Report on Assessment Tools
December 2021

2021 JCR p. 197

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Executive Summary

In the 2021 Legislative Session, the Maryland Legislature charged the Maryland Higher Education Commission (MHEC) with collecting information and reports from Maryland's colleges and universities on their internal validity studies in an effort to identify the most effective assessment methods used to place students in remedial courses. MHEC surveyed all Maryland institutions on their remedial assessment practices and collected reports and validity studies, as well. A review of the institutional submissions reveals that: 1) over half (31 of 52) of Maryland colleges and universities are assessing students for course placement, 2) the vast majority (26 of 31) of those institutions use more than one assessment method to place students (often referred to as multiple measures), 3) many institutions (21 of 31) have performed formal or informal studies of their remedial course placement in the past 10 years[1], and 4) institutions demonstrate a commitment to regularly studying the effectiveness of remedial course placement.

A review of the studies submitted by institutions, as well as a review of the relevant and contemporary applied research on best practices around remedial course placement provide several recommendations:

- The use of multiple measures for course placement should be strongly considered for those institutions that currently do not employ that practice;
- The use of experimental or quasi-experimental methods by institutions to determine the predictive validity of placement tools is strongly encouraged;
- High school transition courses may help reduce remediation in college but more evidence is needed to ensure the courses are having the intended short- and long-term outcomes; and
- Institutions and the state need to take a critical look at data infrastructure and to commit the necessary resources to ensure high-quality data and analysis; investment in infrastructure and in establishing partnerships with national research entities can extend the capacity of overburdened IR offices and ensure rigorous, segment or statewide studies of important topics such as the validity of remedial course placement.

As Maryland builds the foundation to support the Blueprint for Maryland's Future, it is an opportune time for K-12, higher education and the state to collaborate on advancing best practices to ensure student success.

Background

In the 2021 Legislative Session, the Legislature charged the Maryland Higher Education Commission (MHEC) with collecting information and reports from Maryland's colleges and universities and reporting the information obtained from institutions. In the 2021 Joint Chairmen's Report, it states:

> *The budget committees are concerned that the tests used to assess a student's need for remedial coursework may not provide an accurate indication of the student's ability to succeed in credit bearing courses. The committees request that the Maryland Higher Education Commission (MHEC) collect internal validity studies from institutions to identify the most effective assessment tools used to identify students needing remediation. The report should summarize the information from the institutions that can be used as a basis for a more in-depth study on assessment tools. (p. 197)*[2]

[1] In its guidelines, MHEC set a cap of 10 years for the study's age, as practices around remediation and course placement have changed significantly over that time.

[2] See https://mgaleg.maryland.gov/Pubs/BudgetFiscal/2021rs-budget-docs-jcr.pdf page 197

This charge arose, in part, in response to a series of research reports issued by MHEC on remedial students in Maryland colleges and universities.[3] Part 4 of the series, issued in Fall 2020, provides analysis of credit-bearing course completion within the first year of enrollment among Maryland first-time, full-time undergraduates. One of a number of findings from Part 4 of the series was that a portion of the analytic cohort were identified to need remedial work, failed to complete the remedial coursework, but subsequently succeeded in credit-bearing coursework of the subject or subjects for which they needed remediation. The report stated this "is evidence that institutions may erroneously categorize student readiness. Institutions should continue to monitor the tools that they are using to assess whether students require developmental assistance." While the report cautioned that these results may be tied to data entry errors/collection limitations, the finding suggests that institutions should engage in analysis and study of their remediation course placement processes to ensure the placement of students in remedial or developmental courses is necessary. In response to this one report finding, the JCR charge required institutions to show evidence of their work at validating course placement through research studies.

What follows is a summary of the findings from a statewide survey conducted in Summer 2021 and highlights from the narrative reports and studies submitted by institutions. This last section of the report provides some helpful materials on what institutional studies reveal and scholarly research indicates, as well as summarized key takeaways. Appendices A and B contain the reports and validity studies submitted by the institutions and unedited by MHEC.

The Survey[4]

Respondents of survey

All 52 of Maryland's colleges and universities responded to the survey and reporting requirements put forth by MHEC (see a list of the respondents in Appendix C). Of them, 31 indicated that their institution assessed undergraduate students for placement in remedial/developmental[5] courses. For this report, MHEC used the definitions noted below.

> *"Assess" is defined as the use of standardized test scores (e.g., ACCUPLACER) and/or other measures (course grades, HS GPA, SAT scores, etc.) to determine college readiness of the student. "Remedial/developmental courses" are defined as courses, either co-requisite or pre-requisite, that provide students the support and instruction needed for college-level work.*

Table 1 provides a breakdown of the respondents by segment.

[3] For the full series, visit MHEC's Research and Policy Analysis website https://mhec.maryland.gov/publications/Pages/research/index.aspx. The series is under Policy Studies and Information Reports.

[4] A copy of the survey instrument can be found in Appendix D.

[5] Some in the higher education community have argued that there should be a distinction between "remedial" education - e.g., coursework designed to compensate for skills lacking that they already should have obtained - and "developmental" coursework - designed to help students develop understanding in areas that they had not previously studied. However, there is no consensus regarding this, and for this report, institutions did not distinguish the two. Consequently, throughout this report, "remediation" and "developmental" and "remedial" education/courses will be used interchangeably.

Table 1: Response to prompt "Does your institution assess undergraduate students for placement in remedial/developmental courses?"

	Community College	Public 4-Year	MICUA	Private	Total
Yes	16	9	5	1	31
No	0	4	8	9	21

If institutions indicated "No" to the prompt ""Does your institution assess undergraduate students for placement in remedial/developmental courses?," they were asked to indicate why they did not assess. The 21 institutions who indicated that they did not assess for remedial placement responded to the survey prompts on why they did not assess students for placement.

Table 2: Response to prompt "Why does your institution not assess undergraduate students for placement in remedial/developmental courses?"

