

## Multiple Measures: A Better Student Assessment

## Assessing College Readiness Beyond High-Stakes Placement Tests

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## Multiple Measures: A Proven Practice

The use of multiple assessment measures for placing students into English and mathematics courses has grown significantly in the past decade. Whether through state legislation, as seen in California with AB 705, systemwide policy such as North Carolina's Community College System, or through faculty-led professional development networks, there is an increasing number of institutions that are choosing to limit, or eliminate their reliance on, high stakes placement exams in favor of placement mechanisms that better reflect a student's investment in their academic career. Some of the factors utilized in the multiple measures approach include:

- High school or college transcripts;
- Highest level of coursework completed in a given subject area and corresponding course grade;
- Attitude surveys;
- Vocational or career aptitude interest inventories;
- Specialized certificates or licenses;
- Education and employment histories;
- Military training and experience;
- Interviews; and
- Holistic scoring processes.

Developed from the concern that standardized placement exams are high-risk, high-stakes tests that place too many students into remediation, multiple measures has become a practice that maximizes a student's opportunity to receive their highest, most appropriate placement into required math and English courses.

A 2018 report by the Center for the Analysis of Postsecondary Readiness (CAPR) summarizes research conducted on over 13,000 students in the State University of New York (SUNY) system who took courses in 2016 and 2017, finding that the use of multiple measures increased rates of enrollment and completion in college-level, gateway math and English courses. In both math and English, students placed via the multiple measures approach were more likely to enroll in and complete gateway courses compared to those that placed using solely the ACCUPLACER (Control Group), based on the CAPR research (Figure 1).

## Key Messages

- The disjunctive (independent) use of multiple measures and placement tests allows students to place into their highest possible gateway courses.
- An overreliance solely on high-stakes placement exams results in too many students being placed into remedial courses and does not accurately reflect a student's investment in their academic career.
- The use of multiple measures, including high school transcript information, results in higher course placement and increased gateway course success.
- The multiple measures approach can be integrated into NSHE's new corequisite support redesign of remediation to more accurately place students into their courses.
- The multiple measures approach is a better deal for underrepresented minority students, placing more into college-level courses with better success in their courses.
- Adult students returning to higher education benefit from guided self-placement; high school data may still result in more accurate placement than standardized exams.
- Diagnostic tools such as Nevada State College's EdReady program create successful opportunities for students to increase their placement through individualized learning modules.

Figure 1. SUNY System: Gateway Course Completion in Math and English


Source: CAPR Multiple Measures Placement Using Data Analytics, September 2018
The State University of New York system's multiple measures approach includes using alternative tools such as high school GPA and performance on state exams, as well as high school class rank. The CAPR research study found positive impacts for the multiple measures approach related to gender and racial equity. Black and Hispanic students benefited more from this approach than their white peers, and for math, more women than men placed in the higher college-level math under the multiple measures approach. This strategy of assessment is useful in closing both access and achievement gaps for underrepresented students.

The best use of the multiple measures approach is in conjunction with single assessment tools to maximize a student's placement so they place at the highest level possible. The same study found that for approximately 5,000 students placed using multiple measures, 14 percent placed higher than with the ACCUPLACER placement score alone and 7 percent placed lower than the ACCUPLACER score cut-off. Additionally, in English, 41.5 percent of students were placed in a higher-level course through multiple measures, and 6.5 percent placed below the ACCUPLACER placement. Therefore, by using alternative placement criteria alongside traditional singleassessment tools, students are given the maximum opportunity to place into the highest, most appropriate course.

## High-Stakes Placement Tests as College-Level Gatekeepers

Community colleges, including those within NSHE, are known to be open-access institutions, yet access to college-level courses at these institutions is not guaranteed. Many two-year institutions administer high-stakes exams that determine placement into math and English courses to entering students. The same is true for Nevada's four-year institutions that rely heavily on the ACT, SAT and other single-assessment measures for course placement.

