MONTGOMERY COUNTY PUBLIC SCHOOLS
Evaluation Brief

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Evaluation of the Implementation of the Title I Funded Math Content Coach Initiative during the 2004–2005 School Year: Findings from May 2005 Math Content Coach Survey

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Background

This brief is part of ongoing efforts of the Montgomery County Public Schools (MCPS) Department of Shared Accountability (DSA) to evaluate the implementation of the Math Content Coach (MCC) initiative in Title I schools. The MCC initiative was instituted at the beginning of the 2002–2003 school year. The MCC initiative consists of direct teacher support to strengthen and extend the school system's existing priority on the development and implementation of a rigorous mathematics curriculum. MCCs ensure consistent and high quality mathematics instruction to improve mathematics achievement. During the 2004–2005 school year, the 17 Title I elementary schools were staffed with a 0.5 or more full-time equivalent for the MCC positions. Other schools used their discretionary funds to finance an MCC position, making for a total of 40 MCCs countywide. This brief will provide a summary and discussion of findings for each area addressed in the survey.

Methodology

To document the implementation of the MCC initiative, DSA administered a survey of MCCs in May 2005. The purpose of the survey was to a) determine how the initiative was implemented during the 2004–2005 school year, b) identify best practices, and c) identify areas of improvement.

A survey was developed in collaboration with the Division of Academic Support, Federal and State Programs; the Office of Organizational Development; and the Department of Curriculum and Instruction. The survey was administered in a group setting during the MCC monthly training in May 2005. Those who did not attend were supplied with an

electronic and/or paper version of the survey. The survey elicited information on a) the emphasis (i.e., activities central to the role of coaches), b) changes made in mathematics instruction, c) most effective aspects of the MCC initiative, d) estimates of the proportion of time spent on specified activities, e) methods used to assess the effectiveness of mathematics instruction, and f) successes of the MCC initiative, challenges, and critical areas needing improvement in their schools.

A total of 34 out of 40 MCCs responded to the surveys, yielding a response rate of 85%. Because 60% (n=20) of the respondents did not indicate their school, responses could not be disaggregated. Therefore, the data presented in this brief are based on the responses from all 34 respondents. The high response rate allows the assumption that the data are generalizable (Fowler, 2002).

Descriptive summary statistics were computed for the structured survey items. The data from the open-ended survey items were reviewed and coded to summarize similar comments. Only comments from three or more respondents were reported in tables.

Summary of Major Findings

In 2004–2005, the major components of the MCC initiative were the following: defining mathematics instructional goals, planning schoolwide mathematics programs, and collaborating with staff development teachers and team leaders to provide job-embedded professional development for teachers. Therefore, coaching, modeling mathematics lessons, working with teachers in the use of formative assessment data to inform instruction, and using school district data to monitor student progress were somewhat or absolutely central to the activities of the majority of the MCCs. In addition, participation in their own professional development was a central emphasis for the majority of the MCCs. These activities also took up the largest proportion of the MCCs' time.

An overwhelming majority (more than 80%) of the respondents indicated that observations by the

principal, discussions at grade-level meetings, and analyses of state and formative assessments were used most often to monitor the effectiveness of mathematics instruction.

At least one third of the respondents indicated that their schools instituted one or more of the following changes in their mathematics instructional program: data chats or dialogs[1], coaching, reteaching, and increased mathematics discourse. These changes also were cited as the most successful aspects of the program in 2004–2005. Respondents also reported evidence of increased understanding of the revised curriculum, increased unit scores, and increased improvements in teaching including reteaching, retesting, and differentiation.

The successful implementation of the initiative was greatly facilitated by the support from the principals, positive reception from the teachers, and the increased mathematics content knowledge and coaching strategies gained from monthly MCC training sessions. Some of the respondents emphasized that teacher resistance and lack of time to meet with teachers posed considerable challenges. Indeed, some of the MCCs seemed overwhelmed by the demands of their positions and the other teaching and nonteaching duties they were expected to perform in their schools. In addition, the size of the school and consequent number of teachers to be supported were challenges to some.

When asked what kind of support they routinely provided to teachers who provide special services, less than a quarter of the respondents (24%) reported providing support specifically to .5 Title I Gifted and Talented (GT), English for Speakers of Other Languages (ESOL) and/or special education teachers on a regular basis. The support provided was focused on curriculum rollout training, lesson planning, and/or coaching for these teachers.

Finally, the majority of respondents identified critical areas that need improvement with regard to the implementation of the MCC initiative in particular and mathematics instruction in general. These areas included the following: a) focus on lowest achievers, b) need for more differentiation and acceleration for all students, c) improvement on the brief constructed response (BCR), d) focus on specific mathematics components especially fractions, measurement, mathematics computation, and problem solving, and e) vertical articulation to ensure consistent mathematics instruction among grades. Also, the respondents pointed out that more support and staff development time was needed to ensure that more teachers feel comfortable with their level of mathematics content knowledge and with providing accelerated instruction.

[1] Data chats or dialogs are types of data discussion sessions, typically conducted at each grade level. The teachers make observations about the presented data, ask questions, and plan next steps.

Findings

The respondents' mean years of teaching experience was 18.2 (SD=9.9). Half (17/34) had taught for 15 years or more. More than half of the respondents had been MCCs at their school for at least two years. The number of teachers supported by the respondents varied from 14 to 48 teachers per school (M=23, SD=9.9) including an average of two special education and/or two ESOL teachers. Ten of the respondents also were academic support/focus teachers while five were .5 Title I funded GT teachers in their schools. Eleven respondents indicated that they also served as the mathematics resource teacher and/or were involved in a variety of teaching duties (especially accelerated mathematics and reading enrichment). Eight of the respondents taught Math A (Appendix Table A1 and A2).

Implementation Status

Central Emphasis of Math Content Coaches' Activities During 2004–2005. To determine the extent to which the MCC program components were implemented, the survey asked the participants to indicate which components or activities were the central emphasis in their schools during 2004–2005[2]. More than two thirds of respondents reported the following activities to be absolutely central in their schools: working with school staff in defining mathematics instructional goals to ensure consistency with the county mathematics program (67.6%), working with school staff in planning a schoolwide mathematics instructional program (67.6%), and collaborating with the staff development teacher to provide job-embedded professional development opportunities for teachers (69.7%). There were two distinct patterns in the responses to items relating to formative assessments and compiling mathematics assessment data for teachers. Developing new formative assessments (67.7%)[3], implementing new formative assessments (73.5%), and compiling mathematics assessment data for teachers (70.6%)

[2] The response categories were: *Not at all central or did not do at all, Previous year's emphasis, Somewhat central, Absolutely central.*

[3] The *somewhat central* and *absolutely central* categories are combined here.

were somewhat or absolutely central to the implementation of the initiative. Conversely, close to one third of respondents neither considered these activities central nor performed them at all.

The respondents widely reported that coaching (93.9%), facilitating vertical articulation to ensure consistency in implementation across grade levels (91.1%), modeling mathematics lessons (85.3%), working with teachers in the use of formative assessment data to inform instruction (85.3%), and using school district data to monitor student progress (85.3%) were somewhat or absolutely central to their activities. Furthermore, 91.2% considered participation in professional development to enhance their understanding of mathematics instruction somewhat or absolutely central.

Facilitating vertical articulation to ensure consistency in implementation with the middle school and effective programming for student instruction were not emphasized strongly or were not performed by 42.4% of the respondents (Appendix Table A3).

Proportion of Time Spent on Specific Activities. The combination of working with grade-level teams, coaching teachers, gathering and providing resources, and attending meetings took up the bulk of the respondents' time. Over one third (35.3%) of respondents spent more than half of their time attending meetings. More than a third of the respondents indicated that working with grade-level teams (38.2%), coaching teachers (38.3%), and/or attending meetings (35.3%) took more than half of their time. Others spent less (25–50%) of their time working with grade-level teams (44.1%) or providing resources (39.4%). Over half of the respondents spent less than a quarter of their time analyzing state assessment data, gathering resources, planning family involvement, and/or implementing family involvement activities. Notably, one in five respondents spent no time planning or implementing family involvement activities (Appendix Table A4).

Significant Changes in Mathematics Instruction Made in 2004–2005. The most frequently cited changes were data-driven instruction (39.4%), increased differentiation and acceleration (24.2%), familiarity and consistency of delivery with the mathematics curriculum guide (24.2%), more team planning and collaboration (24.2%), and increased mathematics discourse (18.2%) (Appendix Table A5).

Monitoring Effectiveness of the Mathematics Instructional Program. Various methods of assessing the effectiveness of mathematics instruction were reported. An overwhelming majority (more than 80%) indicated that observation by the principal, discussion at grade-level meetings, state assessment data, and formative assessments were used to monitor the effectiveness of mathematics instruction in their schools. Less than half of the respondents reported that observations by external evaluators, norm-referenced test data, and/or school-based program reviews were used to assess the effectiveness of the mathematics instruction in their school. However, it is not clear from the findings of this survey how this feedback informed the subsequent activities of the MCCs (Appendix Table A6).

Challenges to Implementation of the MCC Initiative. The challenges most commonly faced and reported were teacher resistance (30.3%) and lack of time to meet with teachers (30.3%). The competing demands on the MCCs' time were compounded by the part-time nature of the MCC position and other duties required of the MCC. Moreover, 12.1% of respondents expressed the view that reading and consequent staff development focus were given a higher priority than mathematics in their schools.

Among all other challenges cited, some MCCs indicated that a few teachers were greatly lacking in mathematics content knowledge: "They don't know what they don't know." Other less prevalent, but notable challenges included the following: schools with many students who have large gaps in mathematics proficiency, minimal evidence of small group instruction, and instances of the incorrect use of the mathematics curriculum in some classrooms (Appendix Table A7).

Support to Teachers of Students Receiving Accelerated Instruction, Special Education, and /or ESOL Services. Eight respondents indicated that they routinely provided support to teachers of GT students and/or students who received ESOL and/or special education services. ESOL teachers were routinely supported through curriculum rollout training, model lessons, or lesson planning; .5 GT teachers were supported through lesson planning/planning for differentiation; and special education teachers were supported through curriculum rollout training, coaching, and/or lesson planning (Appendix Table A8).

Best Practices

Aspects of the MCC Initiative Perceived to be the Most Effective. When asked which MCC program components they considered to be most effective in their schools, MCCs cited the data chats or dialogs and data analysis (64.5%), coaching (45.2%), and increased understanding of the revised mathematics curriculum (32.3%). Evidence of the effective aspects reported included improved teacher capacity as

evidenced in formative assessment and teacher observation data. These improvements have resulted in increased reteaching, retesting, and differentiation (Appendix Table A9).

Factors that Facilitated the Success of the MCC Initiative. Support from the administration (51.5%), teachers being receptive/open to the support (30.3%), and the support from staff development teachers and mathematics development teams (21.2%) were identified as the key factors that facilitated the success of the MCC initiative during the 2004–2005 school year. Specifically, strong principal support and openness of the administration to new ideas were expressed. In addition, the implementation of the MCC initiative was facilitated by the nonthreatening position of the MCCs, continued rollout training, as well as networking with fellow MCCs (Appendix Table A10).

Benefits of Monthly MCC Training. Overall, the MCCs praised the monthly MCC training for being appropriate to their needs and being an avenue to exchange ideas with other coaches. Above all, the monthly MCC training sessions supported the implementation efforts through increased mathematics content knowledge (45.5%), enhanced coaching strategies (36.4%), and learning about changes, updates, and MCPS expectations (21.2%). Exchange of ideas with other MCCs was considered beneficial (15.2%) (Appendix Table A11).

Critical Areas Needing Improvement

The respondents identified the need to focus more on the lowest achievers, English Language Learners (ELLs), and students receiving special education services because data showed that these groups were not meeting grade level standards. As such, supporting students not meeting success on unit assessments, reteaching and retesting in all areas, and focus on differentiation and acceleration for all students were cited as critical areas needing improvement. Other areas requiring attention during the MCC monthly training and support provided to classroom teachers were—students' achievement in concepts underlying fractions, measurement, problem solving, algebra, mathematics computation, BCRS, and responding to increased mathematics discourse (Appendix Table A12).

Recommendations

Encourage schools to ensure time is set aside for teachers to participate in staff development efforts conducted by the MCCs. The respondents indicated that more time was needed to enable more teachers to feel comfortable with their mathematics content knowledge and with providing accelerated instruction. In addition, the following is recommended:

- Balance the focus on mathematics and reading.
- Continue to focus on increasing the mathematical proficiency of all students by addressing the needs, as well as strengths, of all students.
- Provide additional training to MCCs and teachers with regard to the specific areas identified as needing improvement in the schools.
- Increase the focus on vertical articulation to ensure consistent program implementation across Grades K–5 and middle school.
- Develop a mechanism for MCCs and Title I GT teachers within each school to synchronize their staff development efforts regarding accelerated mathematics instruction.
- Work with teachers to determine ways to provide increased, structured, and strategic support to teachers of identified GT students and students receiving ESOL and/or special education services.

References

Fowler, F. J. (2002). *Survey research methods* (3rd ed.). Thousand Oaks, CA: Sage.

[i] The author would like to thank Mrs. Donna Shipley of DSA for her assistance with coding and summarizing the qualitative data from the open-ended items in the survey, and the math content coaches who contributed their time to complete the survey.

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Evaluation of the Implementation of the Title I Funded Math Content Coach Initiative During the 2004–05 School Year: Findings from Math Content Coach Survey

Appendix

Table A1
Number and Percentage of Respondents Describing their Background Information

Background Information	Number of respondents *N*	Missing	Mean	Standard Deviation	Median
Total number of years teaching	31	3	18.2	9.9	15.0
Number of years as MCC at this school	32	2	2.2	2.3	2.0
Number of hours per week in MCC position	33	1	20.5	10.3	20.0
Number of teachers supported	33	1	23.3	10.0	23.0
Number of ESOL teachers in school	31	3	2.9	2.3	2.0
Number of special education teachers in school	32	2	2.5	1.6	2.0

Table A2
Number of Respondents Describing Their Other Positions and Teaching Duties

		n
Other positions	Academic support/focus teacher	10
	GT	5
	All other positions	3
	None/NA	8
Other teaching duties	Teach class(es)	6
	Support/resource/focus teacher	7
	None/NA	11
Teach Math A	No	25
	Yes	8

Table A3
Number and Percentage of Respondents Indicating the Central Emphasis of the Implementation of the Math Content Coach Initiative in 2004–2005

Component	Not central at all		Previous years' emphasis		Somewhat central		Absolutely central	
	n	%	*n*	%	*n*	%	*n*	%
Working with school staff in defining mathematics instructional goals to ensure consistency with county mathematics program.	0	0.0	6	17.6	5	14.7	23	67.6
Working with school staff in planning a schoolwide mathematics instructional program.	2	5.9	3	8.8	6	17.6	23	67.6
Facilitating vertical articulation to ensure consistency in implementation across grade levels.	2	5.9	1	2.9	18	52.9	13	38.2
Facilitating vertical articulation to ensure clear communication with the middle school and effective programming for student instruction.	14	42.4	2	6.1	13	39.4	4	12.1
Leading grade-level team planning groups.	1	2.9	1	2.9	15	44.1	17	50.0
Developing new formative assessments.	11	32.4	0	0.0	12	35.3	11	32.4
Implementing new formative assessments.	9	26.5	0	0.0	15	44.1	10	29.4
Compiling mathematics assessment data for teachers.	10	29.4	0	0.0	10	29.4	14	41.2
Sharing and reviewing mathematics assessment data with teachers.	1	3.0	2	6.1	11	33.3	19	57.6
Modeling mathematics lessons.	4	11.8	1	2.9	13	38.2	16	47.1
Coaching teachers on a range of mathematics topics and strategies.	1	3.0	1	3.0	11	33.3	20	60.6
Working with teachers in the use of formative assessments to inform instruction.	4	11.8	1	2.9	17	50.0	12	35.3
Working with teachers to use student work to inform instruction.	3	8.8	4	11.8	15	44.1	12	35.3
Examining student work to monitor program implementation.	1	3.0	4	12.1	17	51.5	11	33.3
Using school-based formative assessment data to monitor students' progress in mathematics.	2	5.9	2	5.9	13	38.2	17	50.0
Using school district assessment data to monitor students' progress in mathematics.	3	8.8	2	5.9	12	35.3	17	50.0
Collaborating with the staff development teacher to provide job-embedded professional development opportunities for teachers.	1	3.0	2	6.1	7	21.2	23	69.7
Collaborating with team leaders to provide job-embedded professional development opportunities for teachers.	6	17.6	1	2.9	13	38.2	14	41.2
Participating in professional development experiences to enhance understanding of mathematics instruction.	1	2.9	2	5.9	9	26.5	22	64.7

Table A4
Number and Percentage of Math Content Coaches Reporting Time Spent on Specific Activities by Proportion of Time

Specific Activities	Proportion of Time (%)							
	None		1–25%		26–50%		> 50%	
	n	%	*n*	%	*n*	%	*n*	%
Analyzing formative assessment data	2	5.9	15	44.1	10	29.4	7	20.5
Analyzing state assessment data	4	11.8	18	52.9	10	29.4	2	5.8
Planning family involvement activities	8	23.5	18	52.9	5	14.7	3	8.8
Implementing family involvement activities	8	23.5	21	61.8	2	5.9	3	8.8
Planning curriculum rollout training	2	5.9	14	41.2	11	32.4	7	20.6
Implementing curriculum rollout training	2	6.1	15	45.5	9	27.3	7	21.2
Working with grade-level teams	0	0.0	6	17.6	15	44.1	13	38.2
Coaching teachers	1	2.9	10	29.4	10	29.4	13	38.3
Gathering resource materials	0	0.0	18	52.9	9	26.5	7	20.6
Providing resources	0	0.0	11	33.3	13	39.4	9	27.3
Attending meetings (e.g., leadership team meetings)	1	2.9	15	44.1	6	17.6	12	35.3

Table A5
Number and Percentage of Respondents Reporting Significant Changes Made in Mathematics Instruction during 2004–2005

Changes made in 2004–2005 (multiple responses)	*n*	%
Data-driven instruction	13	39.4
Differentiation/acceleration	8	24.2
Familiarity/consistency with mathematics curriculum guide	8	24.2
More team planning/collaboration	8	24.2
Increased mathematics discourse	6	18.2
Block schedule model	5	15.2
All other significant changes (e.g., computation in the morning, implementation of basic fact skills)	4	12.1

Table A6
Number and Percentage of Respondents' Reporting Methods their Schools Used to Monitor the Effectiveness of Mathematics Instruction in 2004–2005

Methods (Multiple responses)	*n*	%
Discussion at grade-level meetings	32	94.1
Observation by principal	31	91.2
Formative assessments	28	82.4
State assessment data	28	82.4
Observation by MCC	27	79.4
School-based walk-throughs	27	79.4
Local assessments	26	76.5
Observation by consultant or external evaluator	14	41.2
Norm-referenced test data	13	38.2
School-based program reviews	9	26.5

Table A7
Types of Challenges in the Implementation of Math Content Coach Initiative during 2004–2005 School Year

Challenges	*n*	%
Teacher resistance	10	30.3
Lack of time/no time to meet with teacher	10	30.3
All other challenges (e.g., school not using mathematics monitoring tool, upper grade classes too large, size of school and number of teachers supported by one coach, incorrect use of the mathematics curriculum)	10	30.3
Reading is priority	4	12.1
MCC has other duties/position is only part-time	5	15.2

Table A8
Types of Support Routinely Provided to English for Speakers of Other Languages, .5 Gifted and Talented, and Special Education Teachers

Support	ESOL		Gifted and Talented		Special Education	
	n	%	*n*	%	*n*	%
Coaching	3	11.54	2	7.69	4	16.67
Model/model lesson	3	11.54	3	11.54	3	12.50
Rollout training	7	26.92	2	7.69	5	20.83
Small group/one-on-one instruction	2	7.69	2	7.69	2	8.33
Lesson planning/plan for differentiation	3	11.54	8	30.77	4	16.67
None	5	19.23	8	30.77	3	12.50
All other support (e.g., resources for special education teachers; language support for ESOL teachers; and providing resources or recommend students for acceleration to the GT teachers)	3	11.54	1	3.85	3	12.50

Table A9
The Most Effective Aspects of the Math Content Coach Initiative in 2004–2005

Effective Aspect (multiple responses)	*n*	%
Data drives instruction/data analysis	20	64.5
Coaching	14	45.2
Understanding new/revised mathematics curriculum	10	32.3
Increased mathematics discourse	6	18.20
All other effective initiatives (e.g., sharing ideas with grade-level teams, grade-level team meetings, planning with teachers, rollout training)	5	16.1

Table A10
Factors that Facilitated the Success of the Math Content Coach Initiative During 2004–2005

Factors (multiple responses)	*n*	%
Support from administration	17	51.5
All other factors that facilitated success (collaboration of team leaders, teachers, specialists, and administrators; support from mathematics office; school improvement plan; continued rollout training)	11	33.3
Teachers receptive/open to support	10	30.3
Support from staff development teacher and leadership team	7	21.2
People (networking with other MCCs, people providing MCC support)	4	12.1

Table A11
Number and Percentage of Respondents Reporting Benefits of
Math Content Coaches' Monthly Training During 2004–2005

Support	*n*	%
Mathematics content-knowledge/information	15	45.5
Learned coaching strategies	12	36.4
Learned updates/changes/MCPS expectations	7	21.2
All other ways training supported MCC (outstanding and appropriate support, materials and resources, help clarify job responsibilities)	6	18.2
Exchange of ideas with other MCCs	5	15.2
Mathematics specialist (available and responsive)	3	9.1

Table A12
Number and Percentage of Respondents' Identifying Critical Areas Needing Improvement

Critical Areas	*n*	%
Focus on lowest achievers/reteaching	13	39.4
Specific mathematics components that need improvement (measurement, mathematics computation, problem solving, and fractions)	10	30.3
More acceleration/differentiation for all	6	18.2
Improve BCR–oral and written mathematics communication	6	18.2
All other critical areas needing improvement (e.g., developing proficiency for 2nd and 4th grade students, reading comprehension, and retention)	5	15.2