Evaluation Brief

September 2008 Program Evaluation Unit

Impact of the Math Content Coach on Student Achievement in Title I Schools

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Executive Summary

The primary goal of Title I schoolwide programs is to provide effective instruction to enable students in schools highly impacted by poverty to achieve high standards. Beginning with the 2002–2003 school year, math content coaches (MCCs) were placed in the federally funded Title I and other high-needs schools to support implementation of Montgomery County Public Schools' (MCPS) standards-based mathematics curriculum, including the use of formative assessments.

The purpose of this evaluation is to examine effects of MCCs on students' achievement and the provision of a rigorous mathematics program in Title I schools. To accomplish this, statistical analyses were used to estimate significant effects of MCCs on student outcomes. The performance of students in Title I schools was compared with a sample of students in non-Title I schools.

Within Grade 2 and student subgroups, after controlling for demographic characteristics, the analyses showed that 2006 and 2007 *TerraNova* Second Edition (TN/2) mathematics and mathematics computation scores of students from Title I schools were comparable with or significantly higher than scores for students in comparison schools. These differences were large enough to be educationally meaningful, suggesting the initiative had the desired result.

Within grade levels, the Maryland School Assessment (MSA) proficiency rates for students from Title I schools and comparison schools were comparable. In addition within grade levels, the mean MSA scores for students in Title I schools were significantly higher than in comparison schools. Overall, as well as for most subgroups, these differences in MSA scores between Title I and comparison schools were statistically significant and large enough to be educationally meaningful, indicating the MCC initiative had the desired impact. Further, the effect of having MCCs increased over time, with the greatest benefits being evident in 2007.

Because MCPS mathematics end-of-unit (EOU) assessments are formative and are not administered under standardized conditions, the results were not used in a summative way to estimate the effects of MCCs on student outcomes. In this study, EOU scores are presented primarily for the purpose of informing instructional decisions. Notably, 20–30% of the students in Title I schools were taking above-grade-level courses. For Math 1 through Math 6, the EOU proficiency rates for students in Title I schools increased from 2006 to 2007. However, less than one half of Title I students attained proficiency in Math 3 to 5. Even among Grades 3–5 students who did not achieve proficiency in the accelerated mathematics course, a large proportion were at or above proficiency on the MSA at their respective grade level. Proficiency rates in Math 6 were very high in Title I schools. Gaps in proficiency rates among student subgroups widened with each successive mathematics course in Title I schools as well as comparison schools.

Completion of accelerated mathematics instruction was used as evidence of a rigorous mathematics program in Title I schools. At each grade level, there was a marked increase in the number and proportion of students in Title I and comparison schools completing accelerated mathematics instruction from 2005 to 2007. Also, 2007 data showed that nearly all students in above-grade-level courses placed above the national average on the TN/2 or were at or above proficiency on the MSA at their respective grade level.

Based on the findings, recommendations for increasing student achievement in mathematics include:

Math content coaches

- Focus instruction for students on the attainment of course-level content to ensure students consistently demonstrate the necessary skills to enable them to benefit from accelerated instruction and differentiation.
- Plan with a strong emphasis on vertical articulation and whole school focus—sequential continuity of skill building from one mathematics course to the next.
- Continue to systematically ensure that schools provide opportunities for rigor and acceleration in all grades, particularly in K–2, to eliminate risks of gaps increasing in successive grades.
- Develop action plans for decreasing achievement gaps within each school.

- Enhance teacher efficacy to teach challenging mathematics content, work with diverse populations, and provide targeted academic support.
- Ensure mathematics-course assignment and EOU assessment data are consistently and accurately entered into the Instructional Management System (IMS) databases.

Systemwide
- Consider a review of the nature, accuracy, and completeness of the mathematics program and mathematics assessment information available in MCPS databases.
- Examine the impact of student mobility on the proportion of the curriculum completed and subsequent student proficiency levels at each mathematics level.

Background

MCCs support the school staff with curriculum implementation, assessment of student performance, and provide job-embedded professional development in mathematics content knowledge and teaching strategies (MCPS, 2007). Although the MCCs have specified roles, this evaluation recognized that initiatives in Title I schools are designed to work together, rather than separately, to ensure all students improve their mathematical proficiency (Appendix A).

The logic model in Appendix A specifies the indicators for expected short- and long-term outcomes of the MCC initiative (see Appendix A). The expectation is that having an MCC in a school will improve student achievement in mathematics, increase enrollment in accelerated and enriched classes in elementary grades, and increase rates of Algebra 1 completion by Grade 8. For this evaluation, evidence of successful impact of MCC initiative is comparable performance of students in Title I schools with that of students in comparison schools. Earlier evaluation briefs reported findings on the implementation of the MCC initiative (Maina 2006, 2007).

Evaluation Questions

The following questions are addressed:

1. How well are students in Title I schools performing in mathematics compared with students in comparison schools?
2. Is there an increase in the proportion of students from Title I schools a) enrolled in accelerated mathematics courses; b) enrolling in and successfully completing Math 6 in Grade 5?

Methodology

Study sample. Students enrolled in Title I schools from 2004–2005 through 2006–2007 were included in the analyses. A two-step cluster sampling procedure was used to identify a comparison sample of 21 non-Title I schools based on the percentage of students receiving Free and Reduced-price Meals System (FARMS) services among other variables (see Appendix B for detailed discussion of Method). Although the comparison schools are different from Title I schools in more ways than merely the absence of MCCs, they can provide a useful gauge for estimating added effects of MCCs above and beyond the effect of traditional school reforms expected in all MCPS schools.

Outcome measures. Measures of student achievement in mathematics were the 2005, 2006, and 2007 Grades 1–5 MCPS Assessment Program EOU mathematics scores (Appendix C); 2006 and 2007 Grade 2 TN/2; and 2005, 2006, and 2007 Grades 3–5 MSA scores.

Data analysis procedures. Due to lack of random assignment, quasi-experimental design was employed to compare outcomes among students in Title I schools with students in comparison schools. Descriptive analyses and, where appropriate, analyses of covariance (ANCOVA) and effect sizes were used to estimate the effect of MCCs on student outcomes. All achievement measures were analyzed separately for each grade level because available measures of mathematics achievement do not have psychometric properties that explicitly measure development or learning across years.

Detailed Findings

Evaluation findings are organized by evaluation question.

How well are students in Title I schools performing in mathematics compared with students from comparison schools?

Findings are organized by assessment measure. Also, for each measure, the following subquestions are addressed:

a. Does performance vary by English for Speakers of Other Languages (ESOL), FARMS, special education, and all racial subgroups?
b. Has the performance gap between students in Title I and comparison schools decreased since the implementation of the MCC positions?

Grade 2 TN/2 Assessments

Grade 2 TN/2 50th National Curve Equivalent (NCE). The proportions of students at or above the 50th NCE on the mathematics subtest from Title I schools and comparison schools in 2006 (51% vs. 53%) and 2006 and 2007 mathematics computation (65% vs. 63%; 57% vs. 58%) were comparable (Table 1).

Bivariate analyses indicated that the proportion of students at or above the 50th NCE on the 2007

mathematics subtest was significantly higher in comparison schools (49%) than in Title I schools (44%, $p<0.05$).

Table 1
Proportion at the 50th NCE on TN/2 for Mathematics and Math Computation School Group

Subtest/Year	Title I *N*	Title I %	Comp. *N*	Comp. %	All MCPS %
Mathematics					
2006	735	51.3	940	53.3	67.0
2007	793	44.0	925	49.3	73.0
Computation					
2006	935	65.3	1114	63.3	72.0
2007	965	56.7	1085	57.7	67.3

Comp. = Comparison schools.

Grade 2 TN/2 50th NCE by subgroups. This evaluation also examined whether all student subgroups in Title I schools experienced similar benefits on TN/2 assessments.

In 2006 and 2007, descriptive analyses showed that students in African American, Hispanic, ESOL, and FARMS subgroups in Title I schools performed better than their counterparts in comparison schools on the mathematics subtest (See Appendix D, Table D1).

Similarly, the rates for 2007 showed that FARMS, White, and Hispanic students from Title I schools performed better on the mathematics subtest than their counterparts in comparison schools. Also, within the district, about one third of the students who received ESOL services and less than one half of the students who received FARMS services placed at or above the 50th NCE in mathematics in 2006 or 2007 (Zhao & Von Secker, 2007). In addition, by definition, only half of students typically place at or above the 50th NCE on mathematics computation. As such, in 2006, the performance of student subgroups from Title I schools was better than respective student subgroups in the district.

Even with the overall gains observed, there are still sizeable gaps in mathematics achievement among the student subgroups within the Title I schools and between Title I schools and MCPS averages.

Grade 2 TN/2 scale scores. While controlling for average attendance and demographics, Grade 2 students in Title I schools demonstrated statistically significantly higher adjusted mean TN/2 mathematics subtest scores in 2006 and 2007 as compared with students in comparison schools (Table 2). Also, the observed differences were large enough to be meaningful, suggesting that the MCC initiative had its desired effect in Grade 2. Moderate effect sizes were found for the differences in performance between Title I school and comparison schools on the 2006 and 2007 TN/2 mathematics scores (d=0.33; d=0.34). As such, the average score for a student in Title I schools would be higher than the score for 70% of students in comparison schools. Also, significant differences in adjusted mathematics computation scores were found in favor of Title I schools in 2007 but not 2006. A small but meaningful difference between the two groups was observed only for the 2006 mathematics computation scores (d=0.19). In other words, the average student in Title I schools performed better than 58% of the students in comparison schools.

Table 2
TN/2 for Mathematics and Mathematics Computation Adjusted Mean Scale Scores, by Year [a] and School Group

Year	Measure	Title I Adjusted mean	Comp. adjusted mean	Effect Sizes
2006	Mathematics	559.1	544.0	0.33*
	Computation	547.2	536.9	0.19
2007	Mathematics	560.4	546.4	0.34*
	Computation	547.4	541.8	0.12*

*p<0.05; Comp. = Comparison schools.

TN/2 scale scores by subgroup. For each subgroup, the ANCOVA revealed that adjusted 2007 mathematics computation subtest scores for students in Title I schools were comparable with or better than scores of students in comparison schools (See Appendix D, Tables D2–D3). Sizeable effects were found only in 2007 mathematics subtest scores for students receiving special education services (d=0.34) and Asian American students (d=0.21). In 2006, sizeable effects were found for FARMS (d=0.26) and White students (d=0.26).

Maryland School Assessments

MSA proficiency rates. Overall, two thirds or more of the students from the Title I and comparison schools were at or above proficiency on the 2005 to 2007 MSA mathematics tests (Table 3).

Table 3
MSA Proficiency Rates by School Group and Grade Level

Grade	Title I *N*	Title I %	Comparison *N*	Comparison %	All MCPS[a] %
Year 2005					
3	948	75.2	1377	76.2	66.7
4	922	78.8	1458	78.1	84.5
5	772	65.8	1286	70.0	78.5
Year 2006					
3	1037	76.4	1362	77.6	64.5
4	1035	78.1	1490	80.3	86.6
5	965	73.1	1380	71.9	80.8
Year 2007					
3	1025	75.9	1271	73.1	67.9
4	1101	81.1	1474	83.4	88.6
5	1085	77.0	1431	76.1	85.1

[a] 2007 Marylandreportcard.org

A follow up bivariate analysis found that the proportion of students from Title I schools who were at or above proficiency were not significantly different from the proportions from comparison schools (p>0.05).

Although the gap in performance is steadily narrowing, the proficiency rates for students in Title I and comparison schools each year were lower than MCPS averages.

MSA proficiency by subgroup. Comparing across grades, descriptive analyses revealed that the subgroups of students in Title I schools performed as well as or better than their counterparts in comparison schools, with a few exceptions (see Appendix E, Tables E1–E3).

MSA scale scores. From 2005 to 2007, the adjusted mean mathematics scale scores for students in Title I schools were significantly higher than scores for comparison students, with the exception of 2006 Grade 5 and 2007 Grade 4 students (Table 4). The differences in MSA scores were large enough to be practically significant, suggesting that MCCs and other Title I interventions had the desired effect of improving student performance in mathematics.

Table 4
Association Between Adjusted MSA Mathematics Scale Score and School Group, by Year and Grade Level

		Title I	Comparison		
Year	Grade	Adjusted Mean scale score	Adjusted Mean scale score	Mean Diff	ES
2005					
	3*	407.7	403.0	4.7	0.11
	4*	398.2	386.0	12.2	0.33
	5*	404.6	398.8	5.8	0.15
2006					
	3*	409.5	401.3	8.2	0.30
	4*	399.8	393.0	6.8	0.25
	5	398.2	393.0	5.2	0.18
2007					
	3*	408.0	401.9	6.1	0.21
	4	415.0	410.6	4.4	0.16
	5*	422.4	416.7	6.7	0.27

Note. ES = Effect size. Cut-off score for proficiency is 388. *p<0.05

With the exception of 2005 Grade 3 students, effect sizes were at or greater than d=0.15, which is the average program effect as described in literature for schoolwide and Title I programs (Mason, 2005; Borman et al., 2002).