Across the nation, the use of multiple measures is improving the placement, enrollment, and completion of gateway math and English courses compared to single-assessment methods of standardized exams. A 2016 report by the Center for
"When a student is placed into a college-level course and fails there, the fact that there has been a placement mistake is painfully obvious to all. But when a student does well in a remedial course, it's unlikely to be perceived as a problem."

Community College Student Engagement (CCCSE) found that at Ivy Tech Community College in Indiana, 68 percent of students placed using multiple measures passed their gateway math course in contrast to 59 percent of students who were placed using the ACCUPLACER. For writing, similar improvements in completion rates were observed. Using only the ACCUPLACER, 57 percent of students completed the gateway course compared to 64 percent under the multiple measures approach.

A 2012 study from the Community College Research Center (CCRC) highlighted the inefficiency of the standardized placement exams' ability to accurately place students who are predicted to be successful in college-level coursework. Utilizing data on over 42,000 first-time attendees at a large, urban community college system, the study estimated that 61 percent of all incoming students could earn a C or better in the gateway English course (without any remedial support) if allowed to enroll; however the use of single assessment methods (standardized tests) only allowed 19 percent to enroll. In math, the study predicted that 50 percent of students would pass their gateway course (without any remedial support) yet only half of those students were eligible to enroll.

## Placement Tests are Inefficient Predictors of College-level Course Success

College placement tests are essential assessment tools in a student's academic career though few students prepare to take them, and multiple studies have challenged the standardized exam's ability to do what it is designed to do. A 2012 study by Judith Scott-Clayton at the CCRC found that many students were predicted to be successful in the college-level course, however; because only a single, standardized placement exam was used only a few were permitted to enroll. Scott-Clayton also found that placement exams such as the ACCUPLACER are more predictive of success in college-level coursework versus the ability to predict who is likely to fail.

A consequence of relying solely on single placement tests is the risk of what Clayton-Scott defines as the severe error rate or significant discrepancies between actual enrollment into remedial coursework and where Clayton-Scott's model predicts a grade of a B or higher in the college-level course. Again, severe errors are occurrences where a student was required to take a remedial course, but according to the researcher's model and success criterion, the student could have earned a B or higher in the college-level gateway course. In Clayton-Scott's model, the severe error rate for under placement in math was 18 percent, and in English was as high as 28.9 percent meaning that more than one-quarter of students placed into remedial English could have successfully earned a B or higher in their college-level gateway course, according to the model's prediction. However, when the researcher analyzed the effect of multiple measures on placement errors, the severe error rate was reduced. Scott-Clayton suggested that by using multiple measures, the severe error rates could be reduced by approximately 15 percent across both English and math.

A second 2012 CCRC study by Clive Belfield and Peter Crosta found

## When controlling for a student's

 high school GPA, the ACCUPLACER had almost no independent explanatory power.-Community College Research Center that there is no association between a student's placement score and college GPA for students who fell below the institution's benchmarks for college-level enrollment. The research also suggested that "placement tests are not good predictors even when there is no diversion effect." The authors define diversion effect as the endogenous effect that placement into traditional remediation plays in delaying a student's graduation and slowing down progress through their degree or certificate. To combat this effect, the researchers analyzed college GPA, which is less affected by the diversion effect. Building upon the work of multiple measures, the researchers also found that high school GPA is more useful for predicting student
success in gateway math and English courses and has a strong association with college GPA. When utilizing multiple measures for placement in conjunction with single assessment methods, institutions can maximize a student's placement by reducing the severe error rate of placement tests, as well as allowing those that perform well on placement tests the opportunity to place into the highest, most appropriate math and English courses.

## ACCUPLACER: The System's Most Widely Used Placement Test

At all NSHE institutions, recent high school graduates primarily receive their initial English and math course placement based on ACT and SAT scores. Since 2014, Nevada has participated in the statewide administration of the ACT as its college and career readiness assessment. With many students entering higher education directly after high school, most students have at least taken the ACT due to the state's program. However, students may opt for additional measures for placement. All institutions in the System use either the ACCUPLACER or a department-based placement exam that allows students to place into higher math.

