared gateway course outcomes for students *just above* and *just below* the ACT cut scores used for placement into learning support. (For this analysis, we excluded students who were placed using a method other than ACT scores.) We might expect that students just above and just below the ACT cut score are otherwise similar students with a statistically comparable chance of course success. However, under the prerequisite model from 2013-2014, students with ACT scores just below the cut scores were 0.18 points less likely to complete a gateway math course and 0.27 points less likely to complete a gateway writing course than students just above the ACT cut score. After the introduction of corequisite reforms, these discontinuities between students just above and below the ACT cut score were no longer significant.

However, for students with the lowest ACT scores, the probability of gateway course success remained relatively low after the implementation of corequisite learning support, at least in math. Using a difference-in-difference model, we estimated the probability of course success at different levels of ACT scores. For students with ACT math scores of 17 or 18 (just below the cut score for placement), corequisite learning support was associated with a 0.28 increase in the probability of completing a gateway course compared to the prerequisite model. However, for students with ACT math scores of 16 and below, the impact was smaller (a 0.25 increase for students with ACT math scores of 16 and a 0.21 increase for ACT math scores of 15). (Visit the [Technical Appendix](#) to learn more about these models.)

Figure 8: Probability of Completing Gateway Course By First Year, by ACT Score

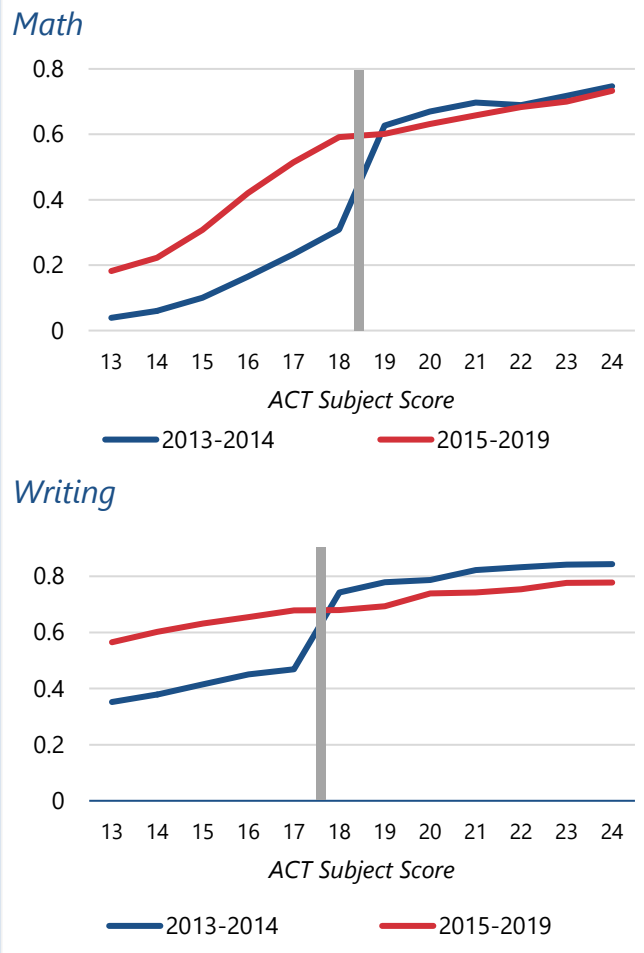


Figure 8 above shows the results of these analyses for math and writing. Students with ACT math scores below 15 still faced only a one in five chance of completing a gateway Math course in their first year, even in the corequisite model.

For students placed into learning support writing, the impact of corequisite learning support on gateway course completion was similar across ACT subject scores. Corequisite support was associated with a 0.20 to 0.22-point increase in the probability of completing a gateway writing course at all ACT subject scores.

Many non-learning support students do not take college-level reading courses in their first year, so completion rates for these students are less comparable and are excluded here.

Corequisite reforms had an uneven impact across colleges.

The introduction of corequisite learning support in 2015 had an uneven impact across colleges, especially in math. **Table 2** summarizes the impact of the change from prerequisite to corequisite learning support for students placed into math and writing. At some colleges, the probability of an average learning support student completing a gateway math course more than doubled after the introduction of corequisite reforms. At other colleges, the impact was smaller. For example, at Pellissippi, the probability of gateway math success increased by 0.13. However, under the prerequisite model, Pellissippi had the highest probability of math success of any college, so corequisite reforms were implemented on top of a relatively more effective model. At Volunteer, corequisite learning support was associated with only a 0.14-point increase in the probability of course success, even though the prerequisite outcomes were not particularly high.

Table 2: Probability of Completing Gateway Course Among Learning Support Students by College

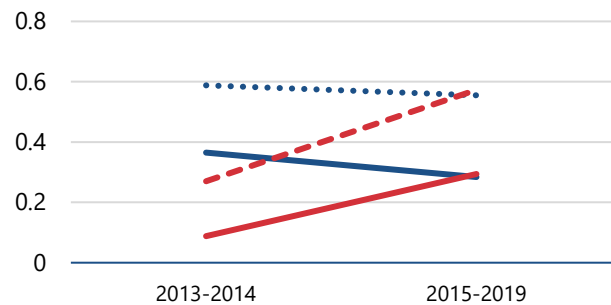
College	Math			Writing		
	2013 -2014	2015 -2019	Diff.	2013 -2014	2015 -2019	Diff.
Chattanooga	0.17	0.50	+0.33	0.45	0.65	+0.20
Cleveland	0.13	0.49	+0.36	0.42	0.66	+0.24
Columbia	0.32	0.66	+0.34	0.39	0.59	+0.20
Dyersburg	0.19	0.55	+0.36	0.48	0.68	+0.20
Jackson	0.16	0.51	+0.35	0.38	0.63	+0.25
Motlow	0.22	0.53	+0.31	0.46	0.69	+0.23
Nashville	0.20	0.43	+0.23	0.36	0.57	+0.21
Northeast	0.21	0.48	+0.27	0.53	0.66	+0.13
Pellissippi	0.43	0.56	+0.13	0.42	0.68	+0.26
Roane	0.28	0.69	+0.41	0.55	0.71	+0.16
Southwest	0.13	0.37	+0.24	0.31	0.67	+0.36
Volunteer	0.27	0.41	+0.14	0.35	0.58	+0.23
Walters	0.19	0.62	+0.43	0.47	0.63	+0.16
All Colleges	0.23	0.52	+0.29	0.41	0.65	+0.24

Equity gaps persisted even after the introduction of corequisite learning support.

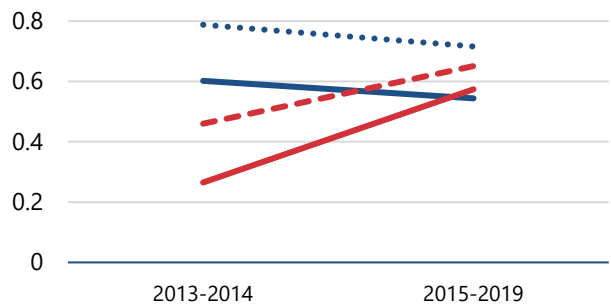
Corequisite learning support substantially increased the probability of gateway course completion for all students in learning support. However, equity gaps persisted in gateway course completion rates for Black learning support students compared to White learning support students. After the introduction of corequisite learning support, the probability of gateway course completion in math and writing remained lower for Black students than for White students *even after accounting for ACT subject scores, high school GPA, and college of enrollment*. **Figure 9** below summarizes the impact of corequisite reforms by students' race and ethnicity for math and writing.

Figure 9: Probability of Completing Gateway Course By First Year, by Race

Math



Writing



Although gateway course success rose, learning support reforms have not translated into clear increases in retention and graduation rates for learning support students.

Retention Rates

Table 3 shows fall-to-spring retention rates for first-time freshmen who entered in fall 2013 and 2014 (before the systemwide implementation of corequisite learning support) compared to those who entered from fall 2015 to 2019 (after corequisite learning support was implemented). While gateway course completion increased after the introduction of corequisite learning support in fall 2015, fall-to-spring retention rates *fell* slightly among learning support students. For students who received any learning support placement, fall-to-spring retention rates fell from 71.5% to 70.7%, a decrease of 0.8 percentage points.

Table 4 shows fall-to-fall retention rates for first-time freshmen before corequisite reforms (fall 2013 and 2014) compared to after corequisite learning support was implemented. Just as with fall-to-spring retention, fall-to-fall retention rates did not change significantly after the introduction of corequisite learning support. However, retention rates increased slightly for students who were placed only into math learning support as well as for students who were placed into learning support for all three subjects.

Notably, retention rates fell for non-learning support students over this period, suggesting that other factors beyond corequisite learning support may have influenced retention rate trends. To better understand retention trends, we used more rigorous difference-in-difference analyses to account for other factors that may influence retention. These estimations included controls for students' ACT scores, high school GPAs, college of enrollment, term, and demographic characteristics. From these estimations, we found that the introduction of corequisite learning support had *no statistically significant effect on fall-to-spring retention* but had a small (though still statistically significant) *negative* effect on fall-to-fall retention.

Table 3: Fall-to-Spring Retention Rates by Learning Support Placement, 2013-2019

Placement	2013-2014	2015-2019	Difference
Math Only	76.2%	74.9%	-1.3 pp
Reading Only	77.9%	76.5%	-1.4 pp
Writing Only	76.2%	74.5%	-1.7 pp
Math & Reading	71.5%	70.6%	-0.8 pp
Math & Writing	68.6%	69.7%	+1.1 pp
Reading & Writing	76.6%	70.8%	-5.8 pp
Math, Reading, & Writing	65.8%	65.8%	-0.0 pp
Any Placement	71.5%	70.7%	-0.8 pp
No Placement	82.3%	80.1%	-2.2 pp

Table 4: Fall-to-Fall Retention Rates by Learning Support Placement, 2013-2019

Placement	2013-2014	2015-2019	Difference
Math Only	53.3%	54.2%	+0.9 pp
Reading Only	55.0%	55.1%	+0.2 pp
Writing Only	50.5%	50.2%	-0.3 pp
Math & Reading	48.9%	47.3%	-1.6 pp
Math & Writing	43.0%	45.9%	+2.9 pp
Reading & Writing	51.2%	44.9%	-6.4 pp
Math, Reading, & Writing	38.8%	40.3%	+1.5 pp
Any Placement	46.6%	47.0%	+0.4 pp
No Placement	61.7%	61.1%	-0.6 pp

Graduation Rates

Table 5 and **Figure 10** show three-year graduation rates by learning support placement for first-time, full-time students before the systemwide introduction of corequisite learning support (from fall 2013 and 2014) compared to after the introduction of corequisite learning support (from fall 2014 to 2017). Three-year graduation rates increased over this period for learning support and non-learning support students.

- For every combination of learning support placement except for one (students who required reading and writing support), graduation rates increased during the 2015-2019 period compared to 2013-2014.
- For learning support students overall, graduation rates increased from 11.0% for the 2013 cohort of entering students to 15% for the 2017 cohort.
- However, for students who were placed into learning support for all three subjects, three-year graduation rates increased from 5% for the 2013 cohort to 9% for the 2017 cohort.

During the same period, graduation rates also increased for *non-learning support students*. In fact, these students saw a larger increase during this period. Increased graduation rates may be the result of other reforms designed to encourage completion, in addition to corequisite learning support ([Ran & Lin, 2019](#)). In fact, when we used difference-in-difference estimations to account for these other factors, we found that corequisite reforms had *no statistically significant effect* on graduation.

Of course, learning support students are required to enroll in additional credit hours to fulfill learning support requirements, and enrolling in additional credit hours could delay students' graduation. Analyses of success rates beyond the three-year graduation rate may better reflect the impact of corequisite reforms. **Figure 11** (on the following page) shows cumulative graduation rates for students who entered in fall 2014 compared to fall 2015 through the six-year graduation rate. As this figure shows, corequisite reforms did *not* translate into increases in six-year graduation rates.

Table 5: Three-Year Graduation Rates by Learning Support Placement, 2015-2017

Learning Support Placement	2013-2014	2015-2017	Difference
Math Only	16.2%	21.8%	5.6 pp
Reading Only	18.3%	21.5%	3.2 pp
Writing Only	16.2%	18.4%	2.2 pp
Math & Reading	10.1%	14.9%	4.8 pp
Math & Writing	8.8%	13.4%	4.6 pp
Reading & Writing	12.9%	11.9%	-1.0 pp
Math, Reading, & Writing	5.1%	7.9%	2.8 pp
Any Placement	11.0%	14.6%	3.6 pp
No Placement	30.6%	35.1%	4.5 pp

Figure 10: Three-Year Graduation Rates by Learning Support Placement, 2015-2017

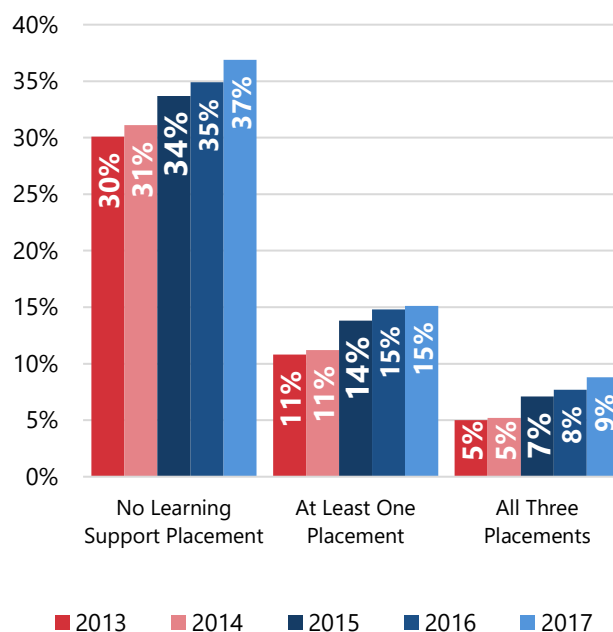
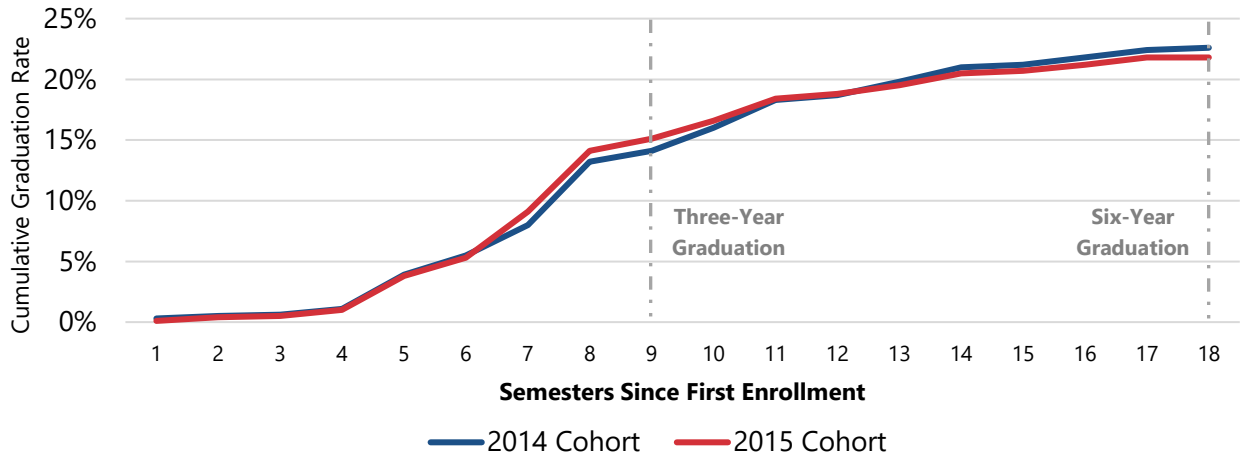
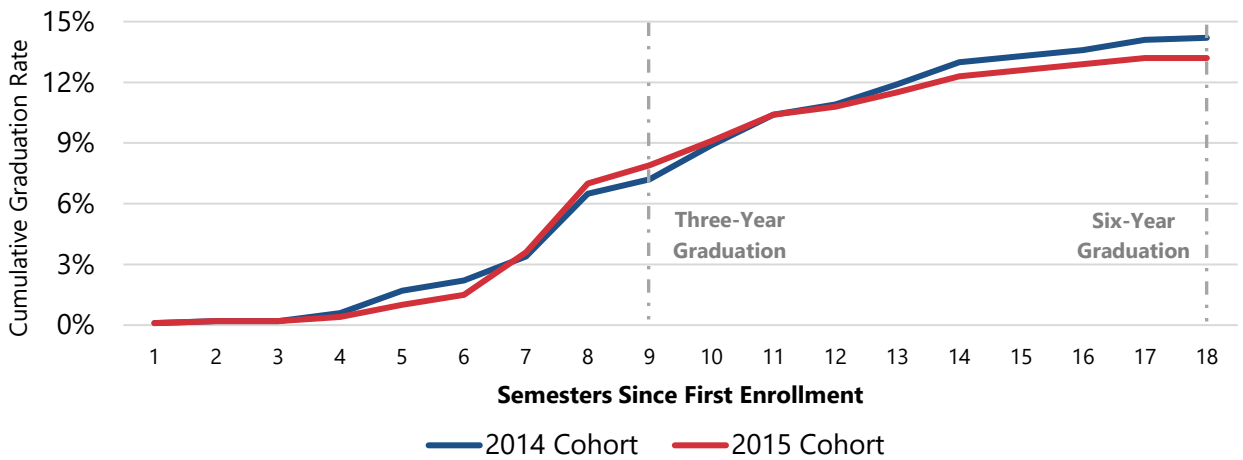


Figure 11: Cumulative Graduation Rates by Learning Support Placement, 2014 and 2015 Cohorts of First-Time, Full-Time Freshmen

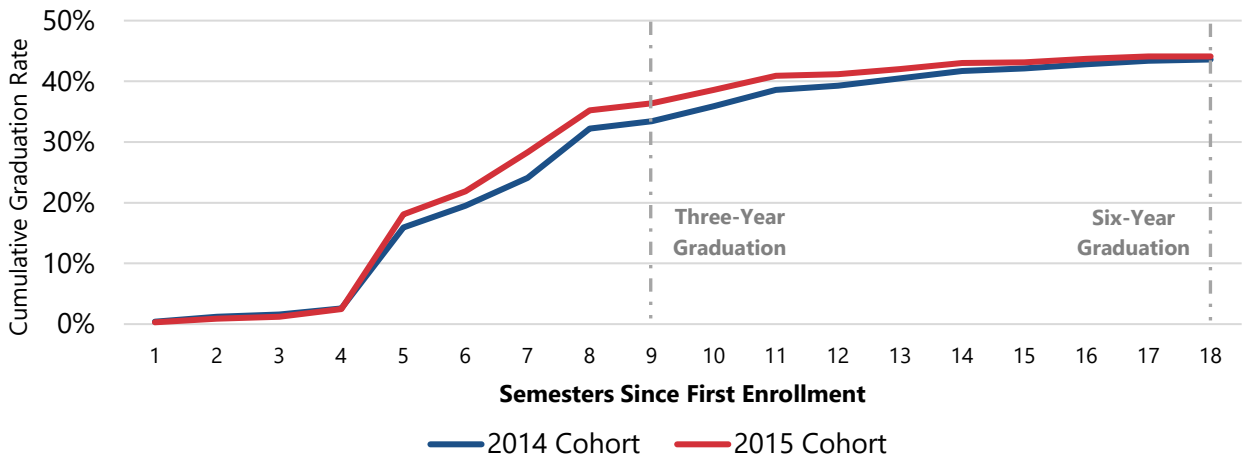
Among Students Placed into Learning Support for at Least One Subject



Among Students Placed into Learning Support for all Three Subjects



Among Students Not Placed into Learning Support for Any Subject



How do faculty perceive the effectiveness of corequisite learning support?

In 2020, faculty and academic administrators at each college participated in a series of surveys about the implementation, effectiveness, and challenges of the corequisite model. First, in July 2020, academic administrators (Chief Academic Officers, Deans, and Learning Support Directors) completed a **questionnaire** about their institution’s implementation of corequisite learning support. Then, in November 2020, full-time and adjunct faculty from across the state’s 13 community colleges participated in an **online survey** about the effectiveness of corequisite learning support. In total, 270 faculty responded to the survey’s questions about the effectiveness of the corequisite learning support model in promoting gateway course completion. Survey participation was limited to faculty who teach learning support courses or college-level courses paired with learning support.

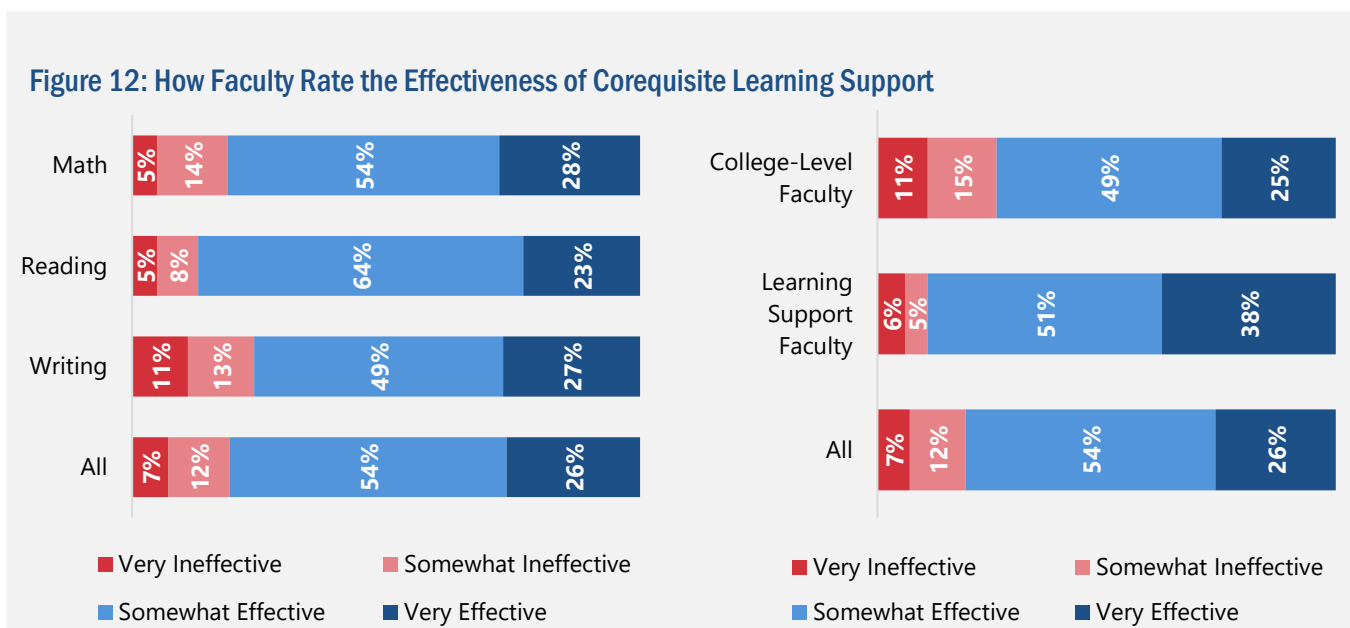
Several themes emerged from the faculty and institutional survey responses, but perceptions of corequisite learning support differed by subject, faculty type, and college.

Most faculty members said that corequisite learning support is effective.

Figure 12 below shows responses from faculty about their perceptions of the effectiveness of corequisite learning support. A majority of respondents said that corequisite learning support at their college is somewhat (54%) or very effective (26%). Additionally, in responses to other questions, two-thirds of faculty somewhat (38%) or strongly agreed (28%) that corequisite learning support courses are effective in helping students to better understand college-level content. Lastly, 60% of faculty agreed that learning support courses provide all of the support that students need to pass college-level courses.

Why is the corequisite model effective?