MSA scores by subgroup. On average, the students from Title I schools earned significantly higher MSA scores than the majority of their subgroup counterparts in comparison schools (see Appendix E, Tables E4–E6). Positive effect sizes greater than d=0.15 showed that the differences were educationally meaningful, with the average students in Title I schools performing better than 58% of the students in comparison schools. These findings suggest that MCCs had an overall academic benefit on Grades 3, 4, and 5 MSA scores, with greater benefits generally evident in 2007.

The steady increase in effect sizes from 2005 to 2007 signified general improvements in the performance of students in Title I schools relative to comparison schools over time (see Appendix E, Tables E4–E6). The overall as well as subgroup effect sizes for 2005 were negligible, indicating comparable performance between Title I and comparison schools. Therefore, one could surmise that support from MCCs yielded larger achievement gains with each year of implementation.

MCPS Assessment Program Mathematics Scores

Notably, 20–30% of students in Title I schools were taking above-grade-level courses. Across courses, the descriptive analyses of the total scores attained on mathematics EOU assessments indicate there is room for improving the rates at which students in Title I schools attain proficiency at each mathematics level (see Appendix F, Figures F1 and F2). Overall, for each mathematics course, EOU proficiency rates for students in Title I schools improved from 2006 to 2007. While three-fifths of the students in Title I schools were proficient in Math 1 and 2, less than one half of the students in Title I schools were proficient in Math 3 through Math 5. Because some students in Grades 3 and 4 were performing acceptably in these higher-level mathematics classes, this finding suggests that enrichment and acceleration may be warranted even sooner, with increased differentiated instruction to balance the needs for all students. The results also indicated that students taking Math 6 in Grade 5 attained proficiency on the EOU assessments at very high rates (81%).

Only descriptive analyses were conducted to examine MCPS mathematics EOU assessments. This approach was used for a variety of reasons. First, these tests are formative and not administered under uniform procedures. Second, the scores are used to monitor student learning by providing continuous feedback to the student and teacher. Third, students are allowed to retake the tests and the results on record are based on the most current scores. Finally, the absence of a pretest measure limits the interpretation about students' progress in the course and across schools. For these reasons, in this study, advanced statistical procedures and statistical controls were not applied to EOU scores.

The observed drop in end-of-unit proficiency rates and widening achievement gaps among subgroups with each successive mathematics course level are surprising for several reasons (see Appendix F, Tables F1–F2). First, the unit assessments are formative assessments. Indeed, compliance with Board of Education Policy IKA, *Grading and Reporting*, calls for opportunities to reteach and reassess students for mastery of content. Second, a

2007 implementation study revealed a) an increase in the number of formative assessments given by teachers, b) their use of these data to adjust instruction, and c) increased use of differentiated instruction to address achievement gaps among the subgroups (Maina, 2007).

Is there an increase in the proportion of students from Title I schools a) enrolled in accelerated mathematics courses, b) enrolling in Math 6, and c) completing Math A/6?

Enrollment in and Completion of Above-grade-level Mathematics Course by Grade Level

Acceleration in Grades K–2. Since placing MCCs in Title I schools, there is evidence of increased enrollment in accelerated and enriched instruction occurring in Grades 1 and 2 (Figures 1 and 2). By 2007, differences in enrollment between Title I and comparison schools were noticeable in Grade 2.

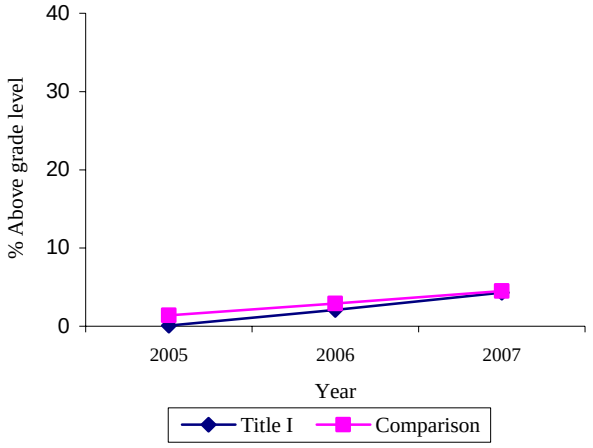

Figure 1. Percentage in accelerated mathematics (Grade 1).

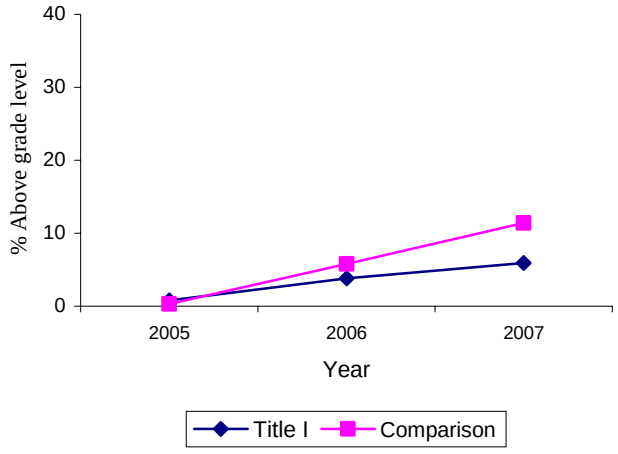

Figure 2. Percentage in accelerated mathematics (Grade 2).

Grades 3–5. Across grade levels, the rates of enrollment of Grade 3–5 students in accelerated mathematics courses improved each year in Title I and comparison schools (Figures 3–5).

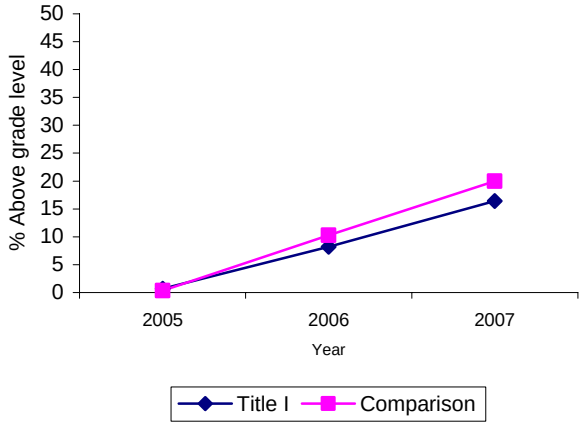

Figure 3. Percentage in accelerated mathematics (Grade 3).

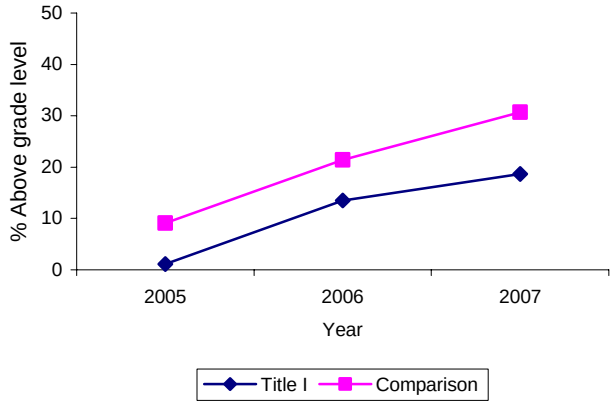

Figure 4 Percentage in accelerated mathematics (Grade 4).

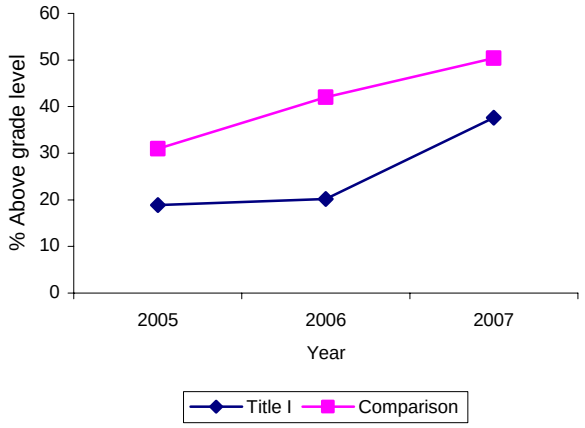

Figure 5. Percentage in accelerated mathematics (Grade 5).

However, differences in enrollment in accelerated courses were persistent; with the greatest gaps observed in 2007 for Grade 5 students (37.6% Title I and 50.4% comparison school students were enrolled in above-grade-

level courses). Details on enrollment by course levels are presented in Appendix G, Figures G1–G3.

Acceleration and performance on TN/2 and MSA. Data from 2007 show that nearly all students (>90%) from Title I and comparison schools taking above-grade-level mathematics courses placed at or above the 50th NCE on the Grade 2 TN/2 (see Appendix G, Tables G1–G3). Similarly, at every grade level, nearly all students taking above-grade-level mathematics were proficient or above on the mathematics MSA.

Conclusions

The purpose of this evaluation was to examine effects of MCCs on the students' achievement and provision of a rigorous mathematics program in Title I schools. Below are the findings that emerged with greatest consistency:

1. Across schools, grade levels, and student subgroups, analyses of covariance revealed that the adjusted TN/2 and MSA mathematics scores of students from Title I schools were comparable with or significantly higher than scores for students in comparison schools. For the TN/2 mathematics subtest and MSA, the differences were large enough to be meaningful in an educational setting.
2. Overall, the performance of subgroups from Title I schools was better on TN/2 mathematics and on MSA scale scores than those of their counterparts in comparison schools. Thus, students from every subgroup appear to derive benefits from having MCCs in their schools. On the other hand, some achievement gaps on the TN/2 and MSA persist among student subgroups in both groups of schools as well as within MCPS.
3. EOUs are the primary means of monitoring performance during the school year. These assessments are formative, However, missing or incomplete data provided some evidence that course content was not always covered in its entirety.
4. Diminishing proficiency rates in Math 4 and Math 5 suggest students may have missed instructional content in the courses, had inadequate prerequisite skills to be successful in higher-level mathematics courses, or had inadequate time to master the content. Higher than average mobility rates may also be a factor in student proficiency. Therefore, it is critical that careful attention be given to vertical articulation, accurate gauging of students' preparation and readiness to undertake increasingly challenging mathematics, and teachers' efficacy to provide interventions to students entering with limited understanding of mathematics be enhanced.
5. At each grade level, the number and proportion of students enrolled in above-grade-level courses increased steadily from 2005 to 2007. The steady increase in accelerated mathematics instruction indicated that rigorous mathematics courses were being provided to students in Title I schools. However, enrollment gaps in above-grade-level courses persist between Title I and comparison schools. Notably, by 2007, the rates of acceleration for Grade 1 students in Title I schools were on par with rates of Grade 1 students in comparison schools. This may be a sign of eventual success in closing the gap observed in earlier years for this grade level and subsequent cohorts.
6. Nearly all (>90%) students in accelerated mathematics courses scored at or above proficient levels on the MSA and at or above the 50th NCE on the Grade 2 TN/2. Even in cases in which the students did not achieve proficiency in the accelerated mathematics course, the increased rigor and acceleration contributed to proficiency on the MSA and TN/2.

Recommendations

Based on the findings and review of related literature, recommendations for increasing student achievement in mathematics include:

Focus instruction for students on the attainment of course-level content to ensure students consistently demonstrate the necessary skills to enable them to benefit from accelerated instruction and differentiation. The degree to which mathematics content and curricula are covered and the alignment of content with standards are critical to student achievement (USDE, 2008). As such, appropriate pacing of mathematics instruction as well as emphasis on reteaching and reassessment for mastery would contribute to a more effective instructional program. Instruction for attainment of course-level content is especially important because mathematics achievement is more dependent on in-school instruction than is reading (Corey, 2004).

Examine vertical articulation as it relates to acceleration pathways. When the increase in accelerated instruction spiked in Grades 3 through 5, there was a corresponding decrease in EOU assessment proficiency rates for students in Math 3 to Math 5 among Title I students overall, as well as for ESOL, FARMS, Hispanic, and African American subgroups. Reports from classroom teachers and MCCs indicate that students often lack basic skills when they move to the next level of mathematics courses (Maina, 2006, 2007).

These findings indicate a need for a) clearly articulated plans for sequential continuity in skill building from one mathematics level to the next; b) diagnostic tools to accurately judge the students' mathematical proficiency and readiness to undertake accelerated mathematics instruction; c) differentiated instruction to raise the achievement of students enrolled in accelerated courses in which students begin with different levels of prior instruction; d) attention to vertical articulation whereby

front loading, increased rigor, and acceleration start prior to Grade 3 (MCPS 2008); and e) cross-grade-level team meetings to clarify required skills and expected level of performance from one mathematics course to the next and foundational knowledge upon which the next grade level builds.

Continue enrichment and acceleration for students. Nearly all students taking above-grade-level mathematics placed at or above the 50th NCE on TN/2 or were at or above proficiency on MSA. A priority should be to ensure that students enrolled in above-grade-level mathematics also have met the proficiency requirements for the course corresponding to their current grade level. Proficiency can be confirmed through the addition of a marker to the end-of-unit assessment data on the IMS, to indicate that students have met current grade-level standards on unit assessments.

