Milwaukee Mathematics Partnership
Year 1 Annual Report
2003 – 2004

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The Milwaukee Mathematics Partnership (MMP) aims to substantially improve mathematics achievement for the 100,000 students in the Milwaukee Public Schools and to increase students success in transitioning to college mathematics. In this first year of the MMP, the University of Wisconsin-Milwaukee, the Milwaukee Public Schools, and the Milwaukee Area Technical College demonstrated their commitment as core partners to this unique collaboration among a large urban district, a four-year urban university, and a two-year technical college. As members of the Milwaukee Partnership Academy (MPA)—a community-wide council of school, university, union, government, business, and community organizations, the MMP utilized the established structures of the MPA to launch and guide its Year 1 work.

“Intense” is the word that might best characterize Year 1 of the MMP. It has been a year of challenges, struggles, and immense rewards. Our accomplishments were beyond our expectations in many ways, particularly given that the award was made on September 22, 2003, after our original proposed start date, after faculty and staff had made other commitments, and after the start of the school year. We began by having to backtrack and move forward at the same time. The intensity of our work, as well as the passion for our work, has not let up.

This section summarizes the progress we have made in implementing our planned activities. The significant activities contributing to realizing our goals were identified in a reflective discussion among the partners. The section begins with a discussion, organized by goal, that provides a narrative reflection on our significant activities.

**Goal 1 Comprehensive Mathematics Framework**

*Implement and utilize the comprehensive mathematics framework to lead a collective vision of deep learning and quality teaching of mathematics across the Milwaukee Partnership.*

“The implementation of the MMP in its first year began the start of enormous impact to enhance the quality of teaching and learning in an urban school district. The creation, design, and district wide implementation of the Comprehensive Mathematics Framework to ensure a consistent and coherent Mathematics vision for each and every school in the district is a great accomplishment.” — TIR, 2004

“The common vision of the MMP is on its way to collectively uniting all three—MPS, UWM, and MATC—communities with a common vision and common language.” — TIR, 2004
**Disseminating the Comprehensive Mathematics Framework**

The Comprehensive Mathematics Framework (CMF), as shown in this graphic, has been at the center of our work this year. The graphic has not only been passed out frequently to many groups of stakeholders, but it has been discussed, dissected, and envisioned as what it means to be successful in mathematics. Our mathematics framework includes the five components of mathematical proficiency—understanding, computing, reasoning, applying, and engaging—as presented in the National Research Council’s report *Helping Children Learn Mathematics* (NRC, 2002) and drawn from the report *Adding It Up* (NRC, 2001). These five components revolve around the Wisconsin content standards of number, algebra, statistics, probability, geometry, measurement, and their interconnections. Our goal is that this vision will drive classroom practice, define high-quality teaching of challenging mathematics, and be incorporated into the entire teacher learning continuum from teacher preparation through induction and continuing professional development.

During Year 1, our objective was to disseminate the framework and engage teachers, both practicing teachers and prospective teachers, administrators, and IHE faculty in discussions on its messages for the learning and teaching of mathematics, as well as the assessment of mathematical knowledge. Hundreds of copies of the National Research Council’s report, *Helping Children Learn Mathematics* (NRC, 2002), have been disseminated to and discussed among teachers, administrators, and IHE faculty. Copies of the full *Adding it Up* report (NRC, 2001) have also been disseminated with initial discussions occurring among key personnel, namely Mathematics Teaching Specialists, Teachers-in-Residence, and UWM faculty.

The following are just some of the events at which the CMF was discussed: Learning Team seminars in November 2003 and February 2004, MPA Board of Director’s presentation (October 2003), NPRIME meetings of IHE faculty (August and November 2003), Mathematics Teacher Leader Kickoff (December 2003), joint Math Teacher Leader and Literacy Coach session (January 2004), new teacher seminars (January and February 2003), Principal meeting (January 2004),
Wisconsin Mathematics Council annual meeting presentation (May 2004). In addition, MTLs were given professional development materials (e.g., script, overhead transparency masters, handouts) to conduct sessions on the Comprehensive Mathematics Framework back at their school sites. Many MTLs reported conducting CMF sessions in their schools.

Unpacking the Learning Targets

The other centerpiece of our Year 1 work involved the MPS learning targets for mathematics. Learning targets are statements of what students are expected to know and be able to do by the end of a particular grade level. In writing the mathematics learning targets, our goal was to write eight to ten statements per grade that captured the important mathematical ideas for students to learn by the end of that grade, as well as statements that showed the progression of ideas across the grades. The complete list of learning targets for mathematics are included in Appendix A (in Section 1F). The targets in the box below provides a sample of four targets on algebra.

| Grade 1: | Identify the basic unit in repeating patterns, and describe, create, and extend patterns. |
| Grade 5: | Describe, extend, and make generalizations about geometric and numeric patterns and properties of operations. |
| Grade 7: | Describe relationships among written descriptions, tables, graphs, and symbolic rules, and reason with the different representations to interpret linear relationships. |
| Grade 9: | Solve linear equations, linear inequalities, exponential equations, systems of linear equations, and quadratic equations numerically, graphically and symbolically. Apply appropriate technology (e.g., computers and graphing calculators) to interpret solutions. (High School Foundation Level 1) |

In the original proposal, we had intended to write the targets in our first year in order to define the challenging mathematics students were to learn at each grade level. However, the district decided to forge ahead and have all disciplines write learning targets prior to the beginning of the 2003-04 school year. MPS and UWM collaborated on writing the mathematics learning targets in spring 2003 and revised them based on feedback from teachers, parents, and IHE faculty during summer 2003.

The learning targets were ready for dissemination to every classroom in MPS in September 2003. In fact, the district printed posters for each teacher to hang in his or her classroom and mailed copies of the targets to the parents of all 100,000 students. All teachers were requested to visibly post learning targets in their classrooms. Administrators across the district visited classrooms conversing with teachers and ensuring targets were posted. Now, it was the real work of the MMP to make the targets
meaningful. An invaluable activity arising from the MMP became known as “unpacking the learning targets.” Various groups of teachers and leaders at multiple times across the district, engaged in work groups to unpack the targets. The benefit of this activity is multiple: (1) teachers talking to teachers about mathematics, (2) a deeper understanding of the targets is developed as mathematical ideas are shared, and (3) enhanced knowledge of the many mathematical ideas and skills embedded in the targets.

These unpacking sessions brought teachers together with a common theme—to deepen their understanding of the mathematical ideas students need to develop. Teachers engaged in pulling apart individual targets, clarifying and studying the mathematics, and identifying the mathematical processes. Video segments and student work samples from MPS classrooms were used to connect the learning targets to teachers’ classroom practice. The learning targets were also used to engage teachers in the analysis and discussion of the development of mathematical ideas across the grades. Even though teachers were initially only given the learning targets for his or her grade level, in all MMP sessions we provided a matrix of cross-grade targets so teachers could examine how ideas grow across grade levels.

A particularly poignant and successful activity was the “Priority Approach” alignment task used at the Learning Team seminars in February 2004. Participants identified the alignment of state standards to specific learning targets. Next they estimated their students’ achievement levels on that particular target. Finally, they examined the actual student test results. From this task, participants engaged in discussions about their school mathematics programs and how to improve students’ achievement. Along with this activity, participants examined the thinking classification levels in the learning targets and on sample state assessment items. This aspect of the tasks helped participants realize that to raise achievement on the state assessment items and to meet the learning targets involves higher levels of reasoning with mathematical ideas, such as at organization and analysis levels, and not just recall of information.

The following are some events at which the learning targets were discussed: Learning Team seminars in February 2004, joint Math Teacher Leader and Literacy Coach session (January 2004), Mathematics Teacher Leader meeting (March 2004), new teacher seminars (January and February 2003). MTLs were given professional development materials (e.g., script, overhead transparency masters, handouts) to conduct sessions on unpacking the learning targets back at their school sites. Many MTLs reported conducting sessions on unpacking the targets in their schools with specific grade level groups of teachers or with entire staffs at Banking Time days or staff meetings. The Learning Team MMP Action Plans also indicated that many schools focused on unpacking mathematics learning targets as part of school based professional development.

The learning targets also impacted upon the work at UWM. The design teams used the learning target documents as a resource in their course development work. The course content is being aligned to the MET report recommendations (CBMS, 2001) as well as the state standards and the district learning targets. In one of the pilot courses, the learning targets were used for course discussion and validation of the mathematics being studied. Additionally, the learning targets are being studied in the mathematics methods at UWM as indicators of the mathematics students are expected to know and as resources in preparation for field experience placements.

Even with all the work on unpacking targets in Year 1, in reality, only very few of the targets were unpacked. For example, at the elementary level, most sessions focused on examining the number and operation standards and sometimes the data targets. Thus, this work of thinking
deeply about the challenging mathematics that students are to learn has only begun. In Year 2, this work of unpacking the learning targets will continue but with a new twist. The Wisconsin Department of Public Instruction in May 2004 released its Wisconsin Assessment Framework that defines the mathematics that will be assessed by the state in grades 3–8 and grade 10 beginning in Fall 2005. The grade level descriptors for grades 3-8 were released in May 2004 and the grade 10 descriptors are scheduled for release in October 2004. As we continue our work of unpacking the learning targets, we will engage teachers in aligning the district learning targets to the state descriptors. The purpose of this work will continue to focus on defining challenging mathematics and deepening teachers’ understanding of this mathematics.

Goal 2 Distributed Leadership

Institute a distributed mathematics leadership model that engages all partners and is centered on school-based professional learning communities.

“From the short term perspective it would seem that the MMP has put mathematics in the forefront of all three institutions. The MMP has given the MPS team a platform from which they can frame their work with Central Services staff and the schools. The MTLs will be in the perfect position to advocate for change given the high quality training they are getting during their monthly meetings.” — TIR, 2004

“The implementation of the MMP has the potential to have an enormous impact on mathematics teaching and learning in MPS. Having achieved the goal of having a Math Teacher Leader in every elementary school, with release time each month for professional development, has begun a process that will afford huge benefits for teachers and students over the next few years, and hopefully beyond.” — TIR, 2004

Mathematics Teaching Specialists and Teachers-in-Residence

One of the first challenges the MMP faced was the hiring of the Mathematics Teaching Specialists and the Teachers-in-Residence. These positions were to be filled by exemplary teachers of mathematics in the district. The challenge was that teachers had begun the school year and were into the routine of teaching their students or performing in their currently assigned positions.

The process began by gaining approval for job descriptions through the district and the union, the Milwaukee Teachers’ Education Association (MTEA), as well as through the MPA Implementation Team. Then the positions were posted, applications received, interviews conducted, and individuals were hired. We were fortunate though in that the position descriptions were based on previous MPA
supported positions, the Literacy Coaches and the Title II Teachers-in-Residence. We were told that this made the process much smoother and quicker, even though it still took several months.

The five Mathematics Teaching Specialists (MTS) were hired first and they transitioned from their current assignments into their new roles from November to January. The Teachers-in-Residence (TIR) were hired in January 2004, with three beginning in February and the fourth beginning in March. Besides the struggles of office space, desks, telephones, and computers, the MTSs and TIRs quickly jumped into their work and the pace of MMP activities quickly accelerated.

The MTSs are, without a doubt, an invaluable and necessary component of the MMP work. They are providing the critical link from district and partner leadership to the schools through the Learning Teams and the Mathematics Teacher Leaders. Our work could not continue without this critical mass of leaders in mathematics at the district level. The five MTSs bring with them teaching experience at the elementary and middle school levels. The district mathematics curriculum specialist, a high school teacher, focused on the high school level. However, with the great amount of work to be accomplished at the high school level, while overseeing the work of five new MTSs, and directing the work of the MMP in the district, it became apparent early on that additional support was needed at the high school level. In Year 1, a consultant was hired to assist with the Ninth Grade Initiative and Assessment committees. In Year 2, a fulltime high school Mathematics Teaching Specialist will be added to the district mathematics leadership team.

The Teachers-in-Residence (TIR), while remaining MPS employees, are on special fulltime assignment to the University of Wisconsin-Milwaukee. They were given office space at the university in the School of Education and have begun their work as members of design teams with mathematics and mathematics education faculty. The TIRs have found that their positions are not as well defined as that of a classroom teacher and are adjusting to the autonomy in schedules and responsibilities. Year 2 will begin with regular meetings of the MMP leadership team at UWM with the TIRs. The membership of the Mathematics Education Committee in the Mathematics Department will also be expanded to include the TIRs and regular meetings will be scheduled. It is anticipated that this will help to keep the lines of communication open and the project work on track among the key personnel at UWM.

An unintended consequence of the Year 1 work has lead to increased collaboration of the MTSs and the TIRs. While it had always been planned for them to interact to learn together and to work together, the level of this collaboration has exceeded expectations in Year 1. The MTSs and TIRs co-planned and co-facilitated sessions at the February Learning Team seminars, at the monthly MTL meetings, and at the MPA Literacy and Mathematics Showcase conference. In addition, some of the MTSs and all of the TIRs are members of MPA workgroups which provides further opportunities for them to support each other in their work.

**Learning Team Seminar Week**

In February 2004, the district offered a full day work session to all Learning Teams to focus on mathematics. Approximately 130 schools were represented by the 560 Learning Team members, including 80 principals. Due to the high participation level learning teams were assigned a specific day during the week of February 17. Learning teams worked together in four sessions throughout the day: (1) the Comprehensive Mathematics Framework, (2) levels of
thinking required in mathematics on state accountability tests and the alignment with learning
targets, (3) MMP action plan in mathematics, and (4) work session on school educational plans
for mathematics. The benefits of this focused Learning Team time included:

- All Learning Teams heard the same message about their important role for improving
  mathematics at their schools.
- The important role and expectations for Mathematics Teacher Leaders were shared with
  all participants.
- Learning Teams were given resources and uninterrupted time to plan together for
  mathematics.
- MMP leadership team listened and learned effective ways Learning Teams work.

This week with the school Learning Teams sent important messages to the district as well as
to the MMP personnel. The critical role of the Learning Teams in the school was reinforced. The
Learning Team is a critical mass of individuals in the school. While much of our work is
directed to working with the Mathematics Teacher Leaders (MTLs), we must remember that this
is just one person in the school. In Year 2, the MTSs need to focus more of their attention toward
supporting the Learning Teams in the schools, not just the MTLs.

Goal 3 Teacher Learning Continuum

Build and sustain the capacity of teachers, from initial preparation through induction and
professional growth, to deeply understand mathematics and use that knowledge to improve
student achievement.

“In talking to colleagues around the nation, I am finding that they greatly
envy the fact that in Milwaukee there is now a systematic plan in place to
have the university and the technical college coordinate efforts with the
public school district. The development of new courses by the design
teams, as well as the coordination of efforts to offer elementary mathematics
foundation courses at both UWM and MATC will greatly aid in teacher
preparation.” — TIR, 2004

Design Teams

The purpose of design teams is to bring together mathematics faculty, mathematics education
faculty, and Teachers-in-Residence in order to develop courses that truly develop the
mathematical knowledge needed for teaching in urban districts. It is our belief that this can best
be accomplished by building a collaborative team that represents the key stakeholders.
Mathematics faculty bring a deep and richly connected knowledge of mathematics, mathematics
education faculty bring knowledge of ways to connect those mathematical ideas with learners,
and the TIRs ground our work in the practice of teaching in urban environments.

Even with the late hiring of the TIRs, much was accomplished in Year 1. Design teams were
active in developing and piloting the mathematical problem solving and critical thinking course
and the discrete probability and statistics course for the elementary education mathematics
minor. A design team also began work on the geometry course. All three of these courses will be
piloted in Year 2 as revision and refinement continues.
A challenge in Year 1, besides finding and scheduling time for all members of the various design teams to meet, was the establishment of new norms for course development. University faculty are accustomed to working in isolation in developing and teaching courses. It is not common practice to collaborate on course development with faculty within one’s own department, even less common to work with faculty from other departments, and nearly unheard of to solicit the advice and input of public school teachers. Similarly, co-teaching sections of university courses is a rare practice. In Year 2, we need to work towards clearer norms of collaboration for design team work and more systematically study the benefits and drawbacks of the design team model.

Parallel Courses at MATC and UWM

All UWM elementary and early childhood teachers complete two mathematics foundation content courses. At the moment, MATC does not have specific mathematics courses for these individuals. Students often wait to take such courses once they transfer to a four-year institution, which puts them behind in coursework and at a disadvantage for completing their teacher certification. MATC has been able to move forward faster than expected in making the parallel courses at reality. UWM and MATC faculty have worked together on course revisions with MATC faculty observing the courses being taught at UWM. MATC initiated the course approval process in Year 1 and gained approval to offer the courses already in Year 2. This next year a design team will be formed to study and continue revision of the foundation content courses across the two institutions.

School-embedded Professional Learning

Learning Teams were provided the opportunity to develop MMP Action Plans in Year 1. Each Learning Team was eligible to receive the equivalent of 50 after school meeting hours for teachers. Teachers could be paid to meet before or after school or substitute teachers could be hired to release teachers from regular duties. The funds were to be used to support discussions and meetings around the mathematics goals developed by the Learning Team. The allotted funding served as a resource to support meetings of the Learning Team and to implement the school’s mathematics goals and education plan. To access the funds, an action plan needed to be developed and submitted by the Learning Team to its Mathematics Teaching Specialists for review and approval.

The impact of these funds was impressive with 104 schools submitting action plans. Most of the funds supported school-embedded professional development which was often lead by the school’s MTL or by the MTL and his or her Mathematics Teaching Specialist. Many of these sessions were conducted during staff meetings, either after school or on Banking Time days, thus focusing entire school staffs on mathematics. We had underestimated the leverage that these 50 hours, about $1500 per school, would have in regards to putting mathematics in the spotlight.
Goal 4 Student Learning Continuum

Ensure that all students from PK-16 have access to, are prepared and supported for, and succeed in, challenging mathematics.

“The development of learning targets from K-12 will ensure that all teachers know what is expected of students at each grade level and what students will be assessed on by the State. Teachers will be able to systematically study test data, reevaluate their teaching practices, and make the necessary teaching adjustments which will enable students to demonstrate proficiency in the mathematics.” —TIR, 2004

Disaggregating Student Achievement Data

At the June MTL meeting, the focus was on analyzing disaggregated data to inform the development of school educational plans for 2004-05. The MTLs were given practice in a shared-experience of analyzing data by subgroups, across grades 3 to 8, and longitudinally over three years. Using the sample data, they practiced reaching conclusions and formulating recommendations based on evidence for the hypothetical school’s education plan. Upon returning to their schools, they were prepared to assist the Learning Team in analyzing their own school’s disaggregated data to inform their school educational plans. A principal remarked to the MTS assigned to his school, “Thank you so much for teaching our MTL how to look at this data. It is so helpful to know exactly how to look at all that data.” Year 2 will continue with examination and discussion of disaggregated data at both the district and school levels.

Ninth Grade Initiative and High School Assessment Committees

Beyond expanding teacher leadership at the high school level, these committees focused on student achievement issues. The Ninth Grade Initiative Committee sought to identify what is working, as well as challenges. The committee has developed a draft position paper (see Appendix B in Section 1F). In Year 2, this committee will evolve into the Foundations Level Network which will work towards implementation of the committee’s recommendations.

The Assessment committee unpacked the high school foundation level targets and developed detailed specifications for each target. In Year 2, this committee will evolve into the Foundations Level Proficiency Pilot and work toward identifying ways to assess and monitor students proficiency group of the targets.

Progress on Deliverables

This section summarizes the progress we have made in attaining the deliverables identified in our Year 1 Implementation Plan. The deliverables were aligned to project goals and objectives and provide indications of our progress toward the projected benchmarks and outcomes of the Milwaukee Mathematics Partnership (MMP). This section begins with a brief narrative highlighting two significant areas in which deliverables were attained in Year 1.
Defining Challenging Mathematics

Deliverable: Goal 1, A1. Disseminate the Comprehensive Mathematics Framework through the Milwaukee Partnership Academy structures—Board of Directors, Implementation Teams, and Workgroups—for use by MPS teachers, administrators, and school learning teams, by MATC and UWM faculty and staff, and by the community.

Deliverable: Goal 1, A2. Develop and disseminate learning targets to define challenging mathematics at each grade level that are aligned with the state standards.

Deliverable: Goal 3, D1. School-based learning teams develop implementation plans for the professional development of teachers and staff. The plans describe activities and strategies aligned with the CMF and Learning Targets.

As discussed and highlighted in several sections of our Year 1 Annual Report, the Comprehensive Mathematics Framework (CMF) and the district learning targets for mathematics were focal points in all MMP work in Year 1. This work impacted Mathematics Teaching Specialists, Teachers-in-Residence, Mathematics Teacher Leaders, literacy coaches, Learning Teams, principals, district administrators (central office administration), IHE faculty, and MPA members, as well as disseminated at state and national levels through presentations at the Wisconsin state mathematics conference, at the annual meetings of the Association of Mathematics Teacher Educators (AMTE) and at the National Council of Teachers of Mathematics (NCTM). The CMF was used to frame discussions of the district learning targets for mathematics. (See Appendix A in Section 1F for a listing of all K-12 mathematics learning targets.) The learning targets were “unpacked” at school-based and district-wide professional development sessions, as well as used at UWM to inform course design work.

Learning Teams were asked to develop MMP action plans and submit vision statements for mathematics. An initial review of the 104 submitted action plans indicate that the majority of schools in the district focused school-based professional development on the CMF and the learning targets. An initial review of the 95 submitted vision statements indicate a strong influence of the CMF and learning targets at the school level.

Mathematics Teacher Leaders

Deliverable: Goal 2, A1. The identified Mathematics Teacher Leader at each school becomes a member of its Learning Team.

Deliverable: Goal 2, B2. The position of Mathematics Teacher Leader (MTL) is defined for elementary and middle schools and an individual is identified at each school as its MTL.
Deliverable: Goal 2, B3. Math leadership is defined for high schools through a Mathematics Learning Team. In order to distribute leadership, three individuals are identified at each school as math leaders with specific roles on its Mathematics Learning Team.

School-based Learning Teams, literacy coaches, and literacy specialists were established during the 2002–2003 school year under the direction of the Milwaukee Partnership Academy. This initial work focused on implementation of the a balanced literacy initiative concentrating on reading and writing. Year 1 of the MMP built upon and expanded this structures for mathematics. Nearly all schools in the district identified school-based Mathematics Teacher Leaders (MTLs). At the K–8 levels, the MTLs were added to the school Learning Teams. At the high school level, a mathematics learning team was form with expanded leadership. The following table indicates the percent of schools with MTLs and the number of MTLs at each level. At all levels, the number of MTLs exceed the number of schools with MTLs. At the high school level, the plan was to expand the leadership to include more leaders at each school. However, at the elementary and middle school levels the expansion was due to requests from schools to designate more than one individual as its MTL. In particular, the elementary schools that include grades K-6, K-7, or K-8 often made this request and were willing to use school funds to provide support for the additional MTL.

<table>
<thead>
<tr>
<th>Level</th>
<th>Percent of Schools with MTLs</th>
<th>Number of MTLs</th>
</tr>
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<tbody>
<tr>
<td>Elementary Schools</td>
<td>100% (118/118)</td>
<td>138</td>
</tr>
<tr>
<td>Middle Schools</td>
<td>91% (21/23)</td>
<td>23</td>
</tr>
<tr>
<td>High Schools</td>
<td>92% (23/25)</td>
<td>42</td>
</tr>
</tbody>
</table>

In addition to the schools listed in this table, two non-instrumentality charter schools and two partnership schools requested to be involved in MMP activities. Thus an additional four MTLs were designated; one at the middle school level and three at the high school level.

The MTLs are participating in and influencing the work of Learning Teams as identified in a self-report survey of the MTLs completed at the end of Year 1. The survey indicated that approximately half of the MTLs were added as new members to their school’s Learning Teams, whereas the other half had been members of the Learning Teams in the previous year but had not been designated as a leader for mathematics.

**Key Features**

**Partnership-Driven**

The Milwaukee Mathematics Partnership (MMP) was written and implemented based on partnership-driven decision making. A two-way working relationship between the University of Wisconsin – Milwaukee (UWM) and Milwaukee Public Schools (MPS) had been established prior to the award of the MMP, but there is no doubt that the structure and the partners of the
Milwaukee Partnership Academy (MPA) has allowed the work of the MMP to begin and continue along collaborative pathways. As issues arise within the goals and benchmarks of the MMP, the administrative management team addresses these issues at MPA meetings where key players are available for support and assistance to understand and work through the necessary structures to create progress. It is this same administrative team of the MMP that collaborates with the Mathematics Teaching Specialists to develop visions, implementation strategies, and reflection times. These actions both strengthen and build the momentum for progression of the MMP. The following two vignettes illustrate the partnership-driven work of Year 1.

**Vignette 1: MPA Influence on District Learning Team Meeting Focused on Mathematics**

One of the most powerful activities that evolved during Year 1 of the MMP, was the meeting of school Learning Teams during February of 2004. The district was close to canceling this activity or offering a random selection of professional development offerings for Learning Teams. It was the MPA implementation team that worked in partnership with the MMP in (1) debating the needs of Learning Teams, (2) challenging each other on the *whys* and *hows* of a math-focused, full day meeting, and (3) reasoning through the benefits of a Learning Team working together collectively with the leadership of the MMP. Through this action, the MPA sent word to the district that the Milwaukee Mathematics Partnership was an important initiative to improve student achievement in mathematics. This meeting was planned and facilitated in partnership between and amongst the many partners of the MMP, including: mathematics teaching specialists, literacy specialists, mathematics educators, and mathematicians. After each days work with designated Learning Teams, discussions between the MMP partners were held to share insights on participant learning, discuss the strengths of the day, and adjust actions to better promote participant learning. Through these reflection activities and using the perspectives and strengths of the partnership, not only were participants learning, the team also grew in their leadership capacity.

**Vignette 2: Joint Partnership-Planned District Professional Development**

The professional development constructed and implemented for teachers and teacher leaders across the district is both purposeful and intentional. Long and short-term timelines established for these activities consider the following: overall vision, goals for learning, and implementation strategies. As professional development opportunities are planned and facilitated by specialists across the partnership, many discussions are held to ponder questions such as: What are the current and overall needs of participants? What skills should be promoted and developed to strengthen participant work? What does the group bring to the sessions? What ideas should be addressed? What are specific strategies that will ensure knowledge is transferred to classroom practice? Through discussions, phone calls, and e-mail correspondences, perspectives from various partners are exchanged and debated to guarantee that high-quality professional development addresses challenging mathematics that is implemented in classrooms across the district.

**Teacher Quality, Quantity, and Diversity**

Partners engaging in conversations, defining needs, and setting priorities has greatly enhanced the work of teacher quality, quantity and diversity. In concurrence with the MPA, the MMP acknowledges the necessity of recruiting a diverse group of qualified individuals to the teaching
profession; fully preparing them for and providing them with the knowledge and skills necessary to effectively teach challenging mathematics for student understanding. The following vignettes explain the unprecedented work involved in having all mathematics teacher positions in high school staffed with a certified or experienced mathematics teacher, and the crucial scaffolding work to ensure capacity building for leadership in mathematics in every school.

**Vignette 1: Hiring Priority for High School Mathematics Teachers by Human Resources**

Innovative strategies were employed by the department of Human Resources to hire certified mathematics teachers for all teaching positions for the 2004–2005 school year. This year, the Human Resources staff took the initiative to begin hiring certified mathematics teachers in January, and completed the hiring process by the end of April. There are no vacancies for mathematics teachers in September. In previous years, the hiring of high school mathematics teachers took place as late as July, or even August, and in order to fill classroom vacancies, permit teachers were hired. A permit teacher has a degree in mathematics but has not completed their professional courses for certification. Three of the permit teachers completed their certification requirements in 2003–2004 and were hired by the district. This will be the first year, 2004–2005, that all MPS classrooms will have a certified mathematics teacher or a permit teacher with teaching experience. To increase the diversity of high school mathematics teachers, three of the new hires that will begin teaching high school mathematics this fall are African American males.

**Vignette 2: Building the Mathematics Support Team in Each School to Improve Teacher Quality**

As the MMP moves ahead, leadership capacity at each school will develop to support and sustain high quality teachers in every classroom. During our first year of the MMP, it was necessary to recognize the Mathematics Teacher Leader at every school, and then develop their capacity as a member of the school Learning Team. The recognition of the MTLs has been accomplished, and we are ready to build capacity for leadership. However, one teacher leader cannot enhance teacher quality for every teacher in every classroom, especially acknowledging the possibility of the leader leaving or transferring. This year, many strategies of the MMP will begin to forge ahead in supporting schools to build the necessary leadership to enhance teacher quality. Some of these strategies include: (1) courses and workshop sessions to enhance administrator leadership in mathematics, (2) peer mentoring for new teachers, (3) designated mathematics assessment leaders at schools, and (4) continual district Learning Team training, and Mathematics Teacher Leader and literacy coach professional development. This leadership team of teachers at all schools will support and enhance teacher quality.

**Challenging Courses and Curricula**

The MMP is in the initial stages of ensuring that all K–12 students develop sufficient depth and breadth of mathematical knowledge. By focusing the district on the Comprehensive Mathematics Framework and district learning targets that are aligned with State Standards we are equipping both students and teachers with the knowledge needed to be successful in their everyday lives. This is, however, a long journey that we are just beginning to undertake as is depicted in the following two vignettes.
Vignette 1: Power of the Graphic

How to create a vision for the teaching and learning of mathematics? How does the Comprehensive Mathematics Framework (CMF) graphic become more than a drawing on a piece of paper? This challenge is what the leaders across the partnership of the MMP are asking themselves on a daily basis as teachers and staff members work together to understand the paradigm shift for the teaching and learning of mathematics embedded in the components of the mathematics framework. Across the district at faculty meetings, professional development teacher days, grade level discussion groups, and University courses, teachers in the MMP are learning mathematics together. It is in the struggling of the mathematics, the sharing of reasoning to explain answers, the unraveling of mathematical ideas, and promoting reflective discussions that the power of the graphic really comes alive for teachers. This power, or understanding of what the graphic really means is how mathematics classrooms will engage in challenging mathematics.

Vignette 2: Alarming Data

Within the first month of the MMP, the curriculum specialist and mathematics specialists presented their findings from analyzing the student data on the Wisconsin Knowledge and Concepts Evaluation (WKCE) accountability test to the Superintendent’s cabinet. Their findings were presented as “Alarming Data.” The following statistics were shared: (1) 68% of fourth graders taking the test scored 0 points or left the answer blank on items that required students to construct written responses to questions. In the 8th grade, 74% of the students scored the same. It is alarming to learn that kids cannot communicate or reason mathematically, and shocking to realize many classrooms do not encourage children to do so. We are on a journey struggling with what teachers/parents/administrators believe to be the nature of mathematics learning and teaching. What does it mean for children to reason in mathematics and why is it important? What are the scaffolds teachers utilize to support
students’ oral and written communication skills? We have a distance to go toward challenging courses and curricula; the journey has started with the CMF and learning targets. Our challenge is to engage teachers in the deep mathematics required by the targets, and understand ways to support children’s developmental thinking and learning.

Evidence-Based Design and Outcomes

The projects within the MMP are designed using current research and studies on teaching and learning. The two projects or vignettes that are described below link outcomes to improving practice. In time, evidence–based strategies from both vignettes can be broadly disseminated to improve overall educational practices within the district and across the nation.

Vignette 1: Addressing Student Reasoning and Communication

The WKCE test results from every school predictably indicate that students are challenged with problem solving and communicating their reasoning in writing. Teachers, administrators, and Learning Teams have analyzed the data, and this spring a collective group of teachers at an elementary school decided to approach the issue. The set up was technology based; teachers were at home (without time constraints) chatting amongst themselves about student written responses via the Internet. Leaders from both MPS and UWM took part in this Internet session, sharing in discourse to address student responses from problem solving situations. Reflecting on the scenario, we have learned that teachers are aware of the data and want to improve student written responses, but may be looking for a quick fix. Two issues emerged from the Internet discussions that will be used in our work with teachers across the district: (1) How do children engage in classroom discussions before writing a response to a math problem? (2) What is the role of the teacher and students in a problem-solving classroom?

Vignette 2: What Makes an Effective Learning Team?

The MMP team recognizes the vital importance of a strong leadership team in every school to build an effective vehicle for change. Already in this first year, the external evaluator has observed actual Learning Teams, and begun helping us understand their characteristics. Four of his major findings were: (1) shared leadership amongst team members, (2) judgment free climate to encourage discourse for open discussions, (3) receptive and willing team members discussing ideas brought forth from the Mathematics Teacher Leader, and (4) the incorporation of MMP activities into the school educational plans. Already these characteristics are being considered as important ideas that will guide our work. From a national perspective, these case studies will be shared and disseminated to other MSPs and leaders across the country. One teacher leader from a Learning Team shared the following, “I think with this new grant, the teacher leader role has really changed. I feel as though I’ve got this new mission to kind of rally the troops, and we all need to be on the same page. And it’s very challenging, but it’s starting to come together, and that’s very exciting. It’s given us a lot of opportunities to begin holding discussions with our colleagues; that really never happened before.”
Institutional Change and Sustainability

Although this is only the first year of the MMP, partners have set priorities and implemented policies and practices to ensure institutional change across Institutions of Higher Education. A vision of the MMP is to advocate discussion amongst co–workers on specific strategies to enhance student understanding. The following scenario exemplifies this type of institutional change.

Vignette: MATC parallel courses with UWM

Milwaukee Area Technical College (MATC) has put in place courses that will ensure students who transfer from a two-year college to a four-year institution, such as the University of Wisconsin-Milwaukee, will be on track, without lagging behind in their mathematics content courses. It was the work of the mathematics faculty across the MMP that really promoted this institutional change. Steps taken to develop and implement these courses include: observing the Math 175 and 176 mathematics courses at UWM, discussions regarding the mathematics content of the courses, co-development of content for the parallel courses, and the necessary paperwork to allow these courses, Math 275 and 276, to begin at MATC in the fall of 2004. These parallel courses across institutions are aimed at helping our CUTEP students, many are MPS graduates, stay on track in their mathematics content coursework.

Lessons Learned

In reflecting upon the first year of the Milwaukee Mathematics Partnership (MMP), both the Year 1 successes and predicted future challenges have regrouped us in the unending endeavor of creating a successful mathematics learning community for all students to succeed in mathematics. As a beginning point, the successes of the MMP were built through the work of the Milwaukee Partnership Academy (MPA). The MPA has helped open previously closed doors, including the ability to work in concordance with the teachers’ union, as well as specialized departments like research and assessment, which have made these initial successes of the MMP so stimulating. By meeting on a regular basis, the MPA was able to address issues, open pathways, and provide support for mathematics that enabled the work of the MMP to begin swiftly and build momentum throughout its first year. Upon analyzing these first year successes, new challenges have been revealed. In this section, the major challenges and impacts of the MMP are defined and explicated within its four main goals.

Goal 1 Comprehensive Mathematics Framework

Lesson Learned

The management team of the MMP anxiously awaited support and resources that enabled members of the school district and faculty at universities to collaborate together to establish and implement a vision for the teaching and learning of mathematics. As the work of the MMP gained momentum, it was astonishing to see how teachers were willing to learn, listen, and work
together. The Comprehensive Mathematics Framework and Milwaukee Public School (MPS) learning targets became significant tools for structuring professional development and for building a collective vision of challenging mathematics teaching and learning. Teachers, at all grade levels, engaged in discussions and activities to deepen their understanding of ways students develop mathematical ideas. A crucial resource that supported such activities was the MMP Action Plan for mathematics, constructed by each school’s Learning Team. This action plan was profound in bringing together a district that was searching for ways to address student achievement in mathematics.

Challenges and Impacts for Year 2

(1) Professional Development

Challenge: Although the MMP is working with teachers using various strategies, making an impact on all teachers is a genuine challenge. Realizing the theory of the change process, it is the “early adopters” and newer teachers who are eager to engage in professional development to further learn and examine their practice. Two challenges that have emerged during this first year are (1) the ability to reach all teachers and (2) the continuance of intense professional development activities to deepen the knowledge needed to align classroom practice with the mathematics framework and learning targets.

Impact: The MMP mathematics specialists will continue to prepare professional development sessions or “mini-workshops” for Math Teacher Leaders who will then facilitate sessions for all teachers in their schools on Banking Time Days and through staff meetings. Math Teacher Leaders reported that the mini-workshops on the Comprehensive Mathematics Framework and learning targets were invaluable as supports for their leadership role, as a means for disseminating a common message across the district, and as a structured way to engage teachers in their schools. To continue the momentum of professional development for all teachers, performance assessments to monitor student achievement of the learning targets will be a focus for Year 2. Several strategies will be put in place focusing on performance assessments including Math Teacher Leader and literacy coach training, pilot schools for performance assessment institutes, Learning Team training, and district wide assessment committees.

(2) Monitoring a Paper Trail—Accountability

Challenge: There is no doubt it was the MMP Action Plan for mathematics that engaged teachers in discussions and activities that promoted understanding of the Comprehensive Mathematics Framework and learning targets for mathematics. It was, however, an accounting nightmare, an unexpected challenge holding 150 schools accountable for a mini-budget of $1500 which produced a perpetual paper trail.

Impact: Systems have been established to monitor the paper trail from the school action plans in mathematics. School and district leaders have become acclimated to the process and realize the necessity of the paperwork, timesheets, and summary reports. Systems will be reviewed and modified in the fall of Year 2.
Goal 2 Distributed Leadership

Lessons Learned
A critical lesson learned this year was the necessity to simultaneously build capacity and sustain effective leadership at multiple levels—individuals, school, district, university, and the partnership. This was demonstrated in everything from building capacity of a Learning Team in focusing on mathematics, to the functioning of Mathematics Teaching Specialists (MTS) and Teachers-in-Residence (TIRs) as teams of leaders amongst Learning Teams, to ensuring collaborating and establishing communication among the partnership administrative leadership teams of the MMP.

Challenges and Impacts for Year 2

(1) Building Capacity for School-based Leadership in Mathematics

Challenge: As Math Teacher Leaders became part of school-based Learning Teams, issues emerged which, if not addressed, may have incapacitated the work of the Learning Teams to focus on mathematics. It became imperative to build the capacity for leadership with a mathematics focus at individual school levels. Reflecting back over the year, it became obvious that the school-based Learning Team was the force that could address the teaching and learning of mathematics at each school site. The focus of the MMP shifted from focusing on the Math Teacher Leader to building capacity for leadership in mathematics for each school’s Learning Team.

Impact: Three major impacts were identified. First, district training facilitated by partners of the MMP will occur semi-annually for members of the Learning Teams. Full-day training will ensure school level leadership is afforded the opportunity to learn and grow together on topics that relate to student achievement in mathematics. Second, the Math Teacher Leader training will semi-annually include the literacy coach. The opportunity will exist for both school leaders to learn together and strategize ways to work effectively amongst teachers at their school sites. Third, communication with principals is critical. In our current system, the principal has an enormous influence with the culture and climate of a school. The principals’ knowledge on effective practices for the teaching and learning of mathematics is essential. The Lenses on Learning instructional leadership course for administrators was offered in summer 2004. Administrators studied classroom practices that aligned with the Comprehensive Mathematics Framework and engaged in discussions on ways to observe classroom teaching. This course will be repeated in Year 2 to impact more administrators and therefore, build capacity for leadership in mathematics at the school level and the district level as administrators collaborate together across the district.

(2) Building District Leadership

Challenge: Mathematics Teaching Specialists (MTS) and Teachers-in-Residence (TIR) were experienced classroom teachers and brought varying abilities and talents to their leadership
roles in the MMP. In their new district leadership roles, it was vital that they have and further develop the ability to work effectively with many different groups of stakeholders—teachers, principals, central office administration, IHE administration, support staff, parents, IHE faculty and staff, and community members. In working with these various groups of stakeholders, it was important for the MTSs and TIRs to use coaching strategies, including active listening and paraphrasing, to build communication avenues in order to address various audiences in practices that impact the teaching and learning of mathematics.

**Impact:** In Year 2, the ongoing monthly training of the MTSs and TIRs will continue to focus on pedagogical content knowledge in mathematics and content-focused coaching skills to promote and strengthen their leadership qualities. They will also continue to collaborate together as district specialists and leaders to plan and facilitate professional development at the school level, district level, and at state and national conferences. This type of professional development training will afford the MTSs and TIRs the ability to concurrently grow as they fortify their level of leadership qualities as a team.

### Goal 3 Teacher Learning Continuum

**Lessons Learned**

Although the district continues to support data-driven decision making at the school level, teachers continue to believe children cannot perform at high levels in mathematics due to their lack of basic skill knowledge. Teachers feel comfortable teaching skill and drill basic facts because of the similar way in which they were taught. Even though the student data indicates children have the most difficulty in problem solving and communication, it is a topic that schools still shy away from addressing. Educators are struggling with their belief system of effective classroom practices on the nature of mathematical understanding and proficiency. At UWM, TIRs are collaborating with mathematics faculty and mathematics education faculty to build the foundation for the mathematical knowledge needed for teaching, including an understanding of the what it means to be proficient in mathematics.

**Challenges and Impact for Year 2**

**1) The Struggle: How does a Standards-based Mathematics Classroom Look and Sound?**

**Challenge:** Educators have embarked on a journey to create a common vision for the teaching and learning of mathematics aligned with the Comprehensive Mathematics Framework and the district learning targets. This vision is attached to an educators belief system which, in some cases, may be in direct contrast to the way many teachers were taught.

**Impact:** MPS classrooms that align to the mathematics framework and targets will be captured on videotape in Year 2 to encourage teacher discussion and reflection with the goal of deepening mathematical content knowledge and exemplifying effective teaching practices. These videotapes will be used at both district and school-based professional development.
sessions, as well as used in university courses for prospective and practicing teachers of mathematics. The professional development courses offered through the university and after school content sessions will continue to engage teachers in activities and discussions that will challenge belief systems of ways students demonstrate understanding and reasoning in mathematics.

(2) Building Effective Design Teams

**Challenge:** The design teams put in place include mathematicians, mathematics educators and TIRs. Their work is to develop and facilitate courses that encompass challenging mathematics and align with state standards, the mathematics framework, and the recommendations of the CBMS report on *The Mathematical Education of Teachers*. As the design teams began to emerge, the varying abilities of these teams to collaborate and work together became evident. If these teams are to be effective, we must actually take one step backwards and reestablish clear understandings of the contributions of each of the members of the design teams and reestablish expectations for the work and outcomes of the teams.

**Impact:** A timeline in year two will define the work and expectations for all members of the design teams. A focused, up front discussion will be held consisting of mathematics faculty, mathematics education faculty, and Teachers-in-Residence on what it means to develop and implement courses and how working together as a team will ensure the professional growth of all team members. Regular meetings will be held the Mathematics Education committee in the mathematics department to include the Teachers-in-Residence and mathematics education faculty. The TIRs will also meet regularly with the MMP leadership at UWM to discuss work expectations and progress and to address challenges and needs.

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**Goal 4 Student Learning Continuum**

**Lessons Learned**

The journey to understand and envision the actualization of challenging mathematics in a classroom has begun. Throughout the district, schools are using various mathematics programs. In order to ensure all schools are supported for challenging mathematics learning, a message was shared that the MMP was not about one mathematics program, but instead about mathematics content using standards-based materials in every classroom for all students. It was a focus of the MMP to discuss classroom practices that align with learning targets and the Comprehensive Mathematics Framework. Teachers enthusiastically engaged in activities that deepened their content knowledge of the targets and worked collaboratively to understand the alignment and the gaps within their programs based on the mathematics framework. Math teacher leaders attended working sessions to learn to disaggregate the data. This work equipped the Mathematics Teacher Leaders with necessary tools to work within their Learning Team to develop school educational plans that will lead all students to succeed in mathematics. The work in Year 1 has laid a strong foundation for work in subsequent years.
Challenges and Impact for Year 2

(1) Data Collection

Challenge: It was astonishing to learn that across all partners and all institutions of the MMP, accessing data has been a major, unexpected problem. Systems have not yet been developed for tracking student achievement data and teacher data that is necessary to study and share for making decisions and monitoring progress.

Impact: The MPA has begun to address the data needs for the district. Meetings have already begun including topics such as what is the data that needs to be collected; what tracking systems are multi-sorting, most efficient, and flexible; and who are the pertinent leaders that for making this happen.

(2) High School Reform

Challenge: Proportionally, 3/4 of our high schools are on the list of schools in need of improvement; less than 1/3 of our elementary and middle schools are on this list in Wisconsin. Clearly, the high school accountability system imposed by both the state and NCLB is straining and testing the confidence of our high schools and our ability to improve the mathematics achievement of high school students. The necessity for change is most crucial at the high school to providing positive examples of success and leadership.

Impact: To improve student achievement, the high school staffs will distribute their leadership roles beyond the work of the mathematics department chair. The goal is for at least two other mathematics teachers to actively participate as representatives of their school on district committees, specifically on the Foundations Level Proficiency assessment pilot and the Foundations Level Network. The high school assessment pilot will have three objectives: (1) unpack the learning targets and collaboratively define the learning targets that will be covered in specific coursework, (2) write classroom assessments based on standards (CABS) to monitor student achievement of targets, and (3) share student work from CABS across schools to enrich and deepen teachers pedagogical content knowledge for challenging mathematics. The second leadership committee, the Foundations Level Network, will engage mathematics teachers of ninth and tenth grade students. Members of this network will focus on lessons and activities that enhance student engagement with mathematics. Through the leadership of this network, high schools will develop a three fold plan: (1) effective teaching strategies for diversification in learning, (2) curriculum alignment to state standards and accountability measures, and (3) possible supplemental materials to refine the mathematics courses at the foundation levels.

As the first year of the Milwaukee Mathematics Partnership comes to a close, we eagerly anticipate the future as an unlimited opportunity to establish a successful mathematics learning community for all students to succeed in mathematics. In reflecting on the lessons learned and the impact for Year 2, we have been able to reframe our work and better anticipate future successes and challenges.
References

