Report on Everyday Math Program Evaluation

March 12, 2009

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Executive Summary

For the past several months, parents and professionals in the CSSU community reviewed the Everyday Math (EDM) program. Drawing from the teacher and parent surveys, CSSU student performance data, current research in mathematics, and consultation with math experts, several key points in regard to the EDM program are identified in this report. Additionally, next steps are outlined.

Overall, teachers felt that EDM is not appropriate for all students, especially students with language issues. Problems with the program's structure and organization interfere with delivery, there are difficulties with differentiating instruction, and technology is poorly integrated.

Research indicates that the spiraling curriculum of concepts in EDM is no longer considered best practice. There is no clear evidence that EDM leads to significantly better performance compared to control groups.

In regard to student performance data across CSSU, 2005-2008 NECAP math scores reveal there is no consistent improvement over time. There is no improvement in the scores for students of lower SES. There is no improvement for students on IEPs.

Next steps:

1. Select programs to pilot.
2. Identify a group of teachers to pilot units of instruction from other mathematics programs.
3. Convene the pilot group in October 2009 to share information on the piloted programs versus EDM.
4. Recommend retention or replacement of EDM.

Introduction

During the academic school year 2008-09, CSSU professionals engaged in an audit of the Everyday Math program. We used student data, a teacher survey, a parent satisfaction survey, and research to help us determine if EDM is serving our students well. The primary purposes of the audit were:

- To determine the level of fidelity in teaching the EDM program within the four elementary schools
- To provide the CSSU educators and community with an opportunity to evaluate the effectiveness of the EDM program and its impact on students.

Interpretation of Literature Review

Research is an ongoing process. The literature we have reviewed comprises highest-quality scientific research, promising or suggestive findings, and statements based on values and opinions. A limited number of studies have been conducted by independent researchers on specific math programs.

Our sources were:

- NCTM's *Focal Points*
- Report of the *National Mathematics Advisory Panel*
- *Adding It Up, Helping Children Learn Mathematics*
- *Alternatives for Rebuilding Curricula*
- *Intervention:* Everyday Mathematics
- *Effective Programs in Elementary Mathematics: A Best-Evidence Synthesis*
- *Research Basis of* Everyday Mathematics: Everyday Mathematics *Student Achievement*

The complete results appear in Appendix B. Here is our summary of the most salient points of the research.

- Everyday Math, along with two other math programs that were funded by the National Science Foundation, was an improvement over mathematics programs in place before the 1980's. (Refer to ARC Study)
- Studies between 1997 and 2001 rate Everyday Math as mildly positive, rarely with statistical significance. (What Works Clearinghouse)
- Instructional process programs are rated as the best approach to improving mathematics achievement as compared to computer-aided instruction and mathematics curricula. (Best Evidence Synthesis). Everyday Math is categorized as mathematics curriculum.
- Algebra is a gateway to higher learning in mathematics and better jobs.
- In order for students to be algebra-ready, students need to be proficient in a prescribed list of concepts including strong fluency with whole numbers and operations, proportionality, positive and negative numbers, rational numbers, problem solving and certain aspects of geometry .
- Numerous sources recommend a streamlined and concentrated progression of limited topics in the early grades.
- Students can learn a concept if they have the foundation for that learning.
- A student who is not successful in math will not perceive herself as a mathematics learner. This will inhibit her ability to learn the next topic.
- Teachers of mathematics need strong content knowledge as well as effective pedagogy.

Data

For this study we analyzed data collected from the following sources:

- Survey of CSSU Everyday Math teachers
- Student performance across CSSU schools
- Survey of parents.

Teacher Survey

We asked all CSSU teachers who are teaching, or have taught, Everyday Math to take a survey on their perceptions of the program. The 32 questions spanned the following five categories:

- Mathematical content
- Organization and structure of the program
- Student experience
- The teacher's role
- Assessment.

The complete results appear in Appendix A. Here are the key findings:

1. Overall, support for EDM was weakly positive, with an average rating of 5.8 on a scale to 10.
2. The most positive responses pertained to parent involvement (3.71 on a scale to 5) and "coherent, with increasing complexity" (3.66).
3. Of all questions, the lowest average rating pertained to EDM's technology integration (1.99).
4. The second lowest rating was found on the question that read "The program is appropriate for *all* students" (2.26).
5. The third lowest rating related to EDM's support for differentiation (2.49).
6. Of the five categories, none earned a majority of positive responses. The "organization and structure" category earned the least support: Five questions earned disapproval, while the other two were neutral.

We believe that observations four and five speak directly to program inadequacies for students of low socio-economic status, those on IEPs, and those who require enrichment. All three are subgroups of particular interest to CSSU. Item three, technology integration, is germane to the goal of moving schools toward 21st-century pedagogy (see the *Connectivity 21* initiative).

