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AUTHOR	Ziebarth, Steven W.
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ABSTRACT

This report uses the Core-Plus Mathematics Project (CPMP) as a case-study example of how new high school curricula have developed in the United States over the last decade since the publishing of the first NCTM Standards Documents (1989, 1991). Beginning with a description of both the curriculum itself and the rationale used to guide its development, the report highlights the associated research and evaluation results that have emerged in terms of students' achievement data on a variety of measures. The report concludes by documenting the growth of CPMP-related professional development activities that are an integral part of successful implementation of new curricula and then identifying and addressing four emerging issues associated with implementation. A consistent theme throughout is the notion that, in general, curriculum development is an ongoing process and specifically that those results highlighted in this report are used to inform a new revision of Core-Plus Mathematics currently underway. (Author)

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A Report on Advances in Secondary Mathematics Curriculum Development in the United States and Imminent New Directions: Core-Plus Mathematics as a Case Study

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Author:

Dr. Steven W. Ziebarth

Assistant Professor of Mathematics Education at Western Michigan University

Evaluation Coordinator, Core-Plus Mathematics Project

Address:

Western Michigan University

4429 Everett Tower

Kalamazoo, MI 49008

Email:

steven.ziebarth@wmich.edu

Phone:

Work: (269-387-4534)

Home: (269-624-4088)

Fax: (269-387-4546)

Abstract

This report uses the Core-Plus Mathematics Project (CPMP) as a case-study example of how new high school mathematics curricula have developed in the United States over the last decade since the publishing of the first NCTM *Standards* Documents (1989, 1991). Beginning with a description of both the curriculum itself and the rationale used to guide its development, the report highlights the associated research and evaluation results that have emerged in terms of student achievement data on a variety of measures. The report concludes by documenting the growth of CPMP-related professional development activities that are an integral part of successful implementation of new curricula and then identifying and addressing four emerging issues associated with implementation. A consistent theme throughout is the notion that, in general, curriculum development is an ongoing process and specifically that those results highlighted in this report are used to inform a new revision of Core-Plus Mathematics currently underway.

A Report on Advances in Secondary Mathematics Curriculum Development in the United States and Imminent New Directions: Core-Plus Mathematics as a Case Study

Introduction

For over a decade, the United States has been engaged in the process of developing and researching new mathematics curricula that attempt to match the content and process goals outlined in the *Standards* documents of the National Council of Teachers of Mathematics (NCTM) (1989, 1991). This report outlines the progress that has been made in three key interconnected areas of curriculum development: curriculum writing, student learning, and professional development, as seen through the lens of the Core-Plus Mathematics Project, one of five high school mathematics curriculum projects funded by the National Science Foundation (NSF) in response to the NCTM vision of creating a core curriculum suitable for all students as expressed in the 1989 *Standards*.

The data sources for this report are excerpts from project documents and proposals, evaluation reports from a variety of Core-Plus Mathematics related projects, published articles by project authors, and interviews and personal communications with project staff. While this report has its focus on one particular curriculum project, reports from the national information clearinghouses for other elementary, middle, and high school reform curriculum projects suggest slow, but steady, progress of K-12 mathematics curriculum implementation in the United States. (c.f. The ARC Center, The Show-Me Center, and COMPASS listed in the bibliography.)

Curriculum Writing and Development

In late 1992, the Core-Plus Mathematics Project (CPMP) was awarded a five-year grant from the National Science Foundation (MDR-9255257) to develop, evaluate, and in cooperation with a publisher, nationally disseminate an integrated three-year high school mathematics curriculum that would reflect recommendations of the National Council of Teachers of Mathematics *Standards* (NCTM 1989, 1991). The CPMP Project represented a collaboration of curriculum writers from several major American research universities headed by a team of leading mathematics educators as co-directors: Chris Hirsch (Western Michigan University), Arthur Coxford (University of Michigan), James Fey (University of Maryland), and Harold Schoen (The University of Iowa). The curriculum was written with several overriding design principles in mind that guided its development: 1) believing that mathematics is a vibrant and broadly useful subject that can best be learned and understood as an active science of patterns, 2) using problems as a context for developing students understanding of mathematics, 3) including mathematical topics within the curriculum based on their importance and use for high school students at various grade levels (resulting in a topic integrated curriculum), and 4) insisting that the study of mathematics is a sense-making activity that should be intellectually engaging for all high school students. (Hirsch, 2001)