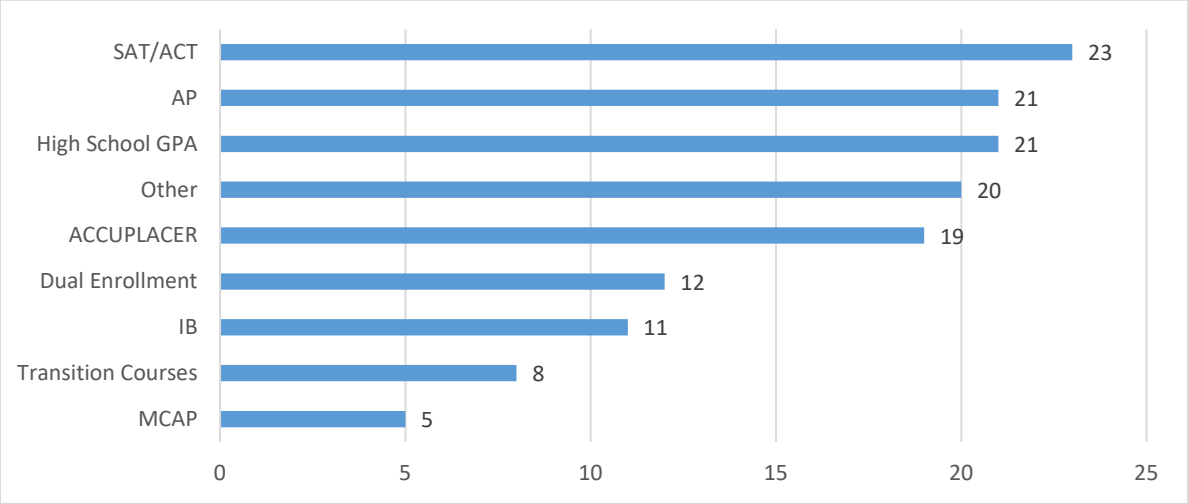
The institution does not offer remedial courses or developmental courses (either co-requisite or pre-requisite)	15
The institution uses admission criteria to screen for college readiness (i.e., all admitted students are considered college ready)	11
The populations of students served at the institution do not require remediation (e.g., graduate students)	5
Other	3

Note: Institutions could select all that apply.

What assessments are institutions using?

The 31 institutions that indicated they use assessments for course placement were prompted to select all of the tools used to assess undergraduate students' preparation for college-level work. Figure 1 below shows the responses.[6]

Figure 1: Counts of Assessment Tools used by Maryland's Colleges and Universities



Note: Institutions could select all that apply.

[6] Acronyms are used throughout this report. The following are those used in assessments. IB (International Baccalaureate), CLEP (College-Level Examination Program), AP (Advanced Placement), MCAP (Maryland Comprehensive Assessment Program), ALEKS (Assessment and Learning in Knowledge Spaces), PARCC (Partnership for Assessment of Readiness for College and Careers), and GED (General Educational Development Test).

Of note is that 20 institutions indicated they used "other" assessments, with some specifying that they used up to four "other" tools; institutions clarified in a text field provided in the survey. The category of "other" followed a few themes: 1) other national or statewide assessments (e.g., CLEP, ALEKS, PARCC), 2) campus-established assessments tailored to the institution's needs, and 3) additional measures that indicate college preparation (e.g., grades in transfer courses, military transcripts). More information on the most widely used assessment tools (e.g., background, vendor) can be found in the Appendix E.

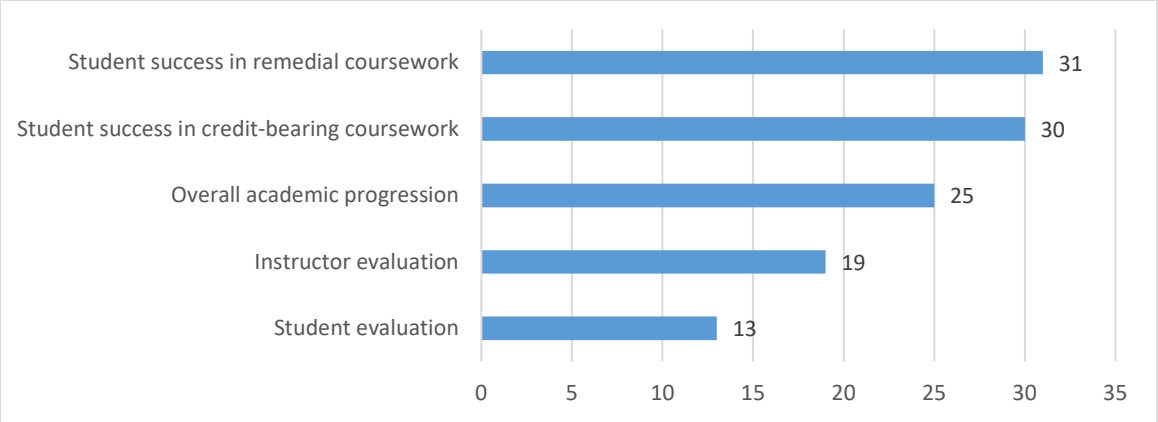
How many assessment tools are institutions using?

Almost all institutions (26 of the 31) indicated they used more than one assessment tool to aid with placement, with an average of 3.4 and a median of 5. The 16 community colleges skew higher than the overall statewide figures with an average of 6.9 assessments used (some institutions use as many as nine assessment methods). Conversely, of the remaining respondents (n=15), all four-year institutions, five of them indicated they used only one assessment method for placement.

How are institutions evaluating the accuracy of remedial course placement?

Institutions were asked to select the methods used for evaluating the accuracy of remedial/developmental course placement and the frequency of these evaluations. Figure 2 shows the results of those responses (for the 31 institutions that assess).

Figure 2: Methods of Evaluating the Accuracy of Remedial/Developmental Placement

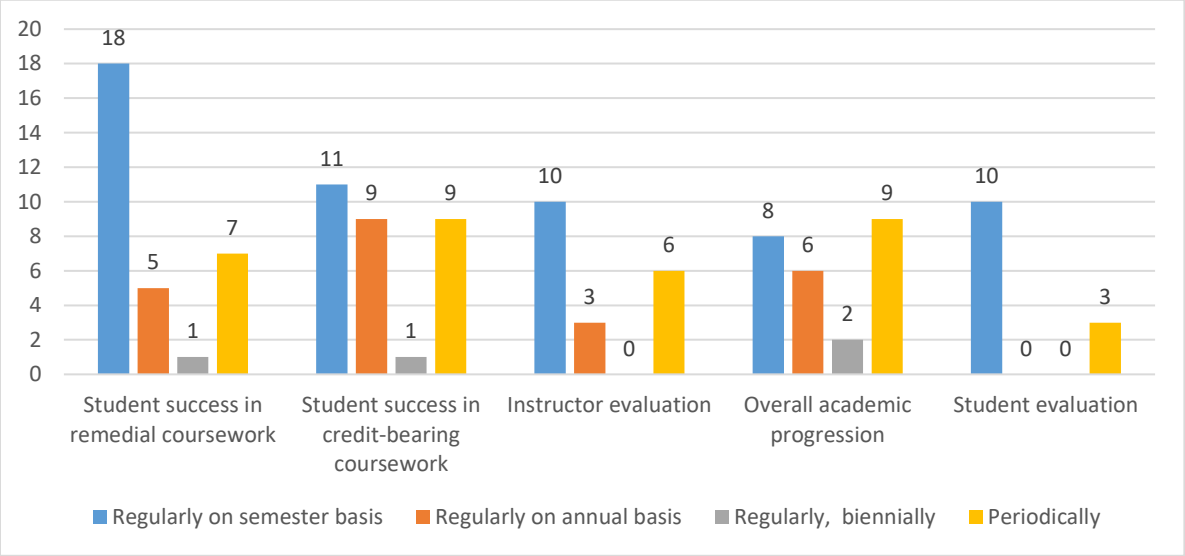


Note: Institutions could select all that apply.

