

INCREASING GATEKEEPER COURSE COMPLETION

**Three-Semester
Findings from an
Experimental
Study of Multiple
Measures
Assessment and
Placement**

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DECEMBER 2021

EXECUTIVE SUMMARY

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CCRC COMMUNITY COLLEGE
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OVERVIEW

Colleges throughout the United States are evaluating the effectiveness of their strategies to place entering students into college-level or developmental education courses. Developmental, or remedial, courses are designed to advance the reading, writing, and math skills of students who are deemed academically underprepared for college-level courses. Placements have traditionally been determined through standardized placement testing; however, through evaluating additional types of placement tests, high school transcripts, and evaluations of student motivation, multiple measures assessments (MMAs) are becoming an increasingly popular tool to place students with greater nuance.

There is no single, correct way to design and implement a multiple measures assessment to improve course placements. Colleges must decide what measures to include, and how to combine them. This study was developed to add to the understanding of the implementation, cost, and efficacy of an MMA system using locally determined rules. As part of a randomized controlled trial, the study team evaluated MMA programs and observed 17,203 student performances across five colleges in Minnesota and Wisconsin over the course of the fall 2018, spring 2019, and fall 2019 semesters.

Findings

Across the five colleges in the random assignment study, about 15 percent of all students who were observed were placed in an alternative course level as a result of the implementation of multiple measures assessments. In this main analysis sample for whom MMA impacted their course placement, there were 1,814 students who had low test scores in English and 2,082 who had low test scores in math but who had strong high school grade point averages (GPAs) or noncognitive scores and were in the “bump-up zone.”

Regarding the quantitative findings over the three-semester period:

- Program group students in the bump-up zone enrolled in more college-level courses than control group students (30.2 percentage points more in English and 19.2 percentage points more in math).
- Students in the bump-up zone who were placed into college-level English were 16 percentage points more likely to have completed the course by the end of their third college semester than their control group counterparts.
- Students in the bump-up zone who were placed into college-level math were 11 percentage points more likely to have completed the course by the end of their third college semester compared with their control group counterparts.
- Overall, all subgroups of students benefited from multiple measures placement, and MMA generally has positive impact estimates on enrollment and completion of gatekeeper courses in English and math.
- This implementation effort cost the colleges about \$33 per student who went through the placement process during the three semesters of the study.

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The Authors

EXECUTIVE SUMMARY

Colleges throughout the United States are evaluating the effectiveness of their strategies to place entering students into college-level or developmental education courses. Developmental, or remedial, courses are designed to advance the reading, writing, and math skills of students who are deemed academically underprepared for college-level courses. This determination is usually made using standardized placement tests such as the ACCUPLACER.¹

For years, colleges have used a single placement test, but many schools are now using multiple measures assessment (MMA)—factoring in additional test scores, high school transcripts, and evaluations of noncognitive skills—to assess and place incoming students. This practice has accelerated in the last few years, especially since the onset of the COVID-19 pandemic, when colleges looked for more flexible placement methods that were not based solely on a single, sometimes difficult to administer, test. MMA systems, like those studied in this report, are now used in states and colleges around the country.²

Despite the promise of MMA, millions of students each year are still being enrolled into developmental classes in math and/or English.³ Not only does this delay students' entry into credit-bearing coursework, but those who begin their studies in developmental classes are also less likely to graduate.⁴ Using MMA could be particularly significant for students of color, who are overrepresented in developmental courses.⁵ MMA can improve outcomes for these students, and may help close achievement gaps.

The findings in this report are derived from a research project undertaken by MDRC and the Community College Research Center to study the use of MMA at Minnesota and Wisconsin community colleges, with funding from the Ascendium Education Group. Five colleges participated in

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1. Elizabeth Zachry Rutschow, Maria S. Cormier, Dominique Dukes, and Diana E. Cruz Zamora, *The Changing Landscape of Developmental Education Practices: Findings from a National Survey and Interviews with Postsecondary Institutions* (New York: Community College Research Center, Teachers College, Columbia University, and Center for the Analysis of Postsecondary Readiness, MDRC, 2019).
 2. Susan Bickerstaff, Elizabeth Kopko, Erika B. Lewy, Julia Raufman, and Elizabeth Zachry Rutschow, *Implementing and Scaling Multiple Measures Assessment in the Context of COVID-19* (New York: MDRC, 2021).
 3. Xianglei Chen, Michael A. Duprey, Nichole Smith Ritchie, Lesa R. Caves, Daniel J. Pratt, David H. Wilson, Frederick S. Brown, and Katherine Leu, *High School Longitudinal Study of 2009 (HSL:09): A First Look at the Postsecondary Transcripts and Student Financial Aid Records of Fall 2009 Ninth-Graders* (Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, 2020).
 4. This could be for a number of reasons, including less-prepared students entering developmental courses, or because the courses themselves present an obstacle to students.
 5. Xianglei Chen, Lesa R. Caves, Joshua Pretlow, Samuel Austin Caperton, Michael Bryan, and Darryl Cooney, *Courses Taken, Credits Earned, and Time to Degree: A First Look at the Postsecondary Transcripts of 2011–12 Beginning Postsecondary Students* (Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, 2020).

