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ABSTRACT

One purpose of this case study was to obtain information on the influence of the Detroit Urban Systemic Initiative (USI) on the frequency of implementation of constructivist-oriented, standards-based science and mathematics instructional practices. Information about the perceived adequacy of the curriculum for standards-based instruction was gathered from data such as a teacher questionnaire, a student questionnaire, and six school case studies. Analysis of the data in the surveys included a comparison across years of the project. In the survey teachers report that they frequently implement instructional practices that promote inquiry learning, ongoing assessment, communities of learners, and that they are involved in planning and decision making about the curriculum. Students were generally in agreement with the teacher reports. Findings also indicate an increase in the use of standards-based teaching practices from 1996 to 1997. Contains 88 references and 6 data tables. (Author/DDR)

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A Paper Presented at the Annual Conference of the
National Association for Research in Science Teaching

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Abstract

The Effect of the Detroit Urban Systemic Initiative on Perceived Instructional Practice and Curriculum Adequacy

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A purpose of this study was to obtain information about the influence of the Detroit Urban Systemic Initiative on the frequency of implementation of constructivist-oriented, standards-based science and mathematical instructional practices. Furthermore, information was gathered about the perceived adequacy of the curriculum for standards-based instruction. Data was collected from several sources, including a teacher questionnaire, student questionnaire, and six school case studies. Analysis of data in the surveys included comparison across years of the project and by scale-up tiers. Teachers reported on the survey that they are frequently implementing instructional practices that promote inquiry learning, ongoing assessment, communities of learners, and involve teachers in planning and decision making about the curriculum. Students when asked to indicate how frequently they experienced standards-based instructional practices in their classes, generally agreed with teacher reports on eight of the similar items in both surveys. Teachers and students from the earlier phased-in schools were found to be using standards-based teaching practices significantly more often in 1997 than in 1996. Furthermore, teachers surveyed about the adequacy of their curriculum across the last four years show significant improvements for each of eight curriculum items. Case studies of six selected schools supported these findings.

The Effect of the Detroit Urban Systemic Initiative on Perceived Instructional Practice and Curriculum Adequacy

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Background

According to Cuban (1990), reforms historically have a periodic nature. Similar reforms return again and again. Why? Reforms have often failed because the solutions provided by the reform were not relevant to the problems they were intended to solve. Cuban says that "Schools and classrooms go largely unchanged, although the noise and motion do give an appearance of fundamental reform."

Classroom instructional practice has been resilient to change in all of these reform efforts through the centuries (Cuban, 1990). Reformers long ago advocated more student-centered instruction as opposed to the more traditional teacher-centered instruction. For example, over a century and a half ago, reformers condemned teacher-centered instruction and advocated object teaching. Object teaching sought to arouse student curiosity by having them make observations with real objects and to make connections to the real world. In the latter part of the 19th century, progressive reformers again tried to end teacher-directed practices and emphasized more active student involvement in learning. Innovative methods advocated included using small groups, activity projects, and joint student-teacher planning of class work. However, according to Cuban, few of these changes advocated in these earlier reforms entered the classrooms as intended.

The current reform efforts in science and mathematics are aimed once more at fighting the subject-centered instruction and promoting more student-centered learning. Reform advocates today usually support constructivist instructional philosophies and advocate more cooperative learning and active involvement of students in the learning process. So what is new about these reform efforts? Will they effect change in classroom practice and the curriculum for students?

Systemic Reform

The new reform efforts in science and mathematics education focus on a systemic approaches as opposed to the piecemeal approaches of the past. The systemic approach involves all stakeholders, policies, and other influences on the learning process from the school classroom to the school district and community. The goal of the systemic reform is to improve instruction and thereby improve student learning.

The National Science Foundation (NSF, 1998) has taken the lead in supporting the systemic reform process in science and mathematics education. It funded fifty nine systemic initiatives that included statewide, urban, rural, and comprehensive partnerships. The guiding principle of all of these systemic initiatives is that "All children can and all children must learn rigorous science, mathematics, and technology." This principle represents a fundamental change in the way educators and society view children and the way they view science, mathematics, and technology education. NSF holds school systems accountable for sustainable system-wide or systemic outcomes rather than for outcomes of isolated projects. Furthermore, it emphasizes implementation of curriculum and instruction that meets science and mathematics standards and that leads to rigorous learning. The key systemic change process driver is "rigorous, standards-based instruction for all students, and the curriculum, professional development, and assessment systems to support instruction." This driver is based on an understanding that learning is an active process wherein the learner is the full participant, not a passive recipient.