In addition to questions about whether the corequisite learning support model is effective, the survey also presented faculty with opportunities to further describe their experiences through open-ended questions. Through these questions, faculty shared their perceptions of *why* corequisite learning support was effective or ineffective. Responses were coded through topic modeling with natural language processing tools and through thematic content analysis with tests of intercoder reliability conducted across four coders.



The corequisite model is effective because it helps students gain experience with a subject.

Many faculty members described how corequisite learning support is effective: it helps students get more practice on subjects and helps instructors reinforce concepts. As one faculty member said, corequisite learning support gives students *“the extra practice to be able to do some of the foundational parts where they may be weak before applying that knowledge to the more complex skills they are learning in the college-level course.”*

A smaller group of faculty respondents described how corequisite learning support allows for more individualized instruction or helps accelerate student progress toward completion.

However, some students may be overwhelmed by the corequisite model.

Some faculty also shared potential reasons for the ineffectiveness of corequisite learning support. The most common theme in these responses reflected faculty concerns that the corequisite model overburdens students with an additional course load or creates greater stress for students. A smaller group of faculty shared concerns that the learning support curriculum was not adequately preparing students for the college-level course or that the corequisite model did not provide the least prepared students with sufficient time to get up to speed.

As one faculty member said, *“Many students opt out because they are overwhelmed by taking two English courses--an area of weakness that produces anxiety and a sense of overwhelm for many.”*

Some faculty described aspects of both effectiveness and ineffectiveness in the model. As one faculty member said, *“The building blocks of the learning support class help build the structure needed for success in the college-level course at the time that it is needed. The ineffective part of corequisite is some students, who are not confident in math ability start to feel overwhelmed having two math courses on their schedule. It is still better than prerequisite offerings.”*

The effectiveness of the corequisite model depends upon how it is implemented.

Faculty members frequently described specific conditions that must be present for the corequisite model to be effective. For example, the largest group of faculty respondents said that the model's effectiveness depends upon specific aspects of the model's implementation, including course pairings, the curriculum, the alignment between learning support and college-level courses, or regular communication between faculty members who teach learning support and faculty members who teach college-level courses.

As one faculty member said, *“I think corequisite remediation is effective, especially, if the instructor is familiar with the requirements of both classes and if the instructors communicate the students' progression during the semester.”*

Another shared, *“The curriculum is scaffolded to support the major assignments in the college-level classes. However, our courses are not paired, so one support class section might represent ten different college-level instructors, each with their different schedules and assignments.”*

Perceptions of the effectiveness of this model differed across the faculty.

Faculty who taught learning support reading courses or college-level courses paired with reading expressed belief in the effectiveness of corequisite learning support at slightly higher rates than other faculty. In fact, 87% of faculty connected with reading learning support felt that the corequisite model was somewhat or very effective, compared to 81% of math faculty and 76% of writing faculty. Faculty teaching writing or English were also less likely to agree that the learning support class sufficiently supported students.

Views of corequisite learning support also varied by the college. At Dyersburg and Motlow, 100% of respondents found corequisite learning support somewhat or very effective (although they had very small sample sizes). Jackson had the largest proportion of respondents who found corequisite learning support very ineffective.

Additionally, faculty who taught college-level courses were somewhat less likely to state that corequisite learning support was effective. Among faculty who only taught college-level courses, 74% found the corequisite model to be effective or very effective, compared to 89% of faculty who only taught learning-support courses.

Faculty have clear ideas about how to improve the implementation of corequisite learning support.

Faculty were also asked an open-ended question about how corequisite learning support could be improved. Responses to this question can be categorized into three groups. First, faculty most frequently described improvements to the implementation of corequisite learning support at their college. Among the improvements suggested in this category, faculty most often described changes to the course curriculum and pairings, the implementation of learning communities, or models where the same faculty member teaches both the learning support course and the college-level course.

Next, some respondents proposed improvements to collaboration among faculty members or greater communication and engagement with students about the role of learning support.

However, 10% of faculty were unable to describe any improvements to corequisite learning support and stated that a return to a prerequisite learning support would be better than the current model.

Academic administrators also had suggestions for improvement. According to one learning support director, *"We need more full-time and qualified adjunct instructors. Scheduling the same instructor for the learning support and college-level course is something we would like to do, but we do not always have the number of instructors to achieve that type of schedule."* An administrator at another college shared similar concerns about staffing, saying, *"In all three co-requisite disciplines we have limited full-time instructors; therefore, there is a reliance on adjuncts who may not be able to teach both learning support and college-level courses."*

Considering the Costs of Corequisite Learning Support

In 2016, the Community College Research Center (CCRC) published a research brief examining the cost-effectiveness of Tennessee's corequisite model ([Belfield, Jenkins, & Lahr, 2016](#)). CCRC analyzed data from 2015 and interviewed college personnel to determine the resources needed to create, implement, and provide learning support as well as transition to the new model.

This research found that corequisite learning support costs more than prerequisite learning support. However, corequisite learning support is significantly more cost effective when considering the amount of resources spent per student who successfully completes the college-level gateway course.

The main reason corequisite learning support is more expensive is more students are taking the college-level course than would have under prerequisite learning support. Additionally, CCRC found the courses in the corequisite model to be slightly more expensive due to smaller class sizes and the type of faculty member teaching the course. They estimated the cost of transitioning to corequisite learning support at \$10,330 per subject area per institution. They note that the transition costs would not be incurred each year, though the CCRC model does amortize these costs over five years.

Based on CCRC's calculations, the math corequisite model cost more than double the prerequisite model, and the writing corequisite model cost 1.7 times the prerequisite model. However, college-level course completion rates were significantly higher under the corequisite model. In math, the number of students successfully completing the college-level course was about four times greater under the corequisite model, and in writing, the number of successful corequisite students was nearly double.



IMPROVING GATEWAY COURSE COMPLETION IN MATH, READING, & WRITING *Summary*

Gaining Momentum

- Since the implementation of corequisite learning support, the proportion of learning support students who were able to *enroll in* college-level gateway courses in their first year increased significantly.
- Additionally, the proportion of students who *complete* gateway math, reading, and writing courses in their first year has doubled. However, the impact was uneven and did not always translate to longer-term success.
- Most faculty members said that corequisite learning support is effective in promoting gateway course success. A smaller group of faculty shared concerns that the learning support curriculum was not adequately preparing students for the college-level course or that the model did not provide the least prepared students with sufficient time to get up to speed.

Connections to Core Principles

- **Promoting Access & Success Through Accuracy in Learning Support Placement:** Notably, gateway course completion rates have not significantly improved for non-learning support students over the past decade. In some subjects and at some colleges, gateway course success rates for learning support students are comparable to non-learning support students. *Which non-learning support students would benefit from additional learning support? How much and what kind of support would be beneficial?*
- **Supporting Institutional Innovation & Autonomy:** In a fall 2020 survey, many faculty members proposed improvements to the implementation of corequisite learning support at their college. Faculty most often described changes to the course curriculum and pairings, proposed the implementation of learning communities, or expressed interest in models where the same faculty member teaches both the learning support course and the college-level course. Some faculty members proposed improvements to collaboration and communication among faculty members. *Which models of corequisite learning support are associated with the most improved rates of student success on short-term and long-term outcomes, and why? How can faculty be involved in testing new implementation models?*
- **Closing Equity Gaps in Retention & Graduation:** Although corequisite reforms improved gateway course completion rates, significant gaps persist between White and Black students. *How do these gaps in gateway course completion contribute to equity gaps in retention and graduation?*

Explore More

- [Working Paper #2: Low-Income Student Experiences in Learning Support](#)
- [Working Paper #3: Differences by Race and Ethnicity in Learning Support](#)
- [TERA Report on Faculty and Student Experiences in Learning Support](#)
- [Data Toolkit](#)



PROMOTING ACCESS & SUCCESS THROUGH ACCURACY IN LEARNING SUPPORT PLACEMENT

To ensure student success in gateway courses, Tennessee community colleges will need to use the most appropriate metrics to accurately identify who needs learning support, how much support they need, and what kind of support they need.

As open-access institutions, Tennessee community colleges welcome students regardless of their prior academic performance. Upon enrolling, a majority of students are placed into at least one learning support course alongside their college-level coursework.

Colleges need accurate placement methods to identify who needs learning support, how much support they need, and what kind of support they need.

Since placement policies impact the majority of students, misplacing students into or out of learning support could create barriers to degree completion or exacerbate equity gaps. Misplacing students into learning support may also have implications for students' financial aid and time-to-degree.

Corequisite learning support did not change placement rules, but it reframed the stakes of placement decisions.

Elsewhere, at colleges that use prerequisite remediation, placement rules determine which students can access gateway courses. Placement rules at these institutions may be designed to address questions like, "Which students are ready to take college-level courses?" However, in the corequisite model, placement rules determine which students take learning support courses alongside college-level courses. This may shift the focus of placement rules away from questions just about who is ready for college-level coursework and toward questions like, "Which students would benefit from learning support alongside college-level courses, and what kind of support do they need?"



How are students placed into learning support?

How many students are placed into learning support?

Which students are placed into learning support?

How are students placed into learning support?

The TBR Learning Support policy establishes methods to determine a student's placement into or out of learning support coursework for math, reading, and writing (TBR, 2019a). According to this policy, students can be placed out of learning support courses through one of four assessment metrics: the ACT, SAT, ACCUPLACER, or by completing SAILS competencies.

Table 7 outlines the placement requirements, and a student must only satisfy one placement requirement to bypass learning support. Most students are placed using only their subject area sub-scores on the ACT or ACCUPLACER. Students with a score that is equal to or greater than the cut score (as listed in Table 3 below) will be exempt from learning support and placed into college-level courses.

Table 7: Approved Cut Scores for Placement Into College Level Courses (as of Fall 2019)

Subject Area	ACT	SAT	ACCUPLACER
Writing	English 18	Reading 490	250
Reading	Reading 19	Reading 500	250
Math	Math 19	Math 500	250

For example, those with an ACT Math score below 19 are placed into corequisite learning support in the same semester as their college-level math course.

According to TBR policy, valid assessment scores are no more than five years old before the first day of class for the student's entering term. Therefore, most adult students are placed using measures other than the ACT or SAT, like the ACCUPLACER. Students who have no valid assessment scores are placed directly into learning support.

Many dual enrollment students and recent high school graduates also take the ACCUPLACER to challenge the placement that resulted from their ACT or SAT score. Students who score 250 or above on an Accuplacer Next Generation subject test are exempt from learning support enrollment in the subject area.

Historically, other assessment methods were available, including Compass and ACCUPLACER Classic. During the transition from Accuplacer Classic to Accuplacer Next Generation in 2019, ACCUPLACER cut scores were revised to more closely align with ACT cut scores. This resulted in a change in the overall placement rate, particularly for adults.

About SAILS

TBR partners with the Tennessee Department of Education and the Tennessee Higher Education Commission to deliver SAILS ([Seamless Alignment and Integrated Learning Support](#)) to high school students across Tennessee. With coursework developed by K-12 and higher education faculty, SAILS embeds TBR's math learning support competencies into 12th grade-math courses, allowing students to begin their higher education career prepared for credit-bearing coursework. Successful completion of the SAILS program allows a student to move directly into college-level gateway courses after high school graduation.

From 2013 to 2019, more than 60,000 high school students across Tennessee had the opportunity to enroll in college-level math courses without the need for learning support because of SAILS. In 2018, the SAILS program was awarded the Education Commission of the States' 2018 Frank Newman Award for State Innovation.

Recent research shows that the SAILS program successfully shifted the timing of math learning support and allowed students to bypass the costs and delays associated with taking remedial courses in college ([Kane et al., 2021](#)).

How many students are placed into learning support?

From 2015 to 2019, more than half of first-time students at Tennessee community colleges were placed into learning support.

From fall 2015 to fall 2019, more than 108,000 students enrolled as first-time freshmen at Tennessee community colleges. Upon enrolling, 60% of these students were placed into learning support for at least one subject area.⁶

By Year

Learning support placement rates have fallen over time, as **Figure 13** shows. In fall 2013, 72% of first-time students were placed into learning support for at least one subject area. This fell to only 56% in fall 2019. These declines have been most pronounced in math, where placement rates fell from 66% to 42% due to SAILS and other efforts to address math preparation. In other subject areas, placement rates have held relatively steady since 2013.

By Subject

Figure 14 below shows learning support placement by subject area. From fall 2015 to 2019, 45% of first-time freshmen were placed into learning support math.⁷ Additionally, 34% of first-time freshmen were placed in learning support for reading, and 37% were placed into learning support for writing.

Many students were placed into learning support for multiple subject areas.

Of all first-time freshmen from fall 2015 to 2019, 23% were placed into learning support in one subject, 17% in two, and 20% in all three subjects. **Table 8** (on the following page) shows placement patterns by subject.

Among students who were placed into learning support, few students were placed into a combination of supports that did not include math. Overall, three-quarters of *learning support students* were placed into learning support math; 26% were for math alone, 6% were for math and reading, 10% were for math and writing, and 33% were placed for all three subject areas. Of all first-time freshmen who placed into learning support, only 25% required a combination of learning support that excluded math.

Figure 13: Percent of First-Time Freshmen Placed into Learning Support Over Time

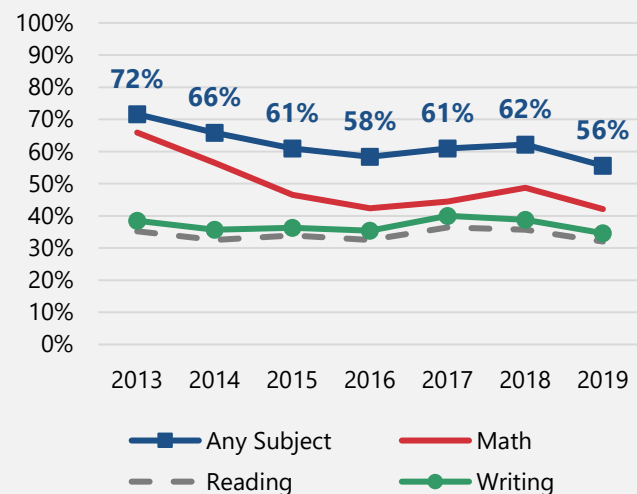
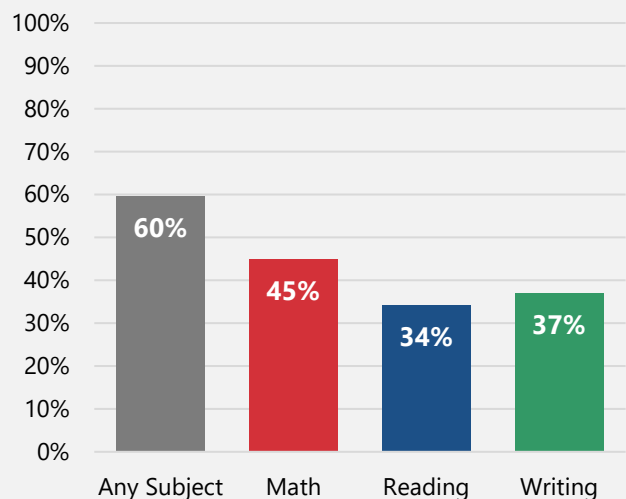


Figure 14: Percent of First-Time Freshmen Placed into Learning Support, 2015-2019



⁶ This analysis reflects students who would require learning support based on their academic preparation, not actual enrollment into learning support courses.

⁷ Students who completed SAILS during their high school senior year are excluded from the number of students who were placed into learning support. Although SAILS students were placed into and received math learning support during their high school senior year, SAILS completers were not required to complete learning support upon enrolling as first-time freshmen. This distinction reflects a change from how TBR has traditionally reported learning support placement rates. If SAILS completers are included, the proportion of first-time freshmen who require learning support rises to 64% of first-time freshmen from 2015-2019.

By College

Learning support placement varied widely by college, as **Table 9** below shows. Southwest Tennessee Community College enrolled the highest proportion of first-time freshmen who were placed into learning support for one or more subject areas. Of all colleges, students at Southwest are placed into learning support at the highest rates, with 82% of first-time freshmen requiring learning support for one or more subject areas. Specifically, 73% of first-time freshmen at Southwest were placed into learning support for math, 57% for reading, and 60% for writing. Nearly half of first-time freshmen at Southwest (45%) were placed into learning support for all three subject areas.

Other colleges had much lower learning support placement rates. At Roane State Community College and Pellissippi State Community College, only 53% of first-time freshmen at both colleges were placed into learning support for one or more subject areas, and only 12% for all three. At Chattanooga State Community College, 53% of first-time freshmen were placed into learning support for at least one subject area, and only 13% were placed into learning support for all three subject areas.

These by-college differences are a function of different student populations and highlight the necessity of tailored approaches to the delivery of learning support at each college.

Table 8: Percent of First-Time Freshmen Placed into Learning Support by Subject, 2015-2019

Subject Area	Percent of FTF	Number of FTF
Math Only	15%	16,661
Reading Only	4%	3,810
Writing Only	4%	4,310
Math & Reading	4%	4,007
Math & Writing	6%	6,649
Reading & Writing	7%	7,878
All Three Subjects	20%	21,194
Any Placement	60%	64,509
No Placement	40%	43,575
All Students	100%	108,084

Table 9: Percent of First-Time Freshmen Placed into Learning Support by College, 2015-2019

College	No LS	1 Area	2 Areas	3 Areas
Chattanooga	47%	23%	17%	13%
Cleveland	45%	23%	16%	15%
Columbia	46%	24%	15%	15%
Dyersburg	41%	24%	19%	16%
Jackson	36%	23%	22%	19%
Motlow	44%	24%	16%	17%
Nashville	35%	21%	17%	27%
Northeast	37%	25%	21%	17%
Pellissippi	47%	26%	14%	14%
Roane	47%	24%	16%	12%
Southwest	18%	18%	19%	45%
Volunteer	44%	24%	16%	16%
Walters	46%	21%	19%	14%
All Colleges	40%	23%	17%	20%

Which students are placed into learning support?

By Academic Preparation

Figure 15 below shows the distribution of ACT scores by students' learning support placement status. ACT subject scores are used to determine learning support placement for most students, so differences in levels of academic preparation between learning support and other students are expected.

Among first-time freshmen who placed into learning support math from fall 2015 to 2019, the average ACT math score was 15.8; 70% of learning support students had an ACT math score of 16 or below.

However, among first-time freshmen who were *not placed* into learning support math, the average ACT math score was only 19.8, just above the cut score for placement. In fact, 68% of non-learning support students had math scores below the ACT college readiness benchmark of 22 ([ACT, 2021](#)).

Learning support students also differed in other metrics of academic achievement. **Figure 16** shows the distribution of high school GPAs (on a 4.0 scale) for learning support students. The high school GPA for students who were placed into learning support in each subject was 0.4 to 0.5 points lower than students who were not placed into learning support.

Figure 15: Percent of First-Time Freshmen Placed into Learning Support by ACT Subject Score, 2015-2019

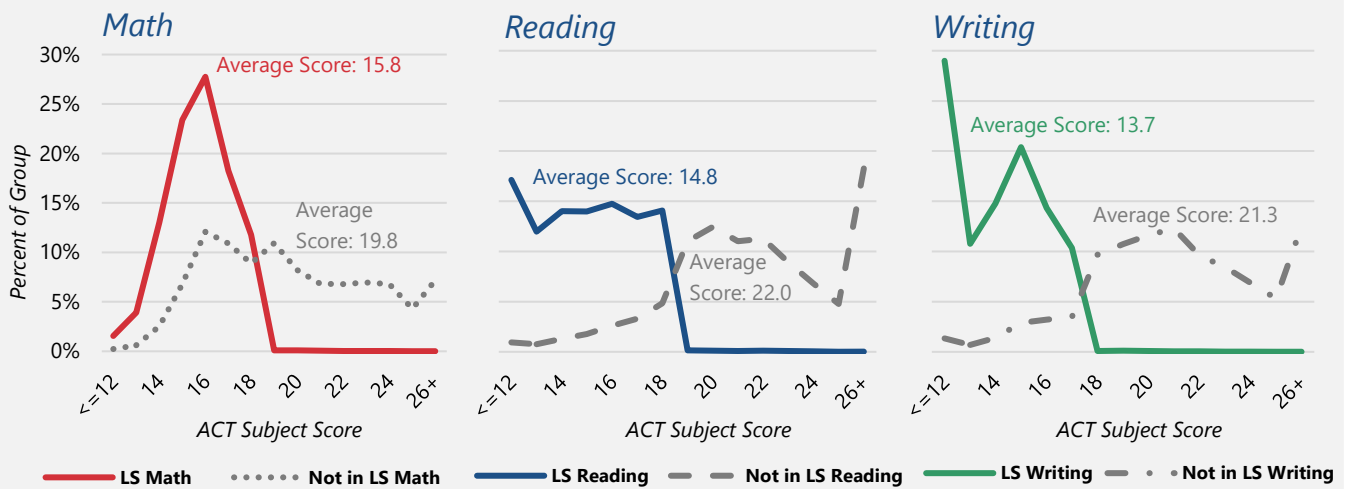
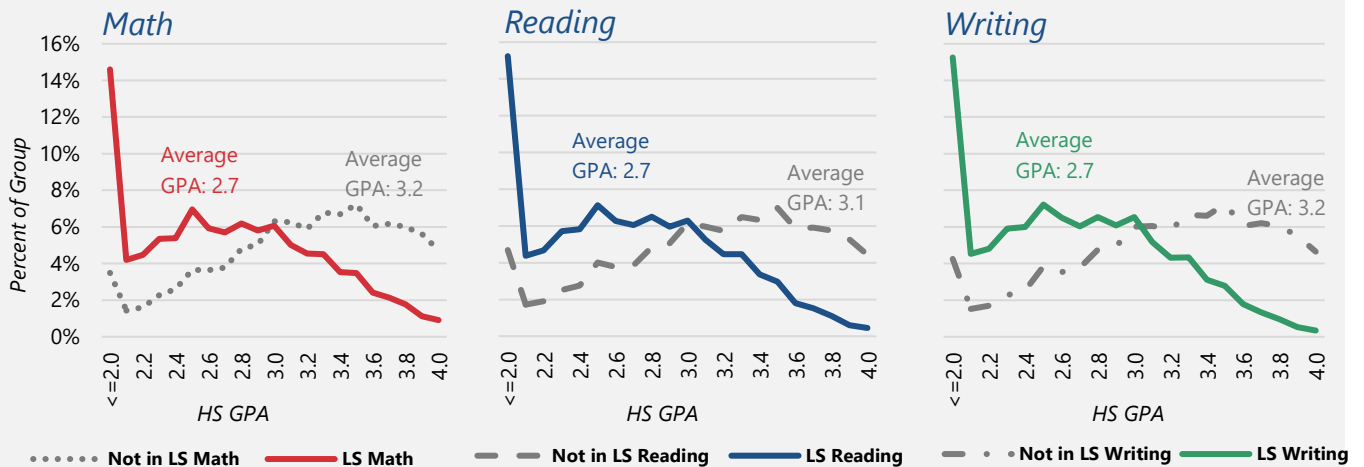


Figure 16: Percent of First-Time Freshmen Placed into Learning Support by High School GPA, 2015-2019



By Demographic Characteristics

From 2015 to 2019, Black, Hispanic, and low-income students were placed into learning support at higher rates than their White or non-low-income peers.⁸

Black and Hispanic students were placed at higher rates than White students.

Figure 17 shows placement rates by student group. From fall 2015 to 2019, 85% of Black first-time freshmen and 66% of Hispanic first-time freshmen were placed into learning support for at least one subject, compared to 53% of White students.⁹

Additionally, **Figure 18** shows the number of subjects for which students were placed. Black students were placed in learning support for all three subjects at *four times* the rate of White students; 46% of Black students were placed into learning support for three subjects. In contrast, only 12% of White students were placed into learning support for three subjects.

Low-income students were placed into learning support at higher rates than non-low-income students.