Using these principles and guided by work on previous curriculum projects, the developers drew heavily on decades of research on mathematics teaching and learning to produce the initial set of CPMP materials for Courses 1-3. Carefully developed with teacher input over a four-year period, each CPMP course was field tested in 36 high schools in Alaska, California, Colorado, Georgia, Idaho, Iowa, Kentucky, Michigan, Ohio, South Carolina, and Texas. (Each field test year was preceded by a year of pilot testing in a smaller sample of schools in Michigan.) A broad cross-section of students from urban, suburban, and rural communities with ethnic and cultural diversity was represented. CPMP Course 1 was field tested in ninth-grade classrooms in 1994-95, Course 2 was field tested in tenth-grade classrooms in 1995-96, and Course 3 was field tested in eleventh-grade classrooms in 1996-97. A great deal of quantitative and qualitative data were collected during the CPMP field test. The data included information about various student outcome variables as measured by standardized tests and by constructed response or performance assessments, teacher attitudes and beliefs, level of implementation of the curriculum and instructional model, and specific site characteristics and experiences. (Some of these results are reported in the section that follows.)

Upon successful completion of pilot and field-test work on Courses 1-3, CPMP was awarded a second grant from NSF in 1997 (ESI-9618193) to develop, evaluate, and disseminate a flexible fourth-year course that continued the preparation of CPMP students for college mathematics and to conduct a summative five-year longitudinal evaluation of the complete four-year curriculum. The four-year program was published by Everyday Learning Corporation under the title *Contemporary Mathematics in Context: A Unified Approach* (Coxford et al., 1997, 1998, 1999, 2001).

The completed four-year curriculum builds upon the theme of mathematics as sense-making. Throughout it acknowledges, values, and extends the informal knowledge of data, shape, change, and chance that students bring to situations and problems. Each year the curriculum features interwoven strands of algebra and functions, geometry and trigonometry, statistics and probability, and discrete mathematics, connected by fundamental themes, by common topics, and by mathematical habits of mind. The curriculum also emphasizes mathematical modeling, especially the modeling concepts of data collection, representation, interpretation, prediction, and simulation. Numerical, graphics, and programming/link capabilities of graphics calculators are assumed and capitalized on throughout the curriculum. This technology helps to facilitate the emphasis in the curriculum and instruction on multiple representations (verbal, numeric, graphic, and symbolic) and on goals in which mathematical thinking is central. Instructional practices promote mathematical thinking through the use of rich applied problem situations that involve students, both in collaborative groups and individually, in investigating, conjecturing, verifying, applying, evaluating, and communicating mathematical ideas. In short, the final published CPMP curriculum materials are distinguished by the following features.

- Each course advances students' understanding of mathematics along interwoven strands of algebra and functions, statistics and probability, geometry and trigonometry, and discrete mathematics.
- These mathematical strands are developed in coherent, focused units that are connected by fundamental ideas such as function, symmetry, and data analysis; and by mathematical habits of mind such as visual thinking, recursive thinking, searching for and explaining patterns, and providing convincing arguments.
- Mathematics is developed in context with an emphasis on problem solving and mathematical modeling.
- Graphing calculators are used as a tool for developing mathematical understanding and for solving applied problems.
- Instructional materials promote active learning and teaching centered around collaborative small-group investigations of problem situations followed by whole-class summarizing activities that lead to analysis, abstraction, and further application of underlying mathematical structures.
- Conceptual understanding, reasoning with multiple representations, and oral and written communication are emphasized.

- Mathematical thinking and reasoning are central to all courses; with formal proof developed "semilocally" in Courses 3 and 4.
- Courses 1-3 constitute a core program designed to provide a wide range of students access to important and broadly useful mathematics.
- Design of Course 4 permits tailoring of seven-unit courses around core units (1-4) plus options so as to keep all college-bound students in the mathematics pipeline whether their intended undergraduate program is calculus-based or not.
- Assessment of students' mathematical understanding through observations of group work, classroom (Checkpoint) presentations, written reports of investigations, quizzes, unit and cumulative exams, and projects.

Students with aptitude and interest in mathematics are often accelerated into Course 1 in eighth grade (or earlier), enabling them to complete Course 4 and, if desired, AP Statistics in eleventh grade and AP Calculus in twelfth grade. Unit titles for the completed four-year curriculum are given in Table 1.