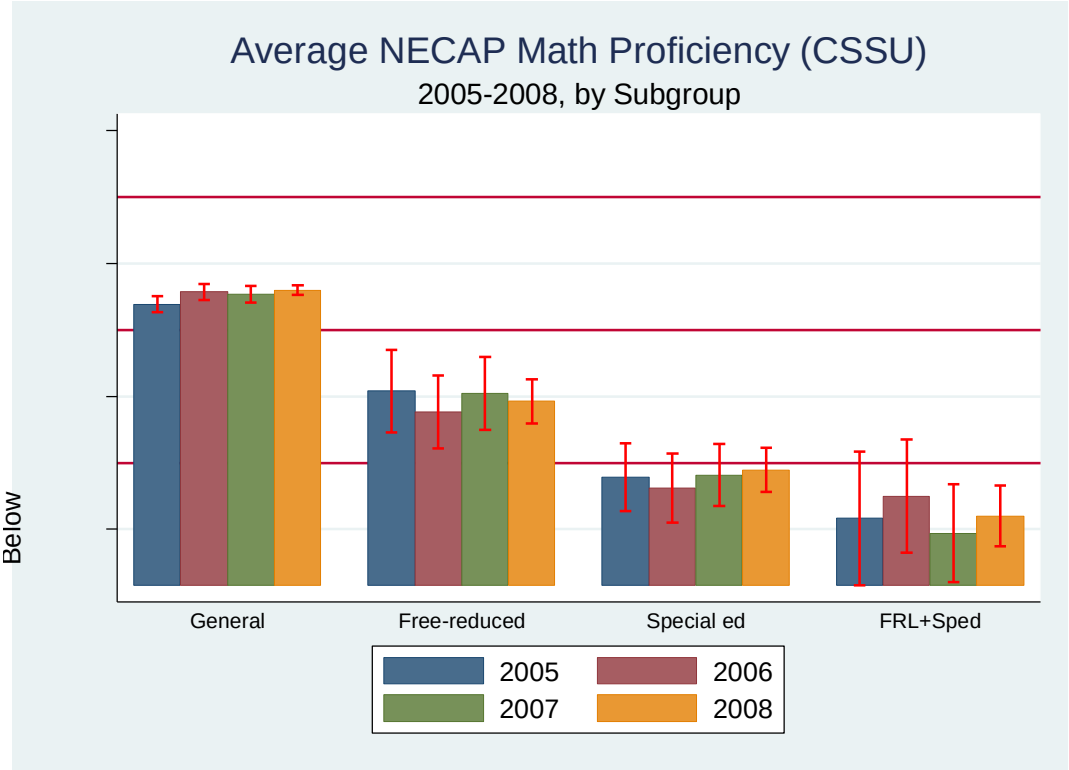
In addition, here are the opinions most frequently expressed in the teacher survey:

- Spiraling curriculum, as implemented in *Everyday Math,* does not work well with low-performing segments of the population
- *Everyday Math* needs to be supplemented in many areas
- Students would benefit from a program having a more constructivist approach than *Everyday Math*
- The program is good overall, though perhaps more so at specific grade levels.

Student Performance Data

It is difficult to draw firm conclusions about the effectiveness of *Everyday Math* from student performance data since there is no control group. However, a goal of the Chittenden South schools is growth over time in our students' math performance, both overall and within key subgroups (e.g., low-socioeconomic students). Everyday Math is the most conspicuous common component in CSSU's math instruction. How do our students fare?

To gain some visibility into this question, we drew on the 2005-2008 NECAP math scores to generate the following graph. It shows the average math proficiency level of all CSSU students, grades 3-8, over the four-year span. The red error bars illustrate the confidence interval of the averages.



Judging from the heights of the bars, there isn't a lot of change over the four administrations of the NECAP. The only possible trend could be a very slight improvement in the general (non-FRL, non-IEP). Otherwise, any differences are quite modest. Examining the error bars within each of the four

subgroups further suggests that there is not much movement, and certainly no clear trend, across the years.

The data also indicated that the same pattern existed within each of the CSSU schools.

From this, we infer that whatever we're doing, kids as a group tend to stay about the same. Since we seek improvement, and the one constant across all systems is Everyday Math, we think this is reason to consider alternatives.

Parent Survey

Over a span of three weeks in February-March, 2009, parents of all CSSU schools had the opportunity to express their opinions of the Everyday Math program. Our analysis treats both the question responses and the comments.

Question responses

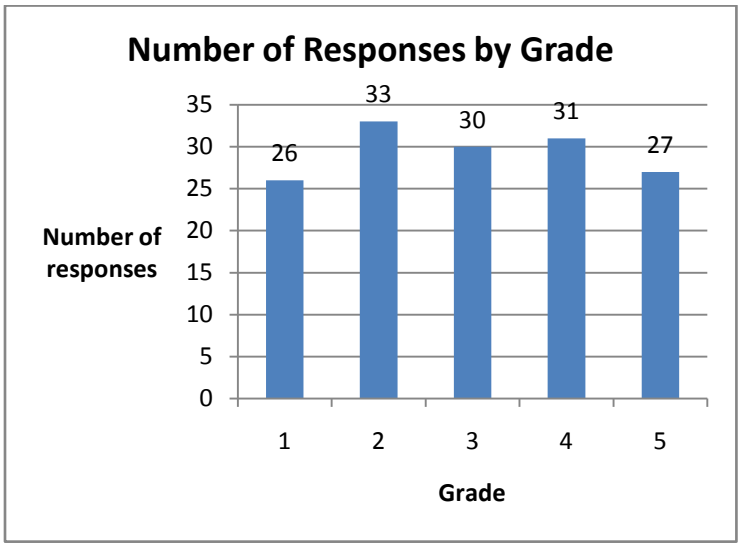
The survey offered the following seven statements:

1. My child has a positive attitude toward math.
2. It is clear to me what my child is supposed to be learning in math.
3. Everyday Math challenges my child appropriately.
4. The Everyday Math homework is clear and allows me to help my child when needed.
5. The Everyday Math homework is worthwhile.
6. The Everyday Math tests demonstrate what my child knows.
7. I am satisfied with the Everyday Math program.

For each question parents selected one of the following five choices:

- Strongly disagree
- Disagree
- Agree
- Strongly agree
- No response.

In addition, parents indicated the grade levels of their children. Responses were fairly evenly distributed across grade, as the following graph shows. (Note that parents responded once for all of their children; a single response could cover several grades, so the total of responses by grade exceeds the number of survey responses.)

