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INFORMATION

Office of Shared Accountability
MONTGOMERY COUNTY PUBLIC SCHOOLS
Rockville, Maryland

March 2, 2011

MEMORANDUM

To: Middle School Principals

From: Renee A. Foose, Associate Superintendent 

Subject: INFORMATION: Grade 8 First Semester Indicators that Predict Core Course Completion During Grade 9

Attached for your information is a research brief produced by the Office of Shared Accountability (OSA). This research brief examines factors that predict the number of core credits that students are likely to earn in Grade 9. The model can predict with 90 percent accuracy whether students are likely to earn four or more credits in core courses by the end of Grade 9.

The results will help school staff members identify students in Grade 8 who might be at risk of not earning four or more credits in core courses by the end of Grade 9, enabling staff to provide the necessary academic intervention prior to these students entering Grade 9. Although the prediction model has a high accuracy for all student groups, many factors may influence individual outcomes, and predicted performance should not be interpreted as a predetermined outcome. School staff members should consider factors that are instructional, motivational, and social that may interact to influence course credit attainment.

If you have any questions, please contact Dr. Vasuki Rethinam, acting supervisor, Applied Research Unit, OSA, at 301-279-3564 or via e-mail.

RAF:vr

Attachment

Copy to:

Executive Staff
Mrs. Collins

Ms. Lake-Parcan
Dr. Rethinam

Dr. Steinberg
Dr. Newman

Approved:


Frieda K. Lacey, Deputy Superintendent of Schools



Research Brief

February 2011

Applied Research Unit

Grade 8 First Semester Indicators that Predict Core Course Completion During Grade 9

Vasuki Rethinam, Ph.D. and Clare Von Secker, Ph.D.

Executive Summary

This research brief examines factors that predict the number of core credits that students are likely to earn in Grade 9. The Grade 9 course completion model correctly predicts attainment of at least four core course credits for 90% of all students. Although the prediction model has a high accuracy for all student groups, many factors may influence individual outcomes, and predicted performance should not be interpreted as a predetermined outcome. The results will help schools identify students in Grade 8 who might be at risk of course failure in Grade 9 and provide the necessary academic intervention prior to these students entering Grade 9.

Four recommendations are:

1. Schools should use the prediction model to identify students in Grade 8 or incoming Grade 9 students at risk of course failure and select students who can benefit from academic interventions.
2. Schools should use the predictions in conjunction with other information to inform decisions about how best to support academic attainment of individual students.
3. The Office of Shared Accountability (OSA) should communicate to school staff on deployment of the model and provide training on its use.
4. OSA should conduct periodic cross-validation studies and update the model as needed to ensure that changes in student cohorts, course offerings, instructional practices, and assessments do not reduce the prediction accuracy of the model.

Background

Goal 1 of the Montgomery County Public Schools (MCPS) strategic plan, *Our Call to Action: Pursuit of Excellence* (MCPS, 2008) is to ensure success for all students. Although MCPS is making progress toward attainment of this goal, one area that needs more attention is successful course completion during Grade 9 in order to meet the criteria required to earn a high school diploma.

Students are expected to successfully complete courses in five subjects during Grade 9. Four of those five courses are in core areas of English, mathematics, science, and social studies. Earning credits in foreign language is one of the options to satisfy MCPS graduation requirements. Therefore, for the purposes of this study, foreign language will be considered a core course.

While credits for core courses are required to meet the Maryland graduation requirements, MCPS policy allows Grade 9 students to be promoted to Grade 10 if they earned five credits that include one in required English and one in required mathematics. Grade 9 students who fail two or more core courses are at higher risk of dropping out or failing to graduate within four years (Lloyd, 2007; Roderick, 1994; Roderick & Camburn, 1999; Rumberger, 1995; Wheelock & Miao, 2005).

In MCPS, early identification of students who are at risk could be possible using a model that helps determine the likelihood of a student earning credits in core courses in Grade 9. Having this information in the spring semester of Grade 8 can assist schools with opportunities to provide academic support to students who are predicted to be at risk for course failure in Grade 9.

This brief addresses the following questions:

1. What factors predict the number of credits that Grade 8 students are likely to earn in Grade 9?
2. Is a model that predicts the number of credits that Grade 8 students are likely to earn in Grade 9 equally accurate for all student groups?

Methodology

The sample for this study consisted of 8,764 first-time Grade 9 students who were enrolled in June 2006 (Class of 2009) and have official transcript file information. Students for whom complete data were available were included in the study. Students' gender, race/ethnicity, participation in Free and Reduced-price Meals System (FARMS), special education, and English for Speakers of Other Languages (ESOL) services were based on MCPS records as reported at the end of school year 2005–2006.

