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Access to Educational Opportunities for Latino Students in Four Massachusetts School Districts

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EXECUTIVE SUMMARY

Introduction

This report was prompted by the pressing concerns over the high failure rates of Latino students on the Massachusetts Comprehensive Assessment System (MCAS) exam. While 27% of White students failed the English portion of the MCAS test and 38% failed the Mathematics portion in 2000, the corresponding rates for Latino students were 66% and 79% respectively (Massachusetts Department of Education, 2000a). There is a great urgency to understand why Latino students score substantially behind students from other racial/ethnic groups. This urgency stems from the reality that students currently enrolled in the 10th grade will be required to pass this exam in order to receive a high school diploma in 2003.

Enrollment in appropriate, academically challenging courses is one aspect of student preparation to demonstrate skills on a standardized test. Previous studies have suggested that the opportunity to learn, as measured by enrollment in appropriate courses, may be a major contributor to the differences in test scores (Gong, 1999; Wang and Goldschmidt, 1999). For example, Gong (1999) notes:

> The moderately strong correlations between student performance and single questions on the student questionnaire [about which math or science course they were enrolled in] support the view that MCAS is related to specific courses of study. This indicates that MCAS is tapping into what students are studying in their academic courses. More importantly it indicates that coursework is an important determinant in student performance on the Grade 10 MCAS. This will be an essential point as achieving a passing score becomes required for student graduation. Schools are and can be providing students with the opportunities to learn the academic content knowledge and skills assessed by the MCAS. (p. 42)

This study analyzes course enrollment patterns in high school mathematics and science by race/ethnicity in four Massachusetts school districts to investigate whether Latino students are being provided with the educational opportunities crucial to prepare

them for successful performance on the Mathematics and Science and Technology MCAS tests. The data used in the analyses were provided by districts with large and/or rapidly increasing Latino student populations: Boston, Framingham, Springfield, and Worcester.

Methodology

The analyses examined the course enrollment numbers by race/ethnicity for all mathematics and science courses offered in the high schools, as well as total enrollment by grade during the 1999-2000 academic year for all districts except for Framingham, which provided enrollment data for the 1998-99 academic year. Analyses of mathematics and science course enrollments were selected for the following reasons:

- Latino failure rates on the Mathematics and Science and Technology sections of MCAS has been particularly high
- there are clearer standards for which type of mathematics and science content are academically appropriate for each grade level
- course titles of mathematics and science courses typically reflect more accurately course content than course titles for other types of courses
- and enrollment patterns in mathematics and science provide continuity with previous research (Gong, 1999; Upshur et al., 1991; Upshur and Carver, 1991)

From each school district, the data analyzed consisted of total enrollment and the number of students enrolled in each math, and each science course, by grade and by race/ethnicity. For school districts providing enrollment data by course titles, course titles were categorized by grade level, based on an academic-level track for typical math and science courses. The course enrollment numbers for courses were totaled and grouped into three categories: number of students behind grade level, on grade level, or ahead of grade level. The appropriate course for each grade level was determined from previous

research, which represents a normative judgment of the courses typically prescribed to prepare for academic post-secondary education, and matched to the Mathematics Curriculum Frameworks recently published by the Massachusetts Department of Education (Massachusetts Department of Education, 2000b; Upshur et. al. 1991, Upshur and Carver 1991). The courses assumed to be on grade level are in Table 1. Where districts offer an integrated course of study covering more than one of the topics in Table 1, the sequence is considered on grade level for the appropriate year. Thus, a 10^{th} grader in the second year of an integrated math curriculum is 'on grade'; a 9^{th} grader in the same course would be 'ahead'.

