

Research Brief \ October 2023

# The Long-Term Effects of Multiple Measures Assessment at SUNY Community Colleges

*Elizabeth Kopko and Hollie Daniels*

Multiple measures assessment (MMA) offers an alternative to strict reliance on standardized test scores for placing students into developmental or college-level math and English courses as they begin postsecondary education. MMA provides a more holistic picture of students' academic preparation and strives to more accurately capture their readiness for college by relying on a broader set of measures, such as high school GPA, that reflect effort and achievement over time. Depending on the design, MMA can contribute to student success by widening access to college-level courses. Despite concerns about allowing underprepared students to take college-level courses, research has found that multiple measures placement leads to increased enrollment in and completion of college-level courses.

In fall 2016, researchers at the Center for the Analysis of Postsecondary Readiness (CAPR) launched a randomized controlled trial of MMA in community colleges in the State University of New York (SUNY) to learn whether MMA yields placement determinations that lead to better student outcomes than a system based on test scores alone. Between fall 2016 and fall 2017, 12,796 students were randomly assigned to receive MMA placement (program group students) or the existing test-based placement (business-as-usual group students) at seven SUNY community colleges. In 2020, a report was released on students' outcomes after three terms.<sup>1</sup> CAPR then launched a follow-up study to estimate outcomes for a longer time period. In the follow-up study, discussed here and in an accompanying paper,<sup>2</sup> student outcomes, including college-

level math and English enrollment and completion and college-level credit attainment, were tracked for at least nine terms from the time of testing, through spring 2021. The findings were disaggregated by race/ethnicity, Pell recipient status, and gender subgroups; a cost analysis of MMA was also conducted.

The SUNY colleges we studied used an algorithmic system of MMA that weighted different measures (placement test scores, high school GPA, time since high school graduation, etc.) according to how well they predicted success in college-level math and English courses. While business-as-usual group students were placed using only ACCUPLACER test scores, program group students were placed using algorithms, one for math and one for English. Once these algorithms were developed, faculty at each college chose cut points for all algorithm scores that were used to place program group students into developmental or college-level math and English courses. In this study, the cut scores faculty chose were lower in English than in math, resulting in fewer program group students gaining access to college-level math, which influenced the effectiveness of MMA for the full sample. Our findings suggest that if more students had been granted access to college-level math, the full sample results in math would likely have been more strongly positive, like those in English. It is also worth noting that other studies have found that simpler methods of MMA are easier to implement and as effective as algorithmic MMA.<sup>3</sup>

Our present study finds that—four and a half years after random assignment—students who were bumped up into college-level math and English courses through MMA were much more likely to have enrolled in and completed a college-level course (with a grade of C or higher) than similar business-as-usual group students. This brief summarizes our findings.<sup>4</sup>

## How MMA Changed Students' Course Placements

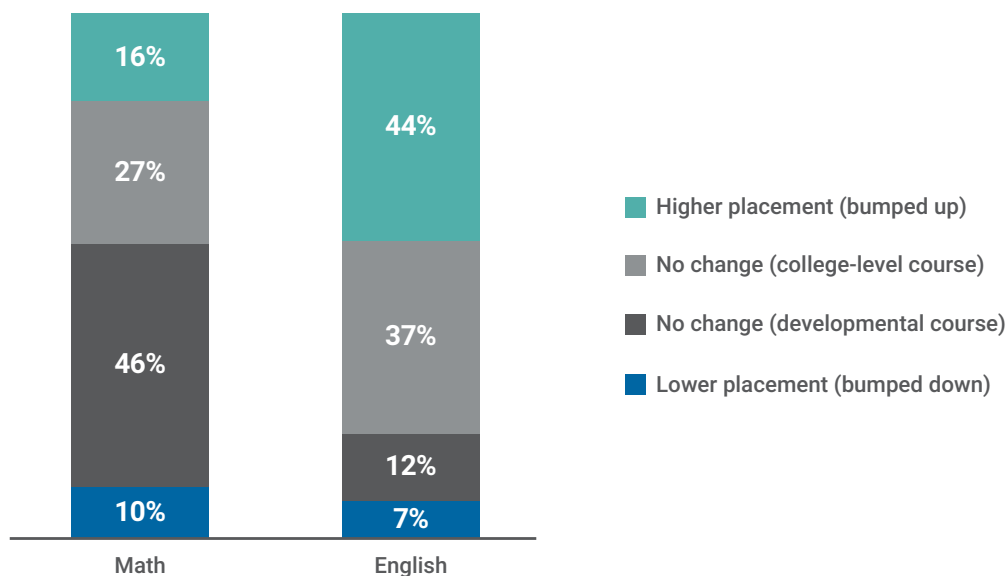
MMA seeks to improve student outcomes by using multiple indicators to better determine the likelihood that a student will succeed in college-level courses. For many program group students in our study, their placement under MMA was the same as it would have been under the status quo, test-based system. But some students' placements changed under MMA. As a result of the experimental design, some program group students who would have been placed into developmental courses under the status quo were instead placed, or "bumped up," into college-level courses