Research on the effects of systemic initiatives on instruction and on curriculum is still incomplete since many reform initiatives are still in progress. Evaluation of such large scale initiatives is difficult since these usually are not carefully controlled experiments. Rather, the systemic initiatives typically involve a multitude of new variables interacting at the same time. This makes makes it hard to determine which project activities and/or forces were responsible for change.

Knapp (1997) studied a group of current systemic reform efforts and found that they were multifaceted with the following commonalities: 1) curricular standards, 2) frameworks (often with supporting materials), and 3) alignment of resources for professional development in support of the framework vision. He saw little evidence that these reforms were greatly improving instructional practice in the classrooms. Teachers were paying attention to the new curriculum content and some aspects of the new assessment procedures recommended. Also, they were adopting more easily imported practices such as the increased use of manipulatives. However, there was not as much alignment at the school level as at the district level. Teachers were often implementing pieces of reform elements but did not have a coherent picture about what the reform was about.

Likewise, Cohen (1995) also comments that systemic reform has not yet increased the capacity for instruction.. He says that systemic reform aims to change teaching through 1)change in policy instruments that reformers assume will "drive" instruction and 2) reduction in bureaucracy that impedes reform. However, he says there is little evidence of a direct and powerful relationship between policy and practice.

Detroit Urban Systemic Initiative

The Detroit Urban Systemic Initiative (Detroit USI) is a five year program developed with the following four goals: 1) provide the mathematics and science fundamentals which will permit all students to participate fully in a technological society; 2) improve mathematics and science literacy of all students in the Detroit Public Schools; 3) enable a significantly greater number of Detroit students to pursue careers in mathematics, science, engineering, and technology; and 4) facilitate a district-wide climate for systemic change that continually assures adoption and maintenance of strategies and programs that enable all students equal access.

Enabling objectives for these Detroit USI goals included such items as: 1) the implementation of a standards-based core mathematics and science curriculum K-12; 2) the provision of related teacher and administrative staff development opportunities to enable effective delivery of the core curriculum; 3) and the provision of student access to instructional delivery systems that develop literacy, such as: hands-on instruction, constructivist approaches to teaching and learning, problem-based leaning, and the use of more collaborative learning strategies.

For this program, the entire Detroit Public School district was divided into three tiers which consisted of school constellations (elementary, middle, and high schools). Tier one experienced the major thrust of the staff development program and began implementing new programs the first year (1994-95) of the DUSI. Tiers two and three were phased in during subsequent years of the program.

In the first year of the Detroit USI, a constructivist vision document (Stein, et. al., 1994) was developed by DPS for teaching, learning, and for staff development. This vision document was based on the original Detroit USI proposal as well as the new national standards in science and mathematics. The vision document serves as a guide for what the Detroit USI hopes to accomplish at the end of the entire project.

The evaluation efforts of the Detorit USI focused on the progress that had been made toward attaining this vision. The evaluation of the Detroit USI was structured to collect stakeholders' perspectives on the progress of the Detroit USI implementation in science and mathematics. In addition, in-depth information was gathered about the changes occurring in selected individual schools. Finally, summary data for science and mathematics students and teachers were examined across the last several years to note progress toward meeting goals.

A combination of data collection techniques were used in the overall evaluation of the Detroit USI. These included: teacher survey, student survey, case studies of six schools, observations of seven staff development sessions, focus group with parents, focus group with unit heads/department heads, ninth grade restructuring surveys, and an examination of test scores of Detroit students on the Metropolitan Achievement Test (MAT) and the Michigan Educational Assessment Program (MEAP) tests. In this paper, the specific aspects of the evaluation will be reported that deal with changes in instructional classroom practice and curriculum adequacy that might be due to the Detroit USI efforts.

Purpose of Study

A purpose of this study was to obtain information about the influence of the Detroit Urban Systemic Initiative on the implementation of constructivist-oriented, standards-based science and mathematical instructional practices. Furthermore, information was gathered about the perceived adequacy of the curriculum for standards-based instruction. Data was collected from several sources, including a teacher questionnaire, student questionnaire, and six school case studies. Analysis of data in the surveys included comparisons across years of the project and by scale-up tiers.