Table 1: Math and Science Courses classified as "on grade level"

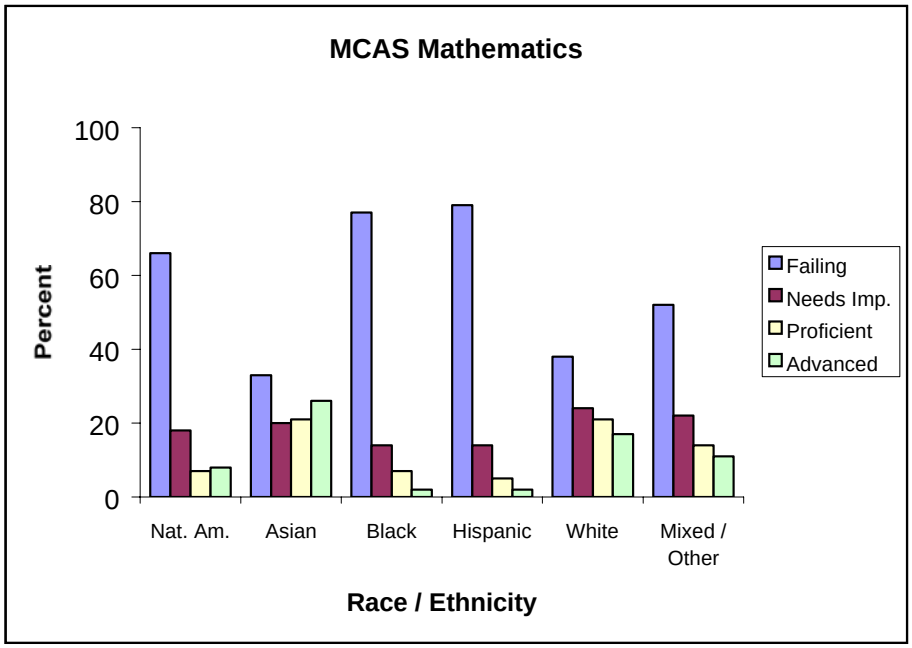
Grade	Math Course	Science Course
9	Algebra 1	Physical Science
10	Geometry	Biology
11	Algebra 2 or Trigonometry	Chemistry, or specialized courses
12	Advanced math through Pre Calculus	Physics, or a second year in any topic

Framingham classifies its math and science courses by level rather than by title: Level One courses are the most advanced, followed by Levels Two and Three. Assignment to Level One through Three courses is not directly comparable to being ahead of, on, or behind grade level, however differences do amount to whether a group is assigned to higher or lower level courses than the reference group. In the Framingham data, we preserve course level assignments and make comparisons based on these directly.

The course enrollment numbers were then compared with the enrollment patterns across race/ethnicity groups for each grade level. Student enrollments of Latino, Black, and Asian students were compared to enrollments of White students as the reference

group. The differences in enrollment patterns were then examined for statistically significant differences by utilizing the Chi-square test.

Figure 1: Spring 2000 MCAS Results
10th Grade



As indicated in Figure 1, the MCAS results by race/ethnic group show a disparaging difference between Latino, Black and Native American students as compared to White students. In 2000 79% of Latino students state-wide failed the 10th grade Mathematics portion as compared to 38% of White students.. In addition, 74% of Latino students failed the 10th grade Science and Technology portion as compared to 30% of White students. The MCAS failure rates for Latino students in the four school districts studied are as follows:

- In Boston, 85% of Latinos failed the Mathematics portion of the MCAS test, and 70% of Latino students failed the test in Science & Technology.

- In Framingham, 78% of Latinos failed the Mathematics portion of the MCAS test, and 73% of Latino students failed the test in Science & Technology.
- In Springfield, 95% of Latinos failed the Mathematics portion of the MCAS test, and 85% of Latino students failed the test in Science & Technology.
- In Worcester, 87% of Latinos failed the Mathematics portion of the MCAS test, and 76% of Latino students failed the test in Science & Technology.

Results

A general pattern emerged upon analyzing the course enrollment data for the four districts examined. In 28 out of 30 grade/district combinations, Latino students were behind White students (as the reference group) at a statistically discernable rate. Being "behind" means that they comparing students across the four categories of not enrolled, behind grade level, on grade level, or ahead of grade level, Latino students were less often enrolled in higher level courses.