## WHAT IS MULTIPLE MEASURES ASSESSMENT?

Colleges that employ MMA use measures such as high school GPA, time since high school graduation, high school coursetaking patterns (e.g., number and level of subject-specific courses completed), noncognitive assessment scores (e.g., ACT Engage or the Grit Scale),<sup>5</sup> or other factors, in addition to or instead of placement test scores, to assign incoming students to either developmental or college-level courses in math and English. The measures can be combined and weighted using an algorithm. Alternatively, a decision-rules or decision-band approach can be used. A set of decision rules can be applied that compare students' scores on each selected measure against a threshold in a predetermined order until a placement is determined. Under a decision-band approach, decision rules are applied only to students falling in a predetermined range on a specified measure, such as high school GPA or ACCUPLACER test score. Students above the range are placed into a college-level course, and those below the range are placed into a developmental course; students within the range are placed using additional measures.

under MMA. Other program group students who would have been placed into college-level courses under the status quo were instead “bumped down” into developmental courses. Figure 1 shows the proportion of program group students according to their “zone” of student placement under MMA: Students in the top zone in each bar were bumped up into college-level courses; students in the middle two gray areas had MMA placements that were unchanged from the status quo, either college-level (light gray) or developmental (dark gray); students in the bottom zone were bumped down into developmental courses. (Students in the business-as-usual group are categorized into these zones according to how MMA would have affected them, though their placements did not change. They serve as comparison group students in the bump-zone analyses.)

**FIGURE 1. Change in Placement Among Program Group Students**



In the SUNY community colleges that participated in the study, many more students were bumped up than bumped down—they received higher placements under MMA than they would have if only standardized test scores were used. A much smaller portion of students were bumped down, meaning that they received lower placements under MMA than if only standardized test scores were used. Importantly, the extent to which students’ placements change under MMA is, at least in part, a function of design choices made by the college. In the current study, faculty at each college selected subject-specific cut scores representing the acceptable minimum probability of success in college-level courses. In setting cut scores, they weighed placing more students into college-level coursework against their concern that students could be harmed by being placed into college-level courses that might be too challenging for them. They strived to balance lower cut scores and increased access to college-level courses with higher cut scores and stable pass rates in college-level courses. Because SUNY math faculty set more conservative cut scores than English faculty, a smaller proportion of math students’ placements were changed by study conditions, limiting access to college-level coursework and reducing the potential impact of MMA.

In the current study, as shown in Figure 1, 73 percent of program group students in math and 49 percent of program group students in English received the same placement under the MMA system that they would have received under the status quo system. The outcomes of these students should not change as a result of the new placement system. Any impact from the new placement system is due to students whose experiences were changed by the introduction of MMA—those in the bump-up and bump-down zones. In order to better understand whether MMA placements represent an improvement in outcomes over status quo placements, this brief focuses on the subset of students whose placements changed under MMA, those in the bump-up and bump-down zones.

## EXPLANATION OF BUMP-ZONE PLACEMENTS

- **Bump-up zone.** All students in the bump-up zone (1,591 in math and 4,596 in English) had ACCUPLACER scores that fell below the threshold for placement in college-level courses but had algorithm scores that exceeded the threshold for placement in college-level courses, as determined by faculty at their college. In other words, the test predicted they would not succeed in college-level courses, but the algorithm predicted that they would succeed. Program group students were bumped up into college-level courses. Business-as-usual group students in the bump-up zone stayed in developmental courses.
- **Bump-down zone.** Likewise, all students in the bump-down zone (944 in math and 740 in English) had ACCUPLACER scores that fell above the threshold for placement in college-level courses but fell below the cutoff for college-level course placement according to the MMA algorithmic system. In other words, they were predicted to succeed in college-level courses by the test but not by the algorithm (as determined by faculty-set cut scores). Program group students were bumped down into developmental education courses. Business-as-usual group students in the bump-down zone stayed in college-level courses.

## Bump-Zone Findings and Implications: The Impact of MMA on Students Whose Placements Changed

In this brief, we focus on bump-zone findings in order to explore potential impacts among the subset of students whose placements changed (or would have changed) under MMA. In general, we find that the benefits of MMA were substantial and were likely driven primarily by increased access to college-level courses rather than by any improved accuracy from using the algorithm. Regardless of subject area, program group students who were bumped up through MMA had better outcomes than similar students in the business-as-usual group, and program group students who were bumped down through MMA had worse outcomes than similar business-as-usual group students. If the algorithm improved the accuracy of placement, we would not expect worse outcomes among program group students in the bump-down zone.