Method

Instruments and Procedures

To determine the effects of a program, teachers and students completing the program can be compared to those beginning the program. Payne (1994) describes this design as an Institutional Cycle Design where, for example, a group is first assigned to the treatment (tier 1 in the DUSI) and then is tested. The second group (tier 2 in DUSI) would be tested at the same time as the first group and then be exposed to the treatment. They would then be post-tested. Then a third group (tier 3 in DUSI) would be tested at the same time as the group two post test and then receive the treatment. They would then be post-tested after receiving the treatment. Program impact was measured, for example, by Group I Post versus Group 2 Pre, Group 2 Post versus Group 3 Pre, and Group 3 Post versus Pre. A similar approach to this was used to evaluate change in instruction and curriculum adequacy in the Detroit USI evaluation.

Teachers Questionnaire - Surveys were conducted in the a second and third year (portions also given in 1993 before the Detroit USI began) of the Detroit USI implementation process. The teacher surveys included the following areas: 1) degree of implementation of standards-based instructional practice and 2) the perceived adequacy of the curriculum for standards-based instruction.

The first part of the teacher questionnaire was developed by the DUSI evaluation team (DPS and WSU) to obtain overall teachers' perceptions about the frequency of implementing 33 standards-based mathematics and science instructional practices. Teachers were asked to respond to statements on a five-point scale of "almost never" to "almost daily." This section dealt with teaching standards A through F of the *National Science Education Standards* (1996), *Professional Standards for Teaching Mathematics* (1991), and the *Assessment Standards for School Mathematics* (1995) These desired instructional practices were also described in a constructivist vision document (Stein et. al., 1994) developed by the school district that served as the blueprint for change in the Detroit Urban Systemic Initiative. Items on this instructional practice section of the teacher survey dealt with such topics as planning and facilitating inquiry learning, using on-going assessment strategies, designing and managing learning environments, developing communities of science and mathematics learners, and actively participating in the planning and decision making about the school science and mathematics program. The internal reliability coefficient for this section was .92. The second half of this section contains 15 items that were also developed by the evaluation team to obtain teachers' perceptions about the adequacy of the mathematics and science curriculum for standards-based instruction. The internal reliability coefficient for this section was .93.

Student Questionnaire - This questionnaire was designed to obtain students' perception about the extent to which the Detroit Urban Systemic Initiative has been implemented within the schools. This questionnaire was administered in the second and third years of the Detroit USI implementation The questionnaire included the 37 items that were developed to obtain students' perceptions of how frequently they experienced standards-based instructional practices in their mathematics and science classroom. Students were asked to respond to statements on a three-point scale: "never," "sometimes," and "everyday." Many of these items were similar to those on the instructional practice section of the teachers survey. This duplication of items on both surveys helped to validate the responses of the teachers with regard to their reported frequency of various instructional practices. Similar responses were found for both students and for teachers. The internal consistency reliability coefficient for these two sections on the student survey was .71.

Teacher and Student Survey Sample

The sampling plan utilized was a stratified random sample to represent tiers and school level. A two-stage sampling process was used for teachers. The first stage was random selection of schools by tier (ten elementary, five middle and three high schools). There were far fewer school in tier one than in tiers two and three. The second stage consisted of surveying all math and science teachers within the randomly selected school. Given this scheme, a total of 570 teachers from 54 schools were sent surveys. Completed questionnaires were received from 61% of the teachers. To represent the entire district, respondent groups were weighted across tier and level to ensure that each group (by level and tier) was represented proportionately to its distribution within the population.

A three-stage sampling process was used for students. The first stage consisted of randomly selecting schools, as was done in the teacher survey. For the second stage, the principal at the elementary school, the math and science unit head at the middle school, and the math department head and science department head at the high school were asked to randomly select two homerooms/classrooms from these schools. At the elementary level, 4th grade students were surveyed, 8th grade for middle school, and 10th grade for high school. The third stage consisted of surveying all the students in those randomly selected homerooms/classrooms. A total of 1,080 students from 54 schools were asked to complete a questionnaire. Completed questionnaires were received from 77% of the students.

School Case Studies

Case studies were made by science and mathematics specialists from Wayne State University for six Detroit schools who exhibited exemplary progress in the last three years toward meeting the goals of the DUSI. These schools were identified by the Detroit Public School science and mathematics supervisors. The purposes of these case studies were to: 1) to describe in more detail the changes that have been undertaken in the science and mathematics programs in the last three years toward a more standards-based curriculum, 2) to document the effects of these new changes on students, teachers, and curriculum at the school level; 3) to gather formative data for program improvement (see attached case study visitation protocol).