- In Boston, Latino students were statistically significantly behind White students in math for all four grades, and in science for grades 9, 10, and 12.
- In Framingham, Latino students were statistically significantly behind White students in math in grades 9 through 11, and in science in all four grades.
- In Springfield, Latino students were statistically significantly behind White students in both math and science in all four grades.
- In Worcester, Latino students were statistically significantly behind White students in math and science in grades 9-11 (enrollments in 12^{th} grade were not available for analysis)

Overall, Latino students were more than 20% less likely than White students to be on or ahead of grade level by the 10^{th} grade in math and science. The results of this study raise concerns about opportunity to learn and student enrollment in courses necessary to

pass MCAS. Tables 2-5 show math and science course enrollments and Figures 2-5 show the overall course enrollments in mathematics for grades 9 through 12 for each school system. These data show a pattern of Latino and Black students not enrolled or enrolled below grade level in math and science.

Table 2. Boston Course Enrollments, Grade 9-12 Math and Science (N and Percent)*

Boston 9-12th		Math				Science				
	Enrolled	None	Behind	On Grade	Ahead	None	Behind	On Grade	Ahead	Electives
Nat. Am	66	2 (3.0)	11 (16.7)	51 (77.3)	6 (9.1)	2 (3.0)	1 (1.5)	52 (78.8)	14 (21.2)	5 (7.6)
Asian	1749	18 (1.0)	179 (10.2)	899 (51.4)	767 (43.9)	33 (1.9)	128 (7.3)	617 (35.3)	928 (53.1)	48 (2.7)
Black	8964	162 (1.8)	2576 (28.7)	5980 (66.7)	694 (7.7)	970 (10.8)	997 (11.1)	4881 (54.5)	1741 (19.4)	375 (4.2)
Hispanic	4163	69 (1.7)	1067 (25.6)	3003 (72.1)	249 (6.0)	409 (9.8)	374 (9.0)	2492 (59.9)	703 (16.9)	185 (4.4)
White	2959	73 (2.5)	469 (15.8)	1423 (48.1)	1075 (36.3)	377 (12.7)	180 (6.1)	1117 (37.7)	1190 (40.2)	95 (3.2)

*Note: totals may not add to 100 percent due to multiple course enrollments by students