The most commonly used information to evaluate the accuracy of placement into remedial or developmental classes is the student's success in that coursework (e.g., grades, completion) and these data are frequently reviewed every term. Many institutions pair these data with the student's subsequent success in the associated credit-bearing course (otherwise known as a "gateway" course) as another data point in evaluating accuracy. Measures of academic progression complement these metrics, as well as evaluations by instructors and students' self-evaluations. These latter three are predominantly used by the community colleges, with over half indicating they use these methods.

Institutions were also asked to indicate the frequency by which they used these evaluation methods, and Figure 3 shows the results.

Figure 3: Frequency of Methods of Evaluating the Accuracy of Remedial/Developmental Placement



Note: Institutions could select all methods and all frequencies that applied. Some institutions noted they used methods on both a semester and annual basis, for example.

Key Takeaways from the Survey Data

The results of the survey show that:

- Over half of Maryland's colleges and universities use assessment methods for student placement in college courses.
- Those that do not use assessments indicate the primary reasons for this are that they do not offer remedial or developmental courses (either co-requisite or pre-requisite) and/or they use admissions criteria to assess for college readiness.
- Of those institutions that use assessments to determine if students are college ready, most use more than one assessment method to place students.
- Many institutions conduct evaluations of the accuracy of their placement efforts regularly on a semester basis; those that do, use student performance in the remedial course and the corresponding credit-bearing gateway course regularly to refine and study their placement and instruction methods.

Narrative Reports

The 31 institutions that indicated they assessed undergraduate students for course placement were required to provide a narrative report (1000-word limit) that summarized the processes and procedures used to select the institution's current assessment tools. These reports can be found, unedited by the Commission, in Appendix A of this report. [7]

Themes from the Narrative Reports

All Sectors

Some common themes arose from a review of the narrative reports that cross **all sectors** of postsecondary education in Maryland.

[7] One private institution, Lincoln College of Technology, assesses their students for course placement; they completed the survey but did not provide a narrative report.

- **Faculty involvement** - Faculty are involved in many aspects of the institution's work on assessment, developmental education and outcomes. They are central to: selecting or developing assessments, developing cut scores or other metric levels used for assessment, performing validity studies, reviewing recent literature, and collaborating with colleagues on best practices. While faculty from around the campus can bring expertise to this work, many campuses rely on the subject matter experts in math, English and reading in the collaboration.
- **Self-directed placement** - Several institutions have begun using self-directed placement as one of several or the primary method of course placement; under this structure the student is asked to self-evaluate and, then, in consultation with an advisor, decide on course placement.
- **COVID-19 impact** - COVID-19 has disrupted processes and practices tied to remedial course placement in several ways, including: complicating data collection and analysis of longer-term student outcomes and other rigorous studies on remediation; forcing institutions to re-evaluate their assessment methods, placement, and course offerings to meet the needs of a mostly-remote admissions, teaching, and advising environment; requiring institutions to look at different ways to assess (due to test center closures); and providing instructional support to faculty to adapt courses (including remedial) to remote delivery.
- **Math, English and Reading placement** - Most institutions follow different placement procedures and protocols for math, English and reading (when applicable); math placement typically involves a greater number of measures and is more likely to involve results from tests (SAT, ACT, ACCUPLACER, etc.) than English, which may rely more on measures like essay writing (with faculty assessment) and self-directed placement.
- **Math pathways** - Students' need for advanced math courses may deviate depending on their major's graduation requirements for math (particularly STEM versus non-STEM). Many institutions have established math pathways and have aligned their assessments to be concomitant to the path. Assessing for a student's developmental needs based upon their major's graduation requirements helps ensure students are placed in the correct math course sequence and can reduce the risk for the need for remediation.
- **Multiple resources** - Institutions use multiple external resources – e.g., national organizations like Achieving the Dream and Community College Research Center (CCRC), accrediting bodies, and statewide networks – to identify best practices in the implementation and evaluation of assessment methods for course placement.
- **Internal studies and evaluation** - Institutions employ a review process (frequency can vary) to evaluate their assessment tools; this involves an analysis of cut scores[8], a review of short- and long-term outcomes of students, and evaluations of course delivery and pedagogy. Almost every institution that assesses for course placement has performed formal and informal studies of their remedial placement assessment tools in the last three years.
- **Multi-level placement** - Some institutions have developed a multi-level placement model, which allows institutions to both assess student readiness for college-level coursework and facilitate placement in the appropriate level of course. This multi-level placement means that the cut scores are not used dichotomously (eligible/ineligible for a college-level course) but instead are used as ranges that place students on different levels for credit courses in the test/course subject.

[8] Cut scores are selected points on the score scale of a test. The points are used to determine whether a particular test score is sufficient for some purpose such as course placement.

Community Colleges

As open enrollment institutions, community colleges provide education to the majority of Marylanders. Because they do not set admissions criteria, their admissions process includes a simple application and an appointment with an academic advisor who helps the student navigate the process of providing the placement documents and records necessary for enrollment.

In Maryland, recent high school graduates provide placement records such as: high school transcripts, prior college or military transcripts; SAT, ACT, AP, IB, PARCC and GED scores. Students with qualifying scores or who have a cumulative high school (unweighted) GPA of 3.0 or higher are considered college and career ready and therefore exempt from placement testing. Additional exemptions may be in place through agreements between the community college and its local school district.

For those applicants who do not meet the qualifying scores or whose time gap between high school or prior college or military enrollment is too sizeable to make the tools listed above highly predictive of their academic performance, the students are required to take placement tests. For most Maryland community colleges these take the form of nationally normed tests (e.g., ACCUPLACER, ALEKS).