Among first-time freshmen from fall 2015 to 2019, 68% of low-income students were placed into learning support, compared to 49% of their non-low-income peers. Similarly, 25% of low-income students were placed into learning support for all three subject areas, compared with only 13% of non-low-income students.

ACT subject scores were the most common metric that was used to determine students' learning support placements. Therefore, the higher rates of learning support placement reflect differences in ACT subject scores for students based on race and ethnicity as well as income status. **Figure 19** on the following page summarizes differences in ACT subject scores for Black and White first-time freshmen from fall 2015 to 2019.

More Tools to Explore Placement

- [Working Paper #2: Low-Income Student Experiences in Learning Support](#)
- [Working Paper #3: Differences by Race and Ethnicity in Learning Support](#)
- [Data Toolkit](#)

Figure 17: Percent of First-Time Freshmen Placed into Learning Support by Group, 2015-2019

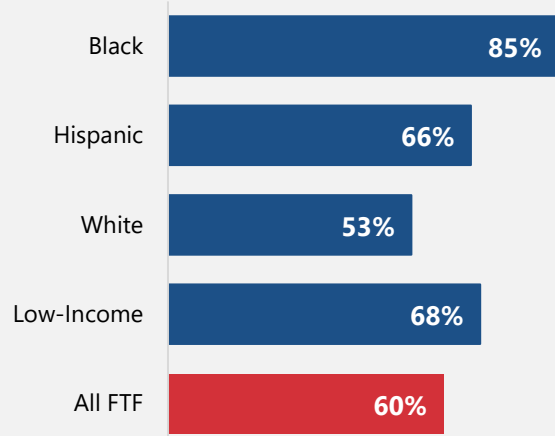
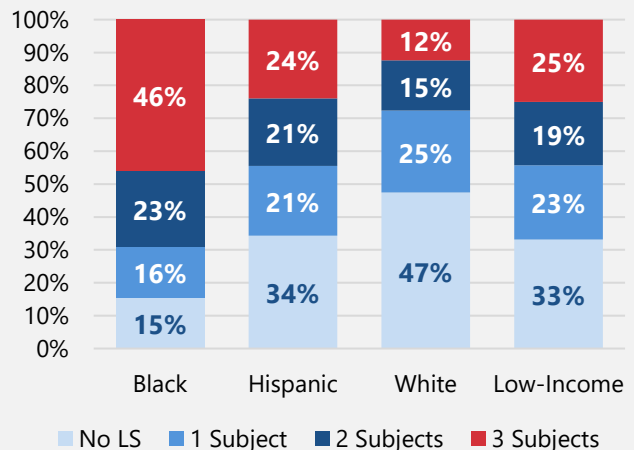


Figure 18: Percent of First-Time Freshmen Placed into Learning Support by Number of Subjects, 2015-2019



⁸ For the following analyses, low-income students are defined as students who received a Pell Grant in their first term of enrollment as first-time freshmen. Acknowledging that this is an imperfect measure, the trends here may be underreported as not all low-income students are Pell grant recipients (Delisle, 2017).

⁹ Of all first-time freshmen from fall 2015 to 2019, 18% were Black or African American, 7% were Hispanic, and 56% were low-income students.

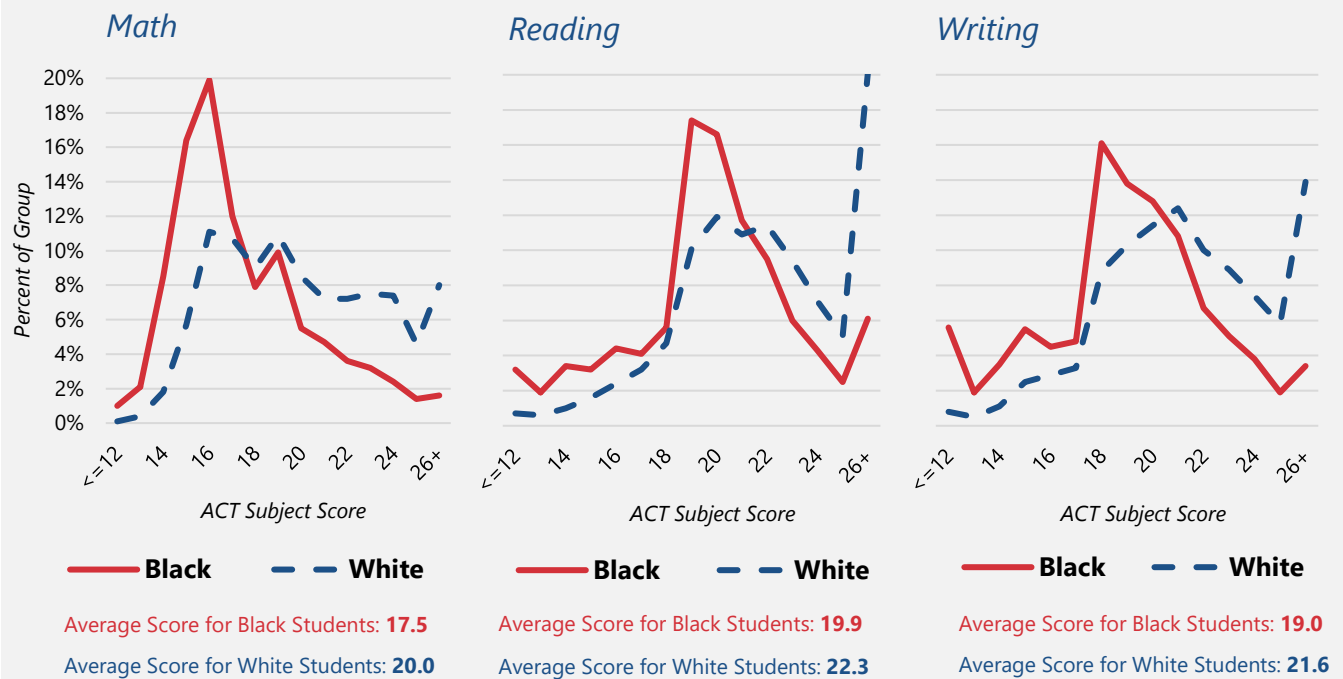
Figure 19: Learning Support Students by ACT Subject Score and Race, 2015-2019

First-Time Freshmen Placed into Learning Support



Figure 20: Non-Learning Support Students by ACT Subject Score and Race, 2015-2019

First-Time Freshmen Not Placed into Learning Support



By County and Region

Learning support placement rates were higher in West and Northeast Tennessee.

Figure 21 below shows placement rates by county in Tennessee. In addition to the major metro areas, West Tennessee and Northeast Tennessee have concentrations of purple or red shading, indicating high learning support placement rates in these areas.

Students from urban parts of the state were placed into learning support at high rates.

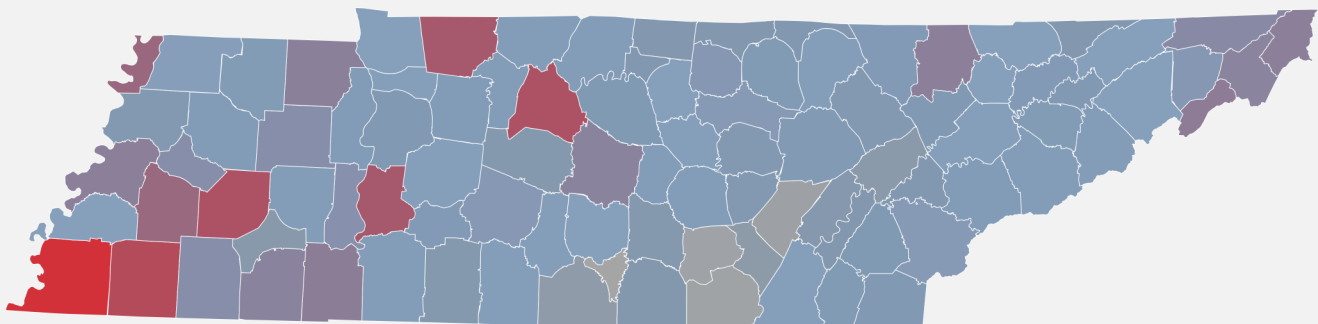
Figure 22 on the following page shows placement rates for students from the ten most urban counties in Tennessee compared to the ten most rural counties and the remaining suburban counties.

From 2015 to 2019, 66% of students from urban counties were placed into learning support for at least one subject area, compared to 55% of students from suburban counties. In math alone, 53% of students from urban counties were placed into learning support.

Just over a third of all first-time freshmen were from one of five urban counties: Shelby, Knox, Davidson, Hamilton, and Rutherford. Two of these five counties (Shelby and Davidson) had placement rates that were 15 or more percentage points higher than the system average.

Notably, from fall 2015 to 2019, 23% of all first-time freshmen in learning support were from Davidson or Shelby County. Only 9% of non-learning support students were from these two counties.

Figure 21: Percent of First-Time Freshmen Placed into Learning Support by County, 2015-2019



Percent Requiring Learning Support 
32% 58% 81%

Students from rural and suburban counties were placed into learning support at lower rates than students from urban counties.

As **Figure 22** shows, students from the ten most rural counties in the state were placed into learning support at relatively lower rates than other students. From fall 2015 to 2019, only 51% of rural students were placed into learning support. In two rural counties, Bledsoe and Moore County, fewer than 40% of first-time freshmen were placed into learning support.¹⁰

By High School

At the top enrolling high schools in rural, suburban, and urban counties, placement rates varied, as **Figure 23** shows.

At the top-three-enrolling high schools from rural counties, Riverside High School in Decatur County had the highest learning support placement rate, with 64% of students placing into learning support. In contrast, of students from Moore County High School, only 24% of first-time freshmen were placed into learning support.

At the top-three-enrolling high schools from urban counties, McGavock High School represented the highest placement rate, with 71% of first-time freshmen placing into learning support.

Among the high schools that sent the most students to community colleges (defined here as high schools from which more than 500 graduates enrolled as first-time freshmen at community colleges from fall 2015 to 2019), learning support placement rates were highest among graduates from Cordova High School (88% were placed) and Bolton High School (86%), both in Shelby County. Placement rates were lowest among graduates from Walker Valley High School in Bradley County (41%) and Lenoir City High School in Loudon County (41%).

Figure 22: Percent of First-Time Freshmen Placed into Learning Support by County Type, 2015-2019

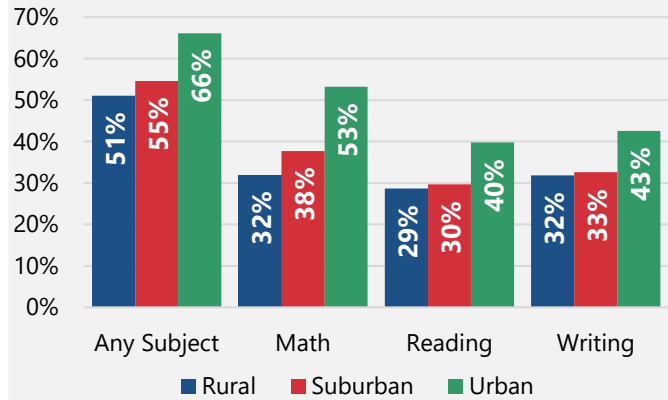


Figure 23: Learning Support Placement by High School, 2015-2019

High School	N	Any LS	Math	Reading	Writing
Rural					
Riverside High School, Decatur County	144	64%	29%	40%	46%
Bledsoe County High School	170	33%	18%	20%	22%
Moore County High School	154	24%	8%	14%	16%
Suburban					
Jefferson County High School	869	51%	37%	26%	31%
Bradley Central High, Bradley County	777	52%	38%	32%	31%
Station Camp High School, Sumner County	746	52%	45%	25%	26%
Urban					
Hardin Valley Academy, Knox County	807	51%	43%	20%	23%
Dobyns Bennett High School, Sullivan/Hawkins Counties	808	58%	35%	37%	40%
McGavock High School, Davidson County	680	71%	56%	44%	50%

¹⁰This analysis is based upon students' counties of permanent residence and is limited to in-state students. Rurality is defined according to the Index of Relative Rurality (Waldorf & Kim, 2018).

Adult Students & Learning Support

More than half of adult students are placed into learning support.

While the prior discussion focused on students who are enrolling in college for the first time, many adult students who are returning to college after time away are also placed into learning support. Of the nearly 25,000 adults (including first-time and returning students ages 25 and over) who enrolled at community colleges in fall 2019, 55% were placed into learning support, as **Figure 24** below shows.¹¹

Student Characteristics: **Figure 25** shows placement rates for adult students by student group. Black students, female students, and low-income students were placed at higher rates than other students. Placement also varied by age group. Among younger adults (those ages 25-29), only 50% were placed into learning support. However, for adult students in their 30s and 40s, placement rates neared 60%.

Adult students enrolling in college for the first time were placed into learning support at slightly higher rates than adult students who had prior college experience. For first-time freshmen adults in fall 2019, 67% were placed into at least one learning support course, compared to 55% of other adult students.

By College: The placement of adult students varied by college. At Southwest, which served the highest number of adults in fall 2019, 66% were placed into learning support, including 62% for math. The placement rate for adult students was higher at Southwest than at any other college. However, at Nashville, which serves the second-highest number of adults, only 45% were placed into learning support—the lowest of any college in fall 2019.

Change Over Time: Learning support placement for adult students changed significantly over the past decade as new assessment methods were adopted. When the Accuplacer Next Generation was adopted in 2019, placement cut scores were revised, which resulted in a drop in the adult placement rate.

Figure 24: Percent of Adult Students Placed into Learning Support by Subject, Fall 2019

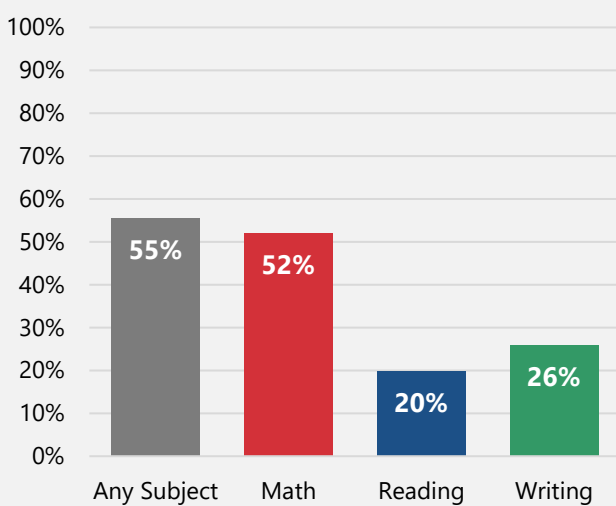
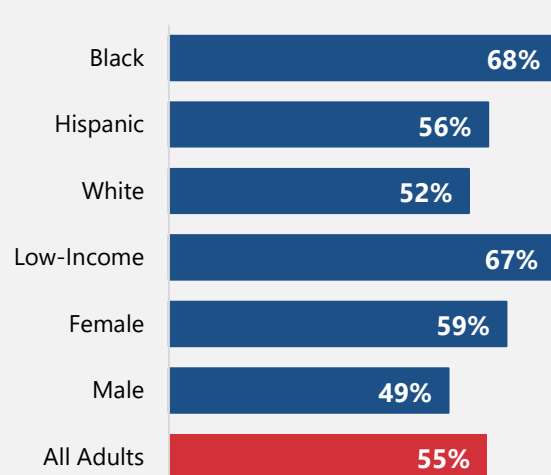


Figure 25: Percent of Adult Students Placed into Learning Support by Group, Fall 2019



¹¹ This analysis reflects placement as of fall 2019. Some adults may have completed learning support in prior terms.

A Closer Look at the Data

While colleges have traditionally used standardized test scores to determine learning support placement, a growing body of research supports placing students using multiple measures rather than relying on standardized test scores alone. Placement methods that rely upon multiple measures of preparation may increase the accuracy of placement and better identify which students would benefit from additional support. In particular, some research suggests that high school GPAs may better predict success because it measures a variety of skills needed for success, beyond subject-matter competency ([Allensworth & Clark, 2020](#); [Ganga & Mazzariello, 2019](#)).

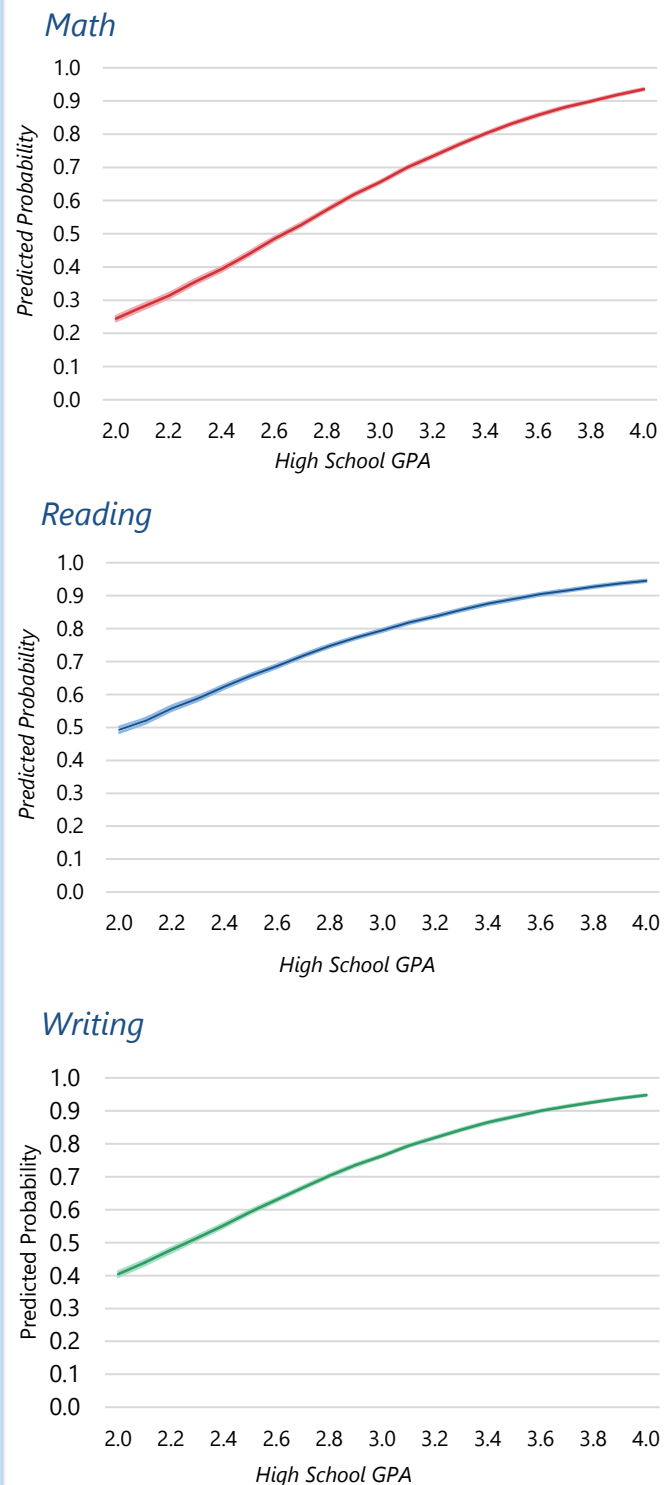
Building upon prior research on predictive analytics and placement algorithms (like [Bergman et al., 2020](#)), we built a *hypothetical placement instrument* based on data from community college students' outcomes. This instrument used data about students' standardized test scores and high school GPAs and accounted for students' first-semester enrollment characteristics and college of enrollment. Then, we compared the predictions of this instrument to *actual student placement* and outcomes from first-time freshmen at Tennessee community colleges from fall 2015 to 2019. (Visit the [Technical Appendix](#) to learn more about these models.)

Students' high school GPAs were highly correlated with outcomes in gateway courses.

Students' high school GPAs were highly correlated with the probability of course success. **Figure 26** shows the probability of a student passing a gateway course based on high school GPA. These estimates account for other factors, like students' college of enrollment, term of enrollment, and ACT scores. Even after accounting for these factors, high school GPA was highly correlated with gateway course success.

Students' ACT subject scores were also highly correlated with the probability that they will pass a gateway course in the subject area by the end of their first year of enrollment. However, when we accounted for a student's high school, the predictive power of ACT subject scores on course success decreased.

Figure 26: Probability of Passing Gateway Courses: Accounting for ACT Subject Scores & High School GPA



Note: Based on logit estimates with robust standard errors and controls for college of enrollment, term of enrollment, and full-time status. Graphs show predicted probability and 95% confidence intervals with all other variables set at their mean values.

Adding students' high school GPAs, alongside their test scores, significantly increased the accuracy of placement models.

We tested a series of logistic regression models that estimated of the probability that a student would earn a passing grade in gateway math, reading, and writing courses by the end of their first year of enrollment. To understand the factors that predict course success, we tested three types of models for each subject:

- **Model A** estimated students' probability of passing a gateway course based on the college of enrollment, term of enrollment, and full-time status. No measures of preparation were included.
- **Model B** added ACT subject scores to the model in Model A.
- **Model C** added students' high school GPAs.

For this analysis, we limited the sample to students who enrolled within one year of high school graduation and who enrolled in gateway courses in their first year. These models included students who were placed into learning support as well as non-learning support students. Students who completed SAILS were excluded from this portion of the analysis.

We can identify two important types of metrics to evaluate these models:

- 1) First, we can identify whether adding or removing new measures of academic preparation increases or decreases the overall predictive power of the model. We will call this the *model fit*.¹²
- 2) Second, we can calculate how well the model's predictions of student success compare to actual

¹² Analyses are based on logit estimates with robust standard errors and control variables for whether the student was enrolled full-time in their first fall of enrollment after high school graduation. Each model also included controls for the term and college. Visit the [Technical Appendix](#) to learn more about these models.

outcomes observed among students. We will call this the *model accuracy*.¹³

Figure 27 on the following page summarizes the *model fit* and *accuracy* for estimates of the probability that a student would pass a gateway math, reading, or writing course by the end of their first year.

In **math**, when neither ACT scores nor high school GPAs were included in the estimates (**Model A**), the model accurately predicted 58% of students' gateway course outcomes. When ACT subject scores were added (**Model B**), the model accurately predicted 60% of students' outcomes. However, when high school GPAs were added (**Model C**), the model correctly predicted 71% of course outcomes. The BIC also declined significantly when high school GPA was added, indicating greater model fit.

When we included students' high school GPAs in the predictive models (**Model C**), we correctly identified a group of students who were unlikely to succeed (the top left quadrant shown in green, representing 21% of students) and students who were very likely to succeed (the bottom right quadrant shown in green, representing 50% of students). Compared to the predictions based on ACT scores (**Model B**), the addition of high school GPA helped increase the accuracy of our predictions of which students were likely to succeed in gateway courses (producing fewer false negatives). However, even **Model C** inaccurately identified 29% of students (the quadrants in red).

Results in **reading** and **writing** were similar, as shown in **Figure 27**. Although outcomes differed by subject, models with high school GPA had greater model fit and accuracy than models based on ACT scores alone.

¹³ **Model fit** is measured using the BIC (Bayesian Information Criterion), which describes the overall fit of a model. The model with the smaller BIC is the better model. When comparing two models, a difference of ten or more suggests evidence of very strong improvement in model fit. **Model accuracy** is calculated using a postestimation classification table that calculates the rate at which a model correctly predicted outcomes. For estimates of model accuracy, the threshold of success is set at 0.70, the mean probability of passing a course.

Figure 27: Model Fit and Accuracy, Accounting for ACT Scores & GPA

Math

Model accurately predicted outcome.

Model inaccurately predicted outcome.