Table 1 **The CPMP Curriculum**

Course 1		**Course 2**	
1	Patterns in Data	1	Matrix Models
2	Patterns of Change	2	Patterns of Location, Shape, and Size
3	Linear Models	3	Patterns of Association
4	Graph Models	4	Power Models
5	Patterns In Space and Visualization	5	Network Optimization
6	Exponential Models	6	Geometric Form and Its Function
7	Simulation Models	7	Patterns in Chance
CAP-STONE	Planning a Benefits Carnival	CAP-STONE	Forests, the Environment, and Mathematics

Course 3		**Course 4**	
1	Multiple-Variable Models	1	Rates of Change
2	Modeling Public Opinion	2	Modeling Motion
3	Symbol Sense and Algebraic Reasoning	3	Logarithmic Functions and Data Models
4	Shapes and Geometric Reasoning	4	Counting Models

5	Patterns in Variation	5	Binomial Distributions and Statistical Inference
6	Families of Functions	6	Polynomial and Rational Functions
7	Discrete Models of Change	7	Functions and Symbolic Reasoning
CAP-STONE	Making the Best of It: Optimal Forms and Strategies	8	Space Geometry
		9	Informatics
		10	Problem Solving, Algorithms, and Spreadsheets

The published curriculum is now used by well over 225,000 students in about 550 schools in at least 39 states. Its adoption continues to grow steadily.

Collecting Data from Students and Teachers

Over the past eight years, the project has conducted or cooperated in the conduct of several studies of mathematics achievement in CPMP classrooms. Most of these studies were part of CPMP's national field test where data from the administration of a range of achievement measures were collected. Analysis of the data revealed a consistent pattern of differing areas of strength and weakness in mathematical achievement of CPMP students and comparable students in more traditional high school mathematics curricula. (Since random assignment of students to classes was not possible in these school-based studies, the comparability of groups was established with respect to baseline achievement measures such as eighth-grade standardized mathematics achievement test scores or pretest scores from beginning of grade 9.) In general, CPMP students have almost always performed better than comparison students on measures of conceptual understanding, interpretation of mathematical representations and calculations, and problem solving in applied contexts, and sometimes not as well on measures of algebraic manipulation skills. Some of the main results of studies from Courses 1, 2, 3, and 4 are briefly summarized below.

- At the end of Course 1, CPMP students' mean performance on the Ability to Do Quantitative Thinking subtest of the nationally standardized Iowa Tests of Educational Development (ITED-Q) was significantly greater ($p < .05$) than that of ITED-Q pretest-matched Algebra students in more traditional curricula. Students from eleven schools were involved in this study. (Schoen and Hirsch, 2002)

- In a six-school study (Huntley et al, 2000) of algebraic skill and understanding across the domain of algebra and advanced algebra at the end of CPMP Course 3, CPMP students performed significantly ($p < .05$) better than a matched group of traditional Advanced Algebra students on concept and application tasks. The Advanced Algebra students scored significantly better ($p < .05$) on a measure of paper-and-pencil algebraic manipulation skills. Similar results were found in separate studies at the end of Courses 1 and 2, except that in the Course 2 study there was no significant difference in means on algebraic skills between the CPMP and comparison groups. (Schoen and Hirsch, 2002)
- In the CPMP longitudinal study, the Educational Testing Service's (ETS) *Algebra End-of-Course Examination* was administered to all CPMP students at the end of Course 2. The subtest means of CPMP Course 2 students in the three high schools were higher at the end of the year than those of the national cohort of Algebra students who completed this test. The order of subtest mean differences favoring the CPMP students were Concepts (50% to 41%), Processes (39% to 32%), and Skills (43% to 42%). (Schoen and Ziebarth, 2000)
- On a test consisting of 30 released items from the National Assessment of Educational Progress (NAEP), the means of CPMP students (mostly juniors) in 22 schools at the end of Course 3 were higher than those of NAEP's nationally representative sample of 1992 beginning-of-year seniors on the five content and three process subtests. The content subtests ordered by mean differences were Data, Statistics & Probability (67% to 45%), Measurement (59% to 43%), Algebra & Functions (53% to 42%), Geometry (60% to 49%), and Numbers & Operations (44% to 34%). The process subtests ordered by mean differences were Concepts (61% to 44%), Problem Solving (53% to 40%), and Procedures (56% to 45%). (Schoen and Hirsch, 2002)
- A comparison of SAT I Mathematics scores of CPMP Course 3 students versus Advanced Algebra students from 8 schools showed no significant difference. (SAT Verbal scores were used to statistically equate groups.) A CPMP Course 4 versus Precalculus comparison of SAT Mathematics scores showed a significant difference ($p < .05$) in favor of the CPMP Course 4 students. (Schoen, Cebulla, & Winsor, 2001)