### WHAT IS THE IMPACT OF MMA ON STUDENT OUTCOMES FOR THE FULL SAMPLE?

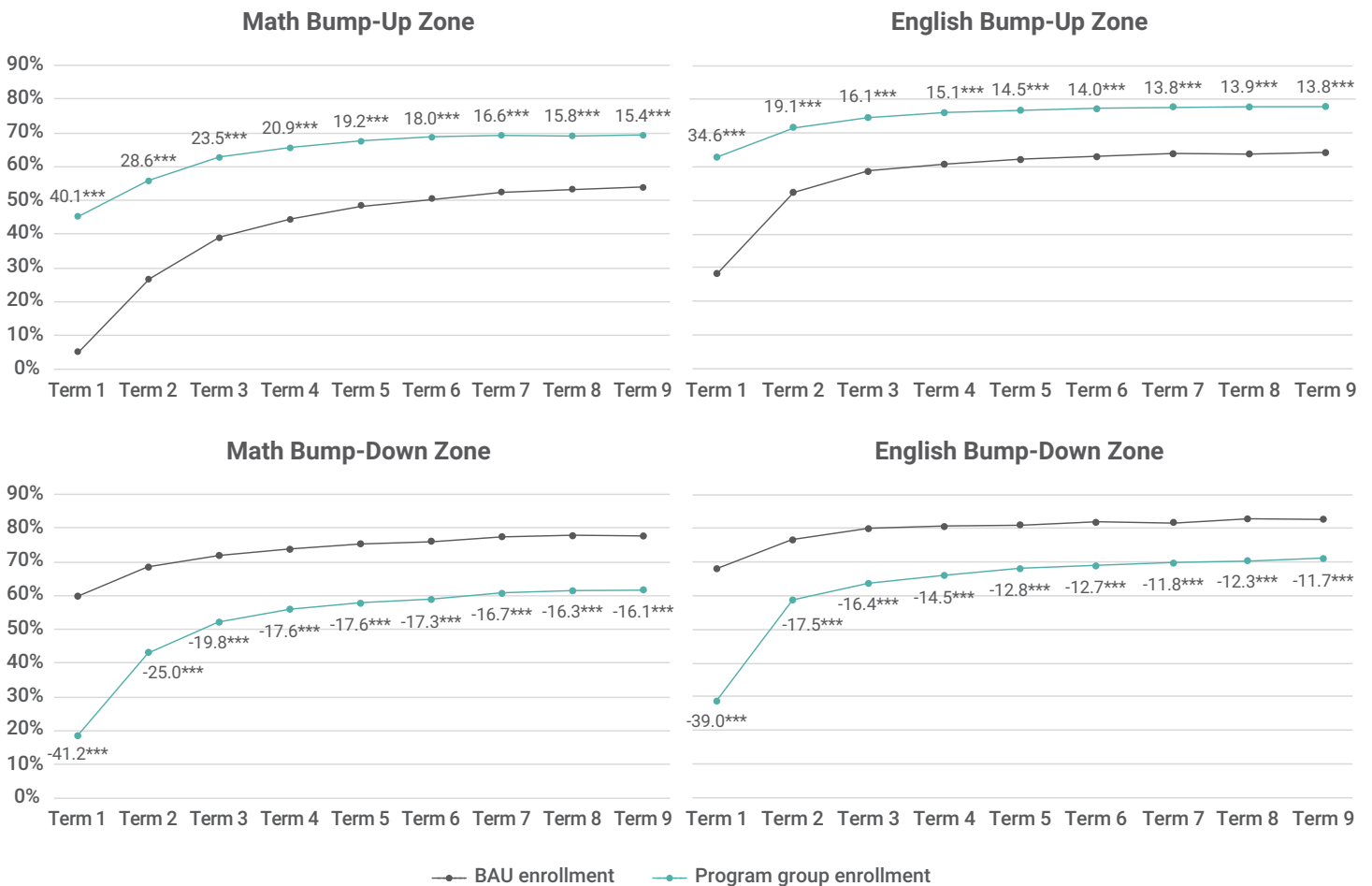
While this brief focuses on students in the bump-up and bump-down zones, the study also uses data from all 12,796 students who took a placement test at one of the seven community colleges during the study period to describe the overall effects of placing students into courses using MMA as compared with traditional procedures.<sup>6</sup> The full sample analyses include students in the “no change” zones as well as those in the bump-up and bump-down zones. Findings from the full sample analyses show that relative to students placed using the business-as-usual (status quo) system, MMA led to the following impacts:

- In English, program group students had higher rates of placement into, enrollment in, and completion of (with a C or higher) college-level English courses. Impacts on enrollment and completion were statistically significant across all nine terms.
- In math, program group students had higher rates of placement into and enrollment in college-level math courses, and they had higher initial rates of completion. While impacts on enrollment persisted through term nine, there is no evidence that statistically significant gains in completion were sustained past the first term.
- While there is no evidence that MMA had an impact on equity gaps within race/ethnicity, Pell recipient status, and gender subgroups, individual subgroups did benefit from MMA. Pell-recipient and Black students in the program group were more likely than those in the business-as-usual group to complete a college-level English course (with a grade of C or higher) within nine terms of testing, while female students in the program group were more likely to complete a college-level course in both English and math and earn more college-level credits.
- MMA placement reduced costs by \$140 per student, with savings from students taking fewer developmental education credits (saving \$1,010), an extra cost for the MMA procedures (costing \$70), and an extra cost from students taking more college-level credits (costing \$800).

**MMA can be designed to increase (rather than restrict) access to college-level coursework.**

The four panels in Figure 2 show the term-by-term rates of enrollment in college-level math and English courses among program and business-as-usual group students in the bump-up and bump-down zones. As shown in the top two panels, program group students in the bump-up zones enrolled in college-level math and English at higher rates than their business-as-usual peers (who were also in the bump-up zones). By the ninth term, 69 percent of students bumped up into math enrolled in a college-level math course, while only 54 percent of business-as-usual group students enrolled in a college-level math course. Likewise, 78 percent of students who were bumped up into English enrolled in a college-level English course, compared to 64 percent of students in the business-as-usual group. In other words, students who were bumped up under the algorithm maintained a 14-to-15-percentage-point advantage in college-level math and English enrollment compared to their business-as-

**FIGURE 2. College-Level Enrollment Among Students in Bump Zones**



NOTE: Data labels represent impact estimates, or the percentage-point difference between the mean outcomes for business-as-usual (BAU) and program group students.

\*\*\*p < .01, \*\*p < .05, \*p < .10.

usual peers. (All the ninth-term bump-zone results discussed in this brief are summarized in Appendix Table A1.)

We see similarly strong, albeit negative, results among students who were bumped down into developmental math or English. By the ninth term, only 62 percent of bumped-down students enrolled in a college-level math course, compared to 78 percent of business-as-usual group students (who were in the bump-down zone but whose placements did not change). We observe a similar pattern in English, where only 71 percent of bumped-down students enrolled in a college-level English course by the ninth term, compared to 83 percent of students in the business-as-usual group. Among students in the bump-down zone, the program group experienced a 16- and 12-percentage-point decrease in college-level math and English enrollment, respectively, compared to their business-as-usual peers. It is important to recognize that an MMA system can be created that does not bump students down into developmental courses.

**When given access to college-level coursework via MMA, many students succeed. Meanwhile, many students who are denied immediate access to college-level coursework fare poorly.**