NSHE has widely used the ACCUPLACER as a testing option for students to place into their gateway math courses. All institutions within the System except UNLV currently offer and accept math ACCUPLACER scores as alternative options to maximize a student's placement into their required math courses. Institutions encourage students to take the ACCUPLACER to maximize their placement options and will allow a student to enroll in a higher math course if their ACCUPLACER scores result in a higher placement than do their SAT or ACT scores. In this approach, the ACCUPLACER, working jointly with other standardized exams, serves as a disjunctive placement measure in which institutions will "super score" placement-utilize the highest score from any exam to maximize a student's placement.

Despite its widespread use both in NSHE and nationwide, the ACCUPLACER's ability to place students accurately has long been criticized. Multiple reports from the CCRC suggest that the ACCUPLACER may under place students into remedial courses. Responding to this criticism, the ACCUPLACER revised its exam in an effort to more accurately place students. Beginning in January 2019, College Board no longer offers the classic ACCUPLACER exam and has instead replaced it with the Next Generation ACCUPLACER. The Next Generation ACCUPLACER's implementation within the System includes three math placement exams: Arithmetic (AR), Quantitative Reasoning, Algebra, and Statistics (QAS) and Advanced Algebra and Functions (AAF). Each of the three exams includes 20 questions each, with content areas comprising 1-5 questions of the exam that generate a single placement score after completion.

With the adoption of the Next Generation ACCUPLACER, institutions were able to tailor the exam through a benchmarking process. This option allows institutions to better align the exam's questions to the institution's curriculum. However, this benchmarking process means that not all ACCUPLACER exams are consistent across the System, and thus, cut-off placement scores are also inconsistent. Table 1 identifies the inconsistencies among ACCUPLACER placement score minimums for placement into the two most popular gateway math courses, MATH 120 (Fundamentals of College Mathematics) and MATH 126 (Precalculus 1). For placement into a college-level course, most institutions require students to have minimum scores on two exams: the QAS and the AAF. The "and" scores notated in Table 1 indicate that a student must meet both minimum scores to enroll in the college-level math course.

Table 1. ACCUPLACER Cut-off Scores for MATH 120 and MATH 126 across the System

| Institution |  | MATH 120 |  |  | MATH 126 and MATH 124 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | QAS <br> Minimum |  | AAF <br> Minimum | QAS <br> Minimum |  | AAF <br> Minimum |
| 2-Year | CSN | 263 | and | 200 | 263 | and | 250 |
|  | GBC | 263 | and | 237 | 263 | and | 250 |
|  | TMCC | 276 | and | 237 | 276 | and | 250 |
|  | WNC | 260 | and | no minimum | 275 | and | 250 |
| 4-Year | NSC | 263 | and | no minimum | 263 | and | 250 |
|  | UNLV | ACCUPLACER not used |  |  |  |  |  |
|  | UNR | 276 | and | 263 | 276 | and | 263 |

Inconsistent cut scores across the System may create complications for students attending multiple institutions; however, the institutional benchmarking process for the ACCUPLACER means that not all Next Generation ACCUPLACER exams are the same, and students across NSHE will not have consistent placement.

## Promoting Diagnostic Tools using Personalized Learning Paths

An alternative pathway to placing students into gateway math and English is through mechanisms that provide individualized learning paths for students. These self-paced modules include a pretest which gauges the student's weakest areas and then provides them with the needed individualized content. Upon completion of the tailored content, the student is then able to complete a post-test for higher placement.

At Nevada State College the campus replaced ACCUPLACER testing with EdReady, a self-paced diagnostic tool. Beginning in Fall 2016, Nevada State College is using EdReady as an additional mechanism to promote placement into college-level mathematics courses. With the use of the program, the placement process detailed in Figure 2 now includes a two-way process in which a student could change their placement via EdReady.

Figure 2. Nevada State College's Revised Placement Process using EdReady

Old Placement System


New Placement System


Previously, a student would receive their Accuplacer score and be given a math course placement; however, with EdReady a student is given an initial pretest, tailored curriculum, and then a post-test that may improve their placement upon successful completion.