Figure 2: Boston Course Enrollments

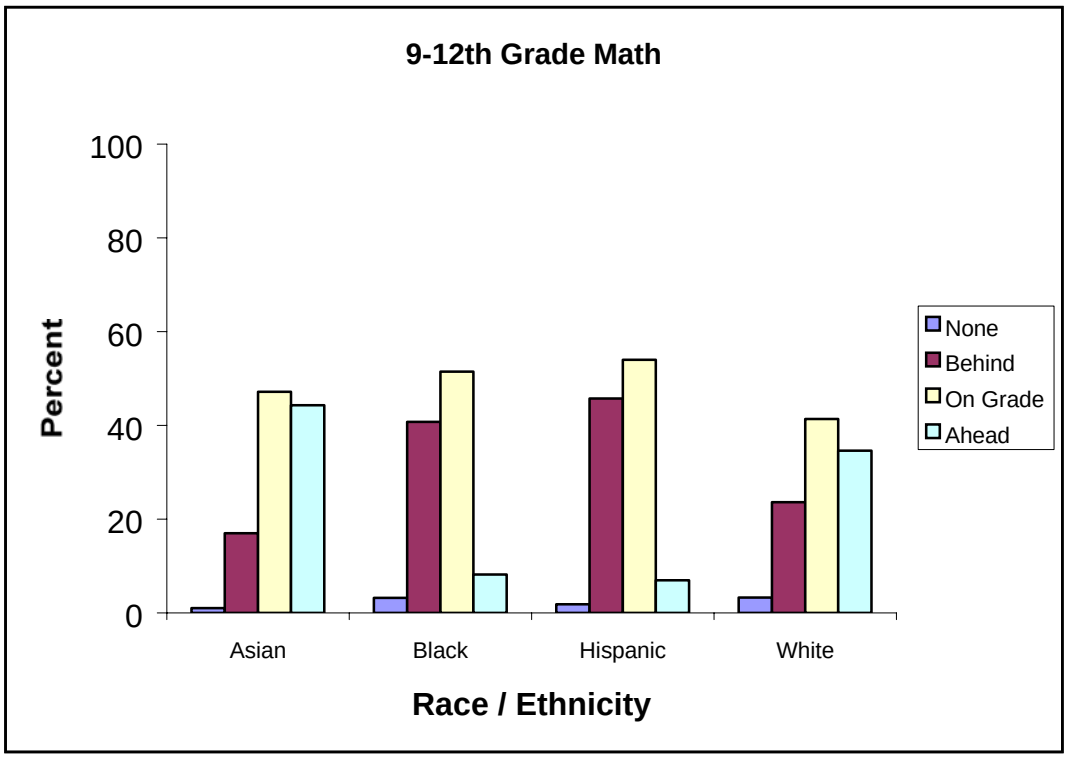


Table 3. Framingham Course Enrollments, Grade 9-12 Math and Science (N and Percent)*

Framingham 9-12th		Math				Science			
	Enrolled	No Level	Level 3	Level 2	Level 1	No Level	Level 3	Level 2	Level 1
Asian	96	1 (1.0)	13 (13.5)	41 (42.7)	45 (46.9)	4 (4.2)	10 (10.4)	46 (47.9)	52 (54.2)
Black	150	3 (2.0)	103 (68.7)	42 (28.0)	9 (6.0)	21 (14.0)	36 (24.0)	81 (54.0)	14 (9.3)
Hispanic	136	32 (23.5)	54 (39.7)	47 (34.6)	3 (2.2)	38 (27.9)	28 (20.6)	58 (42.6)	14 (10.3)
White	1429	201 (14.1)	333 (23.3)	555 (38.8)	340 (23.8)	221 (15.5)	164 (11.5)	615 (43.0)	429 (30.0)

*Note: totals may not add to 100 percent due to multiple course enrollments by students

Figure 3: Framingham Course Enrollments

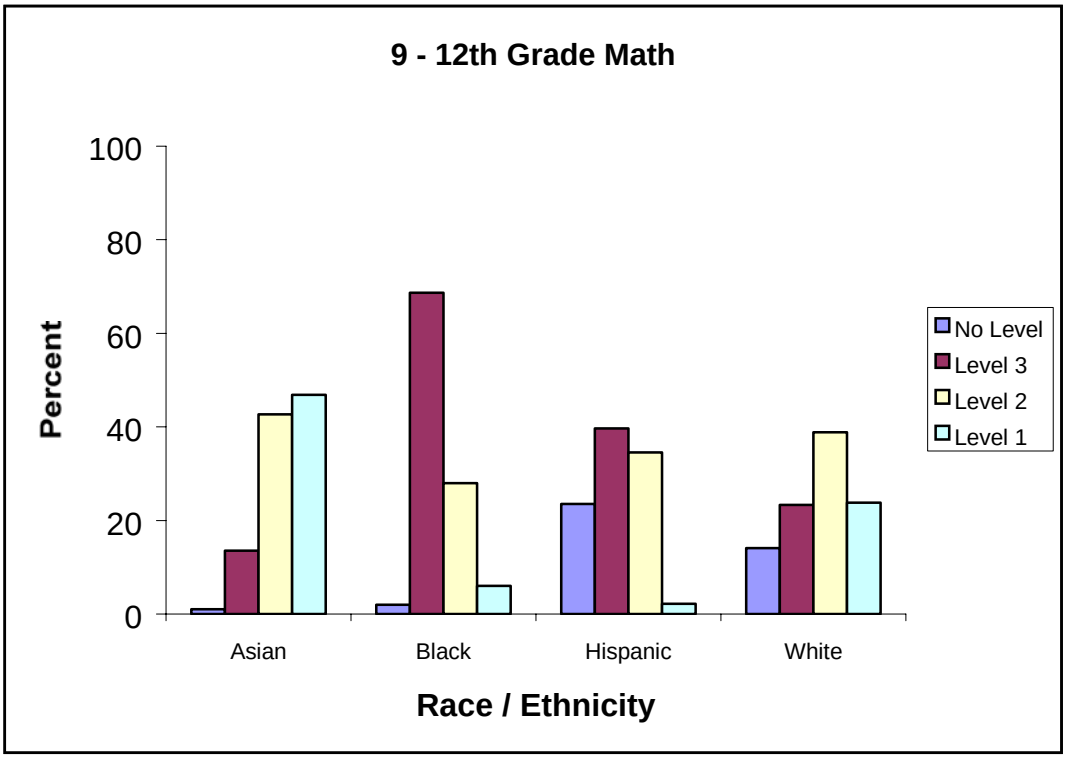


Table 4. Springfield Course Enrollments, Grade 9-12 Math and Science (N and Percent)+