Develop action plans for decreasing within school achievement gaps in Title I schools. The findings related to performance of the subgroups suggest a need for professional development in two areas: presentation of challenging mathematics content to all students, and improving teachers' skills in working with students from diverse backgrounds. Because the subgroups that historically underachieve in MCPS are disproportionately represented in Title I schools, persistent achievement gaps counteract the goal of increasing the proportions of students from Title I schools who complete Algebra 1 by Grade 8. If the performance of these students is not addressed early on, fewer students from these subgroups will complete algebra by Grade 8. Suggestions include a) improving coordination of mathematics instruction and other services for students receiving special services to ensure that those students have access to the entire content of a mathematics course; b) providing a variety of structured mathematics interventions as needed; c) reviewing policies and practices for placing students with teachers; and d) increasing teachers' mathematics content knowledge and their ability to deliver content in a variety of ways. Attention to such practices would ensure that students from historically underachieving subgroups are not being systematically assigned to less effective teachers (USDE, 2008; Sanders & Rivers, 1996).

Increase professional development experiences that target mathematics instruction for ELLs. Students' level of English proficiency affects their ability to understand procedural direction given by the teachers and their ability to communicate mathematical concepts (Miller & Province, 2005). The average proportion of ELLs in Title I schools is 40%. In addition to Title I schools housing a disproportionate number of ESOL students, 70% of current MCPS ESOL students are primarily from kindergarten to Grade 2. At the same time, there is an expressed need for more training related to strategies for working with ELLs in mathematics (Maina, 2006, 2007). Fulfillment of this need would enhance teachers' ability to modify instruction so as to facilitate the understanding of mathematics by ELLs and prevent English proficiency from interfering with acquiring mathematics skills and reasoning.

Examine the completeness, reliability, and usefulness of mathematics program information in MCPS databases. A critical factor influencing the quality of instruction and student achievement is the nature, accuracy, and completeness of the mathematics program information and mathematics assessment information available. As such, determining growth in mathematical proficiency requires the following: a) measures strongly aligned with the curriculum; b) scales that are vertically articulated; and c) a dynamic longitudinal database. In particular, improving the quality and completeness of mathematics instructional program data on IMS is needed.

Examine the impact of student mobility on the proportion of the curriculum completed and consequent student proficiency levels at each mathematics level. Data show that MCPS Title I schools have much higher student mobility rates than non-Title I schools.

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Impact of the Math Content Coach on Student Achievement in Title I Schools

Appendixes

Appendix A: Math Content Coach Postion Description and Program Logic Model

Description of Math Content Coach Positions

The math content coach position is specifically focused on strengthening and extending the school system's existing priority on the development and implementation of a rigorous mathematics curriculum for all students. Math content coaches are experienced teachers with demonstrated expertise in mathematics curriculum, assessment, and instruction. They provide direct teacher support to ensure consistent and high quality mathematics instruction and improve mathematics achievement in Title I schools.

The mathematics instructional guides provide teachers with sample lesson plans and assessments. The task of developing daily lesson plans and the accompanying formative assessments is the classroom teachers' responsibility. Given the added challenge of the revised curriculum, the expectation that teachers develop, administer, and interpret formative assessments; and the large number of inexperienced teachers in Montgomery County Public Schools, especially in Title I schools, direct classroom content/curricular supports are essential.

Research demonstrates that the interaction between teachers, students, and content is essential to improve teaching and learning.

The specific functions of the math content coach are as follows:

- work with the school staff in defining and evaluating mathematics instructional goals to ensure consistency with county mathematics program.
- work closely with staff in planning a schoolwide instructional program that provides consistency, continuity, and varied approaches to curriculum implementation appropriate for the strengths and needs of students.
- facilitate vertical articulation to ensure consistent program implementation across grade levels and with the middle school.
- lead grade level team planning groups to improve consistency and effectiveness of instruction.
- work with teachers in implementing an effective mathematics program by modeling lessons and peer coaching.
- work with teachers to use assessments and student work to inform instruction.
- examine student work and data to monitor mathematics program implementation.
- collaborate with the staff development teacher and team leaders to provide job-embedded professional development opportunities to improve teacher understanding of mathematics and how students learn mathematics.
- participate in professional development experiences to enhance their understanding of effective mathematics instruction and to facilitate effective program implementation at their schools.

Math Content Coach Initiative Logic Model

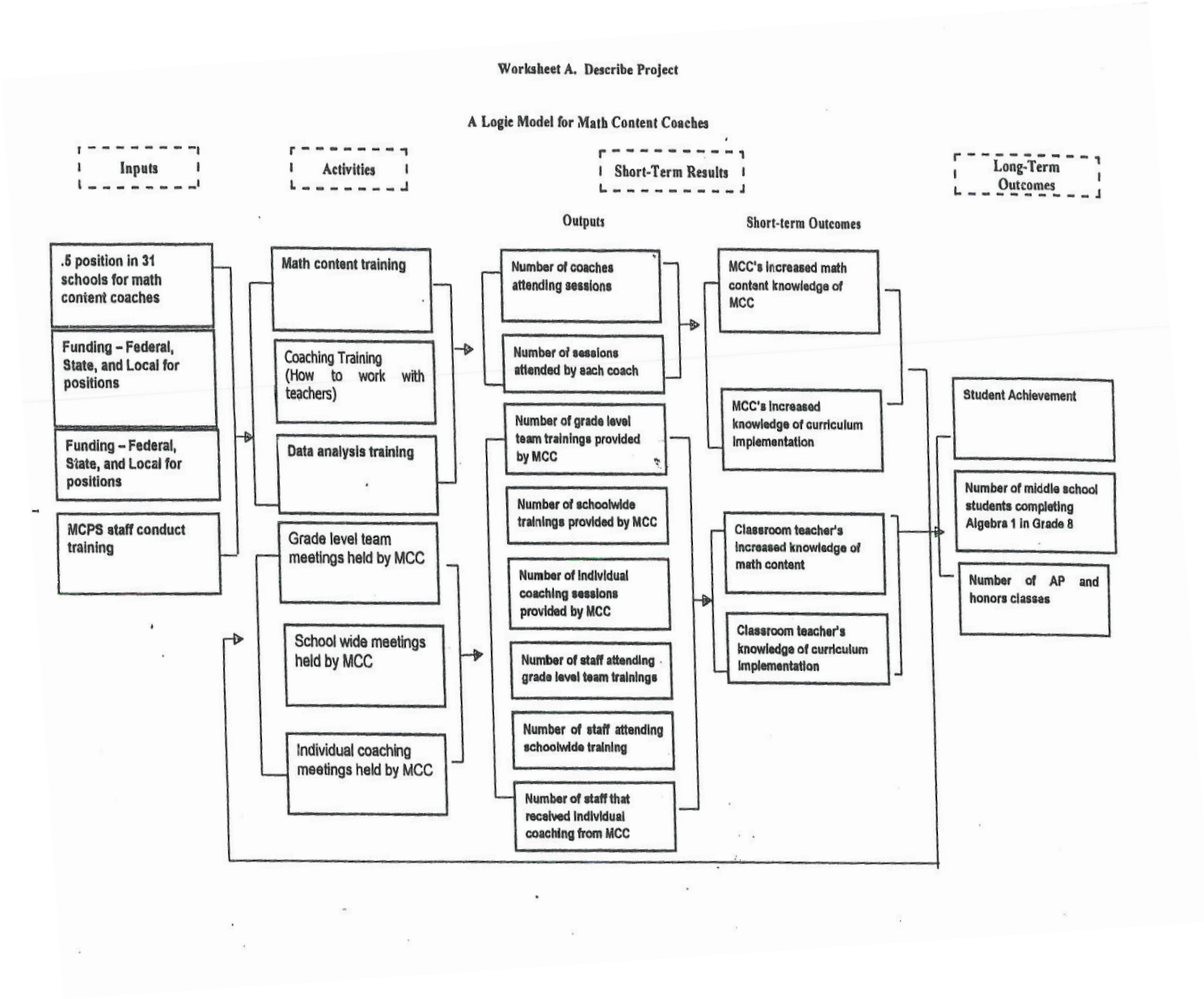

Figure A1. A logic model for math content coaches developed by the Division of Academic Support, Federal and State Programs (DASFSP), the Office of Organizational Development, the Office of Shared Accountability, and the Office of Curriculum and Instructional Programs.

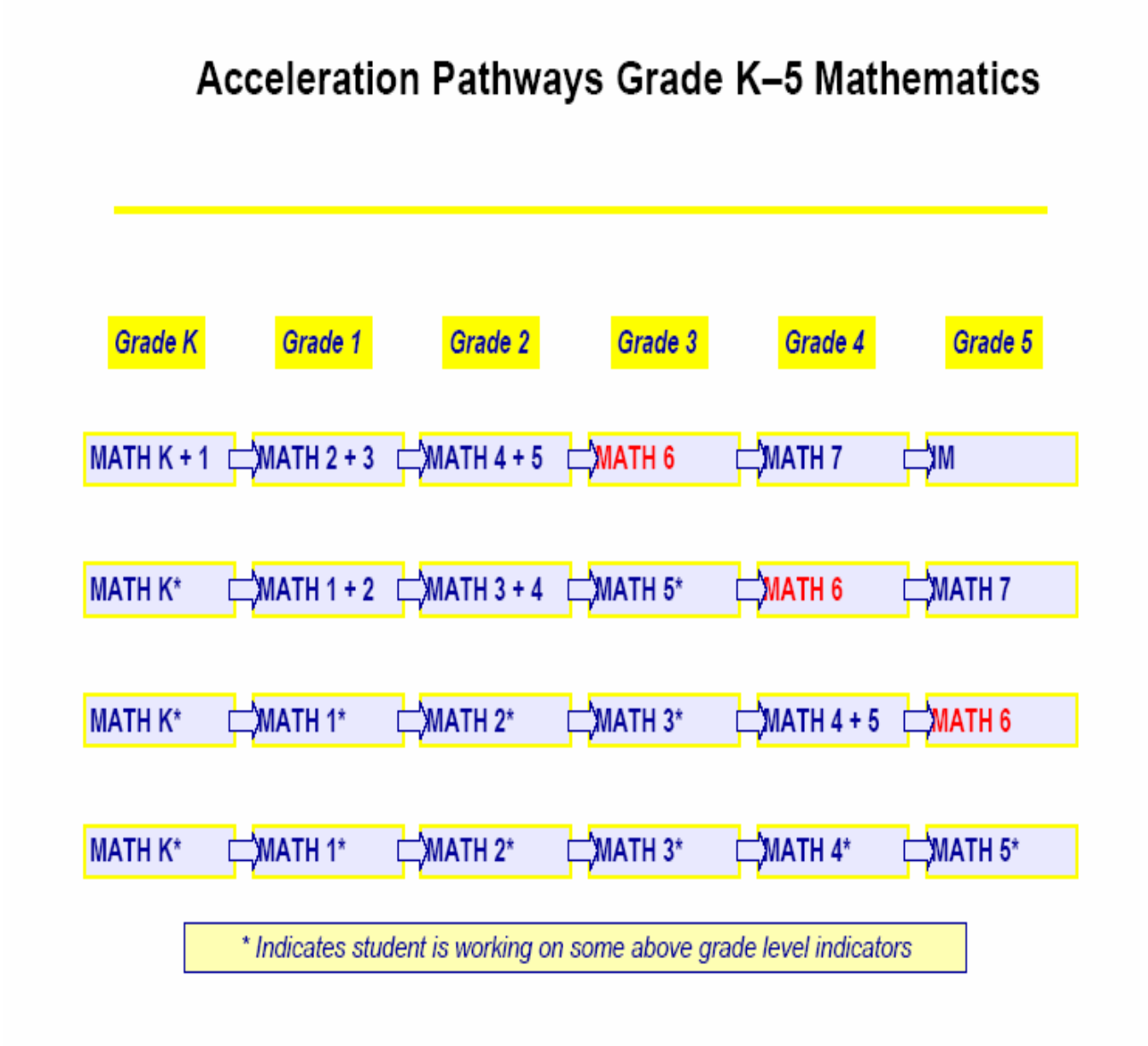

Figure A2. Acceleration Pathways K–5 Mathematics. *Source*: MCPS Mathematics program; MCPS (2008). *Pathways to Success 2008–2009.* Rockville, MD: Montgomery County Public Schools.

Appendix B: Detailed Methodology

Methodology

Evaluation Design

Because students could not be randomly assigned to Title I or comparison schools, this study used a quasi-experimental design to compare outcomes among students in Title I schools with students in the comparison schools. The intentional interrelatedness and synergy of Title I initiatives makes it difficult to estimate the unique value-added by MCCs. Therefore, the evaluation is designed to measure intended outcomes for students in Title I schools overall, without empirically estimating the degree to which the MCC initiative specifically contributed to these outcomes. The design would be stronger if it observed outcomes before and after implementation, with 2003–2004 as the baseline year. However, due to the following limitations, all achievement measures were analyzed separately for each grade level in a given year:

- Data on MCPS end-of-unit assessments for 2003–2004 were not readily available; data for 2004–2005 were available, but they were not labeled consistently with 2006 and 2007 data.
- MCPS unit assessments are administered within courses several times a year, but they are not vertically equated within or across grade levels.
- The TN/2 is commercially available as a vertically equated measure within and across grade levels, but in MCPS, it is administered as a one-time assessment in Grade 2. Also, different versions of TN/2 tests were administered in 2006 and 2007 and TN/2 data could not be compared directly (Zhao & Von Secker, 2007).
- MSAs are administered once a year, but they are not vertically equated across grade levels.