Model A: No Preparation Data Included in the Model

		Model Predicted Student Would Pass	
		No	Yes
Student Passed the Course	No	16%	15%
	Yes	27%	42%

Model Accuracy: 58%
N=53,081
 Model Fit (BIC): 64,735

Model B: ACT Subject Score Included in the Model

		Model Predicted Student Would Pass	
		No	Yes
Student Passed the Course	No	21%	9%
	Yes	31%	39%

Model Accuracy: 60%
N=50,893
 Model Fit (BIC): 58,817

Model C: ACT Scores and High School GPA Included in the Model

		Model Predicted Student Would Pass	
		No	Yes
Student Passed the Course	No	21%	9%
	Yes	20%	50%

Model Accuracy: 71%
N=49,493
 Model Fit (BIC): 49,968

Reading

Model A: No Preparation Data Included in the Model

		Model Predicted Student Would Pass	
		No	Yes
Student Passed the Course	No	6%	19%
	Yes	13%	63%

Model Accuracy: 69%
N=56,947
 Model Fit (BIC): 63,047

Model B: ACT Subject Score Included in the Model

		Model Predicted Student Would Pass	
		No	Yes
Student Passed the Course	No	6%	19%
	Yes	13%	63%

Model Accuracy: 70%
N=54,284
 Model Fit (BIC): 58,537

Model C: ACT Scores and High School GPA Included in the Model

		Model Predicted Student Would Pass	
		No	Yes
Student Passed the Course	No	6%	19%
	Yes	13%	63%

Model Accuracy: 73%
N=52,972
 Model Fit (BIC): 51,552

Writing

Model A: No Preparation Data Included in the Model

		Model Predicted Student Would Pass	
		No	Yes
Student Passed the Course	No	4%	21%
	Yes	9%	66%

Model Accuracy: 70%
N=77,183
 Model Fit (BIC): 87,460

Model B: ACT Subject Score Included in the Model

		Model Predicted Student Would Pass	
		No	Yes
Student Passed the Course	No	11%	14%
	Yes	19%	56%

Model Accuracy: 67%
N=74,175
 Model Fit (BIC): 81,044

Model C: ACT Scores and High School GPA Included in the Model

		Model Predicted Student Would Pass	
		No	Yes
Student Passed the Course	No	15%	10%
	Yes	17%	57%

Model Accuracy: 72%
N=72,468
 Model Fit (BIC): 70,591



However, the impact of high school GPAs may differ by which high school students attended.

Students’ high school GPAs were consistently and significantly correlated with the probability that a student would pass a gateway course. However, the *marginal effect* of high school GPA and overall *model fit* increased when we accounted for the high schools from which students graduated, suggesting that the predictive power of high school GPA for placement may vary depending upon the high school.

Table 10 below summarizes differences in the impact of high school GPA on students’ probability of course success by high school. This analysis focuses on students from the five in-state, public high schools that sent the greatest number of students to Tennessee community colleges from 2015 to 2019.

As this data shows, outcomes differed slightly by high school, especially in math. For example, among graduates of Hardin Valley Academy, a one-point increase in high school GPA (e.g., moving from 3.0 to 3.1) was associated with a three-point increase in the probability that a student would pass gateway math, reading, or writing. However, for graduates of Jefferson County High School, a one-point increase in high school GPA (e.g., moving from 3.0 to 3.1) was associated with a six-point increase in the probability of passing math and a four-point increase in the probability of passing reading or writing.

Additionally, more complex placement models sometimes produced diminishing returns.

While adding additional metrics increased the overall fit and accuracy of the models of course success, complex models sometimes produced diminishing returns and did not notably change the accuracy of our ability to predict course success, beyond what could already be determined by ACT and GPA.

We added other test scores to the model (including SAT scores and ACCUPLACER scores) and used missing data imputation to estimate scores for students whose test scores were unavailable. These estimates did not significantly increase model fit or change the effect of high school GPA and ACT subject scores on the probability of success. To check the robustness of the model, we also estimated the model separately for students based on race, gender, and low-income status. The overall conclusions of the model did not change in these specifications.

However, ACT subject scores *outside of the ACT scores traditionally used for placement* were sometimes highly correlated with course success. For example, success in math was correlated with students’ ACT reading and ACT English scores. Similarly, ACT reading scores were slightly more correlated with success in gateway writing courses than were the ACT English scores that are used for placement.

Table 10: Marginal Effect of High School GPA on Probability of Passing Gateway Course

High School	Math	Reading	Writing
Jefferson County High School	0.06	0.04	0.04
Gallatin High School, Sumner County	0.05	0.04	0.04
Station Camp High School, Sumner County	0.05	0.03	0.04
Dobyns-Bennett High School, Sullivan/Hawkins Counties	0.05	0.02	0.03
Hardin Valley Academy, Knox County	0.03	0.03	0.03
All High Schools	0.04	0.03	0.03



Test-based placement rules may over-prescribe and under-prescribe learning support to some students. High school GPA can help identify these students.

Models that predicted student success using *both* ACT scores and high school GPA (**Model C** in **Figure 27** on the previous pages) allowed us to identify students who had a high or low probability of passing gateway courses. Next, we compared the model's predictions to outcomes for students who were placed into learning support using test-based placement rules.

If the placement model (**Model C**) were used to determine learning support placement, some students who received learning support under existing rules would have been placed *out of* learning support. Similarly, some non-learning support students might not have been placed *into* learning support.

For this analysis, we defined two student groups:

- 1) First, some students may be **over-prescribed learning support**, meaning they are placed into learning support even though they have a high probability of success. In math, when we applied our predictive model to actual placements and outcomes, 12% of first-time freshmen had a high probability of success (e.g., a probability greater than 0.70 of passing a gateway math course) *and* ultimately passed college-level math but were placed into learning support using traditional test-based metrics. Students who were over-prescribed learning support were disproportionately female and typically had high school GPAs above 3.0.
- 2) Traditional placement rules may **under-prescribe learning support** to some students. Our analysis of math outcomes identified 6% of first-time freshmen whose probability of passing a gateway math course was lower than 0.70 *and* who did not pass college-level math courses but who were not placed into learning support. These students were disproportionately male, typically had ACT subject scores just above the placement thresholds, and had high school GPAs under 3.0.

Table 11 summarizes the patterns of over- or under-prescription of learning support based on predictive modeling that used test scores and GPA (**Model C**).

Table 11: Placement Accuracy for First-Time Freshmen, 2015-2019

	Math	Reading	Writing
First-Time Freshmen Who Attempted Gateway Course			
Total Sample Size	49,493	52,972	72,468
% Over-Prescribed	12%	22%	13%
% Under-Prescribed	6%	4%	6%
Black Students Who Attempted Gateway Course			
Total Sample Size	7,109	10,191	11,546
% Over-Prescribed	11%	32%	20%
% Under-Prescribed	6%	4%	5%
Hispanic Students Who Attempted Gateway Course			
Total Sample Size	3,248	3,633	4,710
% Over-Prescribed	13%	26%	18%
% Under-Prescribed	5%	4%	5%
White Students Who Attempted Gateway Course			
Total Sample Size	36,091	35,672	51,843
% Over-Prescribed	12%	19%	10%
% Under-Prescribed	6%	4%	6%
Female Students Who Attempted Gateway Course			
Total Sample Size	27,108	30,054	40,686
% Over-Prescribed	16%	25%	14%
% Under-Prescribed	4%	3%	4%
Male Students Who Attempted Gateway Course			
Total Sample Size	22,363	22,887	31,751
% Over-Prescribed	7%	18%	10%
% Under-Prescribed	9%	6%	8%



PROMOTING ACCESS & SUCCESS THROUGH ACCURACY IN PLACEMENT

Summary

Gaining Momentum

- From fall 2015 to 2019, 60% of first-time students at Tennessee community colleges were placed into a learning support course for at least one subject.
- Black and Hispanic students were placed into learning support at higher rates than White students, and low-income students were placed at higher rates than their non-low-income peers. Black students were placed into learning support courses for all three subjects at four times the rate of White students.
- The use of high school GPA could improve placement accuracy.

Connections to Core Principles

- **Improving Gateway Course Completion in Math, Reading, & Writing:** Accurate placement can shape gateway course outcomes, retention, and students' time to degree. However, data from 2015 to 2019 suggests that some students may have been over- or under-prescribed learning support. *How would the use of additional metrics improve placement accuracy and help identify who would most benefit from learning support?*
- **Supporting Institutional Innovation & Autonomy:** Placement into learning support means additional credit hours a student must complete and creates additional costs for students. *How accurate are current placement metrics in predicting who needs additional learning support, how much support they need, and what kind of support they need?*
- **Closing Equity Gaps in Retention & Graduation:** Accurate placement policies are critical for Black and low-income students, who are more likely than other students to be placed into learning support based on ACT scores. *How will alternative placement metrics like high school GPA affect differences in placement rates and outcomes by race and ethnicity?*

Explore More

- [Working Paper #1: Tennessee Corequisite Placement Pilot](#)
- [Working Paper #2: Low-Income Student Experiences in Learning Support](#)
- [Working Paper #3: Differences by Race and Ethnicity in Learning Support](#)
- [Data Toolkit](#)

About the Tennessee Corequisite Placement Pilot

The COVID-19 pandemic prompted several states to adopt new placement methods since many test-based placement metrics were unavailable. In April 2020, the Tennessee Board of Regents approved a pilot to add high school GPA as a placement method at Tennessee community colleges alongside other measures included in TBR's learning support policy.

In fall 2020, the [Tennessee Corequisite Placement Pilot](#) allowed entering first-time freshmen and dual enrollment students with a cumulative high school GPA of 3.6 or higher to bypass learning support courses, regardless of their test scores. In addition to this new placement metric, three colleges were approved for an Expanded Corequisite Placement Pilot, which allowed entering students to bypass learning support with a high school GPA of 3.6 or higher or provisionally bypass learning support with a GPA between 2.8 and 3.6.

Resources to learn more about the [Tennessee Corequisite Placement Pilot](#) are [available on the TBR website](#).





SUPPORTING INSTITUTIONAL INNOVATION & AUTONOMY

Institutional innovation and autonomy drive remediation reforms in Tennessee. Each college adapts the corequisite learning support models to meet the needs of their students, and some colleges have developed innovative, effective models.

Each college implemented corequisite learning support according to guidelines provided by TBR.

When corequisite learning support was implemented systemwide in 2015, TBR policy outlined placement decisions and provided a framework for the delivery of corequisite learning support ([TBR, 2019a](#)).

Some key guidelines in this framework include:

- Students must enroll in college-level coursework concurrent with learning support.
- Learning support may be credit or non-credit bearing, but no more than three credit hours.
- Faculty members who teach the college-level course must be involved in the development of the learning support curriculum, either by teaching both the learning support course and college-level course or by routine communication with the learning support instructor.

However, colleges could adapt the corequisite model to fit the needs of their students, within certain system guidelines.

Institutional innovation has driven and continues to drive learning support reforms in Tennessee ([Crandall & Soares, 2015](#); [Squires, 2019](#); [TBR, 2021](#)). When corequisite learning support was implemented, colleges were given the latitude to adapt the corequisite model to best fit their needs, especially since the needs of each student body are different. This flexibility was built into the TBR learning support policy, resulting in a number of different models for the delivery of corequisite learning support.

Corequisite learning support works differently at each college. These differences have created a series of field experiments about effective practices for corequisite learning support, but there is limited prior research to evaluate these differences. This section explores the dimensions on which colleges' implementation of corequisite learning support differs and the impact of those differences.



How does corequisite learning support differ **by college**?

Which courses are **paired** with learning support?

How are courses **connected** and aligned?

How are courses **structured**?

How do corequisite learning support experiences differ by college?

Students may experience corequisite learning support differently based on the implementation model in place at their college. Even within colleges, learning support may vary across subject areas. This analysis will explore three dimensions on which the implementation of corequisite learning support might differ, as outlined below:

Dimension	Questions for Consideration	
Which college-level courses are paired with learning support?	Math	Which college-level courses are paired with learning support? How do pairings affect student outcomes or create “hidden prerequisites”?
	Reading	How do differences in college-level reading pairings affect outcomes?
	Writing	How are writing and reading courses linked?
How are college-level and learning support courses connected?	Learning Communities	How are college-level and learning support courses connected and aligned through intentional learning communities?
	Faculty Connections	How do colleges create connections between the faculty members who teach the learning support and college-level courses?
	Curriculum Connections	How can the syllabus or curriculum in learning support courses be aligned to connect with the curriculum in college-level courses?
How are the college-level and learning support courses structured?	Class Size	How are the college-level and learning support courses structured?
	Class Composition	How often are learning support students enrolled in blended college-level sections alongside non-learning support students, versus standalone college-level sections where only learning support students are enrolled?
	Timing	How have colleges adopted innovative methods to ensure all students can enroll in college-level courses during their first year?

About the Data

To learn more about how colleges implemented corequisite learning support to best fit their students’ needs, TBR gathered information about key learning support design models from three sources:

1. Institution-level questionnaire completed by academic administrators in summer 2020
2. Survey of 270 faculty in fall 2020
3. Student and faculty interviews at four colleges in spring 2021 ([Guthrie et al., 2021](#))

These resources shed light on implementation choices and challenges at each college. In the institution-level questionnaire, academic administrators were asked to answer questions about placement, learning support practices, and curriculum alignment. Faculty across the system also participated in an anonymous survey about the features of their courses, collaboration with other faculty, and the effectiveness of the corequisite model. Finally, faculty and students participated in interviews about their experiences with learning support in spring 2021. Interviews were led by the [Tennessee Education Research Alliance](#).



Which college-level courses are paired with math learning support?

According to systemwide policy, learning support courses must be paired with and offered concurrently with credit-bearing, college-level courses relevant to students' programs of study (TBR, 2019a). This systemwide policy allows each college to choose which college-level courses to pair with learning support. For example, the systemwide policy allows colleges to create different pairings based on students' programs of study.

In math, colleges place learning support students into one of nine college-level math courses, which fall into three categories:

- 1) A *Probability and Statistics* course that counts toward a student's degree.
- 2) An *Algebra-Track* course that counts toward a student's program of study.
- 3) Or a *Math Fundamentals* or other math course, which includes courses like *Introduction to Math* or *Algebra Essentials*. These courses sometimes do not count toward the general education requirements.

Some colleges pair learning support math with college-level courses that do not count toward general education requirements.

Many students in STEM programs are required to take algebra-based math courses to fulfill their program's general education requirements. For students who are enrolled in a program of study with an algebra-intensive or calculus math requirement, TBR has allowed colleges to pair learning support math with a college-level course that does *not satisfy general education requirements*, such as *Math Foundations* courses (TBR, 2015).

To address learning support and general education requirements, some learning support students must first complete a college-level math course that does not count toward general education requirements.

Upon successful completion of the non-general education course, these students must then complete a general education algebra-based course.

In effect, this structure creates a "hidden prerequisite" where both the non-general education college-level course and the learning support course must be completed before students can enroll in the math course required for their program.

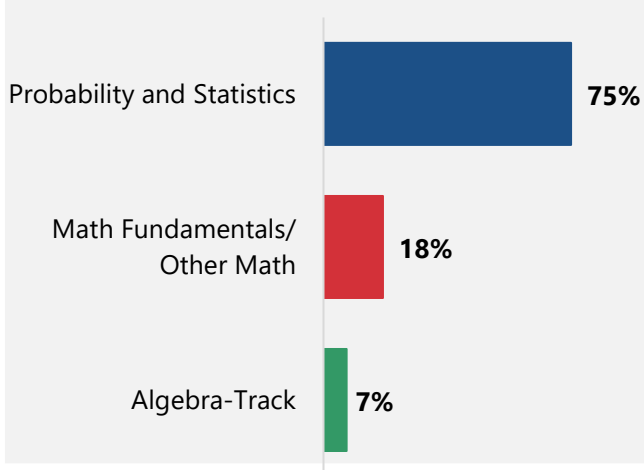
How many students enroll in each pairing?

Figure 28 shows the paired college-level course in which learning support math students enrolled. This analysis is limited to students who enrolled as first-time freshmen from fall 2015 to 2019.

Probability and Statistics is the most common college-level math course for learning support math students.

Among learning support students who enrolled in a college-level math course in their first year, three-fourths of students were enrolled in *Probability and Statistics*. Less than one-tenth of learning support math students enrolled in a college-level math course on the algebra track, including *College Algebra*, *Trigonometry*, *Precalculus*, and *Calculus*. Another fifth enrolled in a math fundamentals course, including *Introduction to College Math*, *Algebra Essentials*, and *Math for Liberal Arts or Education*.

Figure 28: Learning Support Math Pairings, 2015-2019

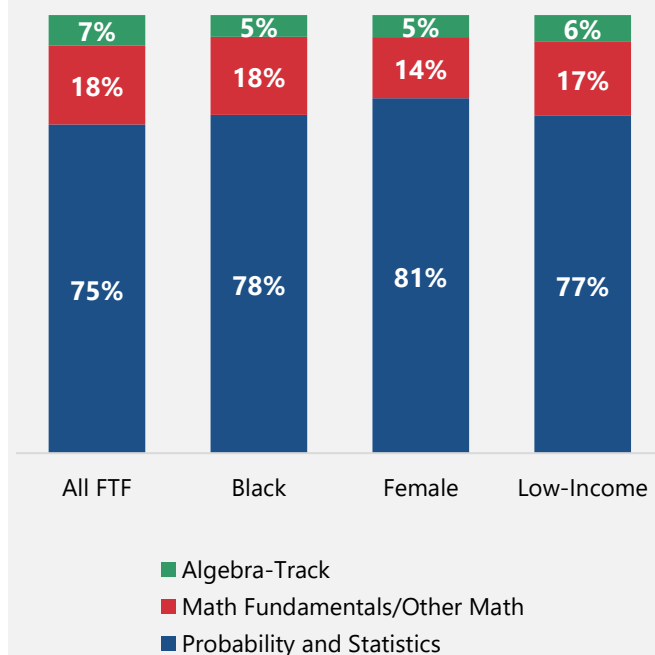


By College: At all Tennessee community colleges, more than half of learning support math students enrolled in Probability and Statistics, with as many as 92% at Roane and as few as 51% at Dyersburg. At all colleges except Columbia and Walters, most students who did not enroll in Probability and Statistics enrolled in a Math Fundamentals/Other course.

Additionally, Walters State Community College also offers College Experience (EDUC 1030) as a paired college-level math course for learning support math students with ACT math scores of 15 or lower.

By Student Demographics: **Figure 29** shows math enrollment by student group. Black students, low-income students, and female students enrolled in Probability and Statistics at slightly higher rates than other students. While 75% of all learning support math students were enrolled in Probability and Statistics, 77% of low-income learning support students, 78% of Black learning support students, and 81% of female learning support students enrolled in Probability and Statistics. Fewer Black, low-income, and female students paired learning support math with a college-level course on the algebra track, which is required for some majors.

Figure 29: Math Course Pairings by Student Group, 2015-2019



How do differences in college-level math pairings affect student outcomes?

Course pass rates, retention rates, and graduation rates were highest for learning support math students who enrolled in an Algebra-Track paired course, as **Figure 30** below shows. While students in Probability & Statistics had the lowest pass rates, students in Math Fundamentals courses had the lowest retention and graduation rates.

For Black learning support students, who enrolled in Probability and Statistics at higher rates than other students, just 44% of students passed the course. Gaps were smaller in Math Fundamentals courses and larger in Algebra-Track courses. Similar patterns were present for low-income students, where participation in Probability and Statistics was higher and success rates were lower than for non-low-income students.

Figure 30: Outcomes in College-Level Courses by Math Pairings, 2015-2019

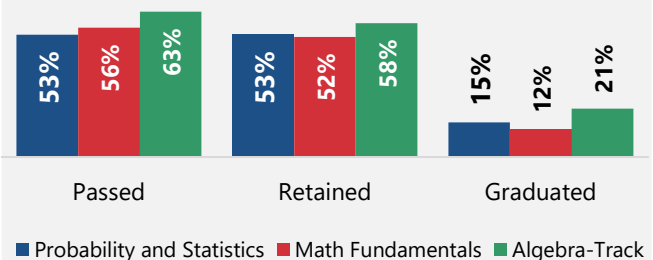
All FTF in Learning Support



Black Learning Support Students



Low-Income Learning Support Students



A Closer Look at the Data

Probability of Success by Math Course Pairing

Descriptive analyses showed that pass rates for students in Probability and Statistics courses were lower than for students who paired learning support with a math fundamentals course or an Algebra-Track course. However, though the *short-term outcomes* (like course pass rates) seemed less positive for these students, the *longer-term outcomes* (like retention and graduation) suggest that Probability and Statistics students were just as successful or more successful than their peers in Math Fundamentals or advanced math courses.

On the other hand, students who paired the learning support math course with a non-Probability and Statistics course, either enrolling in a Math Fundamentals course or an Algebra-Track, course, were more successful in the short term (as measured by course pass rates), but long-term trends are less promising.

However, descriptive analyses may obscure some differences in outcomes across student groups or the impact of other factors that influence success. A closer look at data will allow for a deeper understanding of outcomes by math pairing. (Visit the [Technical Appendix](#) to learn more about these models.)

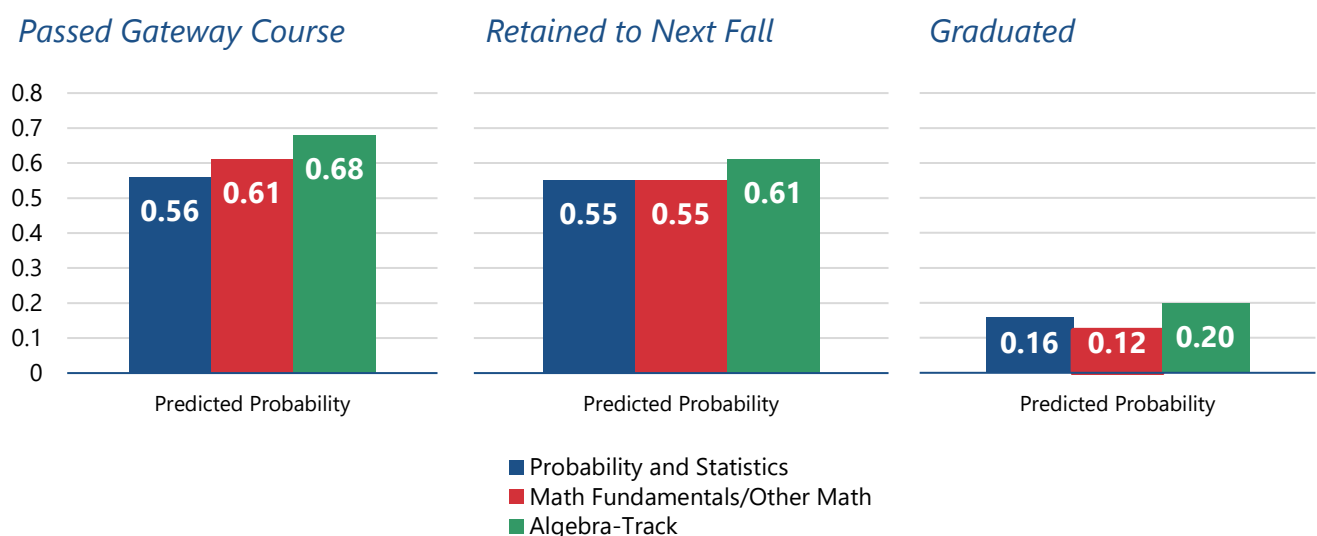
The short-term success of students in Math Fundamentals courses did not translate into longer-term success.

To understand the impact of various math pairings, we estimated the probability of successful outcomes for first-time freshmen in learning support math from fall 2015 to 2019. These estimates produced *predicted probabilities of success* based on math pairings and other factors like students' academic preparation, demographic characteristics, and enrollment patterns.

