

APPENDIX L

SCHOOL IMPROVEMENT GOAL EXAMPLE

Annual School Improvement Goal #1

Improve mathematics achievement by increasing student understanding of operational concepts, problem solving, and mathematical reasoning.

Strategic Goals Addressed

Continually improve the academic achievement of students.

Background Analysis

Analysis of the mathematics portion of the Wisconsin Knowledge and Concepts Exams show that results for Academy students, on average, fall well below the results for students attending the Milwaukee Public Schools and for students throughout the State of Wisconsin. Item analysis of test results for controlled cohort groups of students attending the Academy for three years reveal two areas of significant concern. These areas are: 1) operational concepts and 2) problem solving and reasoning.

In-depth analysis of operational concepts through unit tests at all grade levels indicates that students: 1) do not have a working knowledge of basic facts and 2) are not using a consistent rubric to solve algorithms. A review of the in place curriculum reveals that students are expected to learn basic facts through application. Drill and practice for the memorization of basic facts is absent. The mathematics curriculum does teach a consistent methodology for algorithmic solutions. Classroom observations, however, reveal that teachers at three grade levels utilize algorithm methodology different from that required by the curriculum. This has confused the students and led to inconsistent application.

In-depth analysis of problem solving and reasoning techniques employed by students reveals a lack of process understanding and that students do not have a consistent approach to problem solving. A review of curriculum material indicates that a consistent problem solving methodology is promoted. However, the methodology is not reinforced after its annual introduction (review) at the beginning of the year. Student are expected to carry forward the understanding of the process from year to year. Classroom observation shows that teachers use the process to show solutions to problems and the reasoning behind the solution but do not review the process itself on a regular basis. Further, no classroom rubrics have been created to guide students. Classroom observations reveal that the most difficult problems are often assigned as

homework without in class discussion of the best process for approaching the solution. Finally, problem solutions are shown in class through teacher and student demonstration. The reasoning behind the solution is, however, not discussed.

Key Indicators of Success

- Students will demonstrate knowledge of basic facts.
- Students will demonstrate consistent use of prescribed algorithms.
- Students will demonstrate knowledge of consistent problem solving process.
- Students will demonstrate use of reasoning processes to solve problems.
- Student results on the mathematics portion of the Wisconsin Knowledge and Concepts Test will show a significant increase.

Approach

- Materials designed to promote the memorization and efficient use of basic facts will be developed and applied at all grade levels.
- Instructional methodology designed to foster the memorization and efficient use of basic facts will be designed and implemented.
- Additional materials designed to supplement the present curriculum in the area of problem solving and reasoning techniques will be developed and applied at all grade levels.
- Instructional methodology designed to foster students' ability to utilize a consistent problem solving methodology and understand the reasoning behind the methodology will be developed and applied at all grade levels.

Deployment

Basic Facts

- Appoint faculty committee to develop basic facts curriculum materials.
- Develop materials for each grade level.
- Design process for implementation of basic facts instruction.
- Design periodic assessment of student basic facts knowledge.
- Train teachers for the implementation of basic fact instruction and assessment.
- Monitor implementation of instructional process.
- Inform parents of homework requirements for basic facts program.
- Provide parents with procedures to assist students with the learning of basic facts.
- Measure the progress of students in each grade with the learning of basic facts.

- Analyze results from each grade level to determine level of progress.
- Make mid-course corrections as necessary.

Problem Solving and Mathematical Reasoning

- Appoint faculty committee to develop supplemental curriculum materials in the areas of problem solving and reasoning techniques.
- Develop materials for each grade level.
- Design problem solving and reasoning rubrics for each grade level.
- Design process for implementation of problem solving and reasoning techniques.
- Design periodic assessment of student problem solving knowledge and reasoning techniques.
- Train teachers for the implementation of problem solving and reasoning instruction and assessment.
- Monitor implementation of instructional process.
- Measure the progress of students in each grade in the areas of problem solving and reasoning techniques.
- Analyze results from each grade level to determine level of progress.
- Make mid-course corrections as necessary.