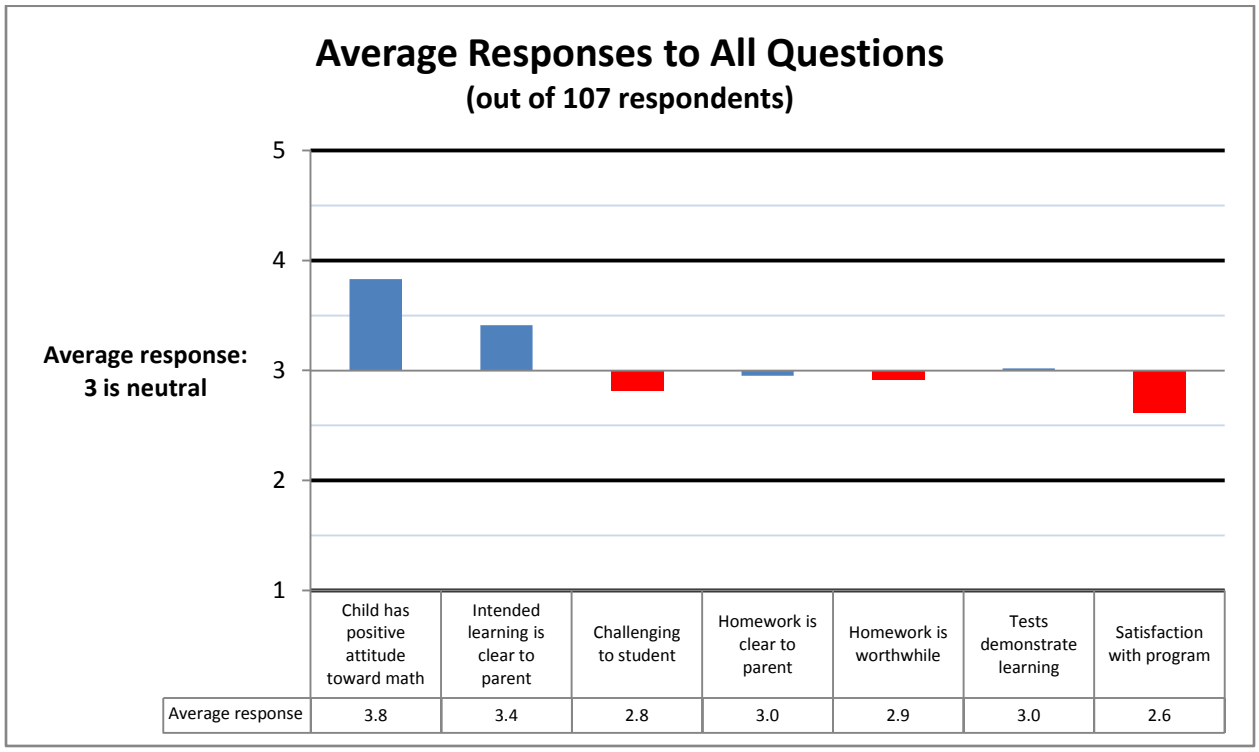


For this analysis, we coded the question responses as follows:

Response	*Code*
Strongly disagree	1
Disagree	2
No response	3
Agree	4
Strongly agree	5

Under this coding system, 3 then, represents a neutral response.

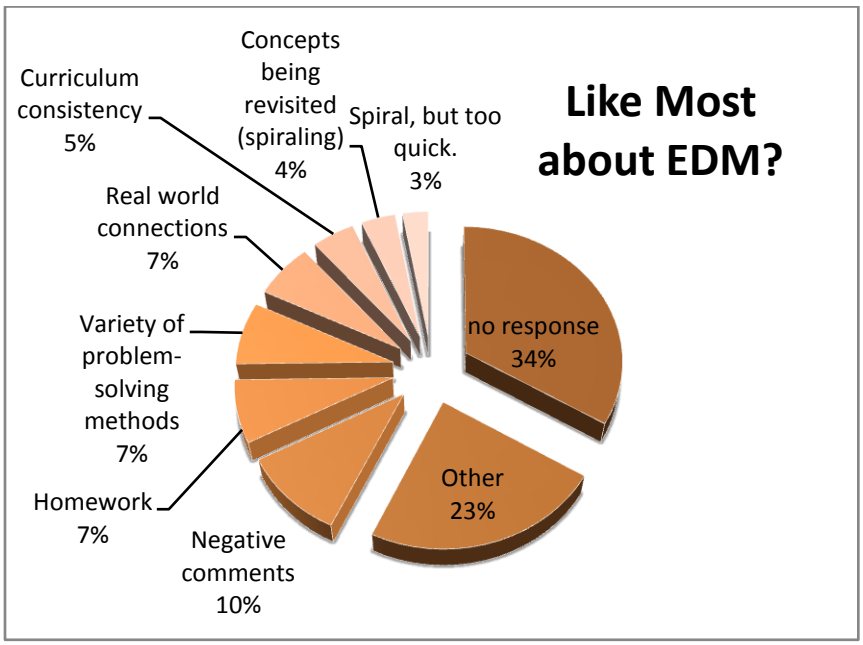
The following table shows the average response for each of the seven questions.