Analysis of Data

Survey Analysis - The data from the student and teacher surveys were analyzed for progress in teacher and student perceptions from 1995-96 to 1996-97. The two years were compared for overall differences. In addition, comparisons across the years were made for Tier (phased-in schools) and grade level (elementary, middle, and high school). For the teacher survey, comparisons were also made for the subject taught (mathematics and science). Where responses were summed across a section (student questionnaire and teacher questionnaire), the Wilcoxon Rank Sum W test was used to test for significant differences with alpha = .05, one-tailed test. The data from the student and teacher surveys for the 1996-97 school year were also analyzed separately to identify significant differences in response by Tier, grade level, and subject area taught (teacher survey only), and gender (student survey only).

Case Study Analysis - A school visitation protocol was developed with questions to serve as a guide for observer. A meeting was held with the visitation team to review the case study protocol questions for consistency in observation and reporting. For example, it was important that each team member visit classes, talk to students and teachers, interview administrators, examine student journals/portfolios, and review artifacts collected. Separate school visitation reports were submitted from each case study school visitation team following the completion of their school visits. An overall report summarizing patterns noticed across schools was developed.

Results

Instructional Practice

Teacher Survey - Science and mathematics teachers reported in 1997 that they are implementing instructional practices that promote inquiry learning weekly or more often (see Table 1 where scores ranged from about 86% to 98% on seven items in this category), promoting on-going assessment in their classroom (see Table 2 where scores ranged from about 51% to 89% on 9 items in this section), supporting a community of learners (see Table 3 where over 54% of the teachers used these two items regularly), and involving teachers in planning and decision making about the curriculum (see Table 4 where reported regular use of the five items in this list ranged from about 37% to 86% with the average rating of 63% for this category).

Table 1

1997 Teachers' Report of Implementation of Instructional Practices that Promote Inquiry Learning (n=317)

Elements of inquiry learning:	**Percent Reporting Weekly or more often**
Connect instruction to students' prior knowledge	97.8%
Incorporate problem-solving and critical thinking opportunities in mathematics and science instruction.	96.9%
Use multiple strategies to teach concepts	96.4%
Engage students in discussions about mathematics and science	92.6%
Use open-ended questions with students	92.6%
Connect mathematics/science concepts with each other as well as to other subject areas	88.2%
Use manipulative materials and hands-on activities where students discover principles and relationship	86.2%

Table 2
1997 Teachers' Report of Implementation of Instructional Practices that Promote Ongoing Assessment
(n=317)

Elements of ongoing assessment:	**Percent Reporting Weekly or more often**
Assign performance tests for students to help measure understanding and ability to apply what they have learned	88.5%
Provide all students with opportunities to write about mathematics/science concepts	80.4%
Provide information and develop student interest in continuing mathematics/science education beyond high school	73.4%
Provide information and develop student interest in enrolling in higher level mathematics/science courses in high school	70.0%
Use technology as a tool for measuring, observing, reporting, and assessing data	57.7%
Use peer reviews as a way of helping students become reflective, critical assessors of their own work and that of others	55.6%
Use personal conference with each student to reflect on progress, accomplishments, and to determine new directions for student effort	53.0%
Maintain portfolios of student work to reflect growth over time and to document evidence of learning	50.7%
Use projects to assess students' work	50.5%

Table 3
1997 Teachers' Report of Implementation of Instructional Practices that Support a Community of Learners
(n=317)

Elements of supporting a community of learners	Percent Reporting Weekly or more often
Plan group activities in which students work cooperatively in solving problems	86.2%
Provide opportunities for students to make choices and to plan, conduct and evaluate independent investigations	54.5%

Table 4
Teachers report of Implementation of Instructional Practices that Involve Teachers in Planning
(n=317)

Elements Involving Teachers in Planning and Development of the School Mathematics and Science Program	Percent Reporting Weekly or more often
Document student accomplishments of objectives	86.3%
Periodically review your own progress and milestones	83.3%
Make changes in instruction based on research findings	65.5%
Meet regularly with other mathematics/science faculty to make mid-course review of information about your program	42.6%
Screen curriculum materials and activities for gender, race, and ethnic group bias	36.7%

The data analysis did not reveal any significant differences between tiers, levels, or subject, but important trends were noted With regard to differences among tiers for 1997, tier one teachers reported using constructivist practices more frequently than teachers in tiers two and three. Elementary teachers reported using these instructional practices more frequently than middle, and high school teachers. Science teachers tended to implement these instructional practices more often than mathematics teachers.