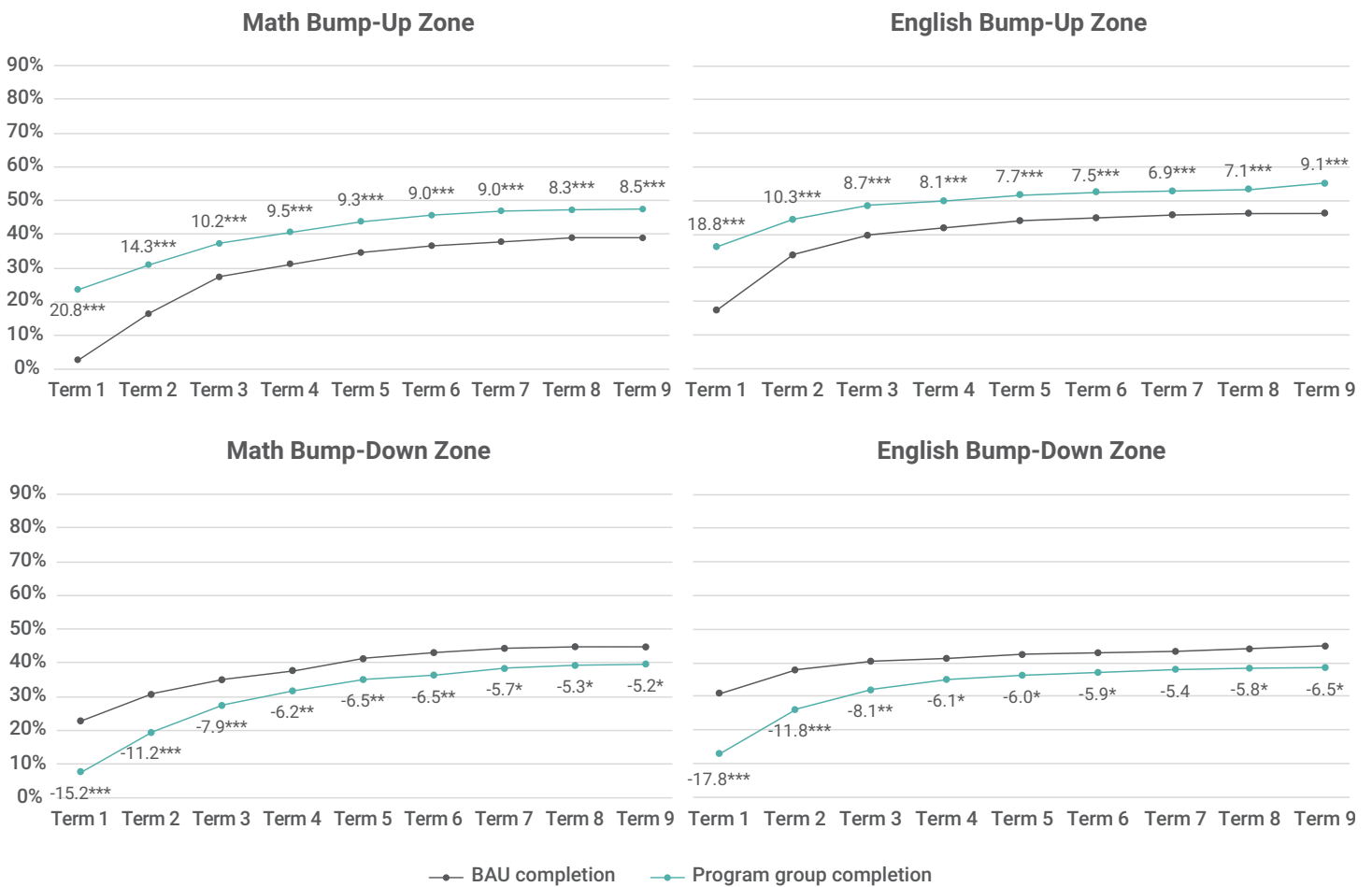
Continuing the momentum from increased enrollment, program students in the study who were bumped up in math or English were more likely to complete a college-level course (with a C or higher) within nine terms (see Figure 3). By the ninth term, 48 percent of bumped-up math students completed a college-level math course, compared to 39 percent among their business-as-usual peers. And 55 percent of bumped-up English students completed a college-level English course, compared to 46 percent of their business-as-usual peers. This means that program group students in the bump-up zone in math or English were about 9 percentage points more likely to complete a college-level math or English course (with a C or higher) within nine terms.

If MMA provided more accurate placements, we would expect students who were bumped down to benefit from developmental coursework, performing even better than their peers who were placed into college-level coursework without the opportunity for the support provided by developmental education. However, this is not the case. In fact, in almost all instances, bumped-down students fared worse than their peers who were given the opportunity to enroll in college-level coursework. For example, only 40 percent of students who were bumped down in math completed a college-level math course within nine terms, compared to 45 percent of business-as-usual peers (whose placements did not change). In English, 39 percent of students who were bumped down completed a college-level English course, compared to 45 percent of their business-as-usual peers. In other words, bumping students down in math or English decreased their probability of completing college-level courses by 5 to 6 percentage points.

**Program group students in the bump-up zone in math or English were about 9 percentage points more likely to complete a college-level math or English course within nine terms.**

It is important to note that the impacts are of similar magnitude in math and English among the subgroups of students in the bump-up and bump-down zones. Bumping up students in math was about as effective as bumping up students in English, and bumping down students had similarly negative effects in both subjects. These similar findings across subject areas may serve to mitigate concerns that MMA cut scores need to vary widely or be tailored by subject area. Instead, by utilizing MMA to grant many more students access to college-level coursework, colleges can help promote better student outcomes regardless of subject area.

**Figure 3. College-Level Course Completion Among Students in Bump Zones**



NOTE: Data labels represent impact estimates, or the percentage-point difference between the mean outcomes for business-as-usual (BAU) and program group students.

\*\*\*p < .01, \*\*p < .05, \*p < .10.