A review of the literature revealed three constructs that were associated with Grade 9 course credit attainment. Those constructs were the rigor of students' middle school courses, middle school academic engagement, and prior performance on standardized tests (Lloyd, 2007; Roderick, 1994; Roderick & Camburn, 1999; Rumberger, 1995; Sciarra & Seirup, 2008; Wheelock & Miao, 2005). The three constructs were measured using seven variables that were available in MCPS student records as of the end of the first semester of Grade 8. Those variables were as follows:

1. Rigor of middle school courses
 - High school mathematics courses passed with a C or higher by end of semester one in Grade 8
 - Enrolled in ESOL or support in reading class in Grade 8 (negative rigor value)
2. Middle school academic engagement
 - Grade 8 semester one marking period averages
 - Grade 7 attendance rate
 - Ineligibility in two marking periods during first semester Grade 8
3. Prior performance on the Maryland School Assessment (MSA) standardized tests
 - Grade 7 MSA Reading score
 - Grade 7 MSA Mathematics score

Other measures of the rigor of students' middle school courses were examined as predictors but were not included in the final model because they did not improve the prediction accuracy. These included the mathematics course level taken during semester one in Grade 8, and Gifted and Talented in English (rigor).

A multilevel linear regression technique, generalized estimating equations, used the seven selected variables to predict the number of credits students would earn in core courses in Grade 9. In general, outcomes were not estimated for students who were missing data on any of the variables used in the prediction model (e.g., no course marks for semester one in Grade 8).

This model defines students as making progress toward attaining a high school diploma if they earn at least four credits in core courses during Grade 9. Prediction accuracy is calculated as the percentage of students whose predicted Grade 9 core credit earned category (fewer than four vs. four or more) matched their actual Grade 9 credits earned in core courses.

Results

The model correctly predicts the two outcome categories—fewer than four vs. four or more credits earned in core courses during Grade 9, for 90% of all students (Table 1). Accuracy rates are lowest among groups of students who on average earned close to four core credits during Grade 9. For nearly all student groups, when predictions are wrong, students are more likely to earn more credits than predicted.

Table 1
Fewer than Four vs. Four or More Core Credits
Earned in 2006 for Grade 9 Students
by Demographic Group

	N	% Correct pred.	% Worse than pred.	% Better than pred.
All Students	8,764	90.0	5.1	4.8
Male	4,412	88.6	6.0	5.4
Female	4,352	91.5	4.2	4.3
African Am.	1,788	82.8	7.3	10.0
Asian Am.	1,285	94.8	3.0	2.2
Hispanic	1,556	79.9	10.4	9.6
White	4,116	95.5	2.9	1.7
FARMS	1,526	80.5	9.7	9.8
Special Education	1,007	78.5	11.1	10.4
ESOL	106	79.2	7.5	13.2

Note. American Indian student results not reported separately.

Prediction accuracy was highest among Asian American (94.8%) and White (95.5%) students, but students in both groups were more likely to earn fewer credits than expected when predictions were wrong. Prediction accuracy was less than 85% among African American (82.8%) and Hispanic (79.9%) students, but students in both groups were likely to earn more credits than expected when predictions were wrong.

Model accuracy was about 80% among students who received FARMS, special education, or ESOL services. The lower accuracy rates were expected because these groups have more students near the cut point (four credits). Errors in prediction occur when students earn between 3.5 and 4.5 credits.

Discussion

This research brief describes a statistical model that predicts with 90.0% accuracy whether Grade 8 students are likely to earn four or more credits in core courses upon entry to Grade 9. This prediction is significant because students earning fewer than four credits in core courses in Grade 9 are at a risk of failing to meet the criteria required to earn a high school diploma. This model will provide teachers and school counselors with tools to identify the students at risk of failing one or more core courses in Grade 9.

Although the model accuracy rates for most student groups are moderately high by statistical standards, they may be inaccurate for as many as 10% of individuals in a group. These errors occur because the model is not able to account for factors beyond the ones used in this model that also may affect students' academic engagement and performance in Grade 9. Thus, while the model is useful and predictive, actual results will be influenced by factors such as students' and teachers' expectations and the strength of students' Grade 9 instructional programs.

Recommendations

The prediction model is most useful for identifying students who are currently in Grade 8 or incoming Grade 9 students at risk of course failure and select students who can benefit from academic interventions. However, schools should remember that the predicted outcome is only one indicator of Grade 9 performance and that many instructional, motivational, and social influences may interact to influence course credit attainment. Teachers and school counselors who design academic interventions for incoming Grade 9 students should consider all available student information.

The predictions should be used in conjunction with other information to inform decisions about how best to support academic attainment of individual students. Predictions should be interpreted with caution that results are not predetermined and that there is no "one size fits all" answer about how to support students who are predicted to earn four credits in core courses in Grade 9 or not.

OSA should communicate to school staff on deployment of the model and provide training on its use. OSA should conduct periodic cross-validation studies and update the model as needed to ensure that changes in student cohorts, course offerings, instructional practices, and assessments do not reduce the prediction accuracy of the model.

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