- A comparison of ACT scores of CPMP Course 3 students versus Advanced Algebra students from fifteen schools showed a significant difference in ACT Mathematics means favoring the Advanced Algebra students. This was offset by an even larger difference favoring CPMP Course 3 students in ACT Science Reasoning. (ACT English scores were used to statistically equate groups.) A CPMP Course 4 versus Precalculus comparison showed no significant differences in Mathematics or Science Reasoning means. In spite of these differences in subtest scores, ACT Composite (average of Mathematics, Science Reasoning, English, and Reading) means of CPMP and comparison groups were virtually identical. (Schoen, Cebulla, & Winsor, 2001)
- A comparison of scores on a college mathematics department placement test given at the end of senior year to CPMP Course 4 and traditional Precalculus students showed no significant difference in Algebra and Intermediate Algebra subtests and a significant difference ($p < .05$) on the Calculus Readiness subtest in favor of the CPMP Course 4 students. The subtests were compiled from a bank of items developed by the Mathematical Association of America. The first two subtests primarily measured algebraic symbol manipulation skill and the third was a measure of concepts and methods needed for the study of calculus. (Schoen and Hirsch, 2001)
- On a test composed of 20 released items from the 1995 TIMSS twelfth-grade Mathematics Literacy (12 items) and Advanced Mathematics (8 items) tests, CPMP end-of-Course 3 students in the longitudinal study performed at a mean level similar to the Netherlands, the top-performing country in Mathematics Literacy; were above the international average (and U.S. average) on probability, statistics, and transformation geometry items; and scored below the international mean (and U.S mean) on more traditional algebra and geometry items from the Advanced Mathematics test. (Schoen and Ziebarth, 2000)

While much was learned with respect to student learning and curriculum implementation from the above sample of studies, new questions emerged as field testing of the CPMP materials was completed. In an attempt to answer these emerging questions, the development of the Core-Plus Mathematics curriculum entered a new phase focusing on materials revision. One such attempt has been to collect longitudinal data. Since September 1997, CPMP has been conducting a longitudinal study of the performance of students in three high schools using the published CPMP curriculum. These students had previously studied NSF-funded middle school curricula (Connected Mathematics or Six Through Eight Mathematics (STEM)). The formal data collection activities were completed in Summer 2002, but a detailed analysis on much of the data has yet to be completed. However, a sample of the early analysis suggests where the next phase of curriculum revision will be targeted, how data collection informs revisions, and how those revisions may proceed.

For example, for each course student achievement measures were collected that matched CPMP objectives. Teachers completed checklists of objectives for each unit in Course 1 indicating whether each objective was new to most of their students, familiar but not entirely understood, or already understood. Teachers discussed the question of overlap and how they handled it during interviews. Teachers also wrote comments and suggestions in their textbooks and these were compiled into a single annotated text that will be used by authors during the revision. Similar annotations have been compiled for Courses 2-4. Extensive descriptions of a variety of practices that schools adopted for accelerating students have also been collected along with the AP test performance of students who completed AP Statistics and/or AP Calculus.

Taken together, these data provide direction for revisions needed in a second edition. As an example, the data suggest that students coming into these schools from Standards-oriented middle school programs are comfortable working in groups, explaining and communicating mathematical ideas, and are generally familiar with their role in a CPMP-like class. They also have more basic skills with calculators, especially as related to its statistical functions. All this enables teachers to move more efficiently through Course 1 than is typically the case when students come from a more traditional middle school curriculum. Investigations in Course 1 designed specifically to introduce students to new classroom roles, expectations, and the use of graphing calculators can potentially be streamlined or omitted for students coming out of these curricula.

Related to this, teachers also identified a great deal of content overlap between CPMP Course 1 and the eighth-grade course of both curricula (CMP and STEM) used in the middle schools of these districts. While teachers did not necessarily think entering ninth-grade students had already attained many of the Course 1 objectives, for all but one objective in the present Units 1, 2, 3, and 5 at least one teacher indicated that her students were familiar with the content of the objectives.