This standard process across all 16 community colleges is reflected in the narrative reports as well as some additional themes unique to this sector.

- **Statewide MOU** - Each year the Maryland Association of Community Colleges (MACC) and the Public-School Superintendents Association of Maryland (PSSAM) update a Memorandum of Understanding that outlines agreed-upon criteria for college and career readiness (See Appendix F for the most recent MOU). These criteria were negotiated based on agreement that students who meet these standards in 11th or 12th grade are automatically placed in college-level English and math courses. This MOU states the exemption. In their reports, all community colleges reference this MOU, as it provides the cut scores, exemption rules and other guidance that are used statewide by all of the colleges.
- **Exemptions** – The colleges use multiple methods to exempt students from having to take placement tests. The exemptions arose from the recommendations of the Maryland Association of Community Colleges (MACC) which included English and math sub-groups comprised of community college faculty. Guidance on placement exemptions has also been provided by several community college affinity groups including Maryland Council of Community College Presidents (MCCCP), Maryland Council of Community College Chief Academic Officers (M4CAO), and the Maryland Community College Research Group (MCCRG).
- **Collaboration** - Community colleges collaborate statewide on a number of activities related to assessment through formal affinity groups (see above) and informal networks developed by the colleges and MACC.
- **Standard cut scores** - Through the campus- and segment-based workgroups, key staff report on agreements through the statewide MACC affinity groups and identify the cut-scores. These scores are standard across the state to assist student transfer among different community colleges.
- **Access and ease** - The community colleges try to reduce barriers to placement by making the cut scores and acceptable multiple measures easy to find on college's websites. In addition they offer free testing if needed and allow students to provide unofficial high school transcripts as evidence of prior performance.

Four-Year Public, State-Aided and Private Institutions

Far fewer four-year institutions indicated they assess students for placement into remedial or developmental courses. Many of the items raised earlier in this report in the "all sectors" section are common themes for all four-year institutions, but there are a few notable items.

- **One assessment** - Overall, four-year institutions are less likely to use multiple measures for their assessment process. They are more apt to rely on one test per subject area (English and math), and they tend to only test for English and math and not test for reading comprehension.
- **Workgroups** - The USM institutions report leveraging system-wide workgroups and other efforts as sources of support and guidance in studying and updating their assessment practices.
- **Campus-developed assessments** - Four-year institutions were more likely than the community colleges to report the use of campus-developed measures for assessment for both math and English placement.

The next section of this report discusses the findings from MHEC's review of the submitted validity studies as well as a brief review of the current scholarly and research literature on validity of assessment tools. The report concludes with some policy and practice recommendations.

Summary from Validity Studies

The charge from the Joint Chairman's Report stated MHEC was to "collect internal validity studies from institutions to identify the most effective assessment tools used to identify students needing remediation. The report should summarize the information from the institutions that can be used as a basis for a more in-depth study on assessment tools."

Of the 31 institutions that indicated they assessed students for placement in courses, 21 of them shared that they had performed formal or informal studies over the past 10 years. [9] Appendix B of this report contains the validity study reports provided by the institutions, and this section of the statewide report summarizes information from both the reports provided and from contemporary research on the subject of remedial assessment.

For formal studies, institutions were to upload presentation slides, reports, scholarly articles, and other materials that were shared with institutional audiences such as fellow researchers, faculty, and governing bodies. For less formal work, institutions were to summarize the studies and findings and limit the summary to no more than three pages (plus appendices). The materials found in Appendix B range from findings presented in scholarly journals, to summaries of research studies to presentation slides provided to governing bodies.

The 10 institutions that reported that they have not performed validity studies in the past 10 years indicate several drivers of the lack of studies. The text responses from institutions reveal the following themes that arose and the frequency of those themes.

[9] MHEC limited the scope of research to a ten-year period, as methods of assessment, course delivery and other aspects of remedial education have changed vastly in the past decade.

Table 6: Responses to Survey Question: "Why has your institution not performed validity studies in the past 10 years?"

Reason	Frequency
Instruments used have been externally validated by vendor	5
Studies underway or will be in 1-2 years	4
Data to perform rigorous validity studies currently being collected	3
COVID 19 disruptions affected ongoing work	2
Validity studies unnecessary due to institutional practices of regularly monitoring effectiveness of assessments using internal data	1
No studies requested from faculty	1

Note: Institutions could provide multiple reasons.

Before exploring some of the findings from the studies submitted, it is important to review several key areas of assessment, placement tests, and the current applied research findings on these as it pertains to placement in remedial/developmental courses.

What is Validity, Predictive Validity and Reliability in Assessment?

Reliability refers to whether an assessment instrument gives the same results each time it is used in the same setting with the same type of students. Reliability essentially means consistent or dependable results. Reliability is a part of the assessment of validity. In the realm of assessments for remediation, reliability could be measured by ensuring internal consistency (do similar questions result in similar responses among test takers) and ensuring parity in results among different subgroups of test takers (e.g., test is not biased by gender, race, ethnicity, etc.).

Validity in research refers to how accurately a study answers the research question(s) or the strength of the study conclusions. For outcome measures such as tests, validity refers to the accuracy of measurement. Here validity refers to how well the assessment tool actually measures the underlying outcome of interest such as grades or course performance. Validity is not a property of the tool itself, but rather of the interpretation or specific purpose of the assessment tool.

Predictive Validity refers to how well a certain measure can predict future behavior or an outcome. In college admissions and placement testing, the use of GPA, test scores, course grades or other measures are used to predict the academic performance of the student in college. Placement tests and other measures are meant to assess the knowledge and skills of first-year students for placement in courses that are appropriate for their current knowledge level. Results from these tests and assessments can also identify additional supports the student might need, including remedial courses that can be utilized to ensure that students are prepared for college-level work.

It is the predictive validity of placement tools that has come under scrutiny and been the subject of study. Colleges face the challenge of using the data they can collect from incoming students to help predict their short- and long-term educational outcomes. It is important that the tools used are reliable (do they produce consistent results) and valid (are they measuring what they intend to). The concern lies in whether the tools being used to assess and place students have predictive validity (are they predicting a future outcome accurately?).

Methods to Ensure Validity

The validity of the use of placement test scores is typically researched through the correlation of test scores and course grades, which are occasionally dichotomized into successful completion (e.g., B or higher, C or higher) versus unsuccessful completion, or through the percentage of students who were correctly placed, again in terms of obtaining grades of C or higher or grades of B or higher.