Springfield 9-12th		Math				Science			
	Enrolled	None	Behind	On Grade	Ahead	None	Behind	On Grade	Ahead
Asian	178	13 (7.3)	32 (18.0)	86 (48.3)	70 (39.3)	16 (9.0)	45 (25.3)	154 (86.5)	20 (11.2)
Black	1925	222 (11.5)	669 (34.8)	1076 (55.9)	181 (9.4)	293 (15.2)	528 (27.4)	1334 (69.3)	184 (9.6)
Hispanic	2237	328 (14.7)	904 (40.4)	1144 (51.1)	119 (5.3)	425 (19.0)	842 (37.6)	1355 (60.6)	192 (8.6)
White	1760	178 (10.1)	486 (27.6)	915 (52.0)	371 (21.1)	208 (11.8)	426 (24.2)	1395 (79.3)	229 (13.0)

*Note: totals may not add to 100 percent due to multiple course enrollments by students

Figure 4: Springfield Course Enrollments

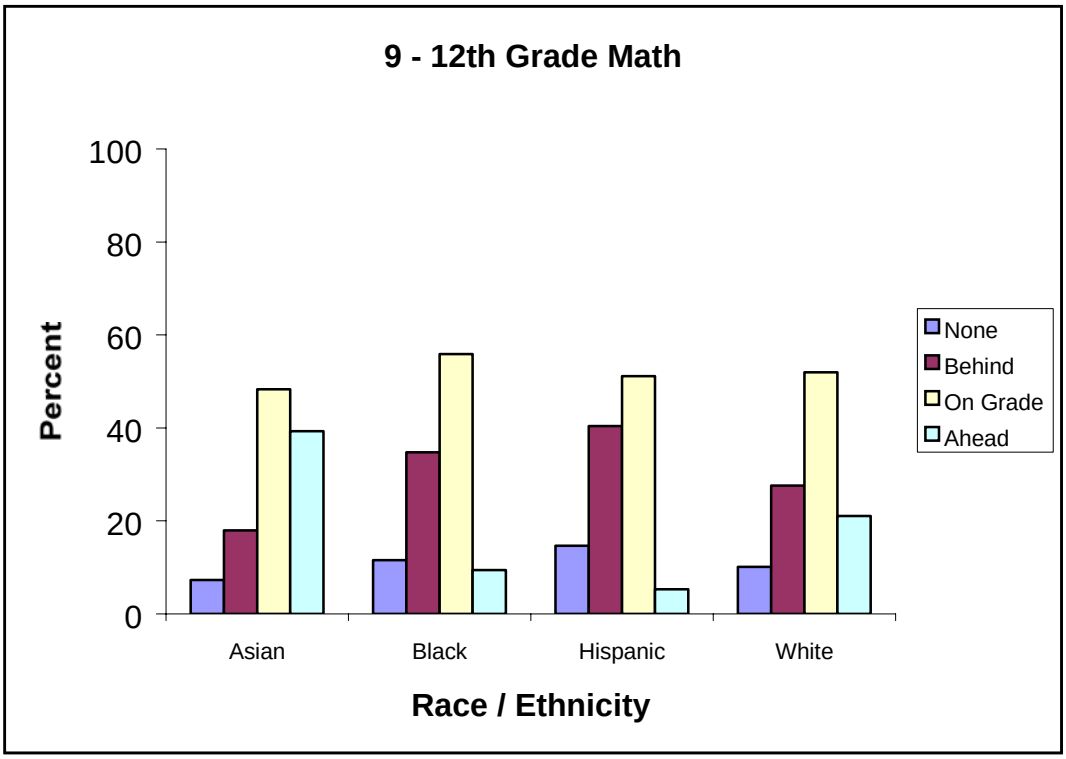
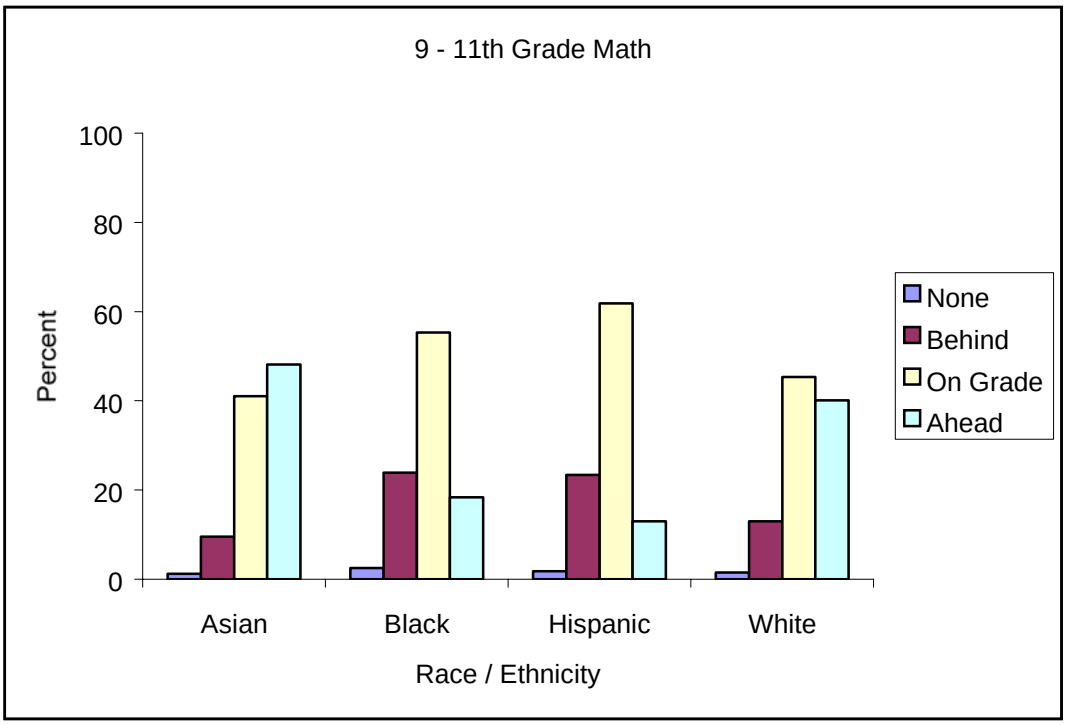


Table 5. Worcester Course Enrollments, Grade 9-11 Math and Science (N and Percent)+

Worcester 9-11th		Math				Science			
	Enrolled	None	Behind	On Grade	Ahead	None	Behind	On Grade	Ahead
Nat. Am.	10	0 (0.0)	1 (10.0)	7 (70.0)	2 (20.0)	0 (0.0)	0 (0.0)	6 (60.0)	4 (40.0)
Asian	324	4 (1.2)	31 (9.6)	133 (41.0)	156 (48.1)	9 (2.8)	15 (4.6)	120 (37.0)	180 (55.6)
Black	436	11 (2.5)	104 (23.9)	241 (55.3)	80 (18.3)	25 (5.7)	59 (13.5)	248 (56.9)	104 (23.9)
Hispanic	899	16 (1.8)	210 (23.4)	556 (61.8)	117 (13.0)	58 (6.5)	171 (19.0)	523 (58.2)	147 (16.4)
White	2161	33 (1.5)	281 (13.0)	980 (45.3)	867 (40.1)	106 (4.9)	228 (10.6)	796 (36.8)	1031 (47.7)

*Note: totals may not add to 100 percent due to multiple course enrollments by students