Interpretation of the results. The Logical Model stipulates that having MCCs will lead to increased mathematics and content knowledge for all teachers, which in turn will lead to improvements in planning, coordination, and implementation of mathematics instructional program. As such, student outcomes in Title I schools will improve. Hence, the hypothesis is that the performance between the two groups of schools would not differ significantly. That is, while Title I schools have high proportions of students from subgroups with one or more educationally risk factors (being ESOL, FARMS, African American, or Hispanic), their performance will be comparable or exceed that of the comparison schools.

Data compilation. Data on students in Title I schools and comparison schools during the 2004–2005 to 2006–2007 school years were obtained from Office of Shared Accountability databases/EDLOAD. These student-level data provided information on attendance and demographic characteristics which were combined with MSA and TN/2 assessment data. In addition, data on 2005, 2006, and 2007 MCPS mathematics end-of-unit assessments and students enrolled in Math 6/A were obtained from Instructional Management System databases (IMS) and combined with student level information on attendance and demographic data.

Sample

Title I schools. The first group was all Title I schools in a given year (Table B1).

Comparison schools. Comparison schools were selected from non-Title I schools. Because the non-Title I schools are less impacted by poverty than Title I schools, they can provide a useful gauge for estimating the added effects of MCCs, above and beyond the effect of traditional school reforms expected in all MCPS schools. Nearly all the comparison schools had no MCCs during the study period (N=85)[1]. Because no data were available as to the type and level of support the MCCs in non-Title I schools provided to their teachers, the locally funded MCCs were essentially considered as part of other forms of school-based support in place in some MCPS schools.

Using two-level-cluster sampling procedure, school level variables from the *Schools at Glance* data were used to create a comparison sample from the 85 elementary schools. The following variables were included in the cluster analysis: percent FARMS, percent ESOL, percent ever FARMS, percent Hispanic, and percent African American students. Four clusters emerged (Table B2). All the schools (N=21) in cluster 4, in the cluster with demographic profile closest to the Title I schools on the clustering variables were included in the comparison sample (Table B2). Based on the records available, only two of the non-Title I schools had an MCCs or math focus teacher funded through local or state funds during the entire study period.

[1] In addition to Title I schools, other high needs schools have MCCs to support the implementation of standard-based mathematics curriculum.

Table B1
Federal Title I Elementary Schools 2004–2007

2004–2005	2005–2006	2006–2007
Broad Acres	Broad Acres	Broad Acres
East Silver Spring	Burnt Mills	Burnt Mills
Gaithersburg	East Silver Spring	East Silver Spring
Harmony Hills	Gaithersburg	Gaithersburg
Highland	Harmony Hills	Harmony Hills
Highland View	Highland	Highland
Kemp Mill	Highland View	Highland View
Montgomery Knolls	Jackson Road	Jackson Road
New Hampshire Estates	Kemp Mill	Kemp Mill
Oak View	Montgomery Knolls	Montgomery Knolls
Rolling Terrace	New Hampshire Estates	New Hampshire Estates
Rosemont	Oak View	Oak View
Summit Hall	Rolling Terrace	Rolling Terrace
Twinbrook	Rosemont	Rosemont
Viers Mill	South Lake	Sargent Shriver
Weller Road	Summit Hall	South Lake
Wheaton Woods	Twinbrook	Summit Hall
	Viers Mill	Twinbrook
	Weller Road	Viers Mill
	Wheaton Woods	Washington Grove
		Weller Road
		Wheaton Woods

Table B2
Elementary Schools Included in the Comparison Sample

Burtonsville
Cannon Road
Capt. James E. Daly
Clopper Mill
Cresthaven
Dr. Charles R. Drew[c]
Fairland
Fox Chapel[a,b,c]
Galway
Germantown
Glenallan[c]
Goshen
Judith A. Resnik
Lake Seneca[a,b,c]
Meadow Hall
Mill Creek Towne[c]
S. Christa McAuliffe
Strawberry Knoll
Waters Landing
Watkins Mill
Whetstone
William Tyler Page

[a,b,c.] These schools had MCCs supported through local or state funds in 2005[a], 2006[b], or 2007[c].

Table B3 illustrates the differences in the demographic make up of the two groups of schools, Title I and comparison schools. The information presented in Table B3 reveal that Title I schools have the highest proportion of students from historically underachieving subgroups in MCPS. Title I schools had a higher percentage of FARMS (62% vs. 46%), ESOL (35% vs. 24%) Hispanic (48% vs. 34%) and Ever FARMS (73% vs. 57%) students than the comparison schools. The Title I schools as a group had generally a lower percentage of African American students than comparison schools (29% vs. 36%).

Table B3
Demographics of Students in Title I and Non-MCC School

	FARMS %		ESOL %		African American %		Hispanic %		Ever FARMS %		Mobility Rate	
Cluster sample	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	5.33	3.68	6.85	4.43	6.46	3.65	6.43	2.03	7.33	4.60	7.95	2.6
2	15.49	3.79	9.16	4.33	16.45	7.20	13.25	3.82	20.72	4.57	10.39	5.99
3	33.00	5.80	15.14	5.08	35.25	15.96	20.80	7.35	41.97	6.76	12.62	3.94
4	46.33	6.52	23.72	8.05	35.79	4.61	33.64	4.37	57.13	7.32	24.34	6.33
Title I schools	62.45	11.52	34.92	10.09	28.77	13.39	47.69	15.77	72.07	12.42	31.6	8.27
All MCPS (2007–2008)[a]	24.70	--	10.60	--	22.90	--	21.50	--	39.40	--	--	--

SD = standard deviation;
[a] *Source*: http://www.montgomeryschoolsmd.org/about/

Analysis Procedures

Descriptive Statistics

Univariate and Bivariate analyses were applied to:

1. *Grades 1 to 5 MCPS Assessment Program Mathematics Scores end-of-unit assessments.* The outcomes were described in terms of proportion over success threshold/whether their scores reach the cut-off scores for proficiency in a specified mathematics course. Details on total possible points and cut-scores for Math 1 through Math 6 are provided in Appendix C. These tests are not administered, scored, or interpreted under standardized conditions. In addition, teachers have multiple opportunities for reteaching for mastery of content and reassessing their students during the school year. As such, no advanced inferential statistical analyses were conducted on the mathematics unit assessments to compare Title I schools and the comparison schools. Analyses on EOU scores were limited to the computation of the number and percentage of students who were proficient on each mathematics course. In addition, descriptive analysis was completed on subgroups of the population. The end-of-unit assessment data for 2004–2005 were not analyzed because the labeling was not consistent with the labeling for the subsequent years and missing data. Also, pre-MCC (2003–2004) end-of-unit data were not readily available.
2. *Grade 2 TN/2 50th NCE.* The percentage of students at or above the 50th NCE on the mathematics and mathematics computation subtests was computed. Separate analyses were conducted for 2006 and 2007 test administrations. In addition, descriptive analysis was completed on subgroups of the population.
3. *Maryland School Assessment (MSA).* The proportions of students from each group at or above proficient on mathematics MSA were computed. In addition, data analysis was completed on subgroups of the population.

Analyses of Covariance

Analyses of Covariance *(*ANCOVA) models were used to evaluate whether the adjusted mean TN/2 and MSA scores were the same for students across the two groups of schools—Title I and comparison schools. It was hypothesized that the outcomes, when adjusted for preexisting differences would be equal for students in Title I and comparison schools. Having the scores equal or better than the scores for comparison schools would indicate an added effect of having MCCs in the schools.

Propensity scores (attendance, demographics, and service receipt measures) were computed using logistic regression and saved as a variable in the dataset. The propensity score is a predicted probability of being in a Title I school/having a math content coach. The variable was further divided into five categories and used as a categorical covariate in each of the ANCOVA models in this study.

Grade 2 TN/2 scale scores. *TerraNova* Second Edition (TN/2) mathematics and mathematics computation scores between the two groups were compared to determine whether significant differences existed. Propensity scores, race, service receipt variables as well as average attendance were utilized to statistically reduce the effects of initial group differences. In addition, data analysis was completed on subgroups of the population.

Maryland School Assessments (MSAs). Analysis of covariance on the mathematics scores was conducted to determine whether significant differences existed between the two groups of schools. Separate analyses were computed for each grade level and for each year. The dependent variable for this model was the MSA mathematics scale scores. The control variables or covariates included race/ethnicity; receipt of FARMS, special education, and/or ESOL services; plus a propensity score. The pretests for this cohort were the CTBS/TN/2 mathematics scale scores. This model was applied to MSA scores for each year included in the study.

Effect size computation. When studying the results of ANCOVA, the statistical as well as practical value of the results must be established. Cohen's *d* was used to measure magnitude of the distance in adjusted mean scores comparing MCC and Non-MCC schools and to establish practical significance of having MCCs in the schools. The following formula was used to calculate the effect size for comparing all students in the two groups of schools was $d = (M_t - M_c)/\text{sqrt MSE}$. The M_t and M_c are adjusted group means for students in Title I schools and those for students in comparison schools respectively, and MSE is the mean square error. The following formula was used to calculate the effect size for subgroups in Title I schools relative to counterparts in comparison schools: effect size = $(M_t - M_c)/SD$. The M_t and M_c are adjusted group means for students in Title I schools and those for students in comparison schools respectively, and SD is the standard deviation of the pooled post test scores.

Interpretation of Effect Sizes. A comprehensive approach to the interpretation of effect sizes is critical. Cohen's definitions of small (d=0.2), modest (d=0.5), and large (d=0.8) (1988). These effect sizes would correspond to the average member of the MCC schools had a better outcome than 58%, 69%, and 79**%** percent of the members of the Non-MCC group.

None-the-less, Cohen (1988) also pointed out that small effect sizes of around d=0.20 are representative of fields aligned with education. Subsequently, a number of researchers have pointed to the need to calibrate the interpretation of effect sizes to the expected impact of the program being studied. Specifically, Lipsey and Wilson (1993) concluded that effects of modest values of d=0.1 to d=0.2 in educational settings are not trivial. Borman and D'Agostino (1996) suggested that the average effect size associated with Title I programs is d=0.15. Overall, as documented in the literature, schoolwide reforms (e.g. MCCs' school-based professional development) have an average effect size of d=0.15 (Bormann, Hews, Overman, Brown, 2002; Mason, 2005). The MCC is a schoolwide initiative; therefore, a threshold of d=0.15 small-modest, d=0.3 modest-large, and d=0.5 as large was adopted in this study.

Strengths and Limitations of the Methodology

Strengths. Quasi-experimental designs are commonly used in the evaluation of educational programs when random assignment is not possible or practical. Causality cannot be inferred from the analyses of data collected through quasi-experimental designs. Below are the strengths of the methodology utilized in this evaluation.

1. Multiple measures of outcomes were utilized which makes the design more powerful. This triangulates several lines of evidence or measures in answering specific evaluation questions about program outcomes which increases the reliability and credibility of results.
2. The outcome measures were aligned with the program's goals or objectives.
3. Propensity scores and ANCOVA were utilized to control for confounding factors and preexisting ability.
4. Furthermore, when interpreting this evidence, use of absolute standards of success such as placing at the 50th NCE on TN/2 or being at proficient on the MSA mathematics were utilized in addition to relative comparisons.
5. Also, alternative explanations for any observed differences in outcome measures were considered based on previous findings from implementation evaluation studies and MCPS reports.
6. Effect sizes, which are metric free measures, were computed and served as additional gauge for indicating the practical significance of having MCCs in schools.
7. Comparison of successive cohorts of students in a given grade was applied to unit assessments and MSA as well as rates of enrollment in accelerated mathematics courses.

Limitations. This study was undertaken within the practical limitations of non-randomization, real world schoolwide initiatives in Title I schools. For example, the comparison schools are different from Title I schools in more ways than merely the absence of MCCs. However, the use of propensity scores and statistical controls such as ANCOVA improved the internal validity of the study.

The determination of the extent to which having an MCC was associated with gains in mathematical proficiency is best achieved by comparison of scores achieved in one measure to later achievement for two groups of students. To determine growth in mathematical proficiency requires a) measures strongly aligned to the curriculum; b) scales that are vertically articulated; and c) and a dynamic longitudinal database The mathematics local and state assessments do not lend themselves to measuring change in mathematical proficiency of the students over time. Specifically:

- MCPS unit assessments are administered within grade levels several times a year, but they not vertically equated within or across grade levels.
- The TN/2 is commercially available as a vertically equated measure within and across grade levels, but in MCPS it is administered as a one-time assessment in Grade 2. Also, different versions of TN/2 tests were administered in 2006 and 2007 and TN/2 data could not be compared directly (Zhao & Von Secker, 2007).
- MSAs are administered once a year, but they are not vertically equated across grade levels.
- There was no field/marker in the IMS data indicating whether students taking above-grade-level mathematics courses were proficient on the mathematic courses corresponding to current Grade (e.g., Grade 3 students enrolled and completing Math 4). Given that more than one third of the students in Math 3 through Math 5 in Title I schools are not proficient on the end-of-unit assessments, these data are critical for planning and informing vertical articulation.
- Different versions of TN/2 were administered since 2005. As such, trend analyses and comparison in performance on Grade 2 TN/2 assessment for 2006 and 2007 would not be meaningful (Stevenson, 2006; Zhao & Von Secker, 2007).
- Using CTBS as pretest or test of existing ability on the MSA decreased the sample sizes for analyses.
- The analyses could not focus on the growth of mathematical proficiency of individual students over time because of the nature of assessment data available. As such, the analyses were limited to assessment of the performance of a group of students on specific measure.
- Also, while fidelity of curriculum implementation was not directly measured, the end-of-unit assessments were taken as proxy for curriculum fidelity. Not all students had data on each unit, reflecting differential implementation of the mathematics curriculum among the schools.