Figure 31 shows the probability of three outcomes for students--passing the gateway course in their first year, returning the following fall, and graduating within three years. After controlling for other factors through logistic regression analysis:

- Learning support math students who enroll in an Algebra-Track course had better short-term *and* long-term outcomes than in Math Fundamentals.
- Students in Math Fundamentals had a higher probability of passing the course than peers in Probability and Statistics; however, the short-term effect of placing students into Math Fundamentals did not translate into longer-term success.
- While placing students into a Math Fundamentals course may look like success in the short term, these gains may be short-lived and result in worse outcomes for students in the long term.

Figure 31: Probability of Success by Learning Support Math Course Pairing, 2015-2019



Which college-level courses are paired with reading learning support?

In reading, colleges place learning support students into college-level reading-intensive courses that fall into one of three categories:

- 1) A *First-Year Seminar*, such as First-Year Experience or College Success.
- 2) *English Composition* (English 1010), which may serve as the paired college-level course for students in both reading and writing learning support, depending upon the college.
- 3) Or a *General Education Humanities Course*, such as Fundamentals of Communication or Introduction to Psychology.

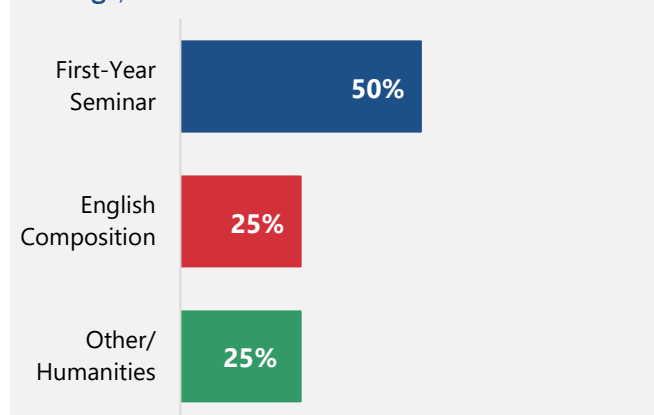
How many students enroll in each pairing?

Figure 32 shows the paired college-level course in which learning support reading students enrolled. This analysis is limited to students who enrolled as first-time freshmen from fall 2015 to 2019.

Half of first-time freshmen in learning support reading enrolled in a First-Year Seminar as their paired reading course.

One-fourth of these same students enrolled in English 1010 as their paired college-level reading course, and about 25% of learning support reading students enrolled in a general education humanities course.

Figure 32: Learning Support Reading Pairings, 2015-2019



By College: Eight colleges pair reading learning support with a first-year seminar. At Jackson, Motlow, and Pellissippi, all learning support reading students were also enrolled in a first-year seminar as their paired college-level courses. Most learning support reading students at Dyersburg, Northeast, and Southwest, enrolled in a first-year seminar.

Chattanooga, Cleveland, Columbia, and Nashville all offer English Composition as a paired course for reading support. At Chattanooga and Columbia, all learning support reading students were enrolled in English 1010 as the paired course. At Walters and Roane, all learning support reading students enrolled in a general education humanities course. At Northeast, a quarter of students enrolled in a humanities course, and at Nashville, nearly half enrolled in a humanities course. Additionally, at some colleges, a select group of college-level courses can be paired with learning support reading only for students who do not *also* require writing support.

Over Time: Over time, pairing trends were relatively consistent, with a few exceptions.

- At Cleveland in 2015, students only enrolled in a first-year seminar or humanities course as their college-level reading courses. However, from 2016 to 2019, all students with learning support reading needs enrolled in English 1010.
- At Dyersburg, from 2015 to 2017, all learning support reading students enrolled in a first-year seminar. Then in 2018 and 2019, about three-fourths enrolled in a first-year seminar while the remainder enrolled in a humanities course.
- At Southwest in 2015, about one-third of learning support reading students enrolled in each of the three categories. In 2016 and 2017, about half enrolled in either a first-year seminar or humanities course, and in 2018 and 2019, all students enrolled in a first-year seminar.
- Finally, in fall 2019, Volunteer moved from a first-year seminar pairing to only pairing learning support reading with English Composition courses.

By Student Demographics: While half of all learning support reading students enrolled in a first-year seminar, Black students enrolled in first-year seminars at higher rates and in humanities courses at lower rates than their White peers. About 47% of White students and 55% of Black students enrolled in a first-year seminar alongside learning support reading. Black students and White students enrolled in English 1010 at similar rates, yet 21% of Black students enrolled in a humanities course, while this number was closer to 28% for White students. However, these trends were largely driven by the course pairings that were available at the colleges that served the highest proportion of Black students.

Low-income students also enrolled in humanities courses at slightly higher rates (26%) than non-low-income students (23%). Lastly, students with higher ACT reading scores enrolled in humanities courses at higher rates, while students with lower ACT reading scores enrolled in first-year seminars at higher rates.

How do differences in college-level reading pairings affect student outcomes?

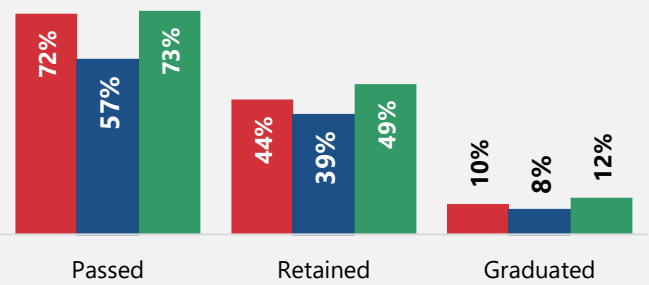
Students who enrolled in college-level English alongside their learning support reading course had lower gateway course pass rates, lower retention rates, and lower graduation rates than their peers in other pairings.

As shown in **Figure 33**, learning support reading students in English Composition had a college-level course pass rate of 57%, a retention rate of 39%, and a three-year graduation rate of only 8%. Students in a humanities course had the highest outcomes of the three pairings, with a 73% pass rate, 49% retention rate, and 12% graduation rate.

Black students and low-income students had lower gateway course pass rates in English 1010 but had pass rates that were almost as their high White and non-low-income peers in first-year seminars and humanities courses. These patterns persist through retention and graduation for both Black and low-income students, and the gap remains widest for students who enrolled in English Composition.

Figure 33: Outcomes in Learning Support by Reading Pairings, 2015-2019

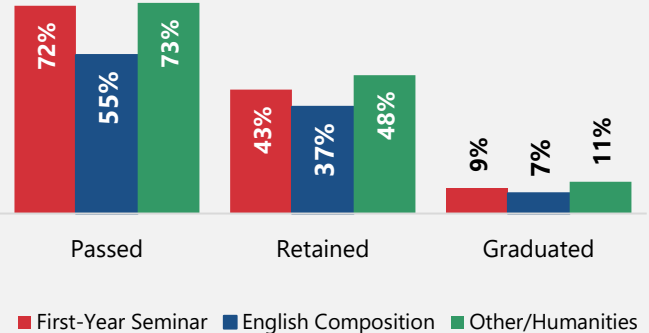
All FTF in Learning Support



Black Learning Support Students



Low-Income Learning Support Students



Which college-level courses are paired with writing learning support?

For students who require learning support in writing, their corequisite learning support course is paired with English Composition I (ENGL 1010) at all colleges. This course is a required general education course. As previously discussed, some colleges pair learning support *reading and writing* with English Composition.

A Closer Look at the Data

Probability of Success by Reading Course Pairing

Descriptive analyses show pass rates for students in English Composition were lower than for learning support students in either a first-year seminar or a humanities course. However, descriptive analyses may obscure some differences in outcomes across student groups or the impact of other factors that influence success. A closer look at data will allow for a deeper understanding of outcomes by reading pairing.

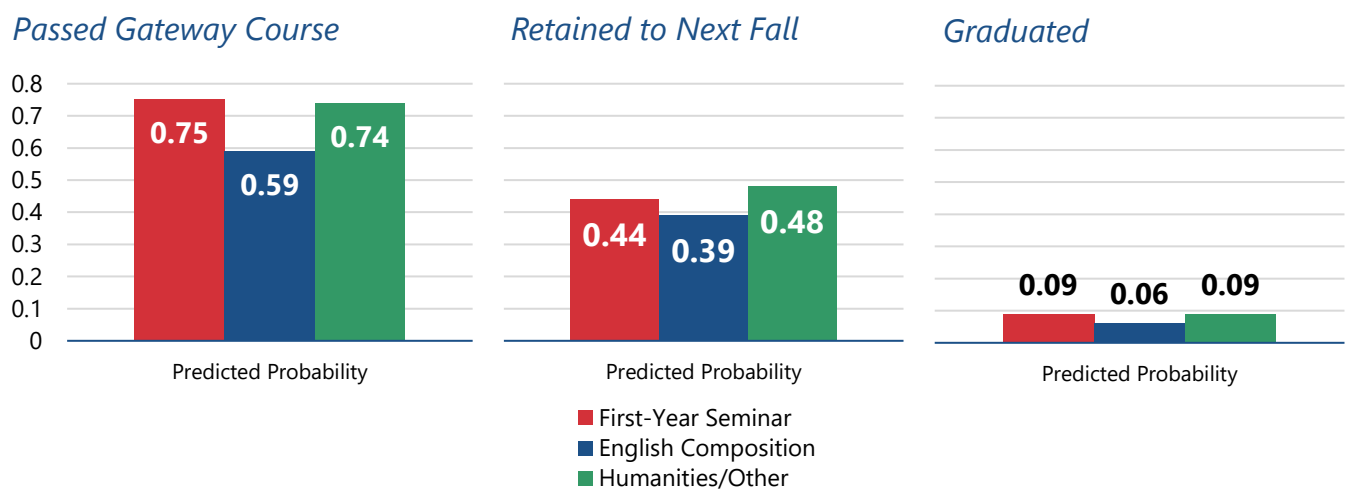
To understand the impact of various math pairings, we estimated the probability of successful outcomes for first-time freshmen in learning support reading from fall 2015 to 2019. These estimates produced *predicted probabilities of success* based on reading pairings and other factors like students' academic preparation, demographic characteristics, and enrollment patterns. (Visit the [Technical Appendix](#) to learn more about these models.)

After accounting for other factors that may influence success, learning support reading students in a first-year seminar or humanities course had higher probabilities of success than their peers in English Composition.

Figure 34 shows the probability of three outcomes for students--passing the gateway course in their first year, returning the following fall, and graduating within three years. After controlling for other factors through logistic regression analysis:

- When learning support reading was paired with a first-year seminar, students had a higher predicted probability of passing the course, yet their probability of returning the following fall was four percentage points lower than their peers in a humanities course.
- Still, students in a first-year-experience or humanities course had a higher predicted probability of being retained than their peers in an English course.
- When learning support reading was paired with English Composition, students had a lower predicted probability of passing the class, being retained, and graduating than their peers in other pairings. For the students in English, the predicted probability of passing the course was 15 or more percentage points lower than peers in other pairings.

Figure 34: Probability of Success by Learning Support Math Course Pairing, 2015-2019



How are college-level and learning support courses connected?

TBR's Learning Support policy requires colleges to connect and align learning support courses with college-level courses. For example, the learning support course must address the competencies required in the paired college-level course and facilitate successful completion of the college-level course. Additionally, faculty who teach college-level courses must be involved in the development of appropriate co-requisite learning support curricula and delivery plans that support the linked college-level courses (TBR, 2019a). Colleges employ various methods to create and align courses.

Corequisite Learning Communities

Learning communities connect students who are engaged in common activities.

TBR's High Impact Practice taxonomy lists learning communities as an evidence-based practice designed to increase student engagement and success. A student learning community occurs when the same groups of students are taking two or more classes concurrently for academic credit, and students in the learning communities are engaged in common intellectual activities with intentional curricular connections (TBR, 2016). Cohort-based learning communities may benefit learning support students by creating a sense of belonging (Adams et al., 2009) or opportunities for peer learning (Daugherty, et al., 2021), which could translate into higher rates of course success (Gonzales & Baier, 2019).

Some Tennessee community colleges use corequisite learning communities to create connections between learning support courses and paired college-level courses.

In the context of corequisite learning support, a learning community may be present when all of the students from a learning support class are enrolled together in the same college-level class. Sometimes, the college-level section may also include additional non-learning support students.

However, learning communities can introduce more complexity into the corequisite model or create implementation challenges (Daugherty, et al., 2018). In a fall 2020 survey of Tennessee community college faculty, some respondents said that corequisite learning communities run the risk of becoming "little more than block registration devices, with little alteration of the teaching and learning environment" in the absence of sufficient resources.

The use of corequisite learning communities differs within and across colleges.

In a 2020 survey, academic administrators at Tennessee community colleges reported wide variation in the use of corequisite learning communities. Seven colleges reported the use of formal corequisite learning communities, but no colleges used learning communities for all three subjects. For colleges that did not use formal learning communities, enrollment data showed that a sizable proportion of students are enrolled in *informal* communities or *paired sections*, where everyone from the learning support section is in the same college-level section. **Table 13** describes learning communities by college.

Table 13: Use of Corequisite Learning Communities by Subject, Fall 2019

	Math	Reading	Writing
Chattanooga	None	None	None
Cleveland	Formal LC	None	None
Columbia	Informal LC	None	Formal LC
Dyersburg	Formal LC	None	Informal LC
Jackson	None	None	None
Motlow	Informal LC	None	None
Nashville	None	None	None
Northeast	Formal LC	None	Formal LC
Pellissippi	Formal LC	None	Formal LC
Roane	Informal LC	None	None
Southwest	Informal LC	None	None
Volunteer	None	None	Formal LC
Walters	Informal LC	Formal LC	Formal LC

Note: Use of learning communities is based on a 2020 survey of academic administrators and fall 2019 enrollment data. Informal communities are identified when more than 20% of learning support students are in paired college-level sections with everyone from their learning support section.

How many students enroll in corequisite learning communities?

Colleges may employ learning communities to create connections between the college-level and learning support courses, and the use of learning communities across colleges may be intentionally designed or the unintentional result of scheduling and course offerings. For this analysis, *when all students from a learning support section move together to one or two college-level sections, they are considered part of a corequisite learning community (formal or informal).*

Figure 35 summarizes the proportion of first-time freshmen learning support students who were enrolled in corequisite learning communities from fall 2015 to 2019. About one-quarter of learning support math students were enrolled in a corequisite math learning community, one-third of learning support writing students were in corequisite writing learning communities, and only 6% of learning support reading students participated in a learning community.

By College: A handful of colleges drive the learning community participation numbers in each subject area, as **Figure 36** shows. In math, 64% of learning support students participated in a corequisite learning community at Pellissippi. Additionally, Dyersburg, Northeast, and Walters also had high rates of enrollment in math learning communities.

In reading, systemwide learning community participation was the lowest across all three subject areas. Three colleges drove the enrollment in reading learning communities: Walters, where 58% of learning support reading students were in a corequisite learning community; Roane, where 22% were in a corequisite learning community; and Dyersburg, where 12% were in a corequisite learning community.

Learning support writing students at Pellissippi had the highest participation rate in a writing learning community, with 90% of their students enrolling in a learning community. An additional handful of colleges had writing learning community participation rates that were all higher than 60%, while the remaining colleges had very few students enrolling in a writing learning community.

Figure 35: Participation in Corequisite in Learning Communities, 2015-2019

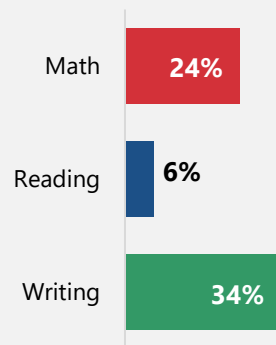
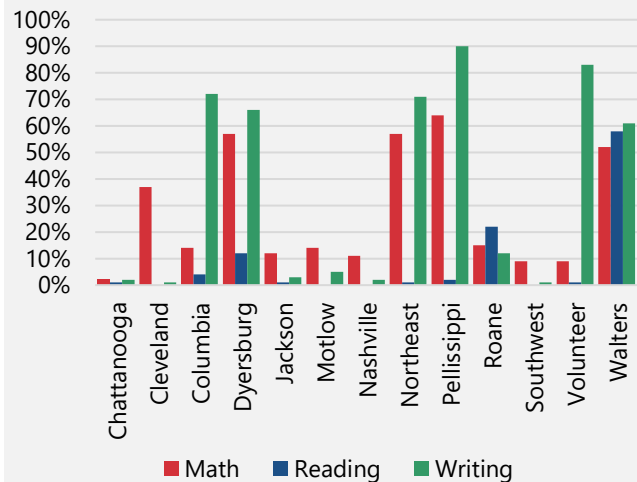


Figure 36: Participation in Corequisite Learning Communities by College, 2015-2019



Over Time: Over time, most colleges have maintained relatively stable learning community participation rates, with a few exceptions.

- In *math*, Dyersburg and Cleveland have had a large increase in participation in math learning communities, while Walters has seen a decrease.
- In *reading*, learning community participation rates have fairly remained consistent over time, with a small handful of colleges driving these participation rates.
- In *writing*, Motlow and Nashville have shifted slightly toward a higher proportion of students enrolling in a writing learning community, while colleges like Jackson and Roane have shifted away from learning communities.

By Student Demographics: Figure 37 shows participation in either formal or informal corequisite learning communities by subject and student group.

Across all three subject areas, Black students were less likely than their White peers to participate in a corequisite learning community.

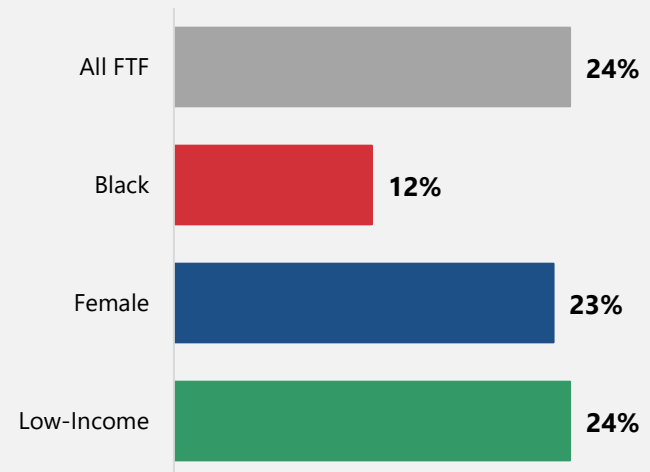
- In *math*, while 24% of all learning support students and 30% of White learning support students participated in corequisite learning communities, just 12% of Black students did so.
- In *reading*, though only 6% of learning support students participated in a learning community systemwide, this number was 9% for White students and just 2% for Black students.
- Lastly, in *writing*, 43% of White students participated in a corequisite learning community, while just 17% of Black students did.

Low-income learning support students participated in corequisite learning communities at similar rates as non-low-income learning support students. In math and writing, however, low-income students participated in learning communities at slightly lower rates. While 25% of non-low-income students enrolled in math learning communities and 37% enrolled in a writing learning community, 23% of low-income students enrolled in math learning communities, and 32% of low-income students enrolled in a writing learning community.

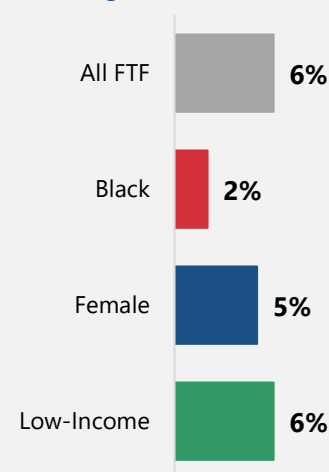
Lastly, male and female students participated in learning communities at similar rates. Female students had learning community participation rates in all three subject areas that were one or two percentage points lower than their male peers.

Figure 37: Participation in Corequisite Learning Communities by Student Group, 2015-2019

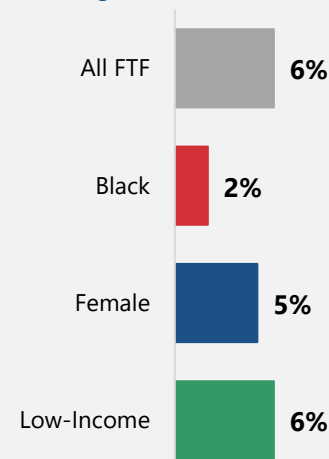
Math



Reading



Writing



How does participation in corequisite learning communities affect student outcomes?

Students who participated in corequisite learning communities for math and writing had higher gateway course pass rates, retention rates, and graduation rates than their peers who were in learning support but not in a learning community.

Figure 38 shows success rates for learning support students from fall 2015 to fall 2019 based upon participation in learning communities.

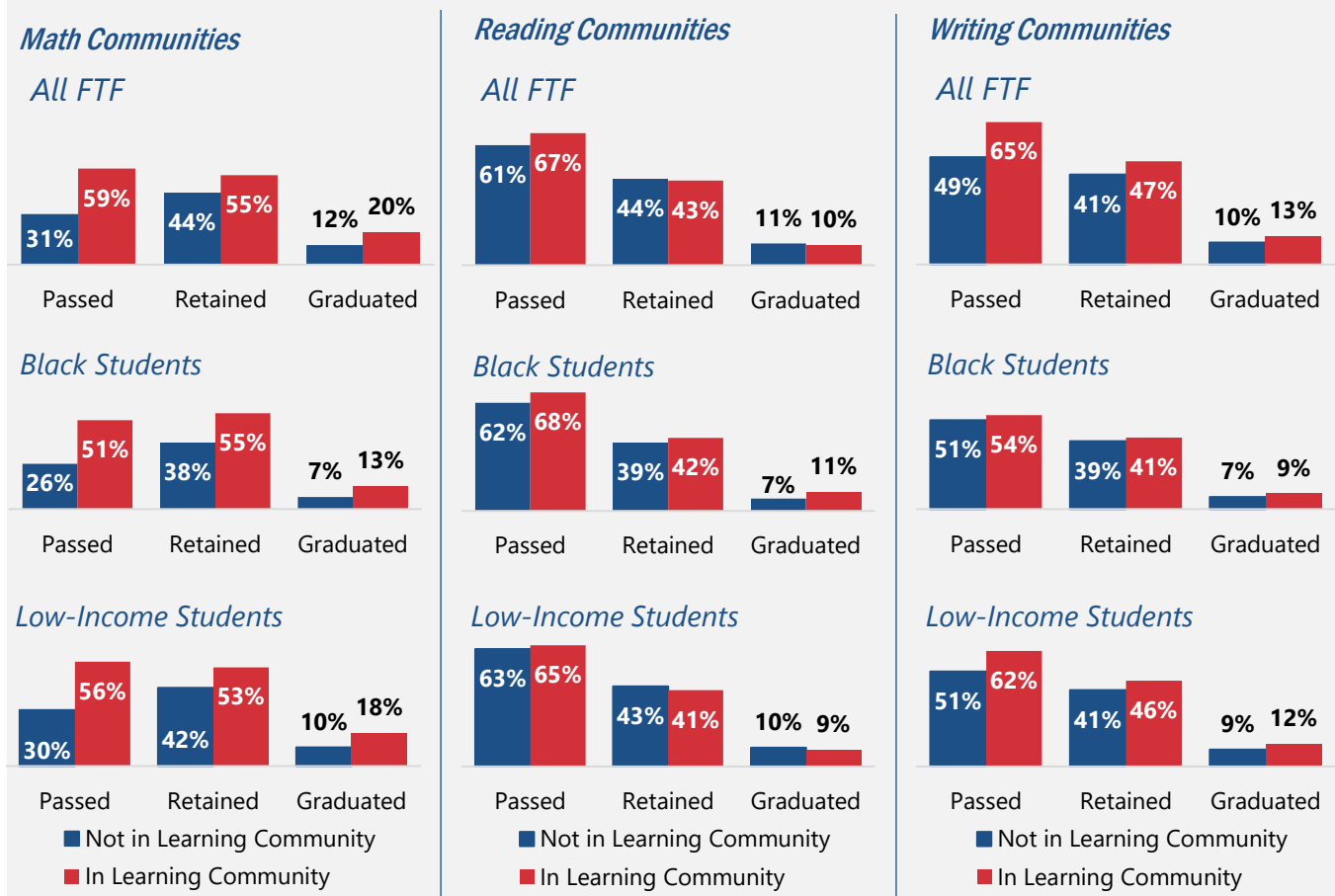
The positive outcomes from learning communities were most prevalent in math courses. Learning support students who participated in corequisite math learning communities had a pass rate of just 59%, which is 26 percentage points higher than their peers who were not in a community.