The traditional method of measuring predictive validity relies on correlation coefficients, where a coefficient of zero indicates no relationship between the test and the relevant outcome and a coefficient of one indicates perfect predictive power.

In studies of placement validity, researchers need to ensure they control for student characteristics and experiences that could explain the differences in outcomes.

Challenges in Determining if Tests are Valid

Scholarly research (Geiser, 2020; Barnett, E., & Reddy, V., 2017;
Scott Clayton J. et al, 2012, 2014[10]) has explored the challenges that lie in determining reliability, validity, and predictive validity in standardized assessments such as the kinds of tests often used for developmental course placement. "High stakes tests" such as the SAT, ACT, ACCUPLACER and other nationally normed tests have been criticized, especially when the scores are used in isolation or with few other measures, for putting too much reliance on a test-takers' fate to one singular test.[11] In addition, tests like the SAT and ACT are more highly correlated with student background characteristics like family income, parents' education, and race or ethnicity. To the extent that test scores are emphasized as a placement criterion, they can affect the pathways of low-income, first-generation college, and underrepresented minority students.

Another challenge is the ability for institutions to conduct rigorous studies that can ensure that the placement test or other measures are valid. Many institutions lack the skills, resources (time and money), and the leadership support to conduct this work. As Ngo and Melguizo state (2016) "…The reality of assessment policy … is that placement measures are not routinely validated, and faculty and administrators often do not feel as though they have adequate tools and support to select and use tests and set cutoffs appropriately. There is scant evidence to inform these practitioner decisions, resulting in continual experimentation with assessment policy that may or may not be beneficial to students. …" [12]

[10] Geiser, S. (2020). Norm-Referenced Tests and Race-Blind Admissions. *The Scandal of Standardized Tests: Why We Need to Drop the SAT and ACT*, 11; Barnett, E., & Reddy, V. (2017). College Placement Strategies: Evolving Considerations and Practices 1. In *Preparing Students for College and Careers* (pp. 82-93). Routledge. Scott-Clayton, J. & Crosta, P, & Belfield, C (2014). Improving the targeting of treatment: Evidence from college remediation. Educational Evaluation and Policy Analysis, 36(3), 371–393. https://doi.org/10.3102/0162373713517935; . Scott-Clayton, J., & Rodriguez, O. (2012). Development, discouragement, or diversion? New evidence on the effects of college remediation (NBER Working Paper No. 18328). Cambridge, MA: National Bureau of Economic Research. http://www.nber.org/papers/w18328.pdf)

[11] While students can take tests like the SAT and ACT more than once, most low-income and minority students do not do so (Goodman, J., Gurantz, O., & Smith, J. (2019). NBER Working Paper: Take Two! SAT Retaking and College Enrollment Gaps https://www.nber.org/system/files/working_papers/w24945/w24945.pdf). In addition, tests like the ACCUPLACER are often offered only once during the admissions process for colleges. If a student wants to retake such a placement test, they typically must wait a period of time (1 month to 1 year) before retaking it.

[12] Ngo, F. & Melguizo, T. (2016). How Can Placement Policy Improve Math Remediation Outcomes? Evidence from Experimentation in Community Colleges? *Educational Evaluation and Policy Analysis* http://pullias.usc.edu/wp-content/uploads/2015/10/Ngo-Melguizo-Placement_Policy_EEPA_FINAL.pdf

Test validation is also challenged by the different standards for "college ready". Tatiana Melguizo and Frederick Ngo (2020) in their research on misalignment between high school and college standards suggest that many students considered "college ready" by high school standard are assigned remedial courses in college.[13]

Performing rigorous studies on the validity of course placement methods and the effectiveness of remediation can be challenging for institutional researchers and faculty to tackle. A well-designed research study would include experimental or quasi-experimental methods in order to ensure the findings were valid, but this can be challenging to perform. As Levin states (2007) "…it is difficult to identify a causal relationship between remediation and educational attainment. Due to the nature of remedial interventions, students are not randomly assigned to remedial education; therefore, factors unobserved by the statistician may also influence future outcomes of remedial students. Therefore, if we simply compare the performances of remedial versus non-remedial students in terms of educational outcomes, the former group will perform far worse than the latter group due mainly to precollege differences rather than to the program itself…We should, instead, compare only those remedial and non-remedial students who actually share similar backgrounds and academic preparedness. By doing so, the effects of an intervention can be attributed to the program rather than to pre-college differences." [14]

But the gold standard in performing studies that test the validity of remediation placement lies in the institution's ability to use experimental/quasi-experimental methods. It can often be beyond the capacity of an institutional IR or assessment office to conduct rigorous studies using and employing the correct comparisons. For example, some institutions compare outcomes among students who were placed in courses using ACCUPLACER with those placed in courses using multiple measures to study accurate placement, which can answer research questions tied to methods of placement. But, a more rigorous study would try to determine whether placement is working – to know whether students who were assigned to remedial courses would pass college-level courses were they allowed to waive the remedial courses. These more rigorous studies can be difficult to conduct; time, staffing, high-quality data, and the ability to employ these research methods can hinder this work. This, coupled with pressure to "fix" the remediation problem and constantly changing policies, can create even more barriers.

It is evident from the research studies submitted by Maryland institutions that they face these same challenges. In general, their work on assessing the validity of their placements have fallen into broad categories; those that use methods to try to determine a causal relationship between assessment, placement and subsequent student performance and those that use descriptive statistics to compare groups and show differences over time. A few have turned to their test provider to perform additional studies of student placement and outcomes.[15] Some Maryland colleges have partnered with research centers or other scholars in order to explore this work more rigorously. A list of recent scholarly work conducted by Maryland institutions is at the end of this report.

[13] Melguizo, T. & Ngo, F. (2020). Mis/Alignment between High School and Community College Standards. https://drive.google.com/file/d/1VHDzvsOAaqpstbplKFOnDMk0VyPZTAJC/view

[14] Levin, H. (2007). Remediation in the Community College: An Evaluators Perspective CCRC Working Paper https://academiccommons.columbia.edu/doi/10.7916/D82V2Q7V/download

[15] Most notably, the College Board offers ACES (Admitted Class Evaluation Service) through ACCUPLACER to institutions as a means of performing evaluation of placement (https://aces.collegeboard.org/pdf/sample-accuplacer-placement-validity-report.pdf).

Summary of National Research Findings

This section summarizes findings from recent scholarly and policy research on remedial assessment, course placement and the longer term outcomes for those assessed to need remediation.