Figure 5: Worcester Course Enrollments



Policy Implications

The purpose of this study was to determine whether Latino high school students, within the four school districts examined, are being provided with educational opportunities that are necessary to prepare them to successfully take the MCAS Mathematics and Science and Technology examinations. For each school district it appears an appropriate curriculum of math and science courses is available for students to be prepared for the MCAS. But, Latino students are significantly under-enrolled in these courses and therefore are not able to access the skills and learning necessary for their high school graduation. The under-enrollment of Latino students in the on-grade and above-grade level courses in math and science appears to be a systemic problem that begins to impact these students prior to high school. These results raise a strong concern about whether the MCAS examination is appropriate as a standard for high school graduation when, even in our sample of only four districts, students are not enrolled in the courses that are necessary to pass the examination. It is not that the MCAS examination is necessarily too hard, but the inability to pass the exam is an indication of the gap between what students are expected to know and/or the ability to do, and what was provided to them in their courses (Thacker and Hoffman, 1999).

In our analysis of the data provided by each of the cooperating school districts we found that high school math and science course enrollments vary in statistically significant ways by race and ethnicity in almost all grades, demonstrating disadvantageous curriculum access for Latino and Black students in all four systems. Sadly, we do not expect anyone to be surprised by this result. There are several interpretations of this, with interlocking policy implications. The set of courses in which a student is enrolled is an indicator of among other things: his or her opportunity to learn

in high school, his or her preparation prior to high school, and his or her overall experience within the educational system and broader culture.

Recommendations

The recommendations are divided into three sections to provide clear and concise arenas in which to improve the access of Latino students to on-grade and above-grade level courses. This access will provide Latino students with the tools necessary to successfully complete the MCAS examination. It should be acknowledged that many school systems are addressing these issues already. However, comprehensive and sustained efforts across many areas will be needed to address the wide achievement gap for minority students. Based on the results of our study and previous research, the following policy recommendations are provided.

I. In the area of course enrollments reflecting the opportunity to learn, action must be taken to ensure equal participation in rigorous subject matter study, including the following:

   a. Administrators, guidance counselors, teachers, parents and students must develop processes and relationships which will enable Latino students to enroll and complete more rigorous courses (Gong, 1999, Wang and Goldschmidt, 1999). Particularly, counselors and teachers should take an advocacy role in encouraging students to try advanced mathematics courses (Useem, 1990).

   b. Ensure that the courses offered in each school allow all students to enroll in appropriately challenging classes even for students in lower tracks.

   c. Design the curriculum so that even the lowest level courses that are offered in a school district are sufficiently rigorous to ensure that each student who completes them is prepared for success. There should be no courses offered that do not provide the opportunity to learn the minimum

standards required for high school graduation (Dentzer and Wheelock, 1990).

d. Ensure that there continues to be opportunity and incentive for students to go beyond the minimum material required for graduation.

e. Provide improved teacher training and professional development that is linked with incentives to improve the tools available to quality teachers in most of these classrooms (Wang and Goldschmidt 1999, and Dentzer and Wheelock, 1990).

f. Conduct longitudinal studies to trace what happens with the students over the course of their schooling. In addition, qualitative studies need to be conducted to provide clarity on the systemic issues that are affecting access to appropriate courses (Dentzer and Wheelock, 1990; Gong, 1999; Thacker and Hoffman, 1999).

II. In dealing with high school course enrollments as the result of preparation to learn, action must be taken to ensure equitable preparation before students reach high school, including the following:

a. Start early in the school career to prepare students for rigorous subject matter courses. For example ensure that there is prior training leading to subjects which are gateways to college majors. (Useem, 1990)

b. Ensure that all primary schools, but particularly those that serve minority populations, have the resources to prepare students to their full potential.

c. Teachers and parents cooperate in the early grades to get students ready for math and science later on. Address any problems a student has well before high school.

d. Increase Latino participation in proven programs, such as Head Start and other preschool programs and increase access and enrollment in full-day kindergarten classes. In addition, increase participation of Latino students in Upward Bound, Gear Up or other educational programs that provide incentive and additional support to successfully complete high school and

enroll in higher education for students from under represented populations.

e. Alter the advisement process to ensure that students, parents and teachers are provided with adequate and equitable information regarding selection of academic courses early in the middle school years. This will avoid students being tracked into low-level courses before they reach the high school years.

f. Conduct longitudinal studies to trace what happens with the students over the course of their schooling. In addition, qualitative studies need to be conducted to provide clarity on the systemic issues that are affecting access to appropriate courses (Gong, 1999).