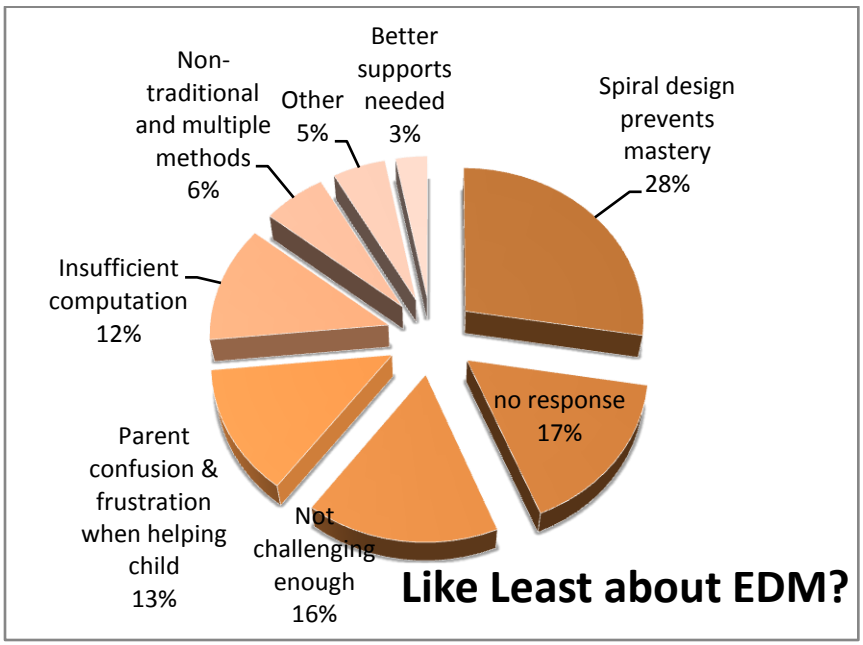


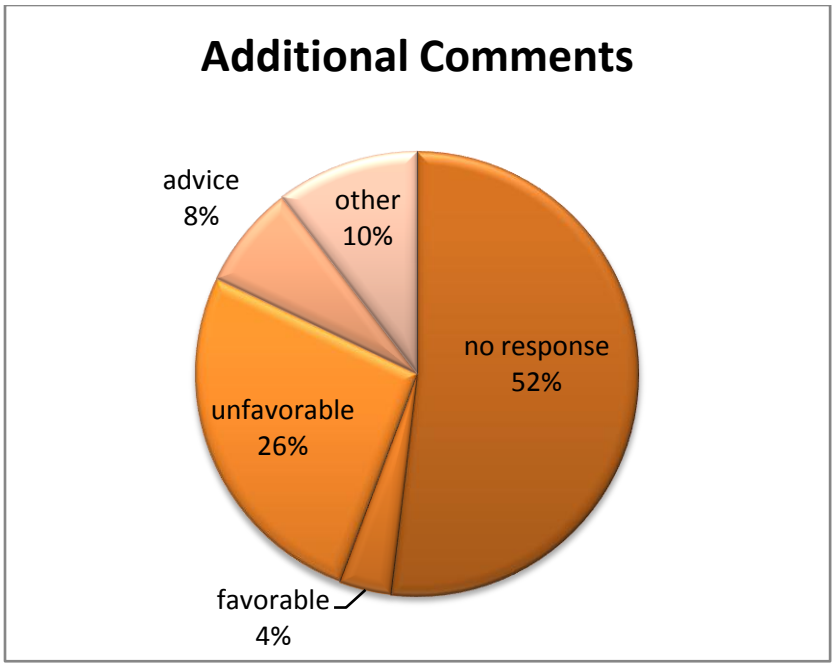
Open Comments

Parents also had an opportunity to submit comments to three prompts:

- What do you like most about the Everyday Math program?
- What do you like least about the Everyday Math program?
- Additional comments







Analysis

The quantitative part of the survey did not reflect strong support for Everyday Math. Overall satisfaction is mildly negative (2.6 on a scale of 1-5). Of the other six questions, the one that stated "My child has a positive attitude toward math" earned the most agreement, with the average approaching "Agree" (3.8). There was mild support for the statement "It is clear to me what my child is supposed to be learning in math" (3.4).

With respect to comments, parents seemed more willing to respond to the second question "What do you like least about the Everyday Math program?" The most frequently expressed concern was about the Everyday Math spiral design (28% of parent comments).

Parents' most favorable comments about Everyday Math noted its connections to real-world problems, the variety of methods for problem-solving, and good homework materials (7% of parent responses for each of these). Numerous other favorable facets of Everyday Math were mentioned on a singleton basis.

The "additional comments" that were submitted tended to be less favorable in nature. Some helpful suggestions were also provided and are appreciated.

Recommendation

Based on our studies, we recommend piloting possible alternatives to *Everyday Math.* We hope to identify a program that better:

- Emphasizes students being active learners and does not rely only on teacher-directed instruction
- Embodies a more straightforward progression of content
- Emphasizes depth over breadth
- Provides quality support for differentiated instruction
- Supports instructional practices and materials based on the most current research
- Supports the teacher with well-organized, user-friendly materials
- Promotes integration of technology.

In addition, research clearly indicates that there are important non-programmatic elements to successful mathematics delivery. While not directly tied to Everyday Math, we feel it is critical to mention them here:

- Success depends on having a strong professional development plan for teachers of math
- Teachers require strong content knowledge regardless of grade level
- It may be both more efficient and more effective to train teachers to specialize in elementary math instruction.

Highlights from School Action Plans

Each of our schools' action plans have one or more steps that concern math achievement. In this section we have summarized these steps and looked at how Everyday Math seemed to align with our goals.

Goal	*Impact of Everyday Math*
Improve support for all students, including low-performing, low-SES and advanced students	There is no evidence of improvement within the low-SES subgroup.
Meet individual students' learning needs in mathematics	Teacher survey indicates a perception that this is a weakness of Everyday Math.
Improve support for lower-functioning math students	Teacher survey indicates a perception that this is a weakness of Everyday Math.
Insure all students have equal access to curriculum-related learning opportunities that integrate technology, including that teachers incorporate technology tasks in their curriculum	Teacher survey indicates a perception that technology is a weakness of Everyday Math. If technology integration depends on supplementation, variations in teachers' familiarity with technology means that students do not start out on a level playing field.

Appendix A: Teacher Survey Results

Respondents were asked to rank Everyday Math in the following 32 areas. Response choices ranged from 1 ("strongly disagree") to 5 ("strongly agree"). Additionally, teachers gave an overall "grade" to Everyday Math: This response ranged from 1 to 10.