Corequisite math learning community students also had higher fall-to-fall retention and three-year graduation rates. Importantly, these trends also hold for Black students and low-income students. In both math and writing, Black students and low-income students who were in a corequisite math learning community had higher pass rates, retention rates, and graduation rates.

In reading, outcomes for learning community participants were less clear. Overall, students in a reading learning community had higher gateway course pass rates, but similar or slightly lower retention and graduation rates.

Low-income students in reading followed a similar pattern as the overall sample. For Black students, however, reading learning community participants had higher pass rates, retention rates, and graduation rates than their peers who were not in a learning community.

Figure 38: Outcomes for Corequisite Learning Community Participants, 2015-2019



A Closer Look at the Data

While participation in a learning community appears to result in higher outcomes for students, especially in math and writing, it is difficult to account for student differences using descriptive analyses alone.

To account for these differences, more rigorous, multivariate analyses (like logistic regression techniques which account for demographics and levels of academic preparation) allow for a more precise understanding of the impact of learning communities on student success. (Visit the [Technical Appendix](#) to learn more about these models.)

Figure 39 shows predicted probabilities produced from these more rigorous analyses.

For students who required learning support math and writing, the probability of completing the gateway course, being retained, and graduating is higher for those who participated in a learning community.

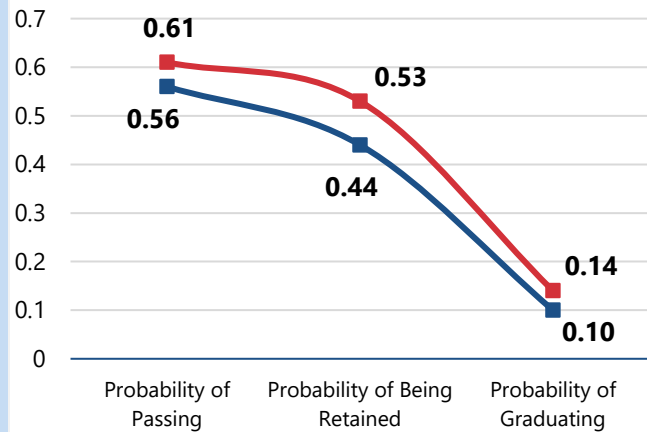
All else equal, students who participate in a math learning community had a higher probability of success across all three outcomes and were five percentage points more likely to pass the course and four percentage points more likely to graduate. In writing, students in a learning community were twelve percentage points more likely to pass the course, but only one percentage point more likely to graduate.

For students who required learning support reading, students in a learning community were less likely to pass the gateway course, but more likely to be retained and graduate.

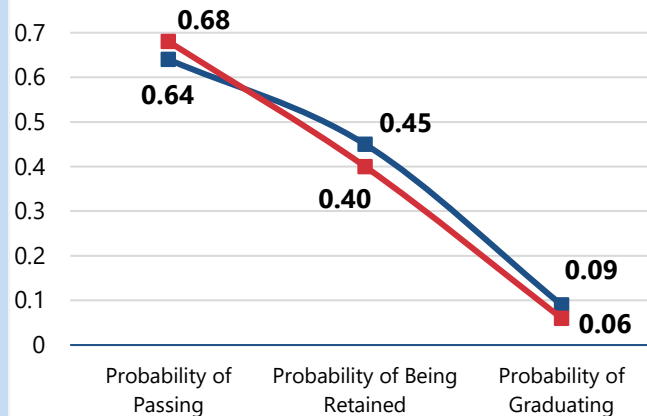
While descriptive outcomes for reading learning communities were mixed, controlling for student characteristics reveals that though students in a reading learning community have a lower predicted probability of passing the course, participation in a reading learning community are five percentage points more likely to be retained, and three percentage points more likely to graduate, than peers who were not in a learning community.

Figure 39: Probability of Success for Corequisite Learning Community Participants, 2015-2019

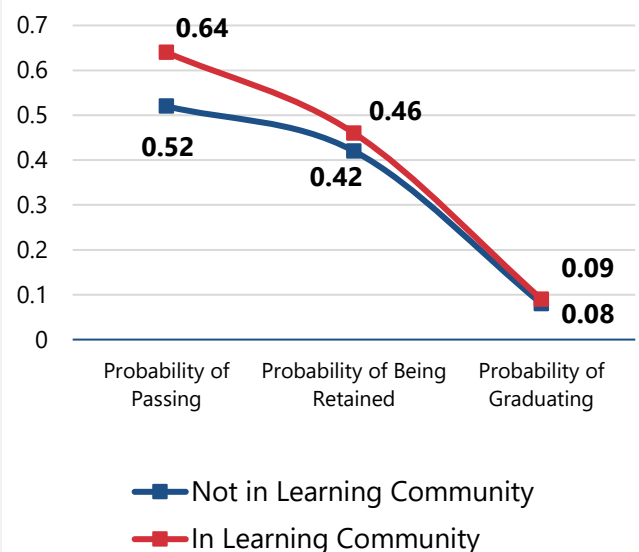
Math



Reading



Writing



How else can colleges create connections and alignment between learning support and college-level courses?

Some learning support students experienced a disconnection from college-level content. But faculty have developed innovative strategies to build connections.

During interviews in 2021, students and faculty shared concerns about the ways that learning support content may seem disconnected from the paired college-level courses (Guthrie et al., 2021). The sense that courses were disconnected or misaligned sometimes led to feelings of frustration or confusion. However, faculty also shared strategies that helped create a greater sense of connection, including:

- *Faculty connections* where the same faculty member taught both the learning support and college-level course, or where the faculty for the two courses worked closely together.
- *Streamlined learning support courses* where a specific learning support course is connected to a single college-level course.
- *Consolidated syllabi* that outline the expectation and assignments for both the learning support and college-level course.

At some colleges, faculty teach both the learning support and the college-level course.

According to TBR policy, the “full-time faculty who teach college-level courses must be involved in the development of appropriate co-requisite learning support curricula and develop plans that support the linked college-level courses” (TBR, 2019a).

Additionally, TBR policy recommends that the *same* faculty member teach both the learning support and the paired college-level course, where possible.

During interviews in 2021, faculty shared their positive reflections of the value of having the same faculty member teach both the college-level course and learning support courses (Guthrie et al., 2021). However, according to a summer 2020 survey of academic administrators, only five colleges regularly have the same faculty member teaching both sections

(two colleges do this for math, one college does this for reading, and four colleges do this for writing). Only one college, Pellissippi, indicated that faculty in all three subject areas are regularly teaching both the learning support and college-level sections. Many colleges cited administrative or financial barriers to assigning the same faculty member to teach both the learning support and college-level course.

In cases where it is not possible to have the same instructor teach both the college-level course and the learning support course, instructors of the two courses should “have routine communication to identify ways to improve student success” (TBR, 2019a). However, a fall 2020 survey of faculty revealed that frequent communication between instructors is somewhat rare. Most instructors reported that they rarely or never communicated with the faculty member in the paired course about student progress or course alignment. Faculty were more likely to communicate about course curriculum but did so infrequently.

Colleges can create differentiated learning support courses and develop the curriculum to align with the paired college-level course.

When the learning support and college-level courses are taught by different faculty, curricular alignment and consolidated syllabi can help ensure connections are made between the content of each course.

For example, colleges may create specific learning support courses for each college-level course pairing, so that the learning support competencies are addressed in the context of the college-level course curriculum. For example, in math, a college may have one learning support course for students enrolled in Probability and Statistics and another for students enrolled in Math for General Education.

According to a 2020 survey of academic administrators at Tennessee community colleges, 11 colleges offer different, content-specific math learning support courses for each paired college-level course. *Jackson and Walters are the exceptions who did not offer differentiated math learning support courses for their college-level course pairings.*

How are the college-level and learning support courses structured?

Class Size

Enrollment changes over the past decade have shaped class sizes.

Beginning in 2013, the SAILS program allowed students to complete math learning support while in high school, increasing the demand for college-level math classes during students' first year while decreasing demand for math learning support. Additionally, the introduction of corequisite learning support in 2015 increased the number of students enrolling in college-level courses in their first year. The first cohort of Tennessee Promise also enrolled in 2015, increasing community college enrollments overall as well as the demand for both learning support and college-level courses.

Prior research has shown that an increase in class size in learning support courses has a negative effect on course success ([Fong et al., 2015](#); [Adams et al., 2009](#)), and this effect is significantly worse for less academically prepared students ([de Paola et al., 2010](#)).

Figure 40 below shows the average class size of learning support sections and college-level sections from 2013 to 2019.

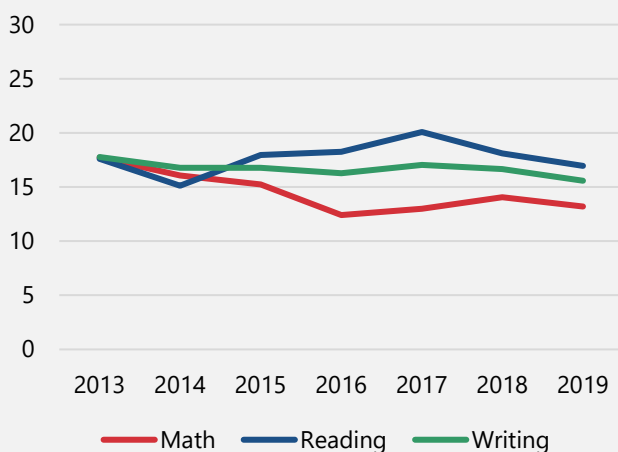
Learning Support Class Sizes: The average number of students in math and writing learning support class sections has steadily decreased over time, whereas reading class sizes have fluctuated from an average of 15 to 20 students per section. In 2019, most colleges had an average reading and writing learning support class size of 15 to 20 students. Math class sizes were more varied, from an average of as few as six students at Motlow to 20 students at Jackson.

College-Level Class Sizes: In 2015, gateway college-level English and math classes saw slight increases. Since 2015, English class sizes have declined slightly to an average of 21 students, while math class sizes have remained steady at 19 students.

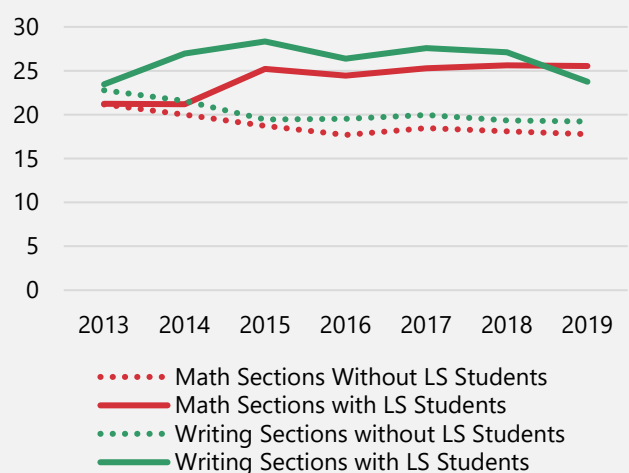
College-level class sizes vary based on the composition of the class. In fall 2019, college-level courses without learning support students had five to six fewer students, on average, than college-level courses that included learning support students. C

Figure 40: Average Number of Students per Class Section, 2015-2019

In Learning Support Courses



In College-Level Courses



Outcomes did not vary significantly based upon the number of students in learning support sections. However, outcomes did vary somewhat based upon the number of students in college-level courses.

Students who enrolled in larger college-level course sections had lower gateway course pass rates, retention rates, and graduation rates than their peers in smaller classes.

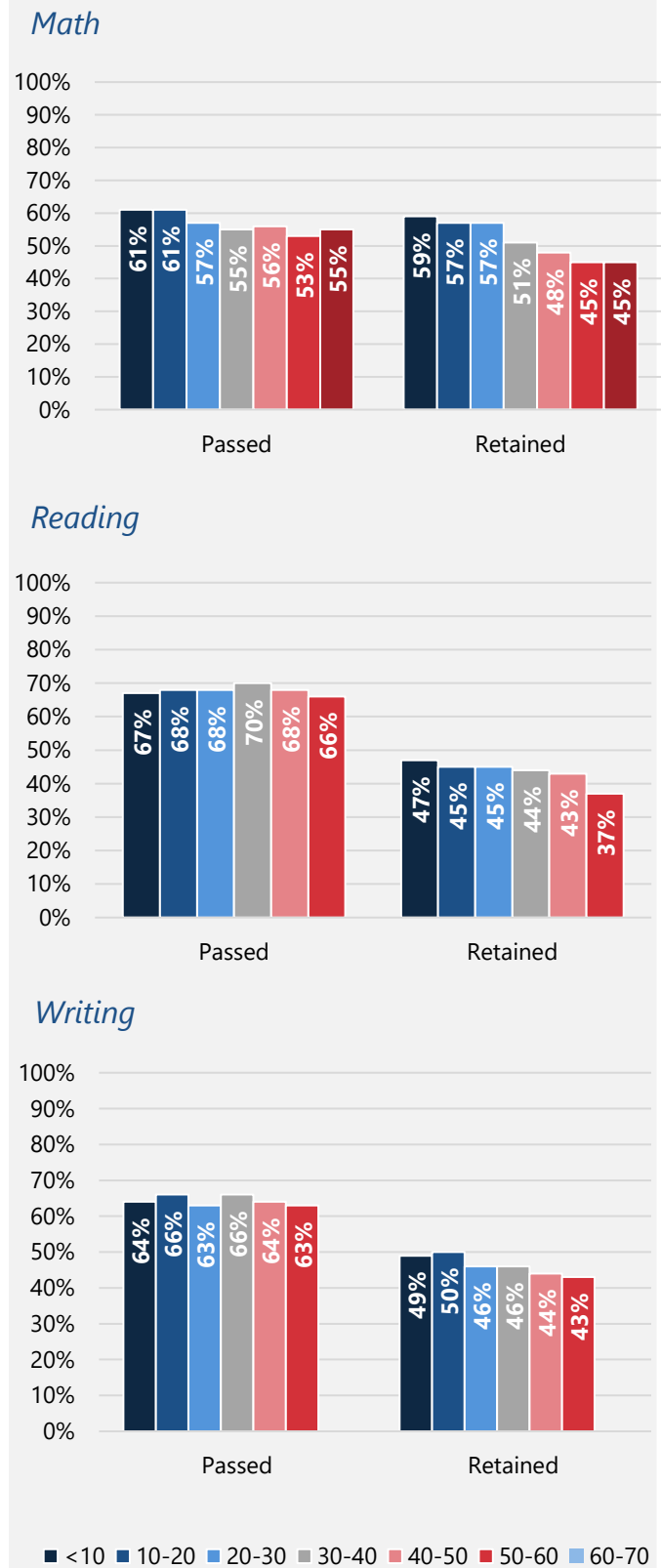
Figure 41 shows outcomes for learning support students based on the number of students enrolled in the college-level course section.

In *math*, outcomes decrease as class sizes increase. From 2015-2019, most students were in a college-level math class of 20-30 students, and these students had a 57% pass rate, a 57% retention rate, and a 17% graduation rate. Students in smaller class sections had higher pass rates and graduation rates than students in larger class sections. For example, students in college-level sections of 10 to 20 students had a pass rate of 61%, a retention rate of 57%, and a graduation rate of 20%.

In *reading*, the patterns are not quite as clear as in math but remain relatively consistent. From 2015 to 2019, college-level reading outcomes were higher for students in a smaller class section. About a third of all learning support reading students enrolled in a college-level class with 30 to 40 students, and these students had a 70% pass rate, a 44% retention rate, and a 10% graduation rate. Just under a third of students were in a class of 20 to 30 students, and while gateway course pass rates for this group were slightly lower at 68%, retention and graduation rates were each one percentage point higher than for students in a larger class size.

Lastly, in *writing*, students in smaller class sections had higher retention and graduation rates. A third of students in this course were in a section of 30 to 40 students, and while the gateway course pass rate of 66% was highest for this group, retention, and graduation rates were higher for students in smaller sections of English 1010.

Figure 41: Outcomes based upon College-Level Course Section Size, 2015-2019



A Closer Look at the Data

College-Level Class Size

Descriptive analyses reveal mixed outcomes for learning support students in various class sizes. Using multivariate analyses which account for student demographic characteristics and academic preparation, as well as the course pairing, gives a clearer picture of how college-level class size impacts student outcomes. **Figure 42** shows the results of these more rigorous analyses.

For learning support math students, the probability that a student will pass the college-level class, be retained, and graduate decreased as class size increases.

This is consistent with the descriptive analysis and is more pronounced in retention in graduation outcomes, where a student in a class of 6 to 16 students has a predicted probability of being retained of 59% and graduating of 18%, while peers in a class of 46-55 students had a predicted probability of being retained that was twelve percentage points lower (47%) and graduating that was seven percentage points lower (11%).

For learning support reading students, the probability that a student will pass the college-level class, be retained, and graduate increased as class size increases.

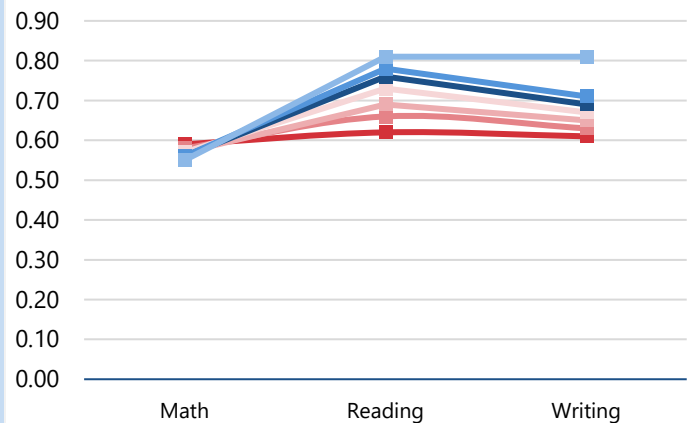
These trends are particularly pronounced in gateway course outcomes, but the gap narrows for retention and graduation rates, indicating that reading class size may only have an impact in the short term.

In writing, gateway course pass rate increases as class size increases, while retention and graduation rates decline slightly or remain flat with increases in class sizes.

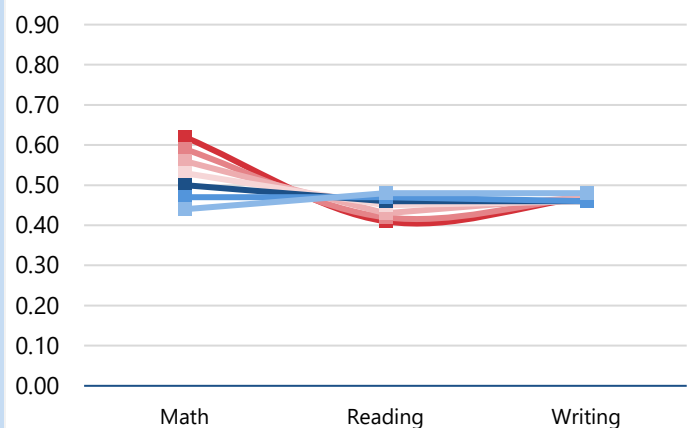
This may indicate that the effects of college-level writing class size may have short-lived impacts for learning support writing students.

Figure 42: Probability of Success based upon College-Level Class Section Size, 2015-2019

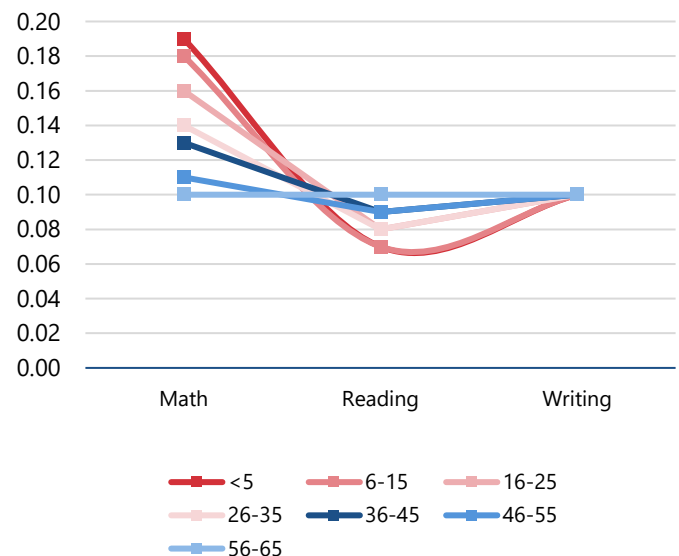
Passed Gateway Course



Retained to Next Fall



Graduated within Three Years



Class Composition

Students who enroll in college-level gateway courses could encounter three potential compositions of college-level courses:

- 1) one that is composed entirely of non-learning support students,
- 2) a blended class of both learning support and non-learning support students, or
- 3) one that is composed entirely of students who are also learning support students.

Within blended sections, learning support students might make up a majority or a minority of the class.

Prior research on class composition in the context of learning support is limited. Some research indicates that instructors are more likely to alter their course content when faced with a high proportion of learning support students, potentially lowering standards. In a 2020 survey, some faculty at Tennessee community colleges shared that it can be very difficult to teach blended college-level sections where the range of students' academic preparation is wide.

Most learning support students enrolled in college-level courses that included non-learning support students as well. Separate sections of college-level courses composed entirely of learning support students are rare.

From 2015 to 2019, learning support students most often enrolled in blended college-level class sections where learning support students composed a high number but not all of the section enrollments. **Figure 43** shows the composition of college-level courses in which learning support students enrolled.

- In *math*, learning support students were in college-level math sections where 51% of students were also learning support students on average.
- In *reading*, learning support students were in college-level sections where 45% of students were also learning support students.
- In *writing*, the average class composition was 44% learning support students.

Based on descriptive analysis, learning support students had the best outcomes when their college-level section consisted of either a very high or very low proportion of learning support students.

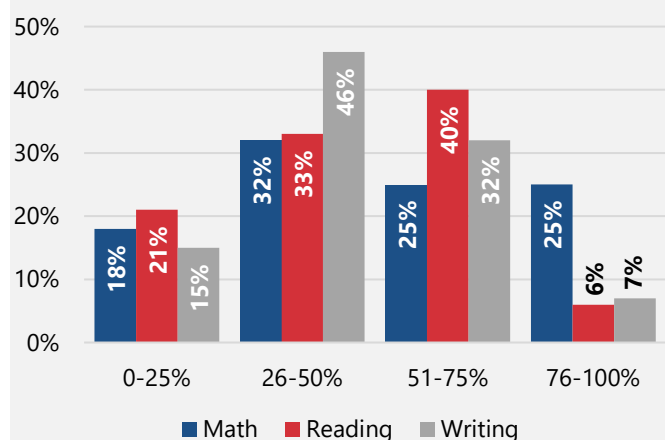
In college-level math, learning support student success rates were highest for students who were in sections that were composed entirely of other learning support students or in sections composed primarily of non-learning support students. Similar patterns emerged in college-level reading and writing courses.

However, more rigorous analyses suggest that class composition has very little impact on student outcomes.

While descriptive analyses suggest that class composition may have an impact on student success, multivariate analyses controlling for other factors suggest that course composition may have very little impact on outcomes for students, especially in the longer-term graduation outcomes.

In regression models that account for course pairings and student characteristics, learning support students in sections with very low proportions of other learning support students have nearly the same probability of passing the college-level course, being retained, and graduating as peers in a college-level course comprised of mostly learning support students.