Teachers' overall perceptions of their use of constructivist teaching practices in mathematics and science for the 1995-96 and 1996-97 school years were compared using an average score of all the elements of constructivist implementation (see Figures 1 and 2). There were statistically significant differences, with tier one teachers reporting that they are implementing constructivist teaching practices more frequently in 1997 than in 1996 (see Figure 1). Tier two and three teachers reported using constructivist instructional practices more often in 1997 than in 1996, but the difference was not statistically different. Science teachers reported using constructivist teaching practices more frequently in 1996-1997 than in 1995-1996 across all three tiers. ($p<.05$, one-tailed test). There were no significant differences between the two years for math teachers.

Student Survey - Tier one students surveyed in 1997 reported experiencing constructivist teaching practices more frequently than tier two and three students for all 37 items ($p<.05$, one-tailed test). Likewise, elementary students reported experiencing these teaching practices more frequently than middle and high school students. Male students reported experiencing constructivist teaching practices more frequently than females, but this difference was not statistically significant.

The overall student perception of experiencing constructivist practices were compared for 1996 and 1997 using mean summed scores of all the questions in this section (reliability coefficient=.71) No significant positive differences in student perceptions for instructional practice were found between 1996 and 1997 regardless of tier or grade level ($p<.05$, one tailed test). Table 5 includes a list of eight of the thirty seven items in this questionnaire along with the student responses for 1997.

Table 5
1997 Students' Report of Frequency of Experiencing Selected Constructivist Practices in their Science Class
(n=816)

Student Experiences In Science Class	**Percent indicating "sometimes" or "almost everyday"**
Work with others in small groups	87%
Learn about science through real life situations	79%
Do hands-on laboratory activities	77%

Use models to represent ideas for concepts	75%
Use a work folder or portfolio	69%
Work on projects that take a week or more	65%
Make your own choices about what you study	51%
Write about science in a journal	48%

Case Studies - Where significant change in instruction was observed, there seemed to be some common elements. These included a more frequent use of hands-on activities, greater likelihood to use an inquiry approach to instruction, increased use of collaborative learning during instruction, more frequent use of long term projects, and a greater attention to and use of alternative forms of assessment.

When science and mathematics teachers in the six case study schools were asked what changes in student learning occurred in the last three years (time of Detroit USI), all teachers reported higher levels of student achievement in their classes. Most teachers attributed this to the constructivist oriented instructional practices that led to a deeper level of conceptual understanding of science and mathematics in their students. These teachers were aware of constructivist pedagogies and attributed the increase in student achievement to an increase in their students' conceptual understanding of the content of mathematics and science. Classrooms observed generally supported these teacher comments. Student journals, portfolios, long term research projects, and other artifacts also supported what these teachers said.

The type of instruction taking place in a science classroom can be inferred form the following quote that was observed in a middle school student's journal;

> "If something happened to the ozone layer and more of the sun's radiation reaches the earth, there could be a sharp increase in rates of skin cancer in humans or other animals. If the people who sun bathe don't watch out, they could be exposed to painful sunburn, cancer, or death.

Students in a mathematics class observed at one of the sites were working with software which emphasized solution strategies. When one student completed a puzzle, her teacher brought her unique solution to the attention of the rest of the class. "No one has ever done it like that," the teacher announced. "Save it!" This case demonstrates that students in this class are encouraged to follow their own interests when they work with the computer, and excellent work is rewarded.

Most science and mathematics teachers at each of the case study sites used cooperative learning venues to some degree. Moreover, the wide-spread use of project work in both mathematics and science fostered collaboration and better connected students' academic work with the communities in which the live. There also appeared to be a district-wide emphasis on writing in the content areas.

This increase in student writing in mathematics and science seems to have helped develop student understanding of concepts, as well as to have personalized their relationship to both disciplines.

All of the mathematics and science teachers who were observed and/or interviewed at each of the case study sites appeared to be using a wide variety of alternative forms of assessment. In addition to more traditional forms of assessment such as tests and quizzes, innovations observed included such methods as the use of student journals, portfolios, long-term projects, group quizzes, and constructed response items. Almost withou exception, teachers cited their Detroit USI activities as the catalyst in their increased interest in and use of alternative forms of assessment.

These observations and examples speak to the type of instruction the teachers felt they had moved toward as a result of their new views about teaching and learning embodied in the Detroit USI constructivist vision statement and sponsored programs.