Colors denote "polarity" of the answer, as follows: Red: Negative Blue: Neutral* Green: Positive				Mean by school				Statistically significant difference across schools?
		N	Mean	CCS	HCS	SCS	WSD	
	Content							
C1	Problem solving	88	**2.58**	2.95	2.26	2.33	2.65	No
C2	Communication	89	**2.92**	3.40	2.53	2.67	2.97	Yes
C3	Connections	89	**2.87**	3.30	2.26	2.73	3.00	Yes
C4	Comprehensive	88	**3.24**	3.70	2.33	3.13	3.47	Yes
C5	Coherent, with increasing complexity	87	**3.66**	4.05	2.84	3.40	3.97	Yes
C6	Doable in one year	84	**2.54**	3.37	2.06	2.33	2.41	Yes
	Organization and Structure							
O1	Units have sufficient time for depth	88	**2.59**	3.21	1.89	2.53	2.66	Yes
O2	Worthwhile math tasks	88	**2.67**	3.42	2.11	2.33	2.71	Yes
O3	Logical sequence	89	**2.93**	3.55	2.16	2.47	3.18	Yes
O4	Incorporate calculators and other tech	82	**2.78**	3.61	2.59	2.33	2.63	Yes
O5	Includes differentiation	88	**2.91**	3.35	2.11	2.40	3.26	Yes
O6	Appropriate for all	88	**2.26**	2.79	1.58	2.20	2.37	Yes
O7	Facilitates DI and accommodations	89	**2.49**	3.00	1.70	2.14	2.76	Yes
	Student Experience							
S1	Students are active learners	91	**3.39**	3.90	2.90	2.79	3.60	Yes
S2	Construct their own understanding	91	**3.06**	3.55	2.33	2.93	3.26	Yes
S3	Mathematical discourse.	91	**3.15**	3.70	2.48	2.93	3.32	Yes

S4	Manipulatives	90	**3.17**	3.75	2.57	2.93	3.30	Yes
S5	Use technology	84	**1.99**	2.44	1.56	1.62	2.11	Yes
S6	Calculate vs. estimation	85	**3.17**	4.06	2.53	3.07	3.14	Yes
S7	Reflect: behavior, performance, and feelings	86	**2.85**	3.17	2.40	2.50	3.08	Yes
S8	Materials are “user friendly"	91	**2.87**	3.70	2.00	3.00	2.87	Yes
	Teacher's Role							
T1	*Materials contain suggestions to…*							
T2	Help foster reasoning, connections, conjecture…	86	**3.14**	3.65	2.44	2.79	3.35	Yes
T3	Help foster discourse	87	**3.14**	3.70	2.61	2.64	3.29	Yes
T4	Help all learn	87	**2.92**	3.35	2.22	2.57	3.16	Yes
T5	Develop culture of understanding	87	**2.84**	3.60	2.39	2.43	2.82	Yes
T6	Helps teachers reflect and adapt	85	**2.64**	3.16	2.00	2.29	2.81	Yes
T7	Involve parents	87	**3.71**	4.10	3.11	3.71	3.79	Yes
T8	Teachers’ guides are “user friendly.”	90	**3.42**	3.65	3.00	3.50	3.50	No
	Assessment							
A1	Integrated assessment	88	**3.31**	3.85	2.90	3.00	3.34	Yes
A2	Test generator	78	**2.78**	3.19	2.39	2.73	2.81	No
A3	Multiple formative assessments	86	**3.21**	3.45	2.89	2.79	3.41	No
A4	Multiple summative assessments	83	**2.94**	3.25	2.83	2.46	3.00	No
	Rating of Program	90	**5.78**	7.25	4.14	5.29	5.92	Yes

* "Neutral" means that the mean was statistically equal to 3.

Appendix B: Literature Review

Excerpts from the *NCTM Focal Points*

Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics:
A Quest for Coherence. NCTM, Inc. Reston, VA, April 2006.

"NCTM: The National Council of Teachers of Mathematics is a public voice of mathematics education, providing vision, leadership and professional development to support teachers in ensuring equitable mathematics learning of the highest quality for all students."

Curriculum focal points are important mathematical topics for each grade level, pre-K–8. These areas of instructional emphasis can serve as organizing structures for curriculum design and instruction at and across grade levels. […]

When instruction focuses on a small number of key areas of emphasis, students gain extended experience with core concepts and skills. Such experience can facilitate deep understanding, mathematical fluency, and an ability to generalize. The decision to organize instruction around focal points assumes that the learning of mathematics is cumulative, with work in the later grades building on and deepening what students have learned in the earlier grades, without repetitious and inefficient reteaching. A curriculum built on focal points also has the potential to offer opportunities for the diagnosis of difficulties and immediate intervention, thus helping students who are struggling with important mathematics content. […]

[The Focal Points publication] represents an attempt to provide curriculum developers with a clear organizational model for establishing a mathematics curriculum from prekindergarten through grade 8 by identifying for each grade level important content that can build connected and integrated mathematical understanding. The curriculum focal points and their accompanying "connections" to related content outline instructional targets for a basic, integrated grade-by-grade framework for a coherent mathematics curriculum. […]

To achieve the best results with students when teaching for the depth, understanding, and proficiency sought by the curriculum focal points, teachers themselves will need a deep understanding of the mathematics and facility with the relationships among mathematical ideas. Thus, effective instruction built on the curriculum focal points requires in-depth preparation of preservice teachers and ongoing professional development for in-service teachers.

Excerpts from the Report of the National Math Advisory Panel

See www.ed.gov/MathPanel for the executive summary and full report (March 2008)

"On March 13, 2008, the National Mathematics Advisory Panel presented **Foundations for Success: The Final Report of the National Mathematics Advisory Panel** to the President of the United States and the Secretary of Education. In response to a Panel recommendation, the U.S. Department of Education, in partnership with the **Conference Board of Mathematical Sciences**, hosted the first National Math Panel Forum on October 6-7, 2008. The Forum brought together various organizations and other interested parties to use the Panel's findings and recommendations as a platform for action."