Although teachers identified overlap, they rarely skipped an entire unit according to their comments during interviews. Rather they occasionally eliminated investigations or proceeded through them at a faster pace. Many teachers commented that students knew some of the concepts well but they lacked the formal vocabulary and needed the more advanced thinking offered in the CPMP units. On the other hand, two of the three longitudinal study schools allowed 10% to 20% of their top ninth-grade students to skip Course 1 entirely, and the third school offered accelerated and regular sections beginning in Course 2. Increasingly, schools outside the longitudinal study report that they are starting selected ninth-grade students who have complete three years of Connected Mathematics in Course 2 with some Course 1 supplementary work. Thus, a major focus of revision efforts will be aimed at achieving better articulation between the CPMP curriculum and reform middle school mathematics programs.

The example outlined in the preceding paragraphs indicates the kinds of links between curriculum writing and testing of those written materials that are required in order to produce better, more useful mathematics textbooks and materials. Data from students and teachers have clearly been an important part of the curriculum development process and will continue be in the future.

Growth in Professional Development

Implementation of a curriculum like Core-Plus Mathematics represents a difficult transition for many mathematics teachers. With CPMP, teachers are not only faced with relearning familiar content that is developed from a new perspective, but much of the content itself may be new (e.g. statistics and discrete mathematics) and never encountered before. Teachers must also have a good background of graphing calculator skills and how to use them in the classrooms. Perhaps the most difficult changes, however, are moving to a very different approach to teaching that involves group work and facilitating mathematical discussion and dealing with the variety of open-ended assessments that are designed to promote thinking and communication.

An important component of recent work in CPMP is providing support to schools implementing the curriculum. Funded through COMPASS (Curricular Options in Mathematics Programs for All Secondary Students; see bibliography) by NSF grants (ESI-9619168, ESI-0001377) to Ithaca College with a subcontract to CPMP the CPMP Implementation Center, in collaboration with Glencoe/McGraw-Hill, provides professional development, leadership development, support for administrators and, to a limited extent, for parents. A review of CPMP documents related to professional development, administered or coordinated through Western Michigan University at several national sites, shows the following: 1) beginning in 1997 (after workshops involving only field test teachers were completed) 126 teachers from 17 states attended summer workshops focused on CPMP Courses 1-4 training, 2) this number has steadily increased to 353 teachers from 26 states for the summer 2002 workshops just completed, and 3) the 6-year (1997-2002) totals show over 1100 teachers from 36 states have participated in Core-Plus professional development, with 70% of participants coming from outside the state of Michigan.

CPMP has also worked closely with other NSF-funded Local Systemic Change (LSC) projects focusing on implementation of *Contemporary Mathematics in Context*. As examples, during the past six years the University of Iowa has been the site of two multi-year CPMP professional development projects, MIME (1996-97) and PRIME-TEAM (1997-99) (ESI-9731375) funded by the Eisenhower Professional Development Program and by NSF. A proposal for a third related project, LEADERS in Math, was submitted to NSF in October 2000, funding was awarded in Fall 2001, and leadership workshop activities began in June 2002. The first two projects used summer workshops to provide a core of Iowa teachers with a broad view of standards-oriented mathematics reform and more specifically to prepare them to implement the CPMP curriculum. Those teachers continue to be active in teaching Core-Plus Mathematics to their own students in a variety of school settings in the state of Iowa and currently form one of the most experienced cadres of teachers of reformed secondary mathematics. The third project, LEADERS, aimed at building CPMP leadership capacity, is currently providing support to more than 100 secondary mathematics teachers in Iowa, Minnesota, and Wisconsin. The initial workshop sessions for this participant group were completed in August 2002 and will continue with a variety of summer workshop and academic year meetings through June 2006.

As the CPMP curriculum and associated professional development activities have moved beyond the immediate confines of the original universities involved in developing the materials, it is becoming a greater challenge to monitor implementation trends. For instance, one common approach to professional development for school districts that have adopted the CPMP curriculum is through a teacher-leader model similar to the one described above. In such cases, districts send one or two teachers to Michigan (WMU) or one of the other national sites, and those teachers in turn conduct local professional development to teachers within their schools and districts. This model has worked well in states such as Washington, Colorado, Pennsylvania, North Carolina, and a number of other states on the East Coast.

Emerging Curriculum Development Issues and Imminent New Directions

The development, implementation, testing and research, and associated professional development of reformed mathematics curricula, and Core-Plus Mathematics in particular, has not been without challenges and controversy. The CPMP longitudinal study and evaluation data collected from teachers who have attended CPMP professional development workshops have contributed to our understanding of the difficulties and challenges that curriculum developers are currently confronted with and are likely to face in the future. What follows are some of the more prominent issues that seem to be defining these challenges.