These findings rebut a common claim that students who are underprepared benefit from participating in developmental education courses. At least with regard to students in the bump-up or bump-down zone, i.e., those who were near the cutoff for placement determinations, these results suggest that access to college-level courses rather than accuracy of placement



matters more to subsequent success in college-level math and English. Indeed, while program group students whose placements changed from developmental to college-level experienced substantially greater benefits overall, those program group students whose placements changed to developmental experienced substantially worse outcomes compared to similar business-as-usual group students. In other words, the addition of developmental coursework for students in the bump-down zone who MMA predicted might struggle to pass a standalone college-level course did not lead to longer term improvements over time but rather created a barrier to subsequent college-level coursetaking and success. At the same time, students in the business-as-usual group who were predicted by the algorithm to be similarly underprepared for college-level coursework as their program group bump-down zone peers benefitted from the absence of developmental education programming and direct access to college-level courses.

**The study findings suggest that access to college-level courses matters more than accuracy of placement for improving success in college-level math and English.**

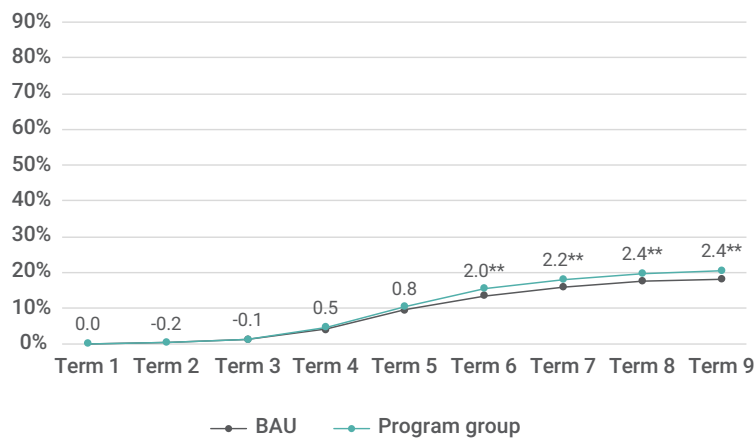
**Access to college-level coursework may drive academic momentum, increasing confidence and leading to greater college-level coursetaking and success.**

Students who were bumped up into college-level courses also enrolled in and completed a second college-level math or English course (with a C or higher) at higher rates than their business-as-usual peers. Specifically, 22 percent of students bumped up in math completed a second college-level math course, compared to 19 percent of their business-as-usual peers. And 32 percent of students bumped up in English completed a second college-level English course, compared to 28 percent of their business-as-usual peers.

In addition to completing subsequent college-level math and English courses at higher rates, students who were bumped up also earned more college-level credit (in any subject) than similar business-as-usual group students. After nine terms, students who were bumped up in math or English earned approximately 3.2 or 2.7 more credits, respectively, than similar business-as-usual group students whose placement did not change. Students who were bumped down in English, on the other hand, earned 3.6 fewer college-level credits by the ninth term than their business-as-usual peers. Although not statistically significant, we also find that students who were bumped down in math earned 0.9 fewer credits than their business-as-usual peers.

We do not find any evidence that MMA improved rates of persistence, but we do find evidence that MMA improved credential completion or transfer among program students in the English bump-up zone (see Figure 4). By the ninth term, students who were bumped up in English were 2 percentage points more likely than their business-as-usual peers to earn any credential or transfer to a four-year institution by the ninth term. Students who were bumped up in English also earned Associate in Arts or Associate in Science degrees at a modestly higher rate.

**Figure 4. Credential Attainment or Transfer Among Students in the English Bump-Up Zone**



NOTE: Data labels represent impact estimates, or the percentage-point difference between the mean outcomes for business-as-usual (BAU) and program group students.

\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .10$ .

Generally, the bump-zone findings from this study show that greater access to college-level coursework may help improve success for at least some students. Toward this end, MMA may better serve students when integrated into a more comprehensive set of reforms, as discussed in the next section.

## Recommendations for Practice

1. **Colleges should expand access to college-level courses by giving students the highest placement possible.** Relative to the status quo, students placed using MMA in this study experienced higher rates of enrollment in college-level coursework, regardless of subject area. Further, bumped-up students had substantially better outcomes, while bumped-down students had substantially worse outcomes in both math and English. In fact, the negative effect of bumping down students was similar in magnitude to the positive effect of bumping up students. By using MMA to grant many more students access to college-level coursework, colleges can help students build academic momentum early in their college careers.
2. **Colleges should use a form of MMA that is relatively easy to adopt and that mitigates the risk of lowering any student's placement.** The findings suggest that access to college-level courses rather than placement accuracy may be the primary mechanism by which MMA improves student success. We recommend using MMA to bump up students into a higher level course than they may have otherwise been placed into under the status quo, and we caution against using MMA to further restrict access to college-level courses by bumping students down into developmental courses. Unlike the algorithm approach used here, MMA systems that incorporate decision rules place students according to the measure that gives them access to the highest level course. Implemented in this fashion, institutions can design MMA systems in ways that will never lead to lower level placements compared to the status quo. Not only does this help improve overall access to college-level courses,

it also can help combat existing inequities in placement that reflect historical disparities, such as racial bias in standardized testing.