The NROC Project conducted a case study on the implementation of EdReady at the NSC campus and found that the self-directed program resulted in substantial changes in remedial math placement. Before the implementation of EdReady, 24 percent of incoming students placed into college-level math. After implementing EdReady, the percentage increased to 42-an 18-point increase in one academic year. The continued success of EdReady at Nevada State College supports the use of alternative pathways for placement.

Placement of new students into college-level math courses increased from 24 to 42 percent using EdReady at Nevada State College.

## Multiple Measures in Use Across NSHE

The work of multiple measures is not new to NSHE; many institutions across the System have been utilizing multiple measures for years. For example, TMCC piloted multiple measure placement into English and math, utilizing high school GPA in 2013 and has been using the method ever since. The use of multiple measures across the System continues to grow, albeit modestly in recent years. Table 2 illustrates the use of multiple measures as placement options for students into gateway math and English courses.

Table 2.
Subject Institution

| Math | NSC | EdReady |
| :---: | :---: | :--- |
|  | TMCC | Unweighted high school GPA (WCSD only) |
|  | WNC | High school course enrollment |
| English | NSC | Directed self-placement |
|  | TMCC | Unweighted high school GPA; AP English course grade |
|  | UNLV | Directed self-placement |
|  | UNR | Writing portfolio of previous work; placement essay |

Currently, five of NSHE's seven teaching institutions are utilizing some form of multiple measures in either math or English. NSC and TMCC are the only institutions utilizing multiple measures for placement into both math and English. Whether using high school coursework like the WNC or TMCC models, guided self-placement like that happening at NSC and UNLV, or through other means like the EdReady model at NSC or writing portfolios of high school assignments at UNR, multiple measures are currently in place within the System. Despite the prevalence of multiple measures within the System, they are not yet at scale for all students. Currently, the multiple measures in use are for smaller, niche populations that students may choose to opt into. Efforts should be made to scale the use of multiple measures in both math and English across the System through sharing practices among institutions, as every institution has taken a unique approach to the practice.

## The Use of the High School GPA and Courses

The most popular multiple measure in use across the nation is the high school GPA. For some states and schools, they may use a student's high school cumulative GPA, taking into account their extracurricular courses, and for others, it may be focused more closely on an academic GPA of core courses, while others may look at the individual performance in certain discipline-specific courses.

Organizations like the California Community College's Research and Planning (RP) Group's Multiple Measures Assessment Project (MMAP) have studied extensively the role of high school GPA on placement success. The group created vast decision trees utilizing high school transcript data to determine the likelihood of student success in college-level math, English, reading, and English as a Second Language (ESL) courses. The outputs shown in Figures 3 and 4 illustrate a few examples of the probabilities of success for students based on their high school coursework alone through MMAP's study of over 260,000 students enrolled during Fall 2017.

Figure 3. Predicted Success for College-level Mathematics Course for STEM Pathways


Source: MMAP Phase II Rule Sets: Math Decision Tree Outputs
The decision tree above illustrates that of the entire cohort of students, 84 percent of all students had a predicted success rate of 50 percent or higher in a college-level mathematics course leading to a STEM pathway (e.g., pre-calculus) without any additional support. Assessing high school GPA and course-taking patterns, the study also found that over one-third of the students had a predicted success rate of over 75 percent.

The decision tree in Figure 4 represents the predicted success rates of students in their first college-level English course based solely on high school transcript data.

Figure 4.

## Predicted Success for College-level English



Source: MMAP Phase II Rule Sets: English Decision Tree Outputs
With over 60 percent of students having a high school cumulative GPA of greater than or equal to 3.1, their predicted success rates averaged over 75 percent. Perhaps most impressive, even for students who would otherwise be underprepared for college-level material, their lowest predicted success rate was 50 percent in their college-level English course without any additional support provided.

The spirit of multiple measures is to maximize a student's placement in courses that they will be successful in, and the MMAP created many complex, well-researched decision trees that analyze student success at every level of enrollment finding that many more students would be successful in the college-level course, but were not previously given the opportunity to enroll. Following the effective date of California's AB 705, the work done through with the MMAP has now been implemented across the state's community colleges.