- High-stakes tests like ACCUPLACER, ALEKS, SAT and ACT may not be effective at accurately assessing student's placement in courses.
- There is a general dearth of empirical research on the predictive validity of high-stakes college placement exams; most studies are conducted by the test makers themselves.
- Overall, the existing literature—albeit limited and mostly conducted by the test makers—suggests that the validity of the high stakes placement test is extremely context- and test-specific.
- Studies on the effectiveness of high-stakes tests in accurate course placement show weak relationships between test scores and subsequent success in courses.
- Unlike SAT and ACT testing, there is not a culture or awareness of the role of such tests as ACCUPLACER for incoming students, which results in students not preparing adequately for the test.
- Multiple measures, the use of a combination of measures such as high school GPA, test scores, high school course grades, writing samples, etc., can be better predictors of placement into remediation/non remedial courses than high-stakes tests, but this practice, in and of itself, is not a guarantee that students will be placed accurately and correctly.
- Of the multiple measures most commonly used, high school GPA (for those recently graduated from high school) shows evidence as a high-quality predictor of success in credit-bearing courses; one reason for this may be because high school GPA is a multiple measure in itself; it captures persistence, content knowledge, and the student's ability to follow instructions and complete course requirements.
- High school GPA, while "best", is still not a great predictor of college readiness, especially in isolation.
- Critics of high school GPA and high school grades as measures of college readiness express concern that different grading policies and graduation requirements do not make GPA a standard measure across school districts or across the state.
- High school GPA loses its power as a reliable predictor of college performance as more time grows between high school graduation and college, but it still has predictive value five to eight years after high school.
- High school GPA can be a better predictor long-term for placement in English than math; the predictive validity of GPA on subsequent math performance in college weakens the longer a student delays entry to college.
- Multiple measures have proven to be effective forms of placement for those who have had a gap in time between high school and college enrollment.
- High stakes test results risk under placing students, thereby putting students in the remedial pipeline that could have performed well in college-level courses. [16]

[16] From Clayton, J., Crosta, P. & Belfield, C. (2012) Improving the Targeting of Treatment: Evidence from College Remediation (https://www.nber.org/system/files/working_papers/w18457/w18457.pdf). They found more students were under-placed in remediation than over-placed in college-level coursework. "Holding the remediation rate fixed, we find that using high school transcript information for remedial assignment—either instead of or in addition to test scores—could significantly reduce the prevalence of these assignment errors…. we find that if institutions took account of students' high school performance, they could remediate substantially fewer students without lowering success rates in college-level courses"

- Directed self-placement, wherein students assess their own skills in consultation with an advisor, have shown, in limited research, to be an effective tool in helping with course placement. This method is labor intensive, lends itself more to English placement (rather than math), and should be performed in combination with other placement tools (assessments, grades, etc.).
- Providing adequate time to study course placement success and outcomes is crucial for valid work but time itself can skew results; for example, students need to be placed in the appropriate remedial or gateway course, complete the course, and subsequently enroll another term of college, at minimum, for researchers to consider their placement valid. Those students who drop out (e.g., for financial, family, time or academic pressures) before the study is completed confound and distort findings. Their departure prevents researchers from fully understanding the validity of the intervention.
- Those who are assigned remedial courses and complete them graduate from college at similar rates to those who were considered college ready (Chen, 2016), which shows evidence that remediation can work for students who need the intervention.
- Multi-pronged solutions to address the needs of students who are considered "at risk" (which includes students who enroll in college not prepared for college-level courses) show great promise as a success intervention in helping students complete. The CUNY ASAP (Accelerated Study in Associate Programs) program has been studied extensively and continues to show great promise. [17] In the remediation literature, this program is cited as a model intervention and has begun to be replicated in other states.[18]
- A less well studied but important part of research on course placement and student outcomes is within the realms of course design, teaching methods, course delivery, and course content.

Summary of the Studies Submitted by Maryland Colleges and Universities

MHEC reviewed the studies submitted by the institutions and found these themes among them:

- All institutions that have performed studies demonstrate a commitment to analyzing and improving remedial or college-level course placement;
- Most institutions' studies are descriptive/non-causal; very few of have performed quasi-experimental studies;
- Most institutions are asking questions tied to comparing new methods of placement (e.g., high school GPA) and students' course outcomes with the outcomes of those placed through a placement test such as ACCUPLACER;
- Some institutions have studied what changes they observe (course placement, course passage, student progression) once moving from one assessment test (e.g., ACCUPLACER) to another (e.g., ALEKS);
- Many institutions have performed studies to determine the cut scores that best predict course placement;
- Some institutions have performed studies to determine whether their new assessment methods/cut score rules, which may result in over-placing students into credit courses, are having the intended effects. Comparison groups for studies can vary; some are studying those just over and just under cut scores and others are comparing earlier cohorts' performance (under older policies) to those newer cohorts placed under the new policy; and

[17] CUNY's ASAP features include individualized course schedules, required full-time study, and comprehensive and personalized advisement and career development services. Financial incentives include tuition and fee gap scholarships for financial aid-eligible students who have a gap between their financial aid award and tuition, assistance to reduce (or eliminate) the cost of textbooks, and unlimited transit cards for all ASAP students.

[18] See https://www1.cuny.edu/sites/asap/replication/ for more about ASAP and replication

- All community colleges report performing studies testing their multiple measures placement outcomes; these results help drive statewide conversations that inform the annual MOU between the colleges and PSSAM and help hone their institutional work around other aspects of course placement such as pedagogy/course delivery, advising and program pathways.

Recommendations for Policy and Practice at Maryland's Colleges and Universities

Based on the research findings noted above and a review of the studies and reports provided by the institutions, here are some recommendations for policy and practice. They are divided areas of focus.

<u>The Use of Multiple Measures for Assessment Should Be Strongly Considered</u>

The growing use of multiple measures for course placement is showing tremendous promise as a means of more accurately placing students in the correct courses. Those institutions that are not using multiple measures or measures that capture high school performance or other pre-college academic performance should consider their capacity and capability of doing so in the future.

Because multiple measures can be a combination of high school performance and other measures (such as self-assessment, non-cognitive tests), these can be used for both recent high school graduates and those who have had a gap between high school and college enrollment[19]. They can also be used for placement in one subject.

All of Maryland's community colleges have adopted multiple measures for course placement due to the MOU in place among community colleges and PSSAM, as well as local school district agreements. Fewer four-year institutions have adopted this practice. Part of this is driven by the nature of the students enrolling. Public four-year institutions are more likely to attract traditional college-age students who have just recently ended their formal K-12 education and therefore have knowledge that can be more readily assessed by standardized tests. This difference in student body as well as less pressure to change practices means the need for multiple measures as a placement tool is less pressing for the four-year institutions.