Parents and Other Stakeholders: Peressini (1998) correctly identified the role parents have played (or not) in past reforms of mathematics curricula. Often seen or portrayed as a barrier to reform, they are now recognized as powerful stakeholders in the long-term success of implementing new curriculum materials. Evaluation data related to implementation of the Core-Plus Mathematics curriculum have described many first-hand accounts of how parents have helped and hindered this process. Parents (and teachers) often find it difficult to "see" the mathematics in the courses. This characterization of the materials has also surfaced in reviews of the curriculum by critics of reform and has become a tool for parents who want adoptions reconsidered. Revision work on the CPMP curriculum will consider how to make the mathematics, particularly algebra (the content most familiar to parents), more visible in the student text material. The development of new materials for parents and other stakeholders who often hold different conceptions of school mathematics and how it should be taught and learned are important if reform is to be successful.

The Press and the Internet: While the Core-Plus Mathematics Project is trying to provide a strong program of professional development and to be very up-front with information about Core-Plus Mathematics, local and national press coverage has sometimes been detrimental to reform efforts. Often under the guise of "balanced reporting," newspaper articles containing misleading and factually incorrect information have found their way to some schools involved in the curriculum adoption process. Once in press, such coverage often catches teachers unprepared to quickly respond to stakeholders' concerns and makes implementation a much more difficult goal to achieve. The Internet as a source of instant and uncritiqued information has become a growing concern to all reformed curriculum projects including CPMP. Unfortunately, through websites and listserves, a growing campaign of anti-mathematics reform misinformation has found its way into the implementation equation. Such misinformation is often presented *and accepted* as fact without evidence or further investigation. On the other hand, the Internet represents a powerful tool for making project information available to those who can use it to help schools in their decision making processes. It can also be used in very effective ways by CPMP teachers to network with each other, via email, to discuss content and share teaching tips.

Teacher Beliefs and Apathy: In conversations with a number of CPMP workshop participants, they have indicated that apathy with respect to colleagues' attitudes about reform and continued professional development remains a prominent issue for some. Particularly in larger mathematics departments where it is more difficult to come to consensus on mathematics content, teaching, and learning, some colleagues represent frustrating barriers to any change efforts. Often participants express frustration with peers who are "going through the motions" of teaching or are close enough to retirement to argue against "learning anything new." Such attitudes translate into negative department votes and often actively undermine reform efforts through negative comments to students, parents, and administrators. There does not seem to be a clear way to address such school-level issues where individual teachers are at very different places on the reform and implementation spectrums.

Changing Expectations for School Mathematics: In a recent *News Bulletin* message NCTM President Johnny W. Lott (2002) indicates that "a static mathematics curriculum is unhealthy" (p.3) and urges teachers to recognize that curriculum change is natural and important as we seek curricula that match the times in which we live. There are many bodies of knowledgeable experts that can help guide this process. For instance, new and emerging curriculum reports from the National Council of Teachers of Mathematics and the Mathematical Association of America provide stimulus and direction for revision of the CPMP curriculum. *Principles and Standards for School Mathematics* (PSSM) (NCTM, 2000) clarifies, elaborates, and, in many cases, extends expectations for teaching and learning mathematics recommended in the 1989, 1991, and 1995 Standards documents that formed the backdrop for the CPMP curriculum. A recent analysis (Martin et al., 2001) of the *Contemporary Mathematics in Context* program in terms of the grades 9-12 expectations of PSSM evidenced strong alignment with both the content and process standards. However, PSSM recommendations for a four-year (as opposed to the CPMP three-year) common curriculum for all students; for increased attention to mathematical proof; and for greater integration of the use of technological tools such as spreadsheets (now reserved to CPMP Course 4), dynamic geometry software, and computer algebra systems provide direction for the re-examination and revision of the CPMP curriculum.

Endnote: This report has described curriculum development in secondary mathematics education as seen through the lens of one project, CPMP. Curriculum writing and data collection that informs that writing have been carefully pursued for nearly a decade as mathematics educators continue to provide better materials for a new generation of pre-college students. Throughout this document, many of the descriptions and examples have been directed at continuing that curriculum development process by way of a major revision of the CPMP curriculum materials. That revision process began with its initial meetings in September 2002.

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