## Returning Adults and Multiple Measures

As high school information (e.g., GPA, course-taking patterns) is the most popular alternative placement tool for students into their gateway math and English courses, questions are raised about how multiple measures affect adult learners and returning adults.

Across the nation, multiple measures have generally taken one of two approaches for placing adult learners. The first approach is to continue to use high school course information. Research that has been done by the MMAP shows that even ten semesters after a student's high school graduation date, their high school transcripts remain more accurate tools for placement than relying solely on standardized exams. To date, there has been no research identified to suggest that high school transcripts older than ten semester are not appropriate tools for placement.

For institutions that choose not to utilize high school transcript data in the multiple measures approach for placement of adult students, they most typically opt for guided self-placement, in which an academic advisor or departmental advisor may meet with a student to discuss their placement options and determine the
appropriate course for the student. The Academic Senate for California Community Colleges published a guide on the practice that explains that guided self-placement is, "a locally developed tool or process that allows students, in consultation with counselors or other faculty, to determine suitable coursework including the appropriate mathematics, English and English as a Second Language (ESL) entry-level class." Guided self-placement within the California Community College system begins with career counseling to determine the students most appropriate major or metamajor as well as the student's ultimate overall education goal. Institutions then provide sample college-level coursework for the students to select a placement, brush up on work before class, and consider the time commitment and expectations of the courses. Students and staff then review previous coursework from both high school and other colleges as well as default placement rules or locally-determined placement rules. From there, the student may place into a class where concurrent academic support is provided simultaneously or place into a college-level course without any additional support. Currently, some institutions within the NSHE system utilize guided self-placement for English.

## Multiple Measures Closes Access Gaps for Underrepresented Students

Aligning with the third strategic goal of Closing the Achievement Gap adopted by the NSHE Board of Regents, research around the use of multiple measures suggests that the practice increases access to college-level courses for historically underrepresented minorities. A 2016 report produced by the CCCSE entitled Expectations Meet Reality: The Underprepared Student and Community Colleges highlights the academic success gains of minority populations by using multiple measures. The report highlights Davidson County Community College (DCCC) in North Carolina that adopted full-scale use of multiple measures based on North Carolina's Multiple Measures for Placement policy beginning in the academic year 2013-14. The use of multiple measures continues to result in more students across all ethnic groups placing into college-level courses compared to the use of placement tests only according to final figures from the academic years 2013-14 and 2014-15 (Figure 5).

Figure 5. DCCC: Gateway Completions by Placement Mechanism


Source: CCCSE Davidson County Community College, Academic Years 2013-14 and 2014-15
The most significant improvements in gateway course completions were for African American students who had a 17-percentage point increase in both gateway math and English completions. Latino and "Other Minority" students also had encouraging increases in placement for both math and English. After two years of implementation, DCCC found that utilizing multiple measures, primarily high school transcript data, resulted in

76 percent of students completing the gateway English course, while only 59 percent of students placed via a high stakes placement test ended up completing the same gateway course.

With continued racial gaps in performance for standardized test scores such as the SAT, the multiple measures approach allays part of the achievement gap by allowing more minority students the opportunity to enroll in college-level courses.

## Conclusion: Measure a Student's Investment in their Education

Admission to one of NSHE's colleges or universities does not yet guarantee entry into college-level courses; however, this changes in Fall 2021 when Board of Regents policy requires all students to enroll into college-level math and English courses with additional academic support as necessary, replacing traditional models of remediation.

The use of scaled multiple measure practices across the System can ensure students are more accurately placed based on a holistic review of their academic history. Multiple measures are a more accurate representation of a student's investment in their educational career than a single assessment such as the ACT, SAT, or ACCUPLACER where one tool taken in a matter of hours will dictate a student's entire postsecondary career-if they will be on track to graduate on-time, or if they will be required to take additional math or English courses before enrolling in the courses that count toward their degrees, costing time and money and decreasing the likelihood of graduation.