For institutions to move to a multiple measures framework, they need to:

- Review existing state and institutional policy to determine what measures they are going to use;
- Identify the sources of those measures (administered by college like placement tests, non-cognitive tests, writing assessments, questionnaires and/or obtained from elsewhere like HSGPA, other HS transcript information, standardized test results like AP, ACT and SAT);
- Determine the systems or approaches to the rules applied, the cut scores that work, the multiple measures to use, the weight or combination of measures that will lead to placements; and whether the institution will adopt self-directed placement;
- Determine the placement pathways – traditional courses, prerequisite or co-requisite courses, adding support services to the courses/accessible to students;
- Engage faculty and institutional research, assessment and evaluation staff on this work; this is imperative to ensure the work is high quality and has institutional buy in;

[19] The predictive validity of high school GPA becomes insignificant around eight years after the student exited high school. See https://rpgroup.org/Portals/0/Documents/Projects/MultipleMeasures/AB705_Workshops/DecayFunctionOfPredictiveValidity_Final.pdf?ver=2021-01-14-094758-067#:~:text=Certainly%2C%20there%20is%20a%20decay,years%20immediately%20after%20high%20school.&text=While%20not%20a%20large%20difference,success%20than%20the%20placement%20test for more.

- Carve out time to ensure planning of multiple measures systems is thoughtful and high quality;
- Identify what barriers might exist to obtaining or storing the data retrieved from the multiple measures. For example, will institutions allow students to self-report grades and GPA or will the institution require a transcript (official or unofficial)? If using self-directed placement, what data will be captured since this is a more qualitative process? Does the Student Information System/Admissions Database allow for that data to be captured and retrieved? If not, what modifications need to be made?;
- Determine, up front, the manner in which assessment of the measures' predictive validity will be studied and what variables need to be collected. Establish if the institution has the capacity to perform quasi-experimental designs and if so, plan for that;
- Because the aim of multiple measures is to place more students on a path to credit-bearing coursework, plan for the likelihood that enrollment into credit-bearing gateway courses (those first math and English courses) will increase and enrollment in traditional remedial courses will diminish; direct resources accordingly;
- Create a culture where this kind of analysis and assessment is seen as a central part of the institutional mission; and
- Implement and regularly assess MOUs or other agreements between Maryland K-12 and higher education institutions; there is anecdotal evidence that MOUs and other negotiated and formalized agreements create opportunities for more collaboration, communication, cooperation and articulation between the state's high school standards and the state's college standards, which may help address the long-standing disconnect between these entities when defining "college ready."

<u>The Use of Experimental or Quasi-Experimental Methods to Determine the Validity of Course Placement Methods Is Strongly Encouraged</u>

Scholars and experts in the field of remedial education call for the use of rigorous statistical methods to study the validity and reliability of remedial course placement. These scholars also point out the challenges of performing experimental or quasi-experimental analysis within the context of the institution. Random assignment to the treatment (remedial courses) is not commonly implemented at the college level for myriad reasons, yet this method is the hallmark of experimental design. Other methods, such as difference in differences analysis and regression discontinuity design, can be challenging to perform and often expand beyond the bounds of the work of an institution's IR or assessment office. Commonly cited literature shows that this work is most often performed in partnership with scholars and research centers. Their expertise and resources can be invested in establishing a rigorous design that provides valid results. [20]

Despite this, institutions in Maryland can and do collaborate on learning best practices both in implementation and in research. It is feasible that this kind of work can be done in the state to allow researchers to learn about and establish rigorous studies but this will take time and require collaboration.

[20] It is important to note that CCBC has been a national model on remedial education reform. See https://files.eric.ed.gov/fulltext/ED512398.pdf, http://debdavis.pbworks.com/w/file/fetch/101325709/Cooper%202014%20remedial%20rescue.pdf, and https://files.eric.ed.gov/fulltext/ED529251.pdf for more

High School Transition Courses May Help Reduce Remediation in College but More Evidence Is Needed

A central goal in Maryland's education agenda is to ensure all students complete high school "college and career ready". One aspect of this is to design courses that aim to improve college readiness while students are still in high school. These transition courses are designed to help students avoid postsecondary remediation in math and English and to become better prepared for the challenges of college. These courses aim to address the long-standing misalignment between high school and college curriculum and to severely reduce the need of remedial course taking for students entering college.

Early research on the effect of these transition courses on students' college outcomes show mixed results. Studies of states' implementation of transition courses show that they can reduce the need for remedial coursework in college, but these transition courses may have little effect on ensuring the student can pass college-level math and English courses. The research on these courses is not extensive, and as Barnett, et al state (2016) "…much is still unknown about transition courses, including: (1) the extent to which they improve college outcomes and (2) their optimal designs, given local priorities and student needs. More research in these areas is needed in order to determine whether and how transition courses are providing the intended benefits to students."

A Critical Look at Data Infrastructures Is Necessary

The landscape of remedial course placement within developmental education is complex and rapidly evolving. At the state level, MHEC should continue working with institutions to ensure that the data elements captured throughout the state's collections portray the most complete picture of what is occurring at the institutional level. Institutions should also be determining what systems they need in place, what variables they need to collect and the means by which those data can be extracted and used by institutional researchers and faculty to conduct rigorous studies.

National reports emphasize that investment in data infrastructure at the institution and state level can yield great benefit. States like Texas, Tennessee and Florida have developed systems such that they share their data with external researchers from the Community College Research Center (CCRC), the Center for the Analysis of Postsecondary Readiness (CAPR), MDRC and other research centers that focus on actionable, applied research; these systems take investments of money, time, and manpower to set up but can reap great reward in the expertise those collaborations bring and the quality and rigor the researchers can bring to the research questions at hand. The Commission, in conjunction with the institutions, can assess the feasibility and cost of such partnerships to determine the cost/benefit analysis.

Conclusion

This report summarizes the findings from narrative reports and a statewide survey and provides recommendations on several paths forward for Maryland's institutions and the State in regard to remedial course placement. It also shines a light on the successes and progress of institutions in addressing the need to ensure accurate remedial course placement and the use of research and evidence to guide those practices. More can be done, but that will require resources, collaboration, and a commitment to advancing best practices evidenced by rigorous research and study.