the randomized controlled trial, which compared students who were placed using the college's existing procedures (the control group) with students who were placed using MMA (the program group). The control group was placed using ACCUPLACER tests, while the program group was placed using MMA systems that incorporated high school grade point average (GPA) and noncognitive assessments, either the Learning and Study Strategies Inventory (LASSI) or the Grit test. Colleges wanted to incorporate noncognitive assessments because they believe success is not determined by content knowledge—the focus of standardized tests—alone.

This report examines the impacts of MMA on math and English gatekeeper course completion and college-level credit accumulation three semesters after students' initial placement. This report also analyzes the predictive utility of high school GPA, placement tests, and the noncognitive assessments used by the study colleges. Finally, the report provides a cost and cost-effectiveness analysis of MMA as implemented by these colleges. The primary research questions are these:

What is the effect of using multiple measures placement on the following outcomes?

- Completion of the first English college-level course (C or higher) within three semesters
- Completion of the first math college-level course (C or higher) within three semesters
- Cumulative college-level credit accumulation within three semesters

How well does each noncognitive assessment used by the participating colleges predict college course completion and persistence in the following circumstances?

- When used alone
- When used in combination with high school GPA

What was the total cost of the resources required to build and scale these MMA systems, including, where applicable, a breakdown by who incurred which costs?

What was the incremental cost per additional credit earned as a result of the MMA systems?

Measures Used and Placement Approach

All colleges in the study included the following measures in their MMA systems: placement test scores, high school GPA, noncognitive assessment results, and scores from the ACT and SAT. The specific measures and decision rules used at each college are displayed in Table ES.1.

Once the colleges selected their assessment measures, they had to decide how those measures would be combined. This was usually done by developing a set of decision rules in which each measure would be considered in a specific order to determine which classes students were eligible to take. The colleges in the study sought to automate this process as much as possible. The third column in Table ES.1 shows the sequence in which colleges considered these measures. Typically, colleges considered waivers first to identify students who would be exempt from consideration of other

TABLE ES.1 MMA Approaches at Colleges in the Multiple Measures Assessment Study

COLLEGE NAME AND STATE	TYPE OF PLACEMENT SYSTEM	MMA APPROACH AND ORDER OF STEPS	NONCOGNITIVE ASSESSMENT	COLLEGE-READY HIGH SCHOOL GPA LEVEL
Anoka-Ramsey Community College, Minnesota	Decision rule	<ol style="list-style-type: none"> Exemptions (AP/IB, ACT, SAT, MCA scores) ACCUPLACER (exemption) GPA or LASSI 	LASSI (motivation): 50th percentile	English/Math: ≥ 3.0 GPA
Century College, Minnesota	Decision rule	<ol style="list-style-type: none"> Exemptions (AP/IB, ACT, SAT, MCA scores) ACCUPLACER (exemption) GPA or LASSI 	LASSI (motivation): 50th percentile	English/Math: ≥ 3.0 GPA
Madison College, Wisconsin	Decision band	<ol style="list-style-type: none"> Exemption (ACT scores) ACCUPLACER (decision band) GPA or Grit 	Grit Scale: 4+	English/Math: ≥ 2.6 GPA
Minneapolis Community and Technical College, Minnesota	Decision band	<ol style="list-style-type: none"> Exemptions (ACT, IB, SAT, MCA scores; college credit) ACCUPLACER (decision band) GPA or LASSI 	LASSI (motivation): 75th percentile	English: ≥ 2.3 GPA Reading: ≥ 2.4 GPA Math: ≥ 3.0 GPA
Normandale Community College, Minnesota	Decision rule	<ol style="list-style-type: none"> Exemptions (AP, ACT, SAT, MCA scores; college credit) LASSI GPA or ACCUPLACER (exemption) 	LASSI (motivation): 75th percentile	English/Reading: ≥ 2.5 GPA Math: ≥ 2.7 GPA

NOTES: Decision rules are a sequence of rules that compares each selected measure with a threshold in a predetermined order. If the threshold is met, a placement is generated; if not, another rule is applied. Decision bands are decision rules that apply only to students who fall within a certain range on a specified indicator (such as high school GPA or a placement test score), usually just below the cutoff. GPA = grade point average, MCA = Minnesota Comprehensive Assessment, LASSI = Learning and Study Strategies Inventory.

measures. Subsequently, the results of the ACCUPLACER placement test, the high school GPA, and the noncognitive assessment would be considered. In some cases, a system of “decision bands,” applicable to students within a particular score range, was used. In these cases, students who earned test scores within a certain range would be evaluated using other measures.