Core Principles of Math Instruction

- The areas to be studied in mathematics from pre-kindergarten through eighth grade should be streamlined and a well-defined set of the most important topics should be emphasized in the early grades. Any approach that revisits topics year after year without bringing them to closure should be avoided.
- Proficiency with whole numbers, fractions, and certain aspects of geometry and measurement are the foundations for algebra. Of these, knowledge of fractions is the most important foundational skill not developed among American students.
- Conceptual understanding, computational and procedural fluency, and problem solving skills are equally important and mutually reinforce each other. Debates regarding the relative importance of each of these components of mathematics are misguided.
- Students should develop immediate recall of arithmetic facts to free the "working memory" for solving more complex problems.
- The benchmarks set forth by the Panel should help to guide classroom curricula, mathematics instruction, textbook development, and state assessments.
- More students should be prepared for and offered an authentic algebra course at Grade 8.
- Algebra should be consistently understood in terms of the "Major Topics of School Algebra," as defined by the National Math Panel.
- The Major Topics of School Algebra include Symbols and Expressions; linear equations; quadratic equations; functions; algebra of polynomials; and combinatorics and finite probability.

Student Effort Is Important

- Much of the public's "resignation" about mathematics education is based on the erroneous idea that success comes from inherent talent or ability in mathematics, not effort. A focus on the importance of effort in mathematics learning will improve outcomes. If children believe that their efforts to learn make them "smarter," they show greater persistence in mathematics learning.

Importance of Knowledgeable Teachers

- Teachers' mathematical knowledge is important for students' achievement. The preparation of elementary and middle school teachers in mathematics should be strengthened. Teachers cannot be expected to teach what they do not know.
- The use of teachers who have specialized in elementary mathematics teaching could be an alternative to increasing all elementary teachers' mathematics content knowledge by focusing the need for expertise on fewer teachers.

Effective Instruction Matters

- Teachers' regular use of formative assessments can improve student learning in mathematics.
- Instructional practice should be informed by high-quality research, when available, and by the best professional judgment and experience of accomplished classroom teachers.
- The belief that children of particular ages cannot learn certain content because they are "too young" or "not ready" has consistently been shown to be false.
- Explicit instruction for students who struggle with math is effective in increasing student learning. Teachers should understand how to provide clear models for solving a problem type using an array of examples, offer opportunities for extensive practice, encourage students to "think aloud," and give specific feedback.
- Mathematically gifted students should be allowed to accelerate their learning.
- Publishers should produce shorter, more focused and mathematically accurate mathematics textbooks. The excessive length of some U.S. mathematics textbooks is not necessary for high achievement.

Effective Assessment

The quality of the National Assessment of Educational Progress (NAEP) and state assessments in mathematics should be improved and should emphasize the most critical knowledge and skills leading to Algebra.

Importance of Research

Our nation must continue to build the capacity for more rigorous research in mathematics education to inform policy and practice more effectively.

Summary of Adding It Up, Helping Children Learn Mathematics

- National Research Council, Adding It Up, Helping Children Learn Mathematics: J. Kilpatrick, J. Swafford, and B. Findell (Eds), 2001.

- Mathematics Learning Study Committee, Center for Education, Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

Adding It Up is the product of an 18-month project in which 16 individuals with diverse backgrounds, as a committee, reviewed and synthesized relevant research on mathematics learning from pre-kindergarten through grade 8.

Curriculum

- More students should be prepared to study algebra in 8th grade. Algebra is considered a gateway to later achievement.
- Curriculum needs to be streamlined and have a well-defined set of critical topics in the early grades. It is recommended that topics be presented in a way to develop ideas thoroughly. Proficiency should be developed before advancing to other topics. Review and consolidation should be increased.
- Instead of cursory and repeated treatment of a topic, the curriculum should be focused on important ideas, allowing them to be developed thoroughly and treated in depth.
- Grades 1-4 should focus on a strong fluency with whole numbers: place value, operations, properties, automatic recall of facts, operation algorithms, estimation,
- Grades 5-6 should focus on proportionality and certain aspects of geometry: positive and negative fractions, number line, fraction/decimal/percents relationships, rational operations, problem-solving, symbolic notation introduction, and certain geometry concepts (similar triangles, perimeter, area, volume, surface area, unknown lengths, angles, area).

Learning

- Mathematical proficiency has five components which should be developed simultaneously: conceptual understanding (comprehension), procedural fluency, strategic competence (problem-solving), adaptive reasoning (capacity for logical thought), and productive disposition (understand relevance of math in general and understand one's self perception as a mathematical learner).
- Problem solving should be where all of the strands of math proficiency converge.
- Improving students' success in mathematics should improve their motivation to learn and lesson math anxiety.
- It is advantageous for children to have exposure to numbers before starting school. Efforts should be made to educate parents and caregivers.
- Teachers need to understand children's conceptual and procedural errors in order to take full advantage of formative assessments.

Knowledgeable Teachers

- Teachers should possess deep knowledge of mathematical concepts and also knowledge of how student understanding develops.
- Professional development positively effects student achievement; and, sustained professional development is needed.
- Possible teaching scenarios that may improve student learning are full-time math teachers, pull-out teachers, and math coaches.

Instruction

- Students need both teacher-directed experiences and student-centered learning. Approaches should be based on mathematical goals.

Assessments

- NAEP should be improved.
- Assessments should be used to develop proficiency, not just to rank students. They should not take away from learning or consume large amounts of review.