As progress is made on enacting the vision set forth by the Blueprint for Maryland's Future, there is no better time for Maryland's secondary and post-secondary institutions, as well as the State, to partner to ensure Maryland's students are well prepared to achieve their educational goals. The use of evidence-based practices in assessment, effective course placement, and the study of the predictive validity of the methods employed by institutions can ensure this work is done thoughtfully and rigorously.

Maryland Studies
CCBC - Community College of Baltimore County's Accelerated Learning Program (2010)
https://ccrc.tc.columbia.edu/research-project/accelerated-learning-program.html
Towson - Imagine No Remediation: Evaluation of a Placement Policy Change
https://link.springer.com/article/10.1007/s11162-019-09568-6
University of Baltimore - Redesigning Developmental Mathematics Education: Implementation and Outcomes https://www.tandfonline.com/doi/full/10.1080/10511970.2021.1872749

State Analysis
Education Commission of the States (2021)
50-State Comparison: Developmental Education Policies https://www.ecs.org/50-state-comparison-developmental-education-policies/
Developmental Education: An Introduction for Policymakers
https://files.eric.ed.gov/fulltext/ED582926.pdf

Research and Advocacy Centers
MDRC https://www.mdrc.org/
Community College Research Center (CCRC) https://ccrc.tc.columbia.edu/
Center for Postsecondary Readiness (CAPR) https://ccrc.tc.columbia.edu/research-project/center-analysis-postsecondary-readiness.html
Complete College America (CCA) https://completecollege.org/
Southern Regional Education Board (SREB)
https://www.sreb.org/state-policies-high-school-graduation-and-postsecondary-readiness

Multiple Measures
Hayward, C. (2017). Validating Placement Systems Comprising Test and Multiple Measure Information https://rpgroup.org/Portals/0/Documents/Projects/MultipleMeasures/Publications/ResearchBrief-ValidatingPlacementSystemswhichUtilizeTestandMultipleMeasureInformationFINAL.pdf
https://files.eric.ed.gov/fulltext/ED609173.pdf
Bahr, P. R., Fagioli, L. P., Hetts, J., Hayward, C., Willett, T., Lamoree, D., ... & Baker, R. B. (2019). Improving placement accuracy in California's community colleges using multiple measures of high school achievement. *Community College Review*, *47*(2), 178-211.
https://journals.sagepub.com/doi/10.1177/0091552119840705
Hayward, C. (2020). The decay function of the predictive validity of high school GPA. *The RP Group*, *10*.
Mazzariello, A. N., & Ganga, E. C. (2019). Modernizing College Course Placement by Using Multiple Measures. https://files.eric.ed.gov/fulltext/ED594092.pdf
Nevada System of Higher Education (2019). Multiple Measures: A Better Student Assessment. Board of Regents Report. **https://nshe.nevada.edu/wp-content/uploads/file/BoardOfRegents/Agendas/2020/03-mar-mtgs/arsa-refs/ARSA-10a.pdf**

Remedial Education
Jaggars, S. S., & Stacey, G. W. (2014). What We Know about Developmental Education Outcomes. Research Overview. *Community College Research Center, Teachers College, Columbia University*.
https://files.eric.ed.gov/fulltext/ED565668.pdf
Boatman, A., & Long, B. T. (2010). Does remediation work for all students. *How the effects of postsecondary remedial and developmental courses vary by level of academic preparation*, 460.
https://files.eric.ed.gov/fulltext/ED512610.pdf

Chen, X. (2016). Remedial course taking at U.S. public 2- and 4-Year institutions: Scope, experiences, and outcomes (NCES 2016-405). U.S. Department of Education. Washington, DC: National Center for Education Statistics. https://nces.ed.gov/pubs2016/2016405.pdf
Kane, T. J., Boatman, A., Kozakowski, W., Bennett, C., Hitch, R., & Weisenfeld, D. (2020). Is college remediation a barrier or a boost? Education Next, 20(2). https://www.educationnext.org/college-remediation-barrier-boost-evidence-from-tennessee/
Hughes, K. L., & Scott-Clayton, J. (2011). Assessing developmental assessment in community colleges. Community College Review, 39(4), 327–351. 18. Scott-Clayton, J., Crosta, P. M., & Belfield, C. R. (2014). Improving the targeting of treatment: Evidence from college remediation. Educational Evaluation and Policy Analysis, 36(3), 371–393. https://doi.org/10.3102/0162373713517935
Scott-Clayton, J., & Rodriguez, O. (2012). Development, discouragement, or diversion? New evidence on the effects of college remediation (NBER Working Paper No. 18328). Cambridge, MA: National Bureau of Economic Research. http://www.nber.org/papers/w18328.pdf. .

Data Systems
Schudde, L., & Yonah Meiselman, A. (2020). The importance of institutional data reporting quality for understanding dev-ed math enrollment and outcomes. Community college journal of research and practice, 44(8), 623-628. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7451620/
Bussey, K., Dancy, K., & Voight, M. (2019). Better Data, Better Outcomes: Promoting Evidence, Equity, and Student Success through the Framework for State Postsecondary Data Solutions. Institute for Higher Education Policy. https://files.eric.ed.gov/fulltext/ED600578.pdf

Transition Courses
Barnett, E. A., Fay, M. P., & Pheatt, L. (2016). Implementation of high school-to-college transition courses in four states. New York, NY: Columbia University Teachers College, Community College Research Center. https://academiccommons.columbia.edu/doi/10.7916/D8H139ND/download
Barnett, E. A., Fay, M. P., Trimble, M. J., & Pheatt, L. (2013). Reshaping the college transition: Early college readiness assessments and transition curricula in four states. New York, NY: Columbia University, Teachers College, Community College Research Center.
https://academiccommons.columbia.edu/doi/10.7916/D8BC4727/download
Kane, T. J., Boatman, A., Whitney Kozakowski,, Bennett, C., Hitch, R., & Weisenfeld, D. (2018). Remedial Math Goes to High School: An Evaluation of the Tennessee SAILS Program.
https://cepr.harvard.edu/files/cepr/files/sails_research_report_final.pdf
Kane, T. J., Boatman, A., Kozakowski, W., Bennett, C., Hitch, R., & Weisenfeld, D. (2021). Is college remediation a barrier or a boost? Evidence from the Tennessee SAILS program. *Journal of Policy Analysis and Management*. https://onlinelibrary.wiley.com/doi/abs/10.1002/pam.22306.
Trimble, M. J., Pheatt, L. E., Papikyan, T., & Barnett, E. (2017). Can high school transition courses help students avoid college remediation? Estimating the impact of a transition program in a large urban district.
https://academiccommons.columbia.edu/doi/10.7916/D8FR146C/download