- 3. Colleges should consider coupling MMA with other reforms such as corequisite support courses to provide greater access to college-level coursework and improve longer term outcomes.** The findings from this study indicate that access to college-level courses was the driving factor in the observed impacts on student success. Indeed, students who were predicted to have low probabilities of success in a college-level course did better when placed directly into those courses than when they were required to take developmental coursework. Importantly, however, in the current study, the classroom experience was not changed to meet the needs of new students in college-level courses. Colleges can further remove barriers to college-level courses by implementing corequisite support courses—courses that allow students in need of remedial help to enroll directly in college-level coursework while taking a supplemental support course in the same subject in the same semester—in place of standalone developmental courses. Further, colleges can design MMA systems with varying cut scores for college-level enrollment with and without corequisite support enrollment. Efforts to provide newly eligible students with extra support through corequisite courses could lead to even further improvements in student outcomes than those observed in the current study.<sup>7</sup> Taken together, MMA is likely to work best when implemented in a corequisite environment wherein the two reform initiatives can work together to improve access to and success in college-level courses.

## Conclusion

For a variety of reasons, standardized tests alone are not good predictors of students' readiness to perform college-level work. This study and other research on MMA demonstrate that many more entering students have the ability to succeed in college-level courses than previously believed. Being granted access to college-level courses can have long-lasting impacts, potentially increasing the likelihood of credential completion. While the MMA system implemented in this study used an algorithmic approach, simpler approaches to MMA are available, easier to implement, and just as effective.<sup>8</sup> We encourage institutions to explore the many possibilities of MMA as they seek to place students into the highest course level possible in which they have a reasonable chance of success.

## Notes

1. Barnett et al. (2020).
2. Kopko et al. (2023).
3. Cullinan and Kopko (2022).
4. More detailed results are available in Kopko et al. (2023).
5. Noncognitive assessments measure student attributes other than content knowledge that may be correlated with academic success.
6. Kopko et al. (2023).
7. Logue et al. (2016); Logue et al. (2019); Mejia et al. (2019); Miller et al. (2021); Park-Gaghan et al. (2022); Ran and Lin (2022).
8. Cullinan and Biedzio (2021); Cullinan and Kopko (2022).

## References

- Cullinan, D., & Biedzio, D. (2021). *Increasing gatekeeper course completion: Three-semester findings from an experimental study of multiple measures assessment and placement*. MDRC. <https://www.mdrc.org/publication/increasing-gatekeeper-course-completion>
- Cullinan, D., & Kopko, E. (2022). *Lessons from two experimental studies of multiple measures assessment*. Center for the Analysis of Postsecondary Readiness. <https://ccrc.tc.columbia.edu/publications/multiple-measures-assessment-lessons-capr.html>
- Kopko, E., Daniels, H., & Cullinan, D. (2023). *The long-term effectiveness of multiple measures assessment: Evidence from a randomized controlled trial*. Center for the Analysis of Postsecondary Readiness. <https://postsecondaryreadiness.org/long-term-effectiveness-multiple-measures-assessment/>
- Logue, A. W., Watanabe-Rose, M., & Douglas, D. (2016). Should students assessed as needing remedial mathematics take college-level quantitative courses instead? A randomized controlled trial. *Educational Evaluation and Policy Analysis*, 38(3), 578–598. <https://doi.org/10.3102/0162373716649056>
- Logue, A. W., Douglas, D., & Watanabe-Rose, M. (2019). Corequisite mathematics remediation: Results over time and in different contexts. *Educational Evaluation and Policy Analysis*, 41(3), 294–315. <https://doi.org/10.3102/0162373719848777>
- Mejia, M. C., Rodriguez, O., & Johnson, H. (2019). *What happens when colleges broaden access to transfer-level courses? Evidence from California's community colleges*. Public Policy Institute of California. <https://www.ppic.org/wp-content/uploads/what-happens-when-colleges-broaden-access-to-transfer-level-courses-evidence-from-californias-community-colleges.pdf>
- Miller, T., Daugherty, L., Martorell, P., & Gerber, R. (2021). Assessing the effect of corequisite English instruction using a randomized controlled trial. *Journal of Research on Educational Effectiveness*, 15(1), 78–102. <https://doi.org/10.1080/19345747.2021.1932000>
- Park-Gaghan, T. J., Mokher, C., Daniels, H., McCoy, K., Henning, H., & Moran, A. (2022). *Exploring corequisite developmental education models in the Lone Star State: A first report on student success and corequisite implementation*. Florida State University, Center for Postsecondary Success. <https://diginole.lib.fsu.edu/islandora/object/fsu:829980>
- Ran, F. X., & Lin, Y. (2022). The effects of corequisite remediation: Evidence from a statewide reform in Tennessee. *Educational Evaluation and Policy Analysis*, 44(3), 458–484. <https://doi.org/10.3102/01623737211070836>