III. To address differential course enrollments as an indicator of cultural issues requires broader changes in society. However, actions that can be taken in the educational context include the following:

a. Ensure that the process of placing students into lower and upper tracks is fair (Bates et al., 1992).

b. Reject the notion that minority students are 'not interested' in taking more rigorous courses. Shift the focus from a person-centered approach to a systems approach. This will enable an examination of the processes that facilitate Latino student enrollment in low-level courses (Dentzer and Wheelock, 1990).

c. At all grades and particularly early on, schooling should not be a subtractive process. Value the strengths each student brings to the classroom. Build on Latino children's bicultural experience (Dentzer and Wheelock, 1990; Valenzuela, 1999).

d. Do not lock students into a track that will prevent them from reaching more rigorous courses later in their secondary schooling. Particularly, do not use measures that may be culturally biased to do so (Dentzer and Wheelock, 1999; Wang and Goldschmidt, 1999).

e. Ensure that courses offered within the “cultural track” (ESL) have a honors track thereby erasing the current, automatic horizontal progression from ESL into regular or lower track only (Valdes, 1998, Olsen, 1997 Romo and Falbo, 1996 all in Valenzuela, 1999).

f. Initiate a structure of caring in the classroom that increases connections between teachers and students.

Further studies are encouraged in this area to enrich available data available on minority and Latino student enrollment and on access to science and math courses throughout Grades K - 12. Until enrollment of Latino students in on-grade and above-grade courses increases dramatically this population will not be provided access to the tools necessary to pass the MCAS examination (Gong, 1999). We strongly recommend that the MCAS examination not be utilized as a high school graduation requirement until this systemic problem is addressed across the state.

References

Bates, P. et al. (1992). Beyond tracking. Ann Arbor, MI: University School of Education Programs for Educational Opportunity. ERIC Document Service No. ED 397207).

Dentzer, E and Wheelock A. (1990). Locked In/Locked Out Tracking and Placement Practices in Boston Public Schools. Boston: Massachusetts Advocacy Center.

Gong, B. (1999). Relationships Between Student Performance on the MCAS (Massachusetts Comprehensive Assessment System) and Other Tests--Collaborating District A, Grades 4 and 10. Prepared for the Massachusetts Department of Education. Dover, NH: The National Center for the Improvement of Educational Assessment, Inc.

Massachusetts Department of Education (2000a). Spring 2000 MCAS Tests: Report of State Results.

Massachusetts Department of Education (2000b). Mathematics Curriculum Frameworks.

Thacker, A. and Hoffman, G (1999). Relationship Between MCAS and SAT-9 For One District In Massachusetts. Radcliff, Kentucky: Human Resources Organization.

Upshur, C., Freitas, R., Ahern, S., Benton, R., Carver, I., Feldman, V., Fleisher, B., Garneau, R., Gimeno, A., Imbert, P., Lugardo, M., Murphy, L., and Sutherland, K. (1991). Analysis of math enrollments in Boston public high schools: effects of differential access and tracking. Boston: College of Public and Community Service, University of Massachusetts Boston.

Upshur, C. & Carver, I. (1991). Analysis of science course enrollments in Boston public high schools 1990 - 1991 school year. Boston: College of Public and Community Service, University of Massachusetts Boston.

Useem, E. L. (1990). You're good, but you're not good enough: Tracking students out of advanced mathematics. *American Educator*, 14 (3), 24-27, 43-46.

Valenzuela, A. (1999). Subtractive Schooling: US Mexican Youth and the Politics of Caring. New York: State University of New York Press.

Wang, J & Goldschmidt, P (1999). Opportunity to learn, language proficiency, and immigrant status effects on mathematics achievement." *The Journal of Educational Research*, v93 i2 (Nov) p101.