Identifying, Recruiting, and Randomly Assigning Students

Five colleges participated in the randomized controlled trial, including all students taking placement tests for enrollment in the fall 2018, spring 2019, and fall 2019 semesters, making three cohorts. The colleges were Anoka Ramsey Community College, Century College, Minneapolis Community and Technical College, and Normandale Community College, all in Minnesota, and Madison College in Wisconsin. Colleges chose not to include dual-enrollment students taking courses at the college while still in high school, as well as English language learners (ELLs). Dual-enrollment students come directly from high school and might go through a different placement process, and high school GPAs based on ELL coursework might have different predictive value for college coursework. Across the four Minnesota colleges, a total of 13,610 students participated in the study. The fifth college, Madison, enrolled 3,593 students, bringing the total number of randomized students to 17,203.⁶ There were 12,046 students testing for English placements and 15,002 testing for math.

All 17,203 students in the sample were randomly assigned to one of two study groups. The program group placed using MMA—specifically high school GPA, noncognitive LASSI or Grit test scores, and the traditional ACCUPLACER placement test. The control group used only the single ACCUPLACER test.⁷ Most of the students' placement was not changed by MMA; about 85 percent of all students were referred to the same course level regardless of the placement procedure that was used. For these students, whose placement was unchanged, the expectation is that the use of multiple measures will have no effect on their academic outcomes. For this reason, this report focuses on the main analysis sample of students whose placement was changed by MMA (or whose placement would have been changed had they been in the program group). Students in the main analysis sample were “bumped up” by MMA, so the main analysis sample is also referred to as “students in the bump-up zone.” There were 1,814 students who had low test scores in English and 2,082 who had low test scores in math but who had strong high school GPAs or noncognitive scores and were bumped up.

Effects of Multiple Measures Assessment

This section presents findings on the MMA placements' estimated effects on the academic outcomes of all cohorts of students in the bump-up zone. After three semesters, it is likely that most students who were initially placed into developmental courses could have had an opportunity to take college-level courses; this allowed the research team to examine how students from the different referral groups did academically and to assess whether offering college-course placements through MMA led to higher rates of college-level course completion and credit accumulation over time. Impact estimates are summarized in Tables ES.2 and ES.3.

6. Madison randomized a large number of students, but because of implementation bottlenecks associated with a lack of automation in their placement process, only a small number of students were given the opportunity to be placed using multiple measures. This college also used different placement tests and noncognitive assessments compared with Minnesota. For these reasons, an exploratory subgroup analysis examined if there were differential effects of MMA by state.

7. The program-to-control random assignment ratio was 70:30 at Century, Minneapolis, and Madison and 50:50 at Anoka-Ramsey and Normandale, but the latter school changed the ratio to 70:30 for the fall 2019 cohort.

**TABLE ES.2 Academic Outcomes After Three Semesters
Among Students in the English Bump-Up Zone**

OUTCOME	PROGRAM GROUP	CONTROL GROUP	DIFFERENCE	90% CONFIDENCE INTERVAL		P-VALUE
				LOWER BOUND	UPPER BOUND	
First-semester placement						
Gatekeeper (%)	100.0	0.0	100.0	100.0	100.0	0.000
Developmental (%)	0.0	100.0	-100.0	-100.0	-100.0	0.000
Three-semester outcomes						
Gatekeeper (%)						
Enrolled	63.3	33.1	30.2	26.6	33.7	0.000
Completed (C or higher)	42.8	26.6	16.3	12.6	19.9	0.000
Failed	12.1	3.3	8.7	6.5	11.0	0.000
Withdrew	8.3	2.9	5.4	3.5	7.4	0.000
Developmental (%)						
Enrolled	7.4	42.0	-34.6	-37.4	-31.8	0.000
Completed (C or higher)	5.4	34.0	-28.6	-31.2	-25.9	0.000
Failed	1.1	5.6	-4.5	-5.8	-3.2	0.000
Withdrew	1.4	3.2	-1.8	-2.9	-0.6	0.011
College level						
Credits earned (C or higher)	2.49	2.12	0.37	0.16	0.58	0.003
Number of courses completed	0.74	0.63	0.11	0.05	0.17	0.003
All subjects						
Enrolled during first semester (%)	81.1	77.9	3.1	0.7	5.6	0.033
Enrolled during second semester (%)	66.6	67.0	-0.3	-3.9	3.3	0.887
Enrolled during third semester (%)	47.6	49.1	-1.4	-5.4	2.5	0.548
Number of semesters enrolled	1.95	1.94	0.01	-0.06	0.09	0.767
Total credits attempted	22.33	21.62	0.71	-0.32	1.75	0.258
Total credits earned	16.55	16.90	-0.34	-1.43	0.74	0.604
College-level credits earned (C or higher)	14.35	13.09	1.26	0.26	2.26	0.038
Developmental credits earned	1.06	2.91	-1.85	-2.11	-1.59	0.000
College-level courses completed	4.78	4.46	0.32	0.00	0.65	0.103
Sample size (total = 1,814)	1,126	688				

SOURCE: Transcript data provided by Anoka-Ramsey Community, Century, Minneapolis Community and Technical, Normandale, and Madison colleges.