Data Collection Plan

Basic Facts

- Thoroughness of basic fact curriculum development process.
- Effectiveness of faculty and staff training.
- Consistency of implementation process.
- Results of monthly basic facts assessments.
- Results of unit examinations.
- Results of Wisconsin Knowledge and Concepts Examination.

Problem Solving and Mathematical Reasoning

- Thoroughness of problem solving and reasoning curriculum development process.
- Effectiveness of faculty and staff training.
- Consistency of implementation process.
- Understanding of problem solving and reasoning rubrics.
- Results of unit examinations.
- Results of Wisconsin Knowledge and Concepts Examination.

Results

Basic Facts

- Monthly administrative/teacher discussions revealed that all necessary curriculum materials required to implement basic fact and algorithmic instruction were properly developed and available for timely use by faculty and staff.
- Following staff development activities, all faculty and staff stated that they understood the new requirements for basic fact and algorithm instruction.
- Classroom observations showed that 78% of faculty and staff properly implemented the basic fact and algorithmic instruction. Twenty-two percent of the faculty and staff did not fully implement the revised curriculum. Of these individuals, seventeen percent (17%) stated that they did not have enough time to properly implement the program while three percent (3%) indicated that they thought that the curriculum should not be modified and two percent (2%) did not give specific reasons for failing to implement the revised curriculum.
- Eighty percent (80%) of the students showed significant increases in their ability to utilize basic facts.
- Seventy-six percent (76%) of the students showed mastery level understanding of required algorithms.
- Sixty-two percent (62%) improved on the operational concepts portion of the WKCE.
- An eleven percent (11%) increase in the number of students achieving proficient or advanced standing on the WKCE was observed.

Problem Solving and Mathematical Reasoning

- Monthly administrative/teacher discussions revealed that all necessary curriculum materials required to implement problem solving instruction were properly developed and available for faculty and staff use.
- Monthly administrative/teacher discussions revealed that materials designed to supplement the present mathematics program in the area of reasoning techniques were inadequate.
- Following staff development activities, ninety percent (90%) of the faculty indicated that they understood the new requirement for problem solving and reasoning instruction.
- Classroom observations showed that 82% of the faculty were properly inserting a discussion of problem solving techniques into classroom problem solutions.
- Fifty-two percent (52%) of the students demonstrated understanding of the problem solving rubric.

- Classroom observation showed that 48% of the faculty were appropriately demonstrating problem solving and reasoning during the demonstrating of classroom problem solutions.
- Twenty-one percent (21%) of the students were able to demonstrate appropriate reasoning techniques.
- Forty-one percent (41%) of the students showed improved problem solving on the WKCE.
- Twelve percent (12%) of the students improved on the mathematical reasoning portion of the WKCE.
- An eleven percent (11%) increase in the number of students achieving proficient or advanced standing on the WKCE was observed.

Analysis of Results

The materials developed to improve basic fact and problem solving instruction were appropriate. Minor improvements recommended by faculty should be made for next year. The materials developed to assist instruction in mathematical reasoning were inappropriate to the task and should be redeveloped. Experts in mathematical reasoning will be consulted prior to new development efforts.

Faculty and staff training for basic fact, algorithm and problem solving instruction was appropriate for most faculty and staff. Individuals experiencing difficulty should be further instructed through a mentoring process.

Consistency of application should be further emphasized with the entire staff and should become part of the evaluation goals for specific staff members who either experienced application problems or indicated disagreement with the effort.

Efforts to improve these areas of mathematics instruction should continue next year. Consistency of understanding and application must be emphasized for basic fact instruction, the application of algorithms, and problem solving methodology. Major emphasis should be placed on staff training surrounding mathematical reasoning and the consistent application of appropriate instructional techniques in the classroom.