## Single standardized exams as sole determinants of placement result in too many students under placing

 With concerns of racial bias in exams like the ACT and SAT, as well as repeated research showing the inability for ACCUPLACER to accurately predict a student's success in their college-level math and English courses, single assessment tools should not be standalone determinants of a student's college career. These exams, particularly the ACCUPLACER, are one that students do not generally prepare or study for and are thus not accurate reflections of a student's entire investment in their education.With ample research finding that standardized exams keep too many students, especially minority students, from accessing college-level coursework, the importance of using multiple measures to close access gaps is critical. Multiple measures serve as a better deal for underrepresented students by allowing more students the opportunity to enroll in the college-level course; research has shown that these students are successful in completing their gateway courses.

## Utilizing multiple measures in conjunction with standardized exams yields maximum results

Standardized exams are inefficient in predicting the success of all students (particularly underrepresented students), and the use of multiple measures minimizes this error. However, research shows that the multiple measures approach is best used when combined with standardized exams to maximize a student's placement into their highest possible gateway courses. Institutions that use both multiple measures and standardized exams to maximize a student's placement have the lowest placement error rates and give students the maximum opportunity to attempt college-level coursework.

## High school transcript data is successful at minimizing placement error, even for adult learners

While the practice of multiple measures may include an array of different tools, high school transcript information remains one of the strongest predictors of postsecondary student success. Whether looking at high school cumulative GPA or individual performance in discipline-specific courses, high school information is a better predictor of student success than standardized exams.

Research has also shown that adult learners benefit more from using high school transcript information than standardized exams. While an ample amount of research has shown that high school information remains a useful tool even after ten semesters since the high school graduation, there is no known research suggesting this information is ineffective even beyond ten semesters. Adult learners may also benefit from the individualized attention of directed self-placement, where an academic advisor or department contact may be able to assist the student in making an informed decision about their placement options.

## The Nevada System of Higher Education has already experienced success with multiple measures

NSHE institutions have been utilizing multiple measures for many years, and all have seen success with their use. Some institutions have chosen a more traditional approach to multiple measures through high school transcript information (TMCC and WNC), and others have used alternative measures for placement such as self-paced learning modules (NSC and CSN), high school academic materials (UNR) or guided self-placement (NSC and UNLV). These efforts should be maintained, shared amongst system colleagues, and brought to full scale.

## Recommendation: Disjunctive Multiple Measures Maximize Placement

The multiple, disjunctive measures approach, where institutions may independently use any array of vehicles to maximize a student's placement into their gateway math and English courses are a better deal for students. Instead of basing a student's remediation need on a single assessment-one that students generally do not prepare for-the multiple measures approach better captures a student's investment into their educational career and is a more accurate predictor of student success. The following are recommendations for utilizing multiple measures within the Nevada System of Higher Education and are intended to be considered holistically in reviewing the future use of multiple measures across the System.

- Maximize a student's placement by utilizing disjunctive multiple measures. Institutions within NSHE should maximize a student's placement into the most appropriate math and English courses by utilizing multiple measures disjunctively. A disjunctive approach to multiple measures maximizes a student's placement by utilizing their highest placement option from any of the measures. In this approach, placement tools are not interdependent, but rather used in combination with standardized exams and other measures.
- Utilize high school transcript information as a multiple measure to improve placement and gateway course completion. High school transcript information, including cumulative GPA, core academic GPA, and performance in discipline-specific courses, are effective tools for placing students. Utilizing high school GPA and course-taking patterns give more underrepresented minority students access to college-level coursework. By measuring a student's investment in their education through high school transcript information, more students have the opportunity to rise to the challenge of college-level math and English placement.
- Scale existing multiple measure practices across all NSHE institutions. Existing multiple measure practices across the System should be supported and scaled. The rich diversity of approaches to the practice within the System should be shared and implemented statewide. From guided self-placement and personalized learning plans to high school transcript data and using high school course assignments, our institutions are already engaged in this work, and students have seen academic gains as a result.

With the Board's adoption of the corequisite support policy in June 2019 and subsequent creation of the NSHE Corequisite Implementation Task Force, members should consider the aforementioned recommendations regarding the use of multiple measures in the context of the Nevada System of Higher Education preparing to make a significant culture shift.

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