Figure 43: Learning Support Student Enrollment in College-Level Sections, by Percent LS Students, 2015-2019



Timing of Learning Support

Corequisite learning support makes it possible for all students to enroll in college-level courses during their first year. However, students who are placed into learning support for *multiple subjects* may require multiple semesters to complete learning support and the paired college-level courses.

Most learning support and paired college-level courses are assigned three semester credit hours for each course. A student who is placed into learning support for all three subjects may have to take 18 credit hours (six courses) to complete learning support and paired college-level sections. Since most learning support students enroll in only 12 or 15 credit hours per semester, it may not be possible to enroll in three corequisite learning support experiences and the paired college-level courses in one semester.

In response to this issue, TBR policy requires that students be able to address at least one learning support subject area per semester, and all learning support courses should be completed within the student's first 30 credit hours. However, TBR policy also states that it may be appropriate to address reading and writing learning support before addressing math learning support ([TBR, 2019a](#)).

Notably, the order in which students complete their learning support courses may have implications for gateway course completion and persistence. From fall 2015 to 2019, 37% of first-time freshmen were placed into learning support for more than one subject area, and 20% were placed into learning support for all three subjects. Therefore, the choices colleges make in managing the timing of learning support have the potential to impact a sizeable number of students.

Additionally, from fall 2015 to 2019, Black and low-income students were placed into learning support for all three subject areas at far higher rates than other students. Therefore, the challenges associated with the timing of learning support may especially affect these students and contribute to equity gaps in gateway course enrollment and completion.

Colleges typically use three methods to manage the timing of learning support for students with multiple placements:

1) **Reduce the credit hour requirement for learning support courses.**

TBR policy requires that the number of credit hours assigned to learning support courses should be kept to a minimum, with no more than three semester credit hours assigned to any one subject area ([TBR, 2019a](#)).

While most learning support courses are assigned three credit hours, some Tennessee community colleges assign only one or two credit hours to learning support courses, which allows students with multiple placements to complete additional corequisite experiences in one semester. For example, at Nashville, some math learning support courses are only one or two credit hours instead of three.

2) **Double course pairings.**

At five colleges, students can pair both reading and writing learning support with English Composition. This allows students to take all three learning support courses plus two college-level classes (a math course and English Composition) in one semester for a total of 15 hours.

3) **Delay math until the second semester.**

Most commonly, students with three learning support placements from fall 2015 to 2019 did not enroll in learning support math or college-level math courses in their first term of enrollment. Fewer than half of students who are placed into math learning support take a college-level math course in the fall. The majority of students who place into all learning support for all three subjects take college-level courses paired with reading and writing in their first semester, intending to delay math enrollment until the spring. *However, because one-third of students who placed into learning support for all three subject areas are not retained to the spring semester, many of these students never attempt college-level math in their first year.*

Figure 44 shows the timing of enrollment in college-level courses for students who were placed into learning support for each subject from 2015 to 2019.

- Fewer than half of students (47%) who were placed into learning support math enrolled in college-level math in their first term.
- Another one-fifth of students (21%) took college-level math in the spring.
- One-third (32%) of students who placed into learning support math did not attempt college-level math by the end of their first year of enrollment.

Figure 44 also shows the timing of enrollment in college-level courses for students who were placed into learning support for all three subject areas.

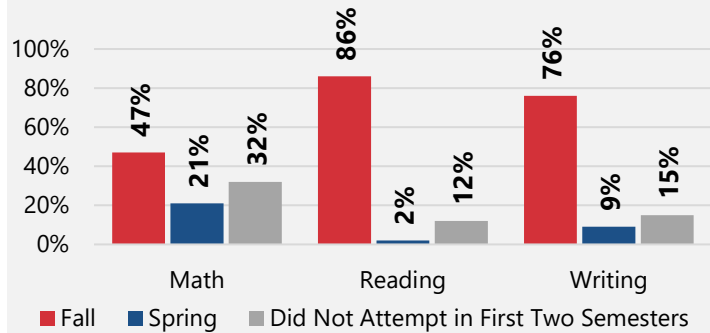
- Only one-quarter (25%) of these students attempted college-level math in the fall.
- One-third (32%) took college-level math in the spring.
- However, 44% of students who were placed into learning support for all three subjects did not attempt college-level math courses within their first year of enrollment.

However, these outcomes may be driven by students who did not return for the spring semester. The bottom panel of **Figure 44** summarizes the timing of enrollment in college-level courses for students who were placed into learning support for all three subject areas and who were enrolled in both the fall and the spring terms.

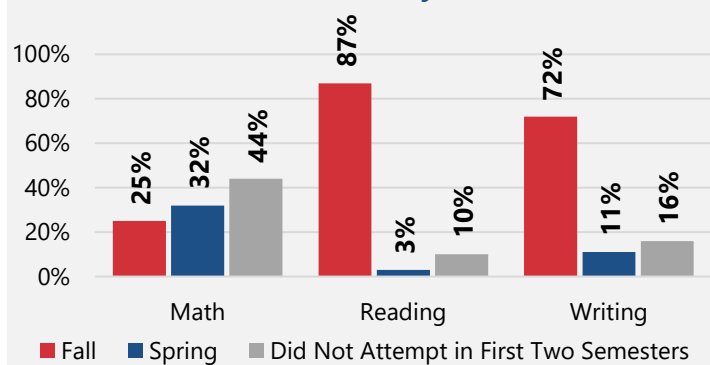
- Most commonly (58% of these students), students who placed into all three learning support courses addressed reading and writing in their first semester (fall) and math in the second semester (spring).
- Only one-quarter (24% of these students) addressed all three learning support requirements in the fall.
- Smaller proportions of students addressed other combinations of learning support in the fall (math and reading or math and writing) or only took addressed one learning support requirement in the fall semester.

Figure 44: Timing of Enrollment in College-Level Courses for Learning Support Students, 2015-2019

All Learning Support Students



Students Placed for Three Subjects



Students Placed for Three Subjects Who Enrolled in Fall and Spring Terms

		Fall			Spring			Count	%
		Math	Reading	Writing	Math	Reading	Writing		
			■	■	■			5,228	58%
	■	■	■					2,117	24%
	■						■	741	8%
					■			597	7%
■					■		■	120	1%
■			■		■			88	<1%
					■	■		31	<1%
			■		■			30	<1%



SUPPORTING INSTITUTIONAL INNOVATION & AUTONOMY

Summary

Gaining Momentum

- **College-level course pairing** choices have an impact on student success. In math, some learning support students enroll in college-level math courses which do not count toward their general education math requirements. Students should be enrolled directly in the college-level math course that counts toward their degree. Additionally, some colleges pair English 1010 with both learning support reading and writing, but this pairing may not translate to higher outcomes for students.
- **Colleges use learning communities, faculty pairings, and differentiated course sections** to create connections between learning support courses and paired college-level courses. Descriptive and more rigorous analyses show that learning communities are a promising practice within the context of learning support.
- Colleges have developed innovative ways to manage the structure of the corequisite experience through class size, class composition, and the timing of when learning support is delivered. Differences in class size and composition seem to have very little impact on student outcomes.

Connections to Core Principles

- **Improving Gateway Course Completion in Math, Reading, & Writing:** Encouraging pairings associated with higher student success outcomes and deeper connections between courses through the use of learning communities and faculty communication may result in higher gateway course outcomes, leading to success even in future terms. *How can colleges streamline course connections and structure to better serve students, especially those with learning support needs in more than one subject area?*
- **Promoting Access & Success through Accuracy in Learning Support Placement:** Though the corequisite learning support student experience differs in many ways, refining best practices in delivery requires that the right students receive the support they need to succeed. *How do we continue to refine the way we identify students with learning support needs, alongside conversations about refining corequisite delivery?*
- **Closing Equity Gaps in Retention & Graduation:** Students of color participated in promising best practices, like learning communities, at lower rates than their white peers. *How can we ensure students of color and low-income students have equitable access to practices proven to promote student success?*

Explore More

- [Working Paper #1: Tennessee Corequisite Placement Pilot \(An Example of Institution-Led Innovation\)](#)
- [TERA Report on Faculty and Student Experiences in Learning Support](#)
- [Data Toolkit](#)



CLOSING EQUITY GAPS IN RETENTION & GRADUATION

After the implementation of corequisite learning support, course completion rates rose for Black and low-income students. Yet, increases in gateway course completion have not closed persistent equity gaps in retention and graduation for Black and low-income learning support students.

Tennessee’s community colleges are committed to closing equity gaps. According to system-wide equity policy, this commitment means ensuring “that each student receives what they need to be successful through the intentional design of the college experience” ([TBR, 2019b](#)). However, gaps persist between Black and White students and low-income and non-low-income students.

To close equity gaps, effective learning support practices must be implemented.

Nationally, students of color and low-income students are far more likely to be placed in remedial education ([Vandal, 2016](#); [Ganga, et al, 2018](#)). However, broad-based remediation reforms often fail to reduce inequities between students of color and their peers ([Brathwaite, Fay, & Moussa, 2020](#)). Research from one statewide learning support reform found that some subgroup differences were actually *intensified* by well-intentioned reforms ([Brathwaite & Edgecombe, 2018](#)).

Learning support policies have been closely linked with equity gaps for nearly forty years.

In 1984, remediation in Tennessee was pushed forward by *Geier v. Tennessee*, a suit that sought to desegregate public higher education in the state. The initial 1984 Stipulation of Settlement in the *Geier* case required colleges to offer support courses to increase student success and required remediation to support students admitted under “alternative standards” ([Geier v. Alexander, 1984](#)).

With the introduction of corequisite learning support in 2015, Tennessee increased the number of students completing college-level courses in their first year. However, little research has examined the impact of these reforms on Black and low-income students. Additionally, gains in gateway course completion may not have translated into higher rates of retention or graduation, and equity gaps persist ([Ran & Lin, 2019](#)).

This section will explore gaps in gateway course success, retention, and graduation for Black and low-income learning support students after the implementation of the corequisite model.



How do success rates for learning support students differ for **low-income students and for **Black students** compared to their peers?**

How do outcomes differ for low-income students compared to non-low-income students?

From fall 2015 to 2019, 60,726 low-income students enrolled at Tennessee community colleges as first-time freshmen, which accounts for 56% of all first-time enrollments. Among low-income students, 52% were placed into learning support in math upon enrolling in college, 41% were placed into learning support in reading, and 45% were placed into learning support in writing. These placement rates were 15-17 points higher than placement rates for non-low-income students, as discussed in a previous section.

Figure 45 below shows gateway course completion rates for low-income learning support students compared to other student groups.

Low-income learning support students completed gateway math courses at lower rates than other students.

Math

From 2015 to 2019, 43% of non-low-income students who were placed into learning support for math completed a college-level math course in their first academic year; only 36% of low-income students in

This represents a seven-percentage point gap between low-income and non-low-income students in learning support.

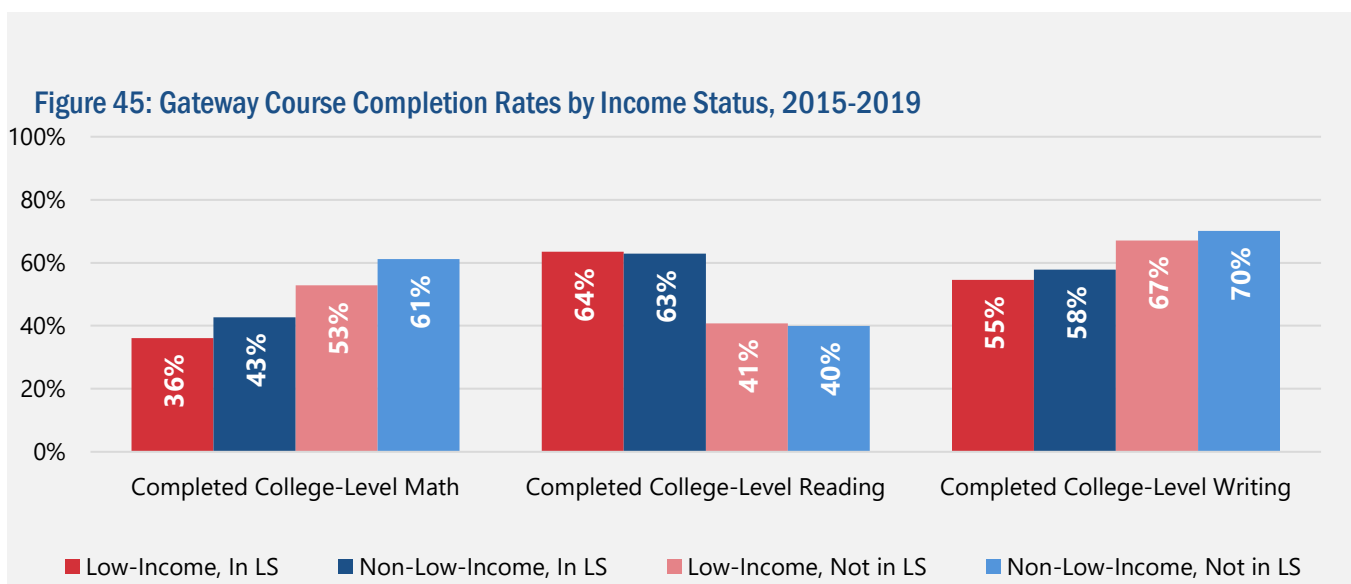
A similar gap exists for students who were not placed into learning support math, though their overall completion rates were higher; 61% of non-low-income students who were not placed into math learning support completed a gateway math course in their first academic year, while only 53% of low-income students who did not require math learning support did so. This represents an eight-percentage point gap.

Reading

In college-level, reading-intensive courses, the gap between low-income and non-low-income students largely disappears. From fall 2015 to 2019, both low-income and non-low-income students who were placed into learning support reading completed gateway courses at a rate of 63%-64%.

Writing

In writing, the gap between low-income and non-low-income student completion rates is small. From fall 2015 to 2019, 55% of low-income students who placed into writing learning support completed a college-level writing course in their first academic year, compared to 58% of non-low-income students who placed into writing learning support. This represents a three-percentage point gap.



learning support in math did so.

The largest gaps by income status exist for students who are placed into learning support for math. These gaps persist even when we account for students' ACT math scores.

Of first-time students who were placed into math learning support from 2015 to 2019, the most common ACT math score was 16. This is true for both low-income and non-low-income students.

However, as **Figure 46** shows, a higher percentage of non-low-income students had ACT scores of 17 and 18, which were just below the learning support cut point of 19. Conversely, more low-income students had lower ACT math scores.

As previously discussed, the rate at which low-income learning support students completed a gateway math course in their first academic year is lower than their non-low-income peers. This gap persists across ACT math scores.

As **Figure 47** shows, this gap appears to widen slightly as ACT math scores increase. For example, low-income students with an ACT math score of 13 complete gateway math courses at a rate two percentage points lower than non-low-income students with the same score, but this gap grows to seven percentage points for students with an ACT math score of 17. Importantly, however, course completion rates also rise for both subgroups as ACT math scores rise.

Low-income learning support students were retained at lower rates than their non-low-income peers, at least for fall-to-fall retention.

Among learning support students, low-income students persisted from the fall to the spring semester at slightly *higher* rates than their non-low-income peers. Low-income students who required learning support returned for the spring semester at a rate of 72% compared to 69% of non-low-income learning support.

By the time the following academic year begins, low-income learning support students returned at *lower* rates than their non-low-income peers; 45% of low-income learning support students returned compared to 50% of non-low-income learning support students.

However, the gap between low-income and non-low-income students was negligible among students who were placed into learning support for all three subject areas. Low-income students who were placed into learning support for all three subject areas persisted at the lowest rate of any group.

Figure 46: Learning Support Math Placement by ACT Math Score and Income, 2015-2019

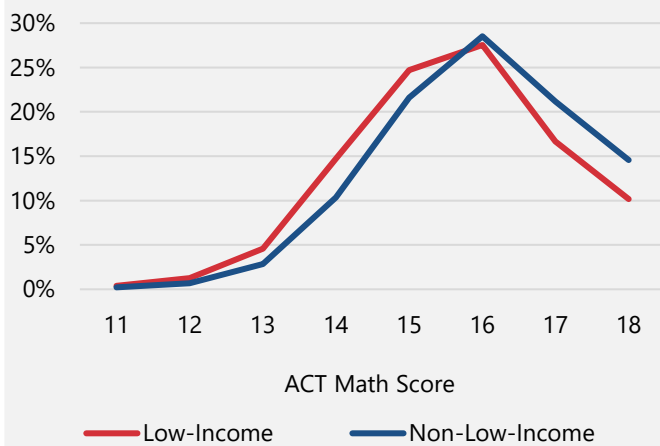
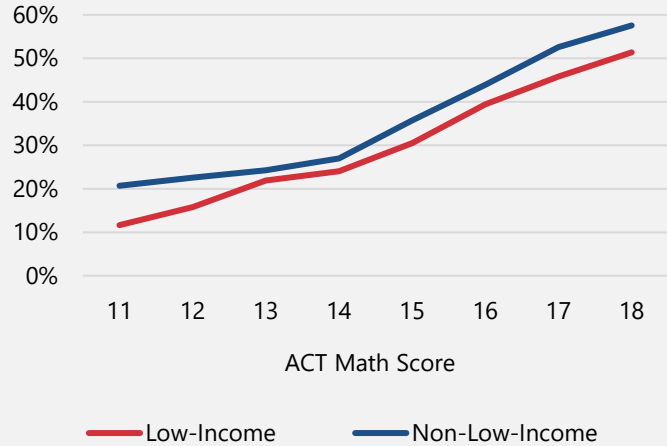


Figure 47: Gateway Math Completion Rates for Learning Support Students by ACT Math Score and Income, 2015-2019



Low-income learning support students graduate at lower rates than non-low-income learning support students.

Figure 48 shows three-year graduation rates for first-time, full-time students who were placed into learning support upon enrolling in college. Students who were placed into learning support in at least one subject graduated at lower rates than students who did not require learning support. Within both groups of students, however, low-income students graduated at lower rates than their non-low-income peers.

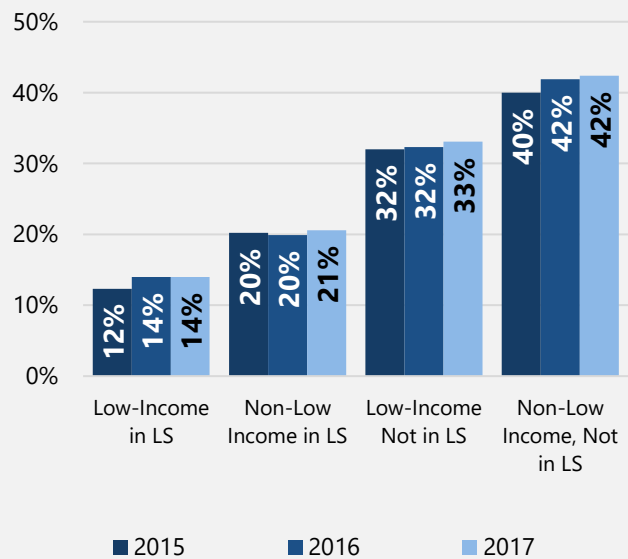
Among first-time, full-time students who began in 2017, 14% of low-income students who were placed into learning support graduated within three years, compared to 21% of non-low-income students in learning support.

As **Table 14** shows, for every combination of placements, low-income students graduate at lower rates than their non-low-income peers. Since placement into learning support for all three subject areas was the most common placement for low-income students, it is important to note that these students graduate at the lowest rate. Only 7.6% of these students graduated within three years. On the other hand, the most common placement for non-low-income students was placement into math learning support alone; these students graduated at the highest rate, aside from students who were not placed into learning support at all.

Table 14: Three-Year Graduation Rates by Learning Support Placement & Income Status, 2015-2017

Learning Support Placement	Low-Income Students	Non-Low-Income Students	Difference
Math Only	21.4%	28.2%	-6.8 pp
Reading Only	19.1%	26.4%	-7.3 pp
Writing Only	17.3%	22.1%	-4.8 pp
Math & Reading	14.3%	19.8%	-5.5 pp
Math & Writing	13.4%	17.5%	-4.0 pp
Reading & Writing	11.0%	14.9%	-3.8 pp
Math, Reading, & Writing	7.6%	11.4%	-3.8 pp
Any Placement	13.4%	20.2%	-6.8 pp
No Placement	32.5%	41.4%	-8.9 pp
All Students	17.2%	27.7%	-10.4 pp

Figure 48: Three-Year Graduation Rates by Income Status, 2015-2017



How do outcomes differ for Black students compared to White and Hispanic students?

From fall 2015 to fall 2019, 18,957 Black students and 7,241 Hispanic students enrolled at Tennessee community colleges as first-time freshmen, representing 18% and 7% of all first-time enrollments, respectively. Among Black students, 85% were placed into learning support for at least one subject area, compared to 66% of Hispanic students and 53% of White Students.

Figure 49 below shows gateway course completion rates for low-income Black and Hispanic students compared to White students.

Black learning support students completed gateway math courses at lower rates than other students.

Math

From fall 2015 to 2019, 29% of Black students who were placed into learning support for math completed a college-level math course in their first year; 42% of White students in learning support math did so. This represents a 13-percentage point gap between Black and White students in learning support math.

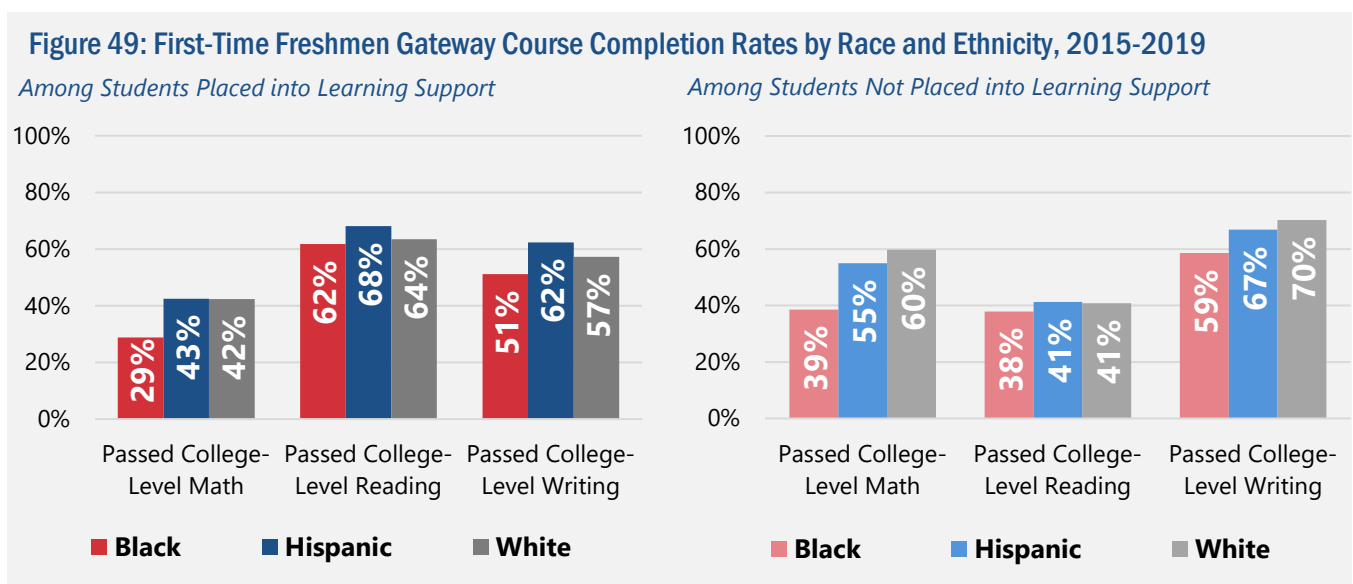
Notably, Black students in learning support also *attempted* math at slightly lower rates than White students; 61% of Black students who were placed in learning support math enrolled in a math course by the end of their first year, compared to 58% of White students. Hispanic students completed gateway math courses at similar rates to White students; 68% of Hispanic students attempted math by their first year, and 43% completed math by the end of their first year.