**Appendix Table A1. Summary of Ninth-Term Bump-Zone Findings**

| BUMP-UP ZONE FINDINGS: STUDENT OUTCOMES AND EFFECTS IN NINTH TERM   |         |       |              |         |       |              |
|---|---------|-------|--------------|---------|-------|--------------|
|   | MATH    |       |              | ENGLISH |       |              |
|   | Program | BAU   | Difference   | Program | BAU   | Difference   |
| Enrollment in college-level course                                  | 69.2%   | 53.8% | 15.4 ppt***  | 77.9%   | 64.1% | 13.8 ppt***  |
| Completion of college-level course                                  | 47.5%   | 39.0% | 8.5 ppt***   | 55.3%   | 46.2% | 9.1 ppt***   |
| Enrollment in second college-level course                           | 41.9%   | 32.4% | 9.5 ppt***   | 55.3%   | 45.1% | 10.2 ppt*    |
| Completion of second college-level course                           | 22.1%   | 18.7% | 3.4 ppt*     | 31.8%   | 27.9% | 3.9 ppt***   |
| College-level credits earned in any subject                         | 33.0    | 29.8  | 3.2**        | 24.7    | 21.9  | 2.7***       |
| Continuous persistence  | 2.5%    | 2.8%  | -0.3 ppt     | 2.1%    | 2.0%  | 0.1 ppt      |
| Credential attainment or transfer                                   | 29.9%   | 27.2% | 2.7 ppt      | 20.5%   | 18.1% | 2.4 ppt**    |
| AA or AS attainment   | 17.5%   | 15.7% | 1.8 ppt      | 12.5%   | 10.0% | 2.5 ppt***   |
| BUMP-DOWN ZONE FINDINGS: STUDENT OUTCOMES AND EFFECTS IN NINTH TERM |         |       |              |         |       |              |
|   | MATH    |       |              | ENGLISH |       |              |
|   | Program | BAU   | Difference   | Program | BAU   | Difference   |
| Enrollment in college-level course                                  | 61.6%   | 77.7% | -16.1 ppt*** | 71.2%   | 82.9% | -11.7 ppt*** |
| Completion of college-level course                                  | 39.5%   | 44.7% | -5.2 ppt*    | 38.7%   | 45.2% | -6.5 ppt*    |
| Enrollment in second college-level course                           | 38.5%   | 49.7% | -11.2 ppt*** | 41.0%   | 57.2% | -16.2 ppt*** |
| Completion of second college-level course                           | 17.9%   | 20.3% | -2.4 ppt     | 21.1%   | 25.6% | -4.5 ppt     |
| College-level credits earned in any subject                         | 26.5    | 27.4  | -0.9         | 15.6    | 19.2  | -3.6*        |
| Continuous persistence  | 1.6%    | 2.9%  | -1.3 ppt     | 0.8%    | 1.6%  | -0.8 ppt     |
| Credential completion or transfer                                   | 21.9%   | 22.3% | -0.4 ppt     | 11.2%   | 15.9% | -4.7 ppt*    |
| AA or AS attainment   | 15.4%   | 11.8% | -3.6 ppt*    | 6.5%    | 8.7%  | -2.2 ppt     |

\*\*\*p < .01, \*\*p < .05, \*p < .10.

## Acknowledgments

CAPR is a partnership of research scholars led by the Community College Research Center (CCRC) and MDRC, supported by the Institute of Education Sciences, U.S. Department of Education, through [Grant R305C140007](#) and [Grant R305U200010](#) to Teachers College, Columbia University. Funding for this project was provided by [Grant R305C140007](#). The opinions expressed herein are those of the authors and do not represent the views of the Institute or the U.S. Department of Education.

For more information about CAPR, visit [postsecondaryreadiness.org](https://postsecondaryreadiness.org).

Copyright © 2023 by CAPR. All rights reserved.

**CENTER FOR THE ANALYSIS OF  
POSTSECONDARY READINESS**

Teachers College, Columbia University  
525 West 120th Street, Box 174, New York, NY 10027  
P 212.678.3091 | @CAPR\_deved  
[capr@columbia.edu](mailto:capr@columbia.edu) | [postsecondaryreadiness.org](https://postsecondaryreadiness.org)



[ccrc.tc.columbia.edu](https://ccrc.tc.columbia.edu) | @CommunityCCRC



[mdrc.org](https://mdrc.org) | @MDRC\_News