Excerpts from *Alternatives for Rebuilding Curricula*

The ARC Center Tri-State Student Achievement Study – year 2003

The ARC Center - Alternatives for Rebuilding Curricula - www.comap.com/elementary/projects/arc/

"The ARC Center promotes the wide-scale and effective implementation of standards-based mathematics curricula. The Center consults with school and districts and provides information and resources to support teacher enhancement, leadership development, and public awareness of mathematics.

The ARC Center is a collaboration between the Consortium for Mathematics and Its Applications (COMAP) and the three National Science Foundation supported elementary mathematics curriculum projects. COMAP is an award-winning non-profit organization whose mission is to improve mathematics education for students of all ages.

Everyday Mathematics; Math Trailblazers; and Investigations in Number, Data, and Space

This study examined achievement test data from three states for a near census of students in schools using NSF-funded comprehensive elementary mathematics curricula. These students' test results were compared to those of students in non-using schools carefully matched by reading score, SES, and other variables. Possible bias due to imperfect matching was controlled by adjustments based on regression studies. The principal finding of the study is that the students in the NSF-funded reform curricula consistently outperformed the comparison students: All significant differences favored the reform students; no significant difference favored the comparison students. This result held across all tests, all grade levels, and all strands, regardless of SES and racial/ethnic identity. The data from this study show that these curricula improve student performance in all areas of elementary mathematics, including both basic skills and higher-level processes. Use of these curricula results in higher test scores.

Excerpts from the Report *Intervention: Everyday Mathematics*

Taken from the *What Works Clearinghouse* website, as follows:
April 30, 2007 http://ies.ed.gov/ncee/wwc/reports/elementary_math/eday_math/effectiveness.asp
July 16, 2007 http://ies.ed.gov/ncee/wwc/pdf/ESM_TR_07_16_07.pdf

The *What Works Clearinghouse* is sponsored by the U.S. Department of Education. It represents a compendium of reports on research-based evaluations of educational programs.

Effectiveness Findings

The WWC review of elementary school mathematics curriculum-based interventions addresses student outcomes in mathematics achievement.

The Carroll (1998) study reported a statistically significant positive effect of *Everyday Mathematics* on geometric knowledge. After accounting for pretest differences between *Everyday Mathematics* students and comparison students, the WWC determined that this finding was substantively important but not statistically significant. Based on this study finding, the WWC categorized the effect of *Everyday Mathematics* on geometric knowledge as being a substantively important positive effect.[4]

The Riordan and Noyce (2001) study reported a statistically significant positive effect of *Everyday Mathematics* on overall math achievement. Using school-level data provided by the authors, the WWC determined that this finding was statistically significant for the 48 early-implementing schools. For the 19 later-implementing schools, however, the WWC determined the finding to be not statistically significant. Based on this study finding, the WWC categorized *Everyday Mathematics* as having a statistically significant positive effect on overall math achievement for the 48 early-implementing schools and an indeterminate effect for the 19 later-implementing schools.

The Waite (2001) study reported a statistically significant positive effect of *Everyday Mathematics* on overall math achievement. After accounting for the misalignment between the school as the unit of assignment and the student as the unit of analysis, the WWC determined that this finding was substantively important but not statistically significant. Based on this study finding, the WWC categorized the effect of *Everyday Mathematics* on overall math achievement as being a substantively important positive effect. The Waite study reported subtest results (concepts, operations, and problem solving). After WWC calculations, these results were found to be positive but not statistically significant. The subtest analyses do not factor into the rating.

The Woodward and Baxter (1997) study reported no significant effect of *Everyday Mathematics* on overall math achievement. After accounting for pretest differences between *Everyday Mathematics* students and comparison students, the WWC confirmed this finding. Based on this study finding, the WWC categorized the effect of *Everyday Mathematics* on overall math achievement as indeterminate.

The study also reported subtest results (computation, concepts, and problem solving) and found a statistically significant positive effect on the concepts subtest. WWC calculations revealed a substantively important, but not statistically significant, positive effect for the concepts subtest and a substantively important, but not statistically significant, negative effect for the computations subtest. The subtest analyses do not factor into the rating.

Four studies examined outcomes in math achievement: One study (Riordan & Noyce, 2001, 48 early-implementing schools) found statistically significant and positive effects. Three studies (Riordan & Noyce, 2001, 19 later-implementing schools; Carroll, 1998; Waite, 2001) found positive effects. And one study (Woodward & Baxter, 1997) found indeterminate effects.

Rating of effectiveness

The WWC rates interventions as positive, potentially positive, mixed, no discernible effects, potentially negative, or negative. The rating of effectiveness takes into account four factors: the quality of the research design, the statistical significance of the findings (as calculated by the WWC), the size of the differences between participants in the intervention condition and the comparison condition, and the consistency of the findings across studies (see the *WWC Intervention Rating Scheme).* The WWC found *Everyday Mathematics* to have potentially positive effects on math achievement.

Excerpts *from Effective Programs in Elementary Mathematics: A Best-Evidence Synthesis*

February, 2007, taken from the *Best Evidence Website*

"The Best Evidence Encyclopedia is a free web site created by the Johns Hopkins University School of Education's Center for Data-Driven Reform in Education (CDDRE) under funding from the Institute of Education Sciences, U.S. Department of Education. It is intended to give educators and researchers fair and useful information about the strength of the evidence supporting a variety of programs available for students in grades K-12."

Research was reviewed on the achievement outcomes of three types of approaches to improving elementary mathematics: Mathematics curricula, computer-assisted instruction (CAI), and instructional process programs.

More research is needed on all of the curricula programs, but the evidence to date suggests a surprising conclusion that despite all the heated debates about the content of mathematics, there is limited high-quality evidence supporting differential effects of different math curricula.

The strongest positive effects were found for instructional process approaches such as forms of cooperative learning, classroom management and motivation programs, and supplemental tutoring programs.