Reading

In reading, the gap between Black and White learning support students almost disappears. From fall 2015 to 2019, Black students who were placed into learning support reading completed gateway courses at a rate of 62%, compared to 63% of White students. Hispanic students completed at even higher rates, as 68% completed a college-level reading course.

Writing

In writing, the gap between White and Black students is present but smaller than in math. From fall 2015 to 2019, 51% of Black students who were placed into writing learning support completed a college-level writing course in their first academic year, compared to 57% of White students and 62% of Hispanic students who placed into writing learning support.



The largest gaps were observed between Black and White students who are placed into learning support for math.

As **Figure 50** shows, the distribution of ACT math scores was lower among Black learning support students than among White learning support students.

- For first-time students who were placed into math learning support from fall 2015 to 2019, the most common ACT math score was 16. The most common ACT math score for Black students who placed into learning support math was 15.
- 57% of Black learning support math students had ACT math scores of 15 and below. In contrast, 34% of White students had math scores of 15 and below.
- Additionally, 37% of White students in math learning support had ACT scores of 17 or 18, compared to 17% of Black students.

Black learning support students completed gateway math courses at lower rates than White learning support students. However, this gap differed across ACT math scores, as **Figure 51** shows.

- The gap between Black and White students was narrow at lower ACT scores. While completion rates rose for both subgroups as ACT math scores rose, a gap emerges between Black and White students with ACT math scores above 16.

- Black students with an ACT math score of 15 complete gateway math courses at the same rate as White students with the same score. However, among Black students with an ACT math score of 18, 43.2% completed a gateway math course, compared to 56.2% of White students with the same score.

Gaps were also present in retention rates for Black and White learning support students.

Among first-time freshmen who were placed into learning support for at least one subject area, fall-to-spring retention rates were highest among Hispanic students: 74% of Hispanic students in learning support persisted to the following semester. Fall-to-spring retention rates were lowest for Black learning support students: only 68% of Black learning support students persisted to the following semester, compared to 71% of White learning support students.

By the time the following year began, 41% of Black learning support students persisted to the following fall, compared to 48% of White learning support students. Fall-to-fall retention rates were again highest among Hispanic students: 52.8% of Hispanic learning support students persisted.

Among Black students who were placed into learning support for all three subject areas (the most common placement for Black students), only 37% persisted to the following fall semester.

Figure 50: Learning Support Math Placement by ACT Math Score and Race, 2015-2019

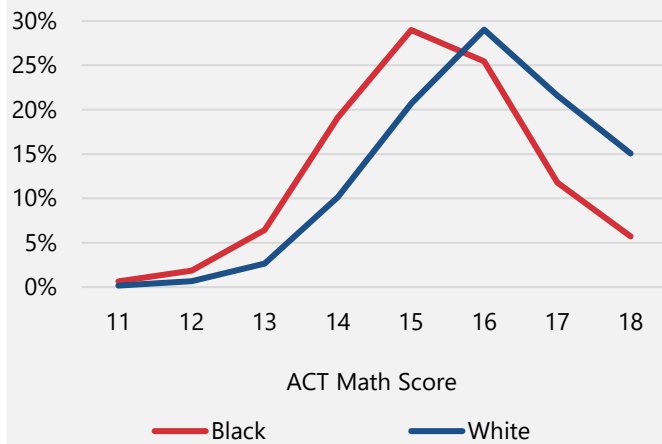
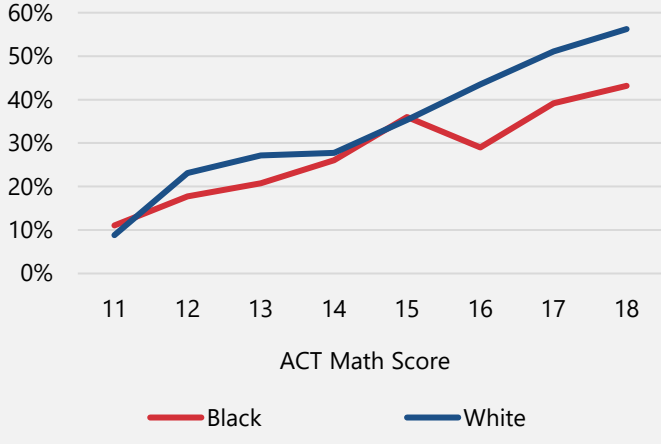


Figure 51: Gateway Math Completion Rates for Learning Support Students by ACT Math Score and Race, 2015-2019



Gaps also persisted in graduation rates for learning support students.

Table 15 and **Figure 52** show three-year graduation rates for first-time, full-time students who were placed into learning support.

Among first-time, full-time students who began in 2017, 9% of Black students who were placed into learning support graduated within three years, while 19% of White students in learning support graduated, representing a 10-percentage point gap.

Graduation rates and the gaps between Black and White students differed by learning support placement. However, for every combination of learning support placement, gaps were present between Black and White students.

Nearly half of Black first-time freshmen from 2015 to 2019 were placed into learning support for all three subject areas; students with this placement graduated at the lowest rate (6%) of any group. The most common placement for White students is to require math learning support only, and these students graduate at the highest rate (26%), aside from students who were not placed into learning support for any subject.

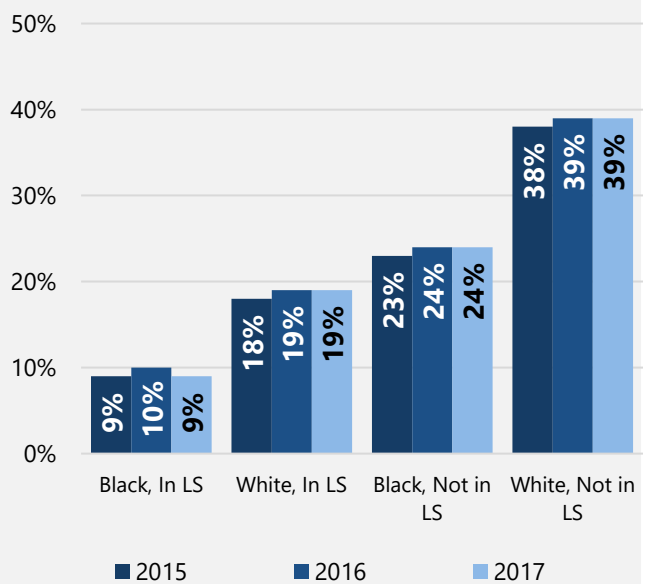
More Tools to Explore Gaps in Learning Support Outcomes

- [Working Paper #2: Low-Income Student Experiences in Learning Support](#)
- [Working Paper #3: Differences by Race and Ethnicity in Learning Support](#)
- [Data Toolkit](#)

Table 15: Three-Year Graduation Rates by Learning Support Placement & Race, 2015-2017

Learning Support Placement	Black Students	White Students	Difference
Math Only	18.3%	25.6%	-7.2 pp
Reading Only	17.4%	23.2%	-5.7 pp
Writing Only	13.4%	20.1%	-6.7 pp
Math & Reading	11.2%	18.1%	-6.9 pp
Math & Writing	11.3%	15.3%	-4.1 pp
Reading & Writing	8.3%	13.3%	-5.0 pp
Math, Reading, & Writing	5.9%	10.9%	-5.1 pp
Any Placement	9.1%	18.5%	-9.4 pp
No Placement	23.6%	38.5%	-14.9 pp
All Students	11.1%	28.2%	-17.1 pp

Figure 52: Three-Year Graduation Rates by Race, 2015-2017





CLOSING EQUITY GAPS IN RETENTION AND GRADUATION *Summary*

Gaining Momentum

- Low-income students completed gateway math courses at lower rates than their non-low-income peers. From 2015 to 2019, 43% of non-low-income students who were placed into learning support for math completed a college-level math course in their first academic year; only 36% of low-income students in learning support in math did so.
- Black and Hispanic students who were placed into learning support math completed college-level math at lower rates than White students. From fall 2015 to 2019, 29% of Black students who were placed into learning support for math completed a college-level math course in their first year; 42% of White students in learning support math did so. This represents a 13-percentage point gap between Black and White students in learning support math.

Connections to Core Principles

- **Improving Gateway Course Completion in Math, Reading, & Writing:** Even among students who were not placed into learning support, a gap in gateway math success exists between low-income and non-low-income students. From fall 2015 to 2019, 53% of low-income students who were not placed into math learning support completed a gateway math course in their first academic year, while 61% of non-low-income students who did not require math learning support did so. *Why do gateway math course outcomes for low-income students lag behind their peers regardless of their learning support status?*
- **Promoting Access & Success through Accuracy and Placement:** Low-income students are more likely to be placed into learning support. Even among learning support students, low-income and Black students had lower ACT scores than other students. *How will alternative placement metrics like high school GPA affect differences in placement rates and outcomes by race and ethnicity?*
- **Supporting Institutional Innovation & Autonomy:** Findings from qualitative and quantitative research reinforced the importance of building clear connections between the learning support and college-level courses through learning communities, faculty pairings or collaboration, and syllabus alignment. *How can we specifically design and scale equity-focused best practices or interventions aimed at closing equity gaps?*

Explore More

- [Working Paper #2: Low-Income Student Experiences in Learning Support](#)
- [Working Paper #3: Differences by Race and Ethnicity in Learning Support](#)
- [Data Toolkit](#)

A young woman with long hair, wearing clear safety goggles, is looking upwards and to the right with a slight smile. She is in a laboratory or classroom setting, with various pieces of equipment and shelves visible in the background. The entire image has a blue tint and is framed by a white border.

GAINING MOMENTUM

Boosting Student Success in the
First Year and Beyond

BOOSTING STUDENT SUCCESS IN THE FIRST YEAR AND BEYOND

Through corequisite learning support and other reforms, community colleges in Tennessee have transformed remediation. More than half of first-time students require learning support upon enrolling. However, community colleges in Tennessee have led the way in implementing innovative strategies to provide students with timely and effective learning support. Through these reforms, every student at a Tennessee community college can access college-level courses during their first term of enrollment, while still receiving academic support for key gateway courses.

However, corequisite reforms had an uneven impact across colleges and student groups. Further, existing learning support placement metrics may over-prescribe *or* under-prescribe learning support to some students. Even more importantly, while corequisite learning support has led to increased success rates for all students, it has not closed critical gaps for Black and low-income students.

Yet, community colleges across Tennessee have also identified and implemented promising learning support innovations. As colleges have adapted the corequisite learning support model to meet the needs of their students, they have also identified effective practices that could be scaled systemwide. Faculty have proposed clear ideas about how to improve the implementation of corequisite learning support at their colleges. Additionally, refinements to learning support placement metrics could help colleges better identify which students would most benefit from learning support.

To build upon the momentum of the past decade of reform and continue to increase student success in the first year and beyond, the College System of Tennessee should consider the following next steps for **research**, **policy**, and **practice**.

Refine learning support placement.

Research: Rigorously evaluate the Corequisite Placement Pilot.

In 2020, Tennessee community colleges launched a pilot project to use students' high school GPAs for learning support placement. TBR and the colleges must continue to track how the addition of high school GPA affected student success, with a particular focus on how these outcomes differ by student demographic and academic characteristics.

Policy: Revisit TBR's placement policy and make permanent refinements.

Research suggests that some students may be over-prescribed or under-prescribed learning support. Even beyond the Corequisite Placement Pilot, TBR must continue to evaluate the effectiveness of existing placement methods and make updates to the policy. The current placement model prescribes a one-size-fits-all learning support model. New pilot projects to test different placement or delivery models will help colleges identify which students need learning support, how much they need, or what kind they need.

Practice: Prepare advisors to engage students in conversations about placement.

A growing body of research supports efforts to engage students in conversations about placement ([Karp, 2021](#)). Some colleges are training advisors to help students understand their placement; others are allowing students to determine their placement.

At Tennessee community colleges, students shared that they sometimes did not see the connection between learning support and college-level classes ([Guthrie et al., 2021](#)). TBR will need to equip advisors with tools and training to engage students in conversations about placement and prepare students to see these connections.



Support institutional innovations that boost student success.

TBR policy allows colleges to make decisions about the implementation of the corequisite model to meet the needs of their students, within certain guidelines. This flexibility has created a series of field experiments about effective practices for corequisite learning support. TBR can build upon the momentum of corequisite reforms by scaling the most promising innovations and discouraging ineffective practices.

Research: Identify and scale promising learning support practices.

Colleges have led the way in identifying innovative and effective practices. However, research on these innovations is limited. TBR can support continued innovation by helping colleges to pilot, evaluate, and implement promising practices like faculty pairings, learning communities, and streamlined corequisite courses with consolidated syllabi.

Policy: Discourage corequisite course pairings that are not contributing to student success.

Each college chooses which courses to pair with learning support in the corequisite model ([TBR, 2019a](#)). Current TBR policy does not designate which college-level courses can be paired with learning support, but courses may be approved by the Vice Chancellor of Academic Affairs. However, data on corequisite learning support allows us to identify which course pairings contribute to student success. To build upon the momentum of learning support reforms, TBR should provide clearer guidance and recommendations about appropriate course pairings.

Additionally, TBR policy does not require colleges to create differentiated learning support courses to align with the college-level paired courses. However, in interviews conducted in 2021, students shared challenges associated with learning support courses that are not differentiated and aligned to the college-level content ([Guthrie et al., 2021](#)). Although most colleges already provide differentiated learning support courses, TBR policy should *require* that colleges implement this best practice.

Practice: Provide colleges with the resources and flexibility to build connections between learning support and college-level courses.

Findings from qualitative and quantitative research reinforced the importance of building clear connections between the learning support and paired college-level courses. Students shared that they often did not see these connections or felt confused by the lack of alignment ([Guthrie et al., 2021](#)).

In a 2020 survey, faculty said the corequisite model sometimes overwhelmed students, especially when the learning support and college-level courses felt separate. However, many faculty members shared that they rarely communicated or collaborated with the other faculty member teaching the paired course.

Yet, many colleges have identified effective practices to build connections between paired courses. Through learning communities, colleges can help connect the content of the courses, which promotes course success, retention, and graduation. Faculty pairings, faculty collaboration, or syllabus alignment can also help to create these connections. However, many colleges have too few resources to implement these practices.

To help colleges build connections between learning support and college-level courses, TBR will need to assist colleges in identifying resources to implement learning communities, promote faculty collaboration, or overcome other financial or administrative barriers.

Refocus on the commitment to improving gateway course success.

After the introduction of corequisite learning support, gateway course completion for learning support students doubled. However, the impact of corequisite learning support was uneven. Plus, gateway course completion rates have *declined* slightly for students who did not require learning support. To continue gaining momentum, TBR and community colleges will need to refocus on the system's commitment to gateway course success.

Research: Build data tools to help faculty and advisors track gateway course success.

To improve gateway course completion, colleges will need tools to help faculty and advisors track gateway course success and identify students in need of additional support. TBR's learning support data toolkit will help colleges identify trends in gateway course completion. However, colleges will also need access to real-time data that allows them to identify students who are struggling in gateway courses.

Policy: Eliminate hidden prerequisite courses.

TBR's learning support policy allows colleges to enroll students in college-level math courses that are not required as part of the general education curriculum. Learning support students enrolled in STEM or Business programs, which typically require an algebra-based math course, can be enrolled in math fundamentals courses alongside corequisite learning support. However, math fundamentals courses typically do not satisfy general education requirements. Upon completion of math fundamentals, students must enroll in *another* college-level, algebra-based course to complete general education requirements. Non-general education math courses operate in a prerequisite model that may contradict the spirit of corequisite reforms.

While pass rates in fundamentals courses are comparable to other math courses, students who enroll in math fundamentals courses are less likely to persist and graduate than other learning support math students, even after we account for other factors that are correlated with success. To promote long-term success, TBR will need to consider these outcomes and eliminate course pairings that do not satisfy general education requirements.

Practice: Convene faculty, staff, and academic administrators to share promising practices and make updates to guidance on corequisite learning support.

When corequisite learning support launched in 2015, TBR shared guidance with colleges in a document describing "Fundamental Features of Corequisite Remediation" ([TBR, 2015](#)).

However, this guidance has not been updated since corequisite reforms began. While TBR's "Fundamental Features" document still influences colleges' work, the document may not fully reflect current practices. To implement refinements to the corequisite model, TBR will need to convene colleges to discuss best practices and update TBR's guidance.

Faculty at Tennessee community colleges will need to play an important role in this process. In a 2021 survey, faculty from across the system shared specific ideas about how to refine the corequisite model. TBR should convene faculty, alongside college staff, learning support directors, and academic administrators, to revisit and refresh guidance about the fundamental features of the corequisite model.

Sharpen the focus on critical equity gaps in student success.

Gateway course completion rates increased for all students after the introduction of corequisite learning support. However, critical gaps still exist in gateway course completion rates, retention rates, and graduation rates for Black and low-income students.

The system's commitment to closing equity gaps must remain at the center of any reforms to learning support policies.

Black and low-income students are more likely than other students to be placed into learning support. Changes to placement rules or learning support practices must be examined through an equity lens.

In 2020, faculty from community colleges across the state convened for the Gateway Academy which focused on redesigning gateway courses with equity in mind. As part of this work, TBR provided small grants to colleges to support training, faculty development, or other efforts to refine gateway courses. Building upon this foundation, TBR further support for this work at colleges through additional grants and training opportunities for faculty.

List of Tables and Figures

Figure or Table	Page
Improving Gateway Course Completion in Math, Reading, & Writing	
Figure 1	First-Time Freshmen Enrolled in Learning Support in their First Term 11
Figure 2	First-Time Freshmen Who Attempted College-Level Gateway Courses by the End of their First Year 11
Figure 3	First-Time Freshmen in Learning Support Who Attempted College-Level Gateway Courses by End of their First Year 11
Figure 4	First-Time Freshmen Who Completed a Gateway Course by their First Term 13
Figure 5	First-Time Freshmen Who Completed a Gateway Course by their First Year 13
Figure 6	First-Time Freshmen Who Passed a Gateway Course by their First Year, Limited to Those who Attempted 13
Table 1	Learning Support Students Who Completed a Gateway Course by their First Year, 2015-2019 14
Figure 7	Probability of Completing Gateway Course By First Year 15
Figure 8	Probability of Completing Gateway Course By First Year, by ACT Score 16
Table 2	Probability of Completing Gateway Course, Among Learning Support Students by College 17
Figure 9	Probability of Completing Gateway Course By First Year, by Race 17
Table 3	Fall-to-Spring Retention Rates by Learning Support Placement, 2013-2019 18
Table 4	Fall-to-Fall Retention Rates by Learning Support Placement, 2013-2019 18
Table 5	Three-Year Graduation Rates by Learning Support Placement, 2015-2017 19
Figure 10	Three-Year Graduation Rates by Learning Support Placement, 2015-2017 19
Figure 11	Cumulative Graduation Rates by Learning Support Placement 20
Figure 12	How Faculty Rate the Effectiveness of Corequisite Learning Support 21
Promoting Access & Success Through Accuracy in Learning Support Placement	
Table 7	Approved Cut Scores for Placement Into College Level Courses (as of Fall 2019) 26
Figure 13	Percent of First-Time Freshmen Placed into Learning Support Over Time 27
Figure 14	Percent of First-Time Freshmen Placed into Learning Support, 2015-2019 27
Table 8	Percent of First-Time Freshmen Placed into Learning Support by Subject, 2015-2019 28
Table 9	Percent of First-Time Freshmen Placed into Learning Support by College, 2015-2019 28
Figure 15	Percent of First-Time Freshmen Placed into Learning Support by ACT Subject Score, 2015-2019 29
Figure 16	Percent of First-Time Freshmen Placed into Learning Support by High School GPA, 2015-2019 29
Figure 17	Percent of First-Time Freshmen Placed into Learning Support by Group, 2015-2019 30
Figure 18	Percent of First-Time Freshmen Placed into Learning Support by Number of Subjects, 2015-2019 30
Figure 19	Learning Support Students by ACT Subject Score and Race, 2015-2019 31
Figure 20	Non-Learning Support Students by ACT Subject Score and Race, 2015-2019 31
Figure 21	Percent of First-Time Freshmen Placed into Learning Support by County, 2015-2019 32
Figure 22	Percent of First-Time Freshmen Placed into Learning Support by County Type, 2015-2019 33

Figure 23	Learning Support Placement by High School, 2015-2019	33
Figure 24	Percent of Adult Students Placed into Learning Support by Subject, Fall 2019	34
Figure 25	Percent of Adult Students Placed into Learning Support by Group, Fall 2019	34
Figure 26	Probability of Passing Gateway Course: Accounting for ACT Scores & High School GPA	35
Figure 27	Model Fit and Accuracy: Accounting for ACT Subject Scores & High School GPA	37
Table 10	Marginal Effect of High School GPA on Probability of Passing Gateway Course	38
Table 11	Placement Accuracy for First-Time Freshmen, 2015-2019	39

Supporting Institutional Innovation & Autonomy

Figure 28	Learning Support Math Pairings, 2015-2019	43
Figure 29	Math Course Pairings by Student Group, 2015-2019	44
Figure 30	Outcomes in Learning Support by Math Pairings, 2015-2019	44
Figure 31	Probability of Success by Learning Support Math Course Pairing, 2015-2019	45
Figure 32	Learning Support Reading Pairings, 2015-2019	46
Figure 33	Outcomes in Learning Support by Reading Pairings, 2015-2019	47
Figure 34	Probability of Success by Learning Support Math Course Pairing, 2015-2019	48
Table 13	Use of Corequisite Learning Communities by Subject, Fall 2019	49
Figure 35	Participation in Corequisite in Learning Communities, 2015-2019	50
Figure 36	Participation in Corequisite Learning Communities by College, 2015-2019	50
Figure 37	Participation in Corequisite Learning Communities by Student Group, 2015-2019	51
Figure 38	Outcomes for Corequisite Learning Community Participants, 2015-2019	52
Figure 39	Probability of Success for Corequisite Learning Community Participants, 2015-2019	53
Figure 40	Average Number of Students per Class Section, 2015-2019	55
Figure 41	Outcomes based upon College-Level Class Section Size, 2015-2019	56
Figure 42	Probability of Success based upon College-Level Course Section Size, 2015-2019	57
Figure 43	Learning Support Student Enrollment in College-Level Sections, by Percent LS Students, 2015-2019	58
Figure 44	Timing of Enrollment in College-Level Courses for Learning Support Students, 2015-2019	60

Closing Equity Gaps in Retention & Graduation

Figure 45	Gateway Course Completion Rates by Income Status, 2015-2019	63
Figure 46	Learning Support Math Placement by ACT Math Score and Income, 2015-2019	64
Figure 47	Gateway Math Completion Rates for Learning Support Students by ACT Math Score and Income, 2015-2019	64
Table 14	Three-Year Graduation Rates by Learning Support Placement & Income, 2015-2017	65
Figure 48	Three-Year Graduation Rates by Income Status, 2015-2017	65
Figure 49	First-Time Freshmen Gateway Course Completion Rates by Race and Ethnicity, 2015-2019	66
Figure 50	Learning Support Math Placement by ACT Math Score and Race, 2015-2019	67
Figure 51	Gateway Math Completion Rates for Learning Support Students by ACT Math Score & Race	67
Table 15	Three-Year Graduation Rates by Learning Support Placement & Race, 2015-2017	68
Figure 52	Three-Year Graduation Rates by Race, 2015-2017	68

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ABOUT THIS PROJECT

The College System of Tennessee is the state's largest public higher education system, with 13 community colleges, 27 colleges of applied technology, and the online TN eCampus. The system is governed by the Tennessee Board of Regents.

This report is part of *Gaining Momentum: Refining Corequisite Learning Support to Boost Student Success in the First Year and Beyond*, a TBR project focused on identifying best practices and developing equity-focused data insights about corequisite learning support at community colleges.

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