Scope of Evaluation. Analysis of outcomes on proportion of students completing Algebra I by Grade 8, which is a long-term outcome of MCC initiative detailed in the Logic Model, was not conducted. By 2006–2007 school year, only one cohort that had benefited from MCCs had reached Grade 8. Therefore, one year's data was considered inadequate for meaningful analyses.

Teacher-level data. For this study, historical data on class assignment for early grades was not readily accessible. As such, this study could not determine whether the distribution of teachers differed by qualifications in the two groups were unequal within the schools, across the grade levels, or in the district.

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Appendix C: Cut-off Scores for End-of-Unit Assessments Math 1 Through Math 6

Table C1
Cut-off Scores for End-of-Unit Assessments[a] Math 1 Through Math 6

Mathematics Unit Assessments/Course Level and Acceleration	Cut Score/Total Points Possible	%
Kindergarten	Total points: 58[b]	
Acceleration (Math 1)	Total points: 131	
Math 1	Proficient: 108/141	77
Acceleration (Math 2)	Proficient: 106/137	
Math 2	Proficient: 105/136	77
Acceleration (Math 3)	Proficient: 131/174	
Math 3	Proficient: 145/193	75
Acceleration (Math 4)	Proficient: 129/177	
Math 4	Proficient: 133/182	73
Acceleration (Math 5)	Proficient: 125/166	
Math 5	Proficient: 131/174	75
Acceleration Math 6 (Math A)	Proficient: 137/192	
Math 6 (Math A)	Proficient: 138/194	71
Acceleration Math 7 (Math B)	Proficient: 104/144	
Math 7 (Math B)	Proficient: 133/185	72
Acceleration Algebra Prep (Math C)	Proficient: 86/107	
Algebra prep (Math C)	Proficient: 93/147	64
Additional points in Algebra Prep that do not count toward total	10	

[a] Adapted/Decision made by Executive Leadership Team Meeting, June 28, 2007.
[b] No proficiency cut scores for kindergarten
Note. Math 7 and algebra were not included in the proficiency computation for this evaluation. There were too few students in these categories for meaningful analyses.

Table C2
Total Points Possible for Math 1–Math 6 End-of-Unit Assessments

Mathematics Course	Unit	Total Points Possible
Math 1	1	35
	2	41
	3	26
	4	27
	5	19
Math 2	1	35
	2	17
	3	24
	4	23
	5	38
Math 3	1	36
	2	19
	3	42
	4	31
	5	47
	6	18
Math 4	1	42
	2	54
	3	33
	4	21
	5	31
Math 5	1	33
	2	23
	3	37
	4	33
	5	29
	6	18
Math 6	1	20
	2	U2 AB=23 U2 CD=36
	3	51
	4	41
	5	*23*

Source: OCIP/DCI math team. Totals are based on parent reports.

Appendix D: TN/2 Results by Subgroups

Table D1
Percentage at or Above the 50th NCE *TerraNova* Second Edition Mathematics and Mathematics Computation, by Subgroup

	Mathematics Computation								Mathematics							
	Comparison				Title I				Comparison				Title I			
	2006		2007		2006		2007		2006		2007		2006		2007	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Race/Ethnicity																
African American	372	54.4	363	52.7	257	60.9	273	52.8	305	44.4	289	41.9	185	43.6	219	42.4
American Indian	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Asian American	197	84.2	186	69.9	111	83.5	115	75.2	160	68.1	166	62.4	86	64.7	97	63.4
Hispanic	219	54.9	257	51.0	402	59.1	425	53.7	160	39.9	189	37.5	313	46.0	282	35.7
White	326	73.8	276	66.2	165	83.8	143	63.8	315	71.3	281	67.4	151	77.0	143	63.8
Gender																
Female	540	63.7	544	59.4	461	63.6	470	56.9	461	54.4	453	49.5	355	49.0	360	43.6
Male	574	63.0	538	56.0	474	67.0	486	56.6	479	52.2	472	49.2	380	53.7	381	44.4
Special Services																
Non-FARMS	813	70.0	721	61.6	431	75.7	402	58.6	726	62.2	667	57.0	368	64.6	366	53.4
FARMS	301	50.4	361	51.1	504	58.4	554	55.5	214	35.8	258	36.5	367	42.5	375	37.5
Non-ESOL	1007	66.0	901	58.9	747	69.3	658	59.2	878	57.4	825	53.9	637	59.1	585	52.7
ESOL	107	45.9	181	52.5	188	53.1	298	51.9	62	26.4	100	29.0	98	27.6	156	27.2
Not Special Education	1114	63.3	1033	58.2	935	65.3	908	57.0	940	53.3	897	50.6	735	51.3	713	44.7
Special Education	--	--	49	48.0	--	--	48	52.7	--	--	28	27.5	--	--	28	30.8

Note. -- The numbers and percentages for American Indians and subgroups with fewer than five students are not reported.

Table D2

Measures of Effect Sizes for Association Between 2006 *TerraNova* Second Edition Mathematics Computation and Mathematics Scores and MCC School, by Subgroup

Outcome measure/Subgroup	Title I mean	Title I *n*	Title I SD	Comparison mean	Comparison *n*	Comparison SD	Mean Difference	*p*	Effect Size
Mathematics Computation									
Race/Ethnicity									
African American	560.4	3209	51.0	558.2	4815	44.3	2.14	0.86	0.00
American Indian	--	--	--	--	--	--	--	--	--
Asian American	579.0	1131	40.1	586.6	1856	46.6	-7.60	0.92	-0.01
Hispanic	560.7	5703	45.8	558.1	3280	40.4	2.57	0.83	0.00
White	600.0	1354	69.4	587.1	3099	57.7	12.89	0.49	0.02
Gender									
Female	566.4	5491	47.5	569.5	6308	47.7	-3.08		-0.01
Male	569.0	5906	57.3	568.9	6742	51.1	0.02	1.00	0.00
Special Services									
Non-FARMS	580.4	4569	63.3	577.6	8593	49.3	2.81	0.79	0.00
FARMS	559.2	6828	42.0	552.8	4457	45.6	6.42	0.54	0.01
Non-ESOL	574.6	7665	53.8	572.7	10918	50.4	1.84	0.83	0.00
ESOL	546.8	3732	42.1	546.3	2132	35.3	0.46	0.97	0.00
Not Special Education	567.7	11397	52.5	569.2	13050	49.5	-1.53	0.82	0.00
Special Education	--	--	--	--	--	--	--	--	--
Mathematics									
Race/Ethnicity									
African American	544.7	3209	67.5	537.1	4815	61.7	7.57	0.00	0.12
American Indian	--	--	--	--	--	--	--	--	--
Asian American	576.6	1131	45.8	571.4	1856	54.9	5.12	0.01	0.10
Hispanic	547.6	5703	54.1	539.7	3280	58.3	7.92	0.00	0.14
White	577.6	1354	44.5	564.3	3099	54.0	13.24	0.00	0.26
Gender									
Female	552.6	5491	52.5	550.7	6308	52.2	1.89	0.05	0.04
Male	554.5	5906	63.2	547.6	6742	66.1	6.89	0.00	0.11
Special Services									
Non-FARMS	562.6	4569	66.6	556.8	8593	60.9	5.84	0.00	0.09
FARMS	547.5	6828	50.6	534.0	4457	54.7	13.44	0.00	0.26
Non-ESOL	558.9	7665	56.4	552.0	10918	58.2	6.90	0.00	0.12
ESOL	537.3	3732	59.9	530.2	2132	66.7	7.04	0.00	0.11
Not Special Education	555.8	1551	55.8	551.7	1810	56.8	4.09	0.04	0.07
Special Education	534.0	159	71.7	529.0	223	77.2	4.94	0.53	0.07

Note. -- The numbers of students in these cells were too low for meaningful comparisons to be conducted.

Table D3

Measures of Effect Sizes for Association Between 2007 *TerraNova* Second Edition Mathematics Computation and Mathematics Scores and MCC School, by Subgroup

Outcome measure/Subgroup	Title I			Comparison			Mean Difference	*p*	Effect Size
	mean	*n*	SD	mean	*n*	SD			
Mathematics Computation									
Race/Ethnicity									
African American	546.4	517	48.3	544.1	689	49.5	2.35	0.41	0.05
American Indian	--	--	--	--	--	--	--	--	--
Asian American	582.2	153	44.9	573.0	266	44.9	9.22	0.04	0.21
Hispanic	549.7	791	46.7	542.4	504	46.7	7.22	0.01	0.15
White	565.9	224	49.1	564.4	417	46.0	1.49	0.70	0.03
Gender									
Female	556.3	826	49.4	554.7	916	48.4	1.55	0.51	0.03
Male	551.4	859	47.6	549.6	960	49.0	1.82	0.42	0.04
Special Services									
Non-FARMS	564.4	686	47.2	559.6	1170	46.5	4.79	0.03	0.10
FARMS	547.7	999	48.3	541.2	706	50.0	6.48	0.01	0.13
Non-ESOL	559.4	1111	48.3	555.0	1531	49.2	4.38	0.02	0.09
ESOL	544.1	574	47.6	540.4	345	45.3	3.71	0.24	0.08
Not Special Education	556.1	1549	47.4	554.6	1694	46.7	1.50	0.36	0.03
Special Education	530.1	136	54.2	529.7	182	60.9	0.43	0.95	0.01
Mathematics									
Race/Ethnicity									
African American	564.9	2237	40.5	562.1	3724	40.1	2.73	0.01	-0.07
American Indian	--	--	--	--	--	--	--	--	--
Asian American	587.2	788	42.0	586.0	1388	48.3	1.19	0.56	0.03
Hispanic	562.3	3966	39.2	558.7	2515	40.8	3.65	0.00	0.09
White	595.0	1015	50.0	588.8	2164	44.0	6.18	0.00	0.13
Gender									
Female	568.9	3884	41.2	571.4	4742	41.0	-2.53	0.00	-0.06
Male	570.6	4122	44.9	569.4	5049	47.3	1.17	0.23	0.03
Special Services									
Non-FARMS	585.7	3228	45.0	580.8	6102	43.6	4.85	0.00	0.11
FARMS	560.5	4778	39.2	555.1	3689	40.8	5.40	0.00	0.14
Non-ESOL	580.3	5598	43.4	576.2	8296	43.3	4.05	0.00	0.09
ESOL	551.5	2408	35.9	546.8	1495	40.2	4.64	0.00	0.12
Not Special Education	572.3	7144	42.6	575.0	8690	40.8	-2.75	0.00	-0.07
Special Education	543.9	862	40.8	528.0	1101	52.1	15.96	0.00	0.34

Note. -- The numbers of students in these cells were too low for meaningful comparisons to be conducted.

Appendix E: MSA Proficiency by Subgroup

Table E1
Percentage at or Above Proficient on 2005, 2006, and 2007 Grade 3 Mathematics
Maryland School Assessment, by Subgroup

	2005				2006				2007			
	Title I		Comparison		Title I		Comparison		Title I		Comparison	
Subgroup	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Race/Ethnicity												
African American	415	65.8	543	72.2	458	66.7	176	68.5	342	76.3	246	68.3
American Indian	--	--	--	--	--	--	--	--	--	--	--	--
Asian American	251	88.7	262	89.4	206	87.7	119	87.5	146	91.3	120	88.2
Hispanic	287	71.6	384	76.0	274	64.2	497	71.2	617	77.9	500	74.0
White	420	86.1	437	93.2	333	85.4	154	92.8	154	85.6	159	89.3
Gender												
Female	695	78.4	761	78.9	633	76.2	429	74.9	636	79.7	506	75.2
Male	682	74.0	865	82.1	638	70.3	519	75.4	623	79.7	519	76.7
Special Services												
Non-FARMS	978	83.4	1161	86.6	848	80.2	386	84.6	562	87.3	426	85.2
FARMS	399	62.8	465	68.6	423	62.0	562	69.8	697	74.5	599	70.5
Non-ESOL	1278	77.5	1475	81.9	1153	77.1	797	81.5	1018	84.6	786	81.5
ESOL	99	62.3	151	69.3	118	48.4	151	53.4	241	64.1	239	61.9
Not Special Education	1278	80.0	1626	80.5	1245	76.3	864	79.6	1259	79.7	1003	77.5
Special Education	99	46.9	--	--	26	24.3	84	48.0	--	--	22	40.0

Note. -- The numbers and percentages for American Indians and subgroups with fewer than five students are not reported.

Table E2
Percentage at or Above Proficient on 2005, 2006, and 2007 Grade 4 Mathematics
Maryland School Assessment, by Subgroup

	2005				2006				2007			
	Title I		Comparison		Title I		Comparison		Title I		Comparison	
Subgroup	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Race/Ethnicity												
African American	478	68.5	529	72.2	520	77.5	201	77.0	285	74.6	296	80.2
American Indian	--	--	--	--	--	--	--	--	--	--	--	--
Asian American	230	89.5	301	94.7	237	93.7	113	91.1	128	90.1	121	93.1
Hispanic	282	71.6	396	78.6	372	79.5	461	74.0	657	79.3	533	77.0
White	462	90.1	495	93.2	345	91.8	146	92.4	163	95.9	151	91.0
Gender												
Female	737	80.0	825	82.2	676	82.6	459	81.7	555	80.4	563	81.8
Male	721	76.1	896	82.8	798	84.0	463	76.2	678	81.4	538	80.4
Special Services												
Non-FARMS	1036	84.5	1240	88.3	949	88.4	344	88.9	520	86.5	427	89.7
FARMS	422	65.7	481	70.6	525	75.6	578	73.8	713	77.3	674	76.5
Non-ESOL	1385	80.3	1611	83.5	1346	85.5	775	83.1	1031	84.1	912	87.9
ESOL	73	51.0	110	70.1	128	66.3	147	62.0	202	68.0	189	59.2
Not Special Education	1360	83.3	1721	82.5	1446	86.6	838	84.9	1233	81.0	1063	82.5
Special Education	98	41.5	--	--	28	28.6	84	45.9	--	--	38	55.1

Note. -- The numbers and percentages for American Indians and subgroups with fewer than five students are not reported.

Table E3
Percentage at or Above Proficient on 2005, 2006, and 2007 Grade 5 Mathematics
Maryland School Assessment, by Subgroup

	2005				2006				2007			
	Title I		Comparison		Title I		Comparison		Title I		Comparison	
Subgroup	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Race/Ethnicity												
African American	377	59.0	556	65.6	454	66.9	149	54.4	316	70.7	259	69.8
American Indian	--	--	--	--	--	--	--	--	--	--	--	--
Asian American	250	87.4	248	89.2	249	89.9	95	83.3	141	89.2	112	94.1
Hispanic	215	56.4	347	70.8	327	68.0	387	62.9	575	75.3	567	74.9
White	441	83.7	456	86.0	401	90.3	138	83.1	157	88.7	147	90.7
Gender												
Female	630	69.9	817	76.9	723	77.6	381	64.2	567	77.0	497	77.4
Male	656	70.0	790	72.9	708	74.6	391	67.4	622	76.8	588	76.7
Special Services												
Non-FARMS	960	77.7	1169	80.5	970	84.6	300	76.7	515	83.3	432	84.0
FARMS	326	54.2	438	63.2	461	62.7	472	60.4	674	72.6	653	73.0
Non-ESOL	1243	72.6	1511	76.1	1356	78.7	693	70.8	997	79.8	920	82.0
ESOL	43	34.4	96	60.0	75	47.8	79	40.7	192	64.9	165	57.5
Not Special Education	1220	76.8	1607	74.9	1325	81.2	701	71.4	1189	76.9	961	81.4
Special Education	66	26.4	--	--	106	42.6	71	37.2	--	--	124	54.4

Note. -- The numbers and percentages for American Indian and subgroups with fewer than five students are not reported.

Table E4

Measures of Effect Sizes for Association Between 2005 Maryland School Assessment Scores and School Group, by Subgroup

Grade	Subgroup	Title I Adjusted Mean	Title I *n*	Comparison Adjusted Mean	Comparison *n*	Mean Difference	*p* value	Effect Size
3	Race/Ethnicity							
	African American	401.37	382	399.57	733	1.81	0.47	0.05
	American Indian	--	--	--	--	--	--	--
	Asian American	416.67	142	414.86	318	1.81	0.66	0.04
	Hispanic	405.09	829	403.28	504	1.81	0.41	0.05
	White	413.48	170	411.67	531	1.81	0.58	0.05
	Gender							
	Female	409.60	690	408.26	1004	1.34	0.51	0.03
	Male	408.70	833	406.44	1082	2.27	0.25	0.05
	Special Services							
	Non-FARMS	411.39	601	409.43	1405	1.97	0.33	0.05
	FARMS	406.91	922	405.27	681	1.64	0.41	0.04
	Non-ESOL	413.59	1226	411.99	1929	1.60	0.29	0.04
	ESOL	404.72	297	402.70	157	2.01	0.60	0.05
	Not Special Education	409.15	1341	407.35	1838	1.81	0.21	0.04
	Special Education	--	--	--	--	--	--	--
4	Race/Ethnicity							
	African American	403.69	382	399.13	733	4.57	0.07	0.12
	American Indian	--	--	--	--	--	--	--
	Asian American	420.75	142	416.18	318	4.57	0.27	0.11
	Hispanic	407.94	829	403.37	504	4.57	0.04	0.12
	White	415.68	170	411.11	531	4.57	0.17	0.12
	Gender							
	Female	415.03	690	408.39	1004	6.64	0.00	0.16
	Male	409.00	833	406.51	1082	2.49	0.21	0.06
	Special Services							
	Non-FARMS	413.03	601	410.30	1405	2.73	0.18	0.07
	FARMS	410.99	922	404.59	681	6.40	0.00	0.16
	Non-ESOL	416.57	1226	411.12	1929	5.45	0.00	0.13
	ESOL	407.46	297	403.77	157	3.69	0.33	0.10
	Not Special Education	412.01	1341	407.45	1838	4.57	0.00	0.11
	Special Education	--	--	--	--	--	--	--
5	Race/Ethnicity							
	African American	408.86	447	403.73	848	5.12	0.03	0.13
	American Indian	--	--	--	--	--	--	--
	Asian American	426.46	158	421.33	278	5.12	0.20	0.13
	Hispanic	414.25	764	409.13	490	5.12	0.02	0.13
	White	419.60	177	414.48	530	5.12	0.13	0.13
	Gender							
	Female	418.12	736	414.67	1063	3.45	0.08	0.08
	Male	416.46	810	409.67	1083	6.80	0.00	0.16
	Special Services							
	Non-FARMS	418.20	618	414.63	1453	3.57	0.07	0.09
	FARMS	416.38	928	409.71	693	6.68	0.00	0.16
	Non-ESOL	421.25	1250	416.74	1986	4.51	0.00	0.11
	ESOL	413.33	296	407.60	160	5.73	0.13	0.15
	Not Special. Education	417.29	1337	412.17	1880	5.12	0.00	0.13
	Special Education	--	--	--	--	--	--	--

Note. -- Values for American Indian and students receiving special education were too low for meaningful comparisons.

Table E5
Measures of Effect Sizes for Association Between 2006 Maryland School Assessment Scores and School Group, by Subgroup

Grade	Subgroup	Title I		Comparison		Mean		
		Adjusted mean	*n*	Adjusted mean	*n*	Difference	*p*	Effect Size
3	Race/Ethnicity							
	African American	407.19	413	397.46	766	9.72	0.00	0.29
	American Indian	--	--	--	--	--	--	--
	Asian American	425.27	132	415.53	296	9.73	0.02	0.24
	Hispanic	418.70	821	408.81	531	9.89	0.00	0.27
	White	419.82	176	408.26	492	11.55	0.00	0.32
	Gender							
	Female	418.17	705	408.79	1033	9.39	0.00	0.24
	Male	417.31	837	406.25	1052	11.06	0.00	0.27
	Special Services							
	Non-FARMS	417.71	605	406.83	1301	10.88	0.00	0.28
	FARMS	417.77	937	408.20	784	9.57	0.00	0.26
	Non-ESOL	418.72	1240	410.75	1911	7.97	0.00	0.22
	ESOL	416.76	302	404.28	174	12.48	0.00	0.27
	Not Special Education	421.17	1308	416.34	1820	4.82	0.00	0.12
	Special Education	414.32	234	398.69	265	15.63	0.00	0.50
4	Race/Ethnicity							
	African American	408.86	382	403.73	733	5.12	0.00	0.13
	American Indian	--	--	--	--	--	--	--
	Asian American	426.46	142	421.33	318	5.12	0.03	0.13
	Hispanic	414.25	829	409.13	504	5.12	0.00	0.13
	White	419.61	170	414.48	531	5.12	0.03	0.14
	Gender							
	Female	415.03	690	408.39	1004	6.64	0.00	0.16
	Male	409.00	833	406.51	1082	2.49	0.00	0.06
	Special Services							
	Non-FARMS	413.03	601	410.30	1405	2.73	0.01	0.07
	FARMS	410.99	922	404.59	681	6.40	0.00	0.16
	Non-ESOL	416.57	1226	411.12	1929	5.45	0.00	0.13
	ESOL	407.46	297	403.77	157	3.69	0.08	0.10
	Not Special Education	412.01	1476	407.45	1985	4.57	0.01	0.11
	Special Education	408.86	382	403.73	733	5.12	0.01	0.13
5	Race/Ethnicity							
	African American	403.69	447	399.13	848	4.57	0.00	0.11
	American Indian	--	--	--	--	--	--	--
	Asian American	420.75	158	416.18	278	4.57	0.00	0.11
	Hispanic	407.94	764	403.37	490	4.57	0.00	0.12
	White	415.68	177	411.11	530	4.57	0.00	0.12
	Gender							
	Female	418.12	736	414.67	1063	3.45	0.00	0.08
	Male	416.46	810	409.67	1083	6.80	0.00	0.16
	Special Services							
	Non-FARMS	418.20	618	414.63	1453	3.57	0.00	0.09
	FARMS	416.38	928	409.71	693	6.67	0.00	0.16
	Non-ESOL	421.25	1250	416.74	1986	4.51	0.00	0.11
	ESOL	413.33	296	407.60	160	5.74	0.00	0.15
	Not Special Education	417.29	1488	412.17	2043	5.12	0.00	0.13
	Special Education	403.69	447	399.13	848	4.57	0.00	0.11

Note. -- Values for American Indian students were too low for meaningful comparisons.

Table E6
Measures of Effect Sizes for Association Between 2007 Maryland School Assessment Scores and School Group, by Subgroup

	Title I		Comparison				
Grade/Subgroup	Adjusted Mean	*n*	Adjusted Mean	*n*	Mean Difference	*p*	Effect Size
Grade 3							
Race/Ethnicity							
African American	401.40	414	390.02	774	11.38	0.00	0.30
American Indian	--	--	--	--	--	--	--
Asian American	421.64	149	406.03	263	15.61	0.00	0.36
Hispanic	406.16	750	394.46	476	11.70	0.00	0.27
White	416.29	193	403.36	437	12.93	0.00	0.29
Gender							
Female	412.95	751	399.87	925	13.08	0.00	0.29
Male	409.80	755	397.06	1025	12.73	0.00	0.29
Special Services							
Non-FARMS	412.32	608	399.77	1233	12.55	0.00	0.53
FARMS	410.43	898	397.17	717	13.27	0.00	0.32
Non-ESOL	413.27	1094	403.81	1694	9.46	0.00	0.23
ESOL	409.48	412	393.13	256	16.36	0.00	0.33
Not Special Education	415.04	1345	407.15	1722	7.89	0.00	0.18
Special Education	407.72	161	389.79	228	17.93	0.00	0.52
Grade 4							
Race/Ethnicity							
African American	407.19	760	397.46	423	9.72	0.00	0.25
American Indian	--	--	--	--	--	--	--
Asian American	425.27	282	415.53	149	9.73	0.03	0.22
Hispanic	418.70	521	408.81	777	9.89	0.00	0.23
White	419.82	422	408.26	178	11.55	0.00	0.26
Gender							
Female	418.17	931	408.79	760	9.39	0.00	0.21
Male	417.31	1054	406.25	767	11.06	0.00	0.25
Special Services							
Non-FARMS	417.71	1247	406.83	601	10.88	0.00	0.25
FARMS	417.77	738	408.20	926	9.57	0.00	0.23
Non-ESOL	418.72	1772	410.75	1186	7.97	0.00	0.20
ESOL	416.76	213	404.28	341	12.48	0.00	0.25
Not Special Education	421.17	1746	416.34	1338	4.82	0.00	0.11
Special Education	414.32	239	398.69	189	15.63	0.00	0.46
Grade 5							
Race/Ethnicity							
African American	416.98	766	406.64	413	10.35	0.00	0.30
American Indian	--	--	--	--	--	--	--
Asian American	426.39	296	427.70	132	-1.31	0.61	-0.03
Hispanic	420.76	531	411.24	821	9.53	0.00	0.26
White	424.09	492	415.61	176	8.48	0.01	0.23
Gender							
Female	424.36	1033	416.82	705	7.54	0.00	0.20
Male	419.76	1052	413.77	837	5.98	0.00	0.15
Special Services							
Non-FARMS	421.14	1301	415.55	605	5.59	0.00	0.14
FARMS	422.97	784	415.05	937	7.93	0.00	0.22
Non-ESOL	426.62	1911	420.80	1240	5.82	0.00	0.16
ESOL	417.49	174	409.80	302	7.70	0.08	0.17
Not Special Education	423.76	1820	419.39	1308	4.37	0.00	0.11
Special Education	420.35	265	411.20	234	9.15	0.00	0.29

Note. -- Values for American Indian students were too low for meaningful comparisons.

Appendix F: MCPS End-of-Unit Proficiency Rates

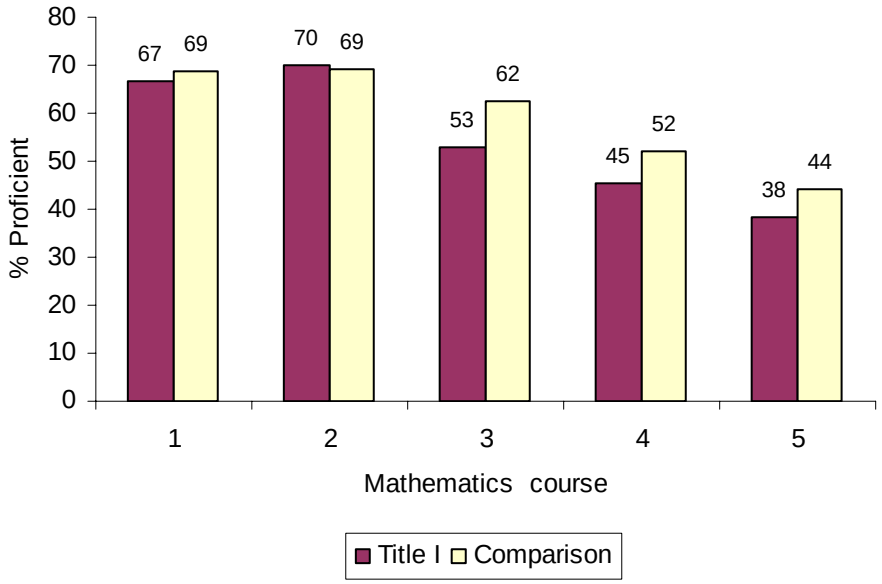


Figure F1. 2006 End-of-unit assessments proficiency rates by mathematics course level.

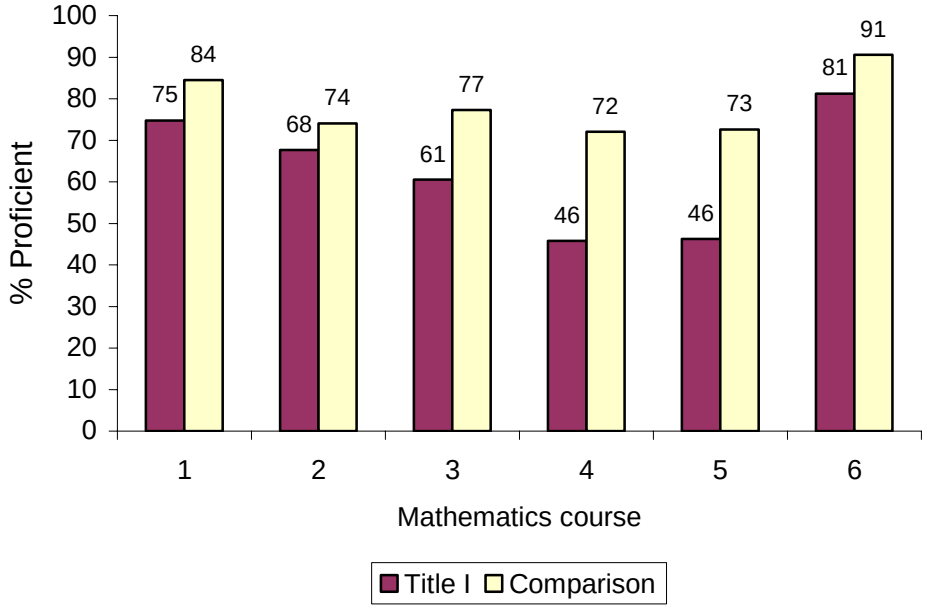


Figure F2. 2007 End-of-unit assessments proficiency rates by mathematics course level.

Table F1
2006 MCPS End-of-Unit Proficiency Rates, by Subgroup

Mathematics Assessment Course	Subgroup	Comparison		Title I	
		n	%	*n*	%
Math 1	Race/Ethnicity				
	African American	413	64.23	289	64.22
	American Indian	--	--	--	--
	Asian American	190	71.97	97	72.39
	Hispanic	305	64.21	432	63.72
	White	320	80.00	143	78.14
	Gender				
	Female	634	72.54	481	67.27
	Male	594	65.42	480	65.75
	Special Services				
	Non-FARMS	839	74.91	397	70.89
	FARMS	389	58.76	564	63.73
	Non-ESOL	989	73.75	620	73.90
	ESOL	239	54.20	341	56.27
	Not Special Education	1147	71.87	903	67.69
	Special Education	81	43.55	58	52.25
Math 2	Race/Ethnicity				
	African American	475	64.89	218	61.76
	American Indian	--	--	--	--
	Asian American	187	82.38	87	81.31
	Hispanic	296	63.93	440	69.51
	White	310	74.88	141	80.11
	Gender				
	Female	617	71.08	451	70.47
	Male	651	67.25	435	69.16
	Special Services				
	Non-FARMS	867	74.74	386	78.46
	FARMS	401	59.32	500	64.35
	Non-ESOL	1109	71.36	665	73.08
	ESOL	159	56.38	221	61.56
	Not Special Education	1175	71.95	809	71.47
	Special Education	93	45.81	77	56.20
Math 3	Race/Ethnicity				
	African American	371	53.69	151	43.77
	American Indian	--	--	--	--
	Asian American	204	75.84	87	73.11
	Hispanic	278	57.56	314	50.89
	White	309	73.92	96	67.13
	Gender				
	Female	546	61.69	324	53.11
	Male	616	63.11	324	52.77
	Special Services				
	Non-FARMS	832	70.39	286	63.00
	FARMS	330	48.60	362	47.01
	Non-ESOL	1064	65.00	543	58.96
	ESOL	98	43.75	105	34.65
	Not Special Education	1095	66.81	604	56.13
	Special Education	67	30.18	44	29.73

(Continued)

Table F1 (Continued)
2006 MCPS End-of-Unit Proficiency Rates, by Subgroup

Mathematics Assessment Course	Subgroup	Comparison		Title I	
		n	%	*n*	%
Math 4	Race/Ethnicity				
	African American	302	41.60	126	37.39
	American Indian	--	--	--	--
	Asian American	194	75.78	73	60.33
	Hispanic	211	43.33	274	41.39
	White	289	66.13	108	67.50
	Gender				
	Female	511	54.07	282	47.32
	Male	485	50.47	299	43.71
	Special Services				
	Non-FARMS	735	61.51	269	53.69
	FARMS	261	36.71	312	40.05
	Non-ESOL	946	54.31	521	49.95
	ESOL	50	30.49	60	25.32
	Not Special Education	938	56.17	537	47.99
	Special Education	58	24.58	44	27.33
Math 5	Race/Ethnicity				
	African American	11	19.30	--	9.09
	American Indian	--	--	--	--
	Asian American	22	55.00	--	42.86
	Hispanic	12	38.71	19	43.18
	White	51	57.30	9	69.23
	Gender				
	Female	48	50.00	19	41.30
	Male	48	39.67	14	35.00
	Special Services				
	Non-FARMS	82	49.40	15	40.54
	FARMS	14	27.45	18	36.73
	Non-ESOL	93	44.71	32	42.67
	ESOL	--	33.33	--	9.09
	Not Special Education	93	44.71	30	37.50
	Special Education	--	33.33	--	50.00

Note. -- The numbers and percentages for American Indians and subgroups with fewer than five students are not reported.

Table F2
2007 MCPS End-of-Unit Proficiency Rates, by Subgroup

Mathematics Assessment Course	Subgroups	Comparison		Title I	
		n	%	*n*	%
Math 1	Race/Ethnicity				
	African American	822	71.4	651	69.9
	American Indian	10	83.3	10	90.9
	Asian American	941	88.9	333	85.6
	Hispanic	671	75.8	774	69.0
	White	2646	90.7	596	84.1
	Gender				
	Female	2559	85.8	1207	76.3
	Male	2531	83.2	1157	73.3
	Special Services				
	Non-FARMS	4297	88.4	1295	81.2
	FARMS	793	68.2	1069	68.3
	Non-ESOL	4351	87.2	1636	79.6
	ESOL	739	71.3	728	65.8
	Not Special Education	4731	86.5	2203	76.7
	Special Education	359	64.8	161	55.9
Math 2	Race/Ethnicity				
	African American	648	56.4	596	61.2
	American Indian	17	70.8	6	50.0
	Asian American	800	81.9	288	79.3
	Hispanic	532	58.6	659	61.6
	White	2397	83.3	552	80.3
	Gender				
	Female	2180	74.7	1090	70.4
	Male	2214	73.4	1011	64.9
	Special Services				
	Non-FARMS	3815	79.8	1181	74.9
	FARMS	579	50.3	920	60.2
	Non-ESOL	4003	77.5	1665	73.1
	ESOL	391	51.0	436	52.7
	Not Special Education	4099	76.4	1966	70.2
	Special Education	295	51.8	135	44.1
Math 3	Race/Ethnicity				
	African American	699	58.4	440	50.3
	American Indian	11	68.8	8	80.0
	Asian American	790	84.1	235	78.9
	Hispanic	527	61.3	570	54.9
	White	2476	88.1	463	75.4
	Gender				
	Female	2181	77.7	882	61.4
	Male	2322	77.0	834	59.6
	Special Services				
	Non-FARMS	3877	83.1	981	70.1
	FARMS	626	54.1	735	51.2
	Non-ESOL	4251	80.3	1446	63.9
	ESOL	252	47.7	270	47.0
	Not Special Education	4148	80.3	1580	63.3
	Special Education	355	53.9	136	40.0

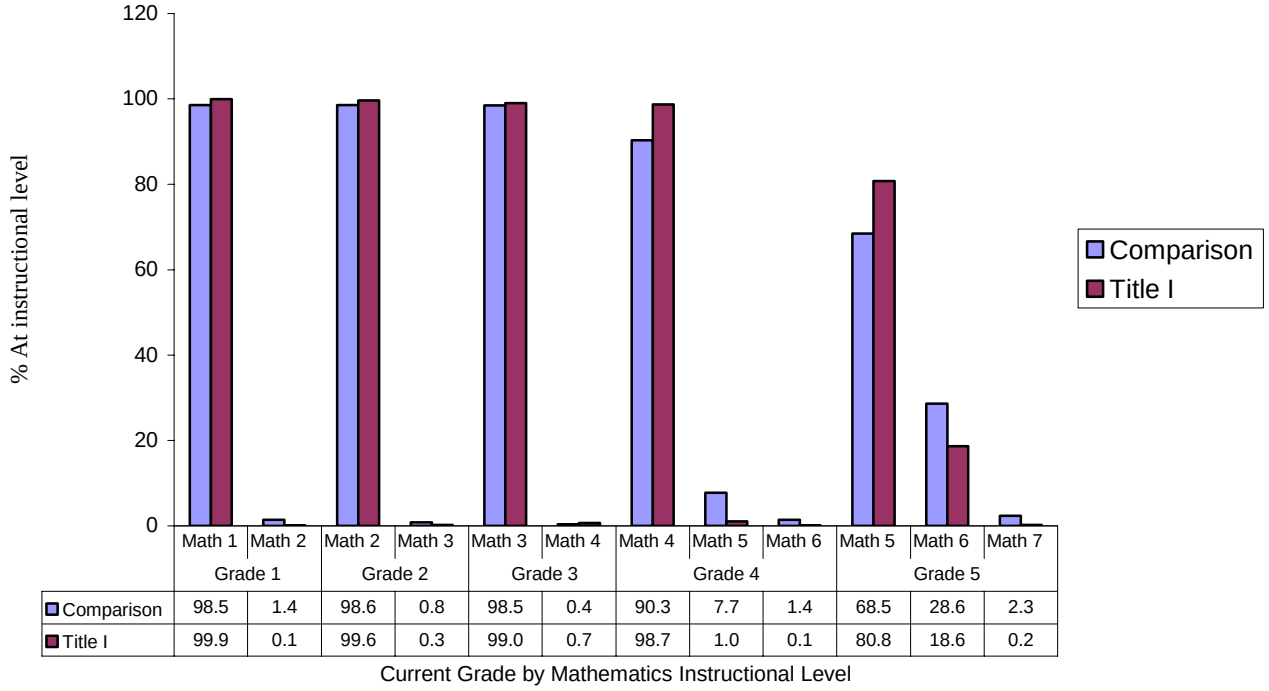
(Continued)

Table F2 (Continued)
2007 MCPS End-of-Unit Proficiency Rates, by Subgroup

Mathematics Assessment Course	Subgroups	Comparison		Title I	
		n	%	*n*	%
Math 4	Race/Ethnicity				
	African American	592	51.8	344	36.1
	American Indian	10	62.5	--	--
	Asian American	805	82.4	199	61.2
	Hispanic	485	55.7	454	41.4
	White	2264	82.0	406	58.7
	Gender				
	Female	2039	73.0	723	47.4
	Male	2117	71.2	683	44.1
	Special Services				
	Non-FARMS	3597	77.9	817	53.6
	FARMS	559	48.7	589	38.1
	Non-ESOL	3941	74.1	1266	49.2
	ESOL	215	47.5	140	28.0
	Not Special Education	3821	75.5	1291	48.6
	Special Education	335	47.3	115	27.6
Math 5	Race/Ethnicity				
	African American	615	56.3	297	36.3
	American Indian	9	69.2	--	--
	Asian American	605	80.0	141	60.5
	Hispanic	475	58.7	408	40.3
	White	1886	82.8	335	68.5
	Gender				
	Female	1806	74.3	597	48.0
	Male	1784	70.9	588	44.6
	Special Services				
	Non-FARMS	3032	78.7	691	57.1
	FARMS	558	51.0	494	36.5
	Non-ESOL	3410	74.4	1063	49.2
	ESOL	180	49.7	122	30.2
	Not Special Education	3191	76.0	1066	49.5
	Special Education	399	53.1	119	29.0
Math 6	Race/Ethnicity				
	American Indian	9	100.0	5	100.0
	African American	249	84.1	202	75.9
	Asian American	636	93.3	153	83.6
	Hispanic	199	80.2	219	73.5
	White	1727	91.9	350	89.3
	Gender				
	Female	1354	91.2	467	84.0
	Male	1466	90.0	462	78.6
	Special Services				
	Non-FARMS	2635	91.5	655	86.0
	FARMS	185	79.4	274	71.7
	Non-ESOL	2777	91.0	904	82.0
	ESOL	43	68.3	25	61.0
	Not Special Education	2719	91.2	892	81.2
	Special Education	101	76.5	37	82.2

Note. -- The numbers and percentages for American Indians and subgroups with fewer than five students are not reported.

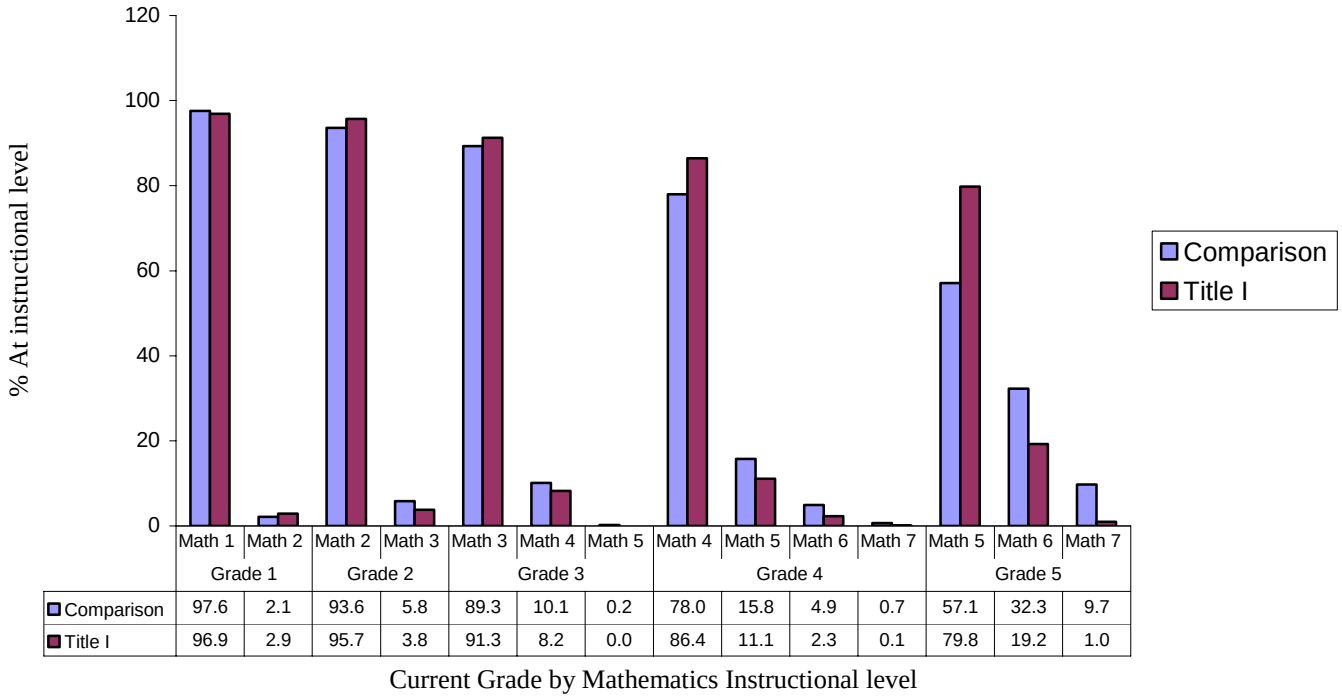
Appendix G: Enrollment in Above-Grade-Level Courses, by Grade, Year, and Level



	Math 1	Math 2	Math 2	Math 3	Math 3	Math 4	Math 4	Math 5	Math 6	Math 5	Math 6	Math 7
	Grade 1		Grade 2		Grade 3		Grade 4			Grade 5		
Comparison	98.5	1.4	98.6	0.8	98.5	0.4	90.3	7.7	1.4	68.5	28.6	2.3
Title I	99.9	0.1	99.6	0.3	99.0	0.7	98.7	1.0	0.1	80.8	18.6	0.2

Current Grade by Mathematics Instructional Level

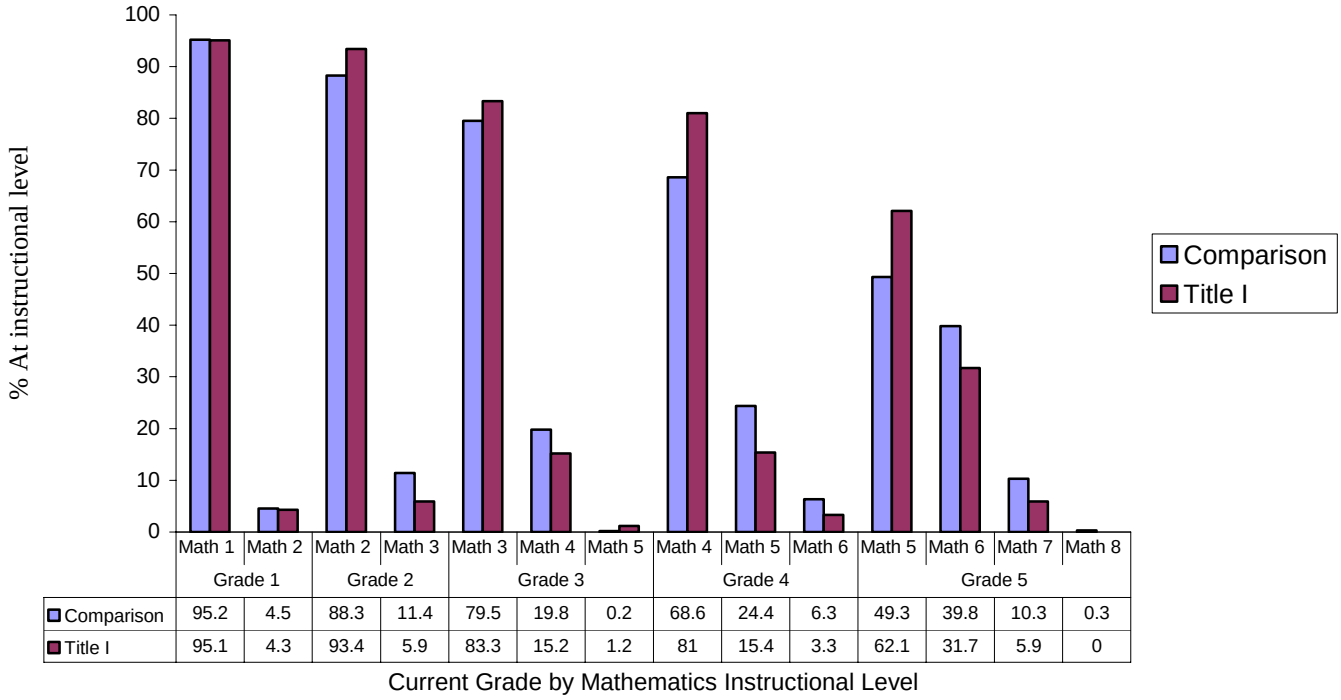
Figure G1. Percentage enrolled in mathematics courses in 2005, by grade level.



	Math 1	Math 2	Math 2	Math 3	Math 3	Math 4	Math 5	Math 4	Math 5	Math 6	Math 7	Math 5	Math 6	Math 7
	Grade 1		Grade 2		Grade 3			Grade 4				Grade 5		
Comparison	97.6	2.1	93.6	5.8	89.3	10.1	0.2	78.0	15.8	4.9	0.7	57.1	32.3	9.7
Title I	96.9	2.9	95.7	3.8	91.3	8.2	0.0	86.4	11.1	2.3	0.1	79.8	19.2	1.0

Current Grade by Mathematics Instructional level

Figure G2. Percentage enrolled in mathematics courses in 2006, by grade level.



	Math 1	Math 2	Math 2	Math 3	Math 3	Math 4	Math 5	Math 4	Math 5	Math 6	Math 5	Math 6	Math 7	Math 8
	Grade 1		Grade 2		Grade 3			Grade 4			Grade 5			
Comparison	95.2	4.5	88.3	11.4	79.5	19.8	0.2	68.6	24.4	6.3	49.3	39.8	10.3	0.3
Title I	95.1	4.3	93.4	5.9	83.3	15.2	1.2	81	15.4	3.3	62.1	31.7	5.9	0

Current Grade by Mathematics Instructional Level

Figure G3. Percentage enrolled in mathematics course in 2007, by grade level.

Table G1

Course Enrollment and Performance on the 2007 *TerraNova* Second Edition

		Proficient End-of-unit Assessment				At or Above 50th NCE Mathematics				At or Above 50th NCE Mathematics Computation			
		No		Yes		No		Yes		No		Yes	
School Group	Course	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Title I	Math 2	482	34.6	910	65.4	712	52.1	654	47.9	497	36.4	870	63.6
	Math 3	21	23.1	70	76.9	--	--	88	98.9	--	--	87	97.8
Comparison	Math 2	597	38.8	943	61.2	718	47.1	806	52.9	557	36.6	963	63.4
	Math 3	8	6.5	115	93.5	--	--	120	97.6	--	--	119	96.7

Note. -- The numbers and percentages for cells with fewer than five students are not reported.

Table G2

Course Enrollment and 2007 Maryland School Assessment Performance in Title I Schools

		End-Of-Unit Proficiency				MSA Math Proficiency Level					
		No		Yes		Basic		Proficient		Advanced	
Grade Level	Mathematics Course	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
3	Math 2	16	100.0	--	--	15	93.8	--	--	--	--
	Math 3	1239	24.4	3835	75.6	871	17.2	2694	53.1	1461	28.8
	Math 4	225	7.8	1036	82.2	4	0.3	261	20.7	995	78.9
	Math 5	10	71.4	4	--	--	--	--	--	14	100.0
	Math 6	--	--	4	--	--	--	--	--	5	100.0
4	Math 3	12	85.7	--	--	12	85.7	--		--	--
	Math 4	1376	30.7	3113	69.3	562	12.5	2282	50.8	1606	35.8
	Math 5	238	14.9	1359	85.1	--	--	224	14.0	1366	85.5
	Math 6	27	6.5	387	93.5	--	--	14	3.4	398	96.1
	Math 7	--	--	26	92.9	--	--	--	--	28	100.0
5	Math 5	1110	33.3	2227	66.7	854	25.6	2259	67.7	195	5.8
	Math 6	265	9.8	2429	90.2	15	0.6	1112	41.3	1560	57.9
	Math 7	48	6.9	649	93.1	--	--	102	14.6	594	85.2

Note. -- The numbers and percentages for cells with fewer than five students are not reported.

Table G3

Course Enrollment and 2007 Maryland School Assessment Performance in Comparison Schools

Current Grade	Mathematics Course	End-Of-Unit Proficiency				MSA Math Proficiency Level					
		No		Yes		Basic		Proficient		Advanced	
		n	%	*n*	%	*n*	%	*n*	%	*n*	%
3	Math 2	7	100.0	--	--	7	100.0	--	--	--	--
	Math 3	1088	41.2	1552	58.8	626	23.7	1521	57.6	466	17.7
	Math 4	274	57.0	207	43.0	7	1.5	160	33.3	312	64.9
	Math 5	17	45.9	20	54.1	--	--	4	10.8	33	89.2
4	Math 4	1380	53.5	1199	46.5	522	20.2	1415	54.9	596	23.1
	Math 5	167	33.9	325	66.1	6	1.2	113	23.0	373	75.8
	Math 6	30	28.0	77	72.0	--	--	5	4.7	101	94.4
	Math 7	--	--	--	--	--	--	--	--	--	--
5	Math 4	10	100.0	0	0.0	10	100.0	--	--	--	--
	Math 5	1194	58.7	840	41.3	694	34.1	1259	61.9	60	2.9
	Math 6	184	17.8	852	82.2	23	2.2	584	56.4	428	41.3
	Math 7	21	11.0	170	89.0	--	--	53	27.7	138	72.3

Note. -- The numbers and percentages for cells with fewer than five students are not reported