NOTES: Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because categories are not mutually exclusive.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

**TABLE ES.3 Academic Outcomes After Three Semesters
Among Students in the Math Bump-Up Zone**

OUTCOME	PROGRAM GROUP	CONTROL GROUP	DIFFERENCE	90% CONFIDENCE INTERVAL		P-VALUE
				LOWER BOUND	UPPER BOUND	
First-semester placement						
Gatekeeper (%)	100.0	0.0	100.0	100.0	100.0	0.000
Developmental (%)	0.0	100.0	-100.0	-100.0	-100.0	0.000
Three-semester outcomes						
Gatekeeper (%)						
Enrolled	39.8	20.6	19.2	15.9	22.5	0.000
Completed (C or higher)	25.6	14.7	11.0	8.1	13.9	0.000
Failed	4.6	2.3	2.3	0.9	3.7	0.006
Withdrew	8.7	2.9	5.9	4.0	7.7	0.000
Developmental (%)						
Enrolled	4.5	33.6	-29.1	-31.6	-26.7	0.000
Completed (C or higher)	3.7	26.4	-22.8	-25.0	-20.5	0.000
Failed	0.6	5.7	-5.1	-6.3	-4.0	0.000
Withdrew	0.8	3.5	-2.8	-3.8	-1.8	0.000
College level						
Credits earned (C or higher)	2.16	1.55	0.61	0.41	0.81	0.000
Number of courses completed	0.64	0.44	0.19	0.14	0.25	0.000
All subjects						
Enrolled during first semester (%)	84.2	84.3	-0.1	-2.0	1.8	0.917
Enrolled during second semester (%)	73.8	74.0	-0.3	-3.3	2.8	0.885
Enrolled during third semester (%)	56.6	54.6	2.0	-1.6	5.6	0.363
Number of semesters enrolled	2.15	2.13	0.02	-0.05	0.08	0.693
Total credits attempted	24.85	24.75	0.09	-0.85	1.04	0.871
Total credits earned	20.37	20.35	0.02	-0.98	1.03	0.970
College-level credits earned (C or higher)	18.62	17.14	1.48	0.51	2.44	0.012
Developmental credits earned	0.65	2.25	-1.60	-1.82	-1.38	0.000
College-level courses completed	6.04	5.63	0.41	0.10	0.71	0.027
Sample size (total = 2,082)	1,189	893				

SOURCE: Transcript data provided by Anoka-Ramsey Community, Century, Minneapolis Community and Technical, Normandale, and Madison colleges.

NOTES: Rounding may cause slight discrepancies in sums and differences.

Distributions may not add to 100 percent because categories are not mutually exclusive.

The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect.

Summary of Findings

Program group students in the bump-up zone enrolled in more college-level courses than control group students (30.2 percentage points more in English and 19.2 percentage points more in math).

Students in the bump-up zone who were placed into college-level English were 16 percentage points more likely to have completed the course by the end of their third college semester than their control group counterparts.

Students in the bump-up zone who were placed into college-level math were 11 percentage points more likely to have completed the course by the end of their third college semester compared with their control group counterparts.

Program group students in the English bump-up zone earned 1.3 more college-level credits across all subjects, and program group students in the math bump-up zone earned 1.5 more college-level credits across all subjects.

Overall, all subgroups of students benefited from multiple measures placement, and MMA generally has positive impact estimates on enrollment in and completion of gatekeeper courses in English and math.

The predictive analysis found that GPA was the best of the available predictors of success in college-level courses. The LASSI and Grit noncognitive assessments appeared to add no predictive value above and beyond that of GPA.

Implementing MMA cost the colleges \$33 per student over the business-as-usual placement process. It is comparable in per-student and per-credit-earned effects to the Encouraging Additional Summer Enrollment (EASE) informational campaign.⁸ The cost could likely be lowered over time either through continued use or by tweaks to the implementation.

8. Caitlin Anzelone, Michael Weiss, and Camielle Headlam, with Xavier Alemañy, *How to Encourage College Summer Enrollment: Final Lessons from the EASE Project* (New York: MDRC, 2020). MDRC's *Encouraging Additional Summer Enrollment (EASE)* study used behavioral insights and a financial incentive with the goal of boosting enrollment rates.

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