Curriculum Adequacy

Science and mathematics teachers were surveyed to determine how adequate they felt the curriculum was for 15 standards-based items. More than half of the teachers surveyed in 1997 reported that the curriculum adequately ("adequately enough")outlines major concepts we want our students to know and to be able to demonstrate (59%), makes connections to the state curriculum frameworks (56%), and articulates the skills we want our students to be able to demonstrate (54%). Lesser numbers of teachers reported that the curriculum develops technological science concepts (22%) or relates to societal issues relevant to the student (21%). Elementary teachers surveyed in 1997 were more likely than middle and high school teachers to view the curriculum as adequate ($p<.05$, one tailed test).

In comparing teachers' overall perceptions of the adequacy of the curriculum from 1996 to 1997, there were no statistically significant differences according to the teachers' grade level, tier, pr subject area. However, when teachers were asked their view of the adequacy of the curriculum (see Table 6) in the 1993-94 school year (before DUSI) and again in the 1996-97 school year (third year of DUSI), there were significant improvements found for each of the eight curriculum items ($p<.05$, one tailed test).

Table 6
Changes in Teachers' View of Curriculum as Adequate From 1993 to 1997

	Math			Science		
Element of Curriculum	1993	1997	Sign Dif	1993	1997	Sign Dif
Overall number of cases	123	147		159	173	
Develops problem solving skills	1.98	2.29	p<.05	1.89	2.40	p<.05

Develops a relationship between math, science and other disciplines	1.75	2.06	p<.05	1.79	2.26	p<.05
Relates to needs of urban students	1.76	1.94	p<.05	1.78	2.08	p<.05
Prepares students for a college education	1.91	2.19	p<.05	1.90	2.17	p<.05
Prepares students for local and national tests	1.93	2.13	p<.05	1.90	2.16	p<.05
Prepares students for future jobs	1.84	2.12	p<.05	1.77	2.13	p<.05
Develops practical skills to use scientific instruments, calculators and computers	1.93	2.12	p<.05	1.80	2.04	p<.05
Relates to societal issues relevant to the student	1.73	1.80	p<.05	1.77	2.02	p<.05

(Scale: 1=not at all adequate; 2=somewhat adequate; 3=adequate enough)

Discussion and Conclusions

Instructional Practice

Although there was not a significant increase in the use of this entire list of constructivist and standards-based instructional practices across all tiers from the 1995-96 school year to the 1996-97 school year, there were differences found in the three tiers. Tier one teachers who had been exposed to almost three years of the DUSI program were found to be more likely to implement these practices in their classroom in 1997 than were tier two or three teachers. Likewise, on the student survey, students in tier one classrooms were more likely to experience these instructional practices in 1997 than tier two and three students. Since there were fewer schools involved in the earlier tier one implementation than for the tier two and tier three implementations, overall school district differences in instructional practice from one year to the next might not be a meaningful indicator of change until all school tiers have had sufficient time to change. The tier effects support the contention that the DUSI resulted in changes in teacher instructional practice toward a more standards-based instructional model.

There were no significant gender differences in experiences of students with these instructional practices. This speaks to the concern that all students have access to quality instruction. Science teachers across the district reported using standards-based instructional practices more frequently in 1997 than in 1996. There was no significant increase in the use of these practices by mathematics teachers across the district for these two years.

Curriculum Adequacy

There were significant increases for all items between 1993-94 and 1996-97 in teachers' perceptions that the curriculum adequately aligns with National Standards. This provides evidence that the DUSI program has contributed to changes in the teachers' perceptions about the adequacy of the science and mathematics curriculum so that they are more in alignment with national standards. There were no significant differences in perceived curriculum adequacy found between tiers from 1996 to 1997. This was due to the fact that the new Detroit core curriculum guidelines and textbooks were given to all tiers early in the program. Elementary school teachers were more likely to view the curriculum in 1997 as adequate than middle school and high school teachers. This latter finding is in keeping with findings from other reform studies.

Discussion

Changes in teacher attitudes and instruction takes time. The Detroit USI is in the fourth year of its implementation of a systemic change initiative and the effects of this effort might not be known for many years to come. The previous literature suggests that as a result of a reform initiative, widespread change in classroom instruction toward a student-centered approach is very unlikely. However, change in curriculum materials (textbooks and curriculum guides) is possible.

However, thus far, the Detroit USI has shown some movement toward more constructivist, standards-based instruction. This was evident from the survey data where teachers from schools in tier 1 who had experienced the reform initiative in the first year said that they were more frequently using desired instructional practices that were tier 2 and tier 3 teachers who experienced the reform efforts