The review concludes that programs designed to change daily teaching practices appear to have more promise than those that deal primarily with curriculum or technology alone.

Excerpts of *Research Basis of Everyday Mathematics: Everyday Mathematics Student Achievement*

Taken from *http://everydaymath.uchicago.edu/* and
http://everydaymath.uchicago.edu/about/research/basis_4

"*Everyday Mathematics* is a comprehensive Pre-K through 6th grade mathematics curriculum developed by the University of Chicago School Mathematics Project."

A large number of studies of Everyday Mathematics student achievement have been conducted.

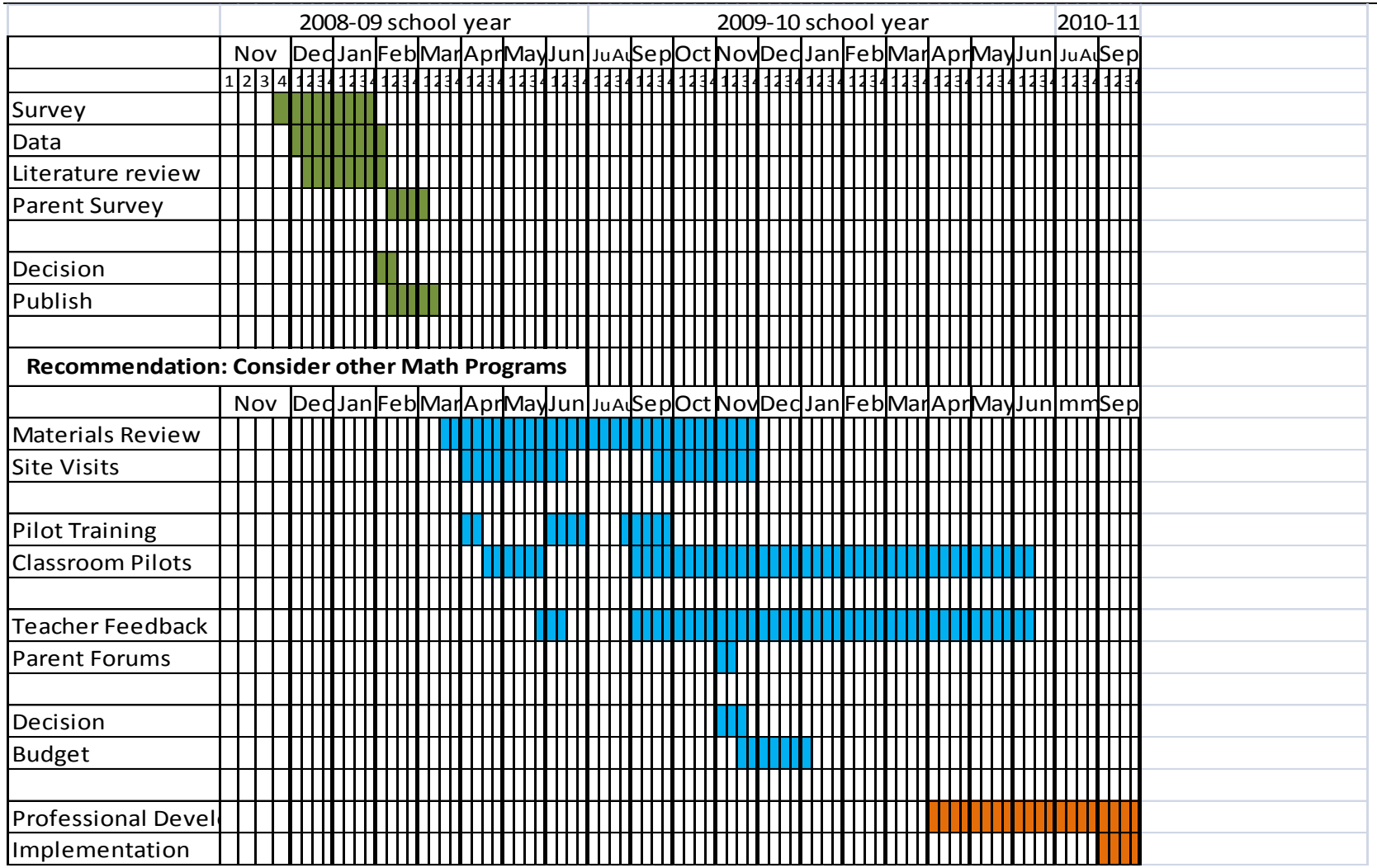
These studies have been carried out by four principal groups: (i) the elementary and evaluation components of UCSMP (see above for cites), (ii) an NSF-funded group at Northwestern University, which carried out a five-year longitudinal study of the curriculum (see above for cites), (iii) individual schools and districts using the curriculum (Everyday Learning, 2001, 1998, 1996; Greene, 1996; Briars & Resnick, 2000; Mathematics Evaluation Committee of the Hopewell Valley Regional School District, 1997), and, increasingly, (iv) independent researchers (Hawkes, Kimmelman, & Kroeze, 1997; Woodward & Baxter, 1997; Riordan & Noyce, in press). These studies, which have used a wide range of instruments and methods to measure students' progress and understanding, provide a broad perspective on the effects of the curriculum.

Generally, results indicate the following:

- On traditional topics, such as fact knowledge and paper-and pencil computation, Everyday Mathematics students perform as well as students in more traditional basal programs. However, Everyday Mathematics students use a greater variety of computation methods and are especially strong on mental computation.

On topics that have been underrepresented in the elementary curriculum, such as geometry, measurement, algebra, problem solving, reasoning, and communication, Everyday Mathematics students score substantially higher that students in more traditional programs. Total mathematics achievement typically increases significantly following the adoption of the curriculum.

Appendix C: Evaluation Timelines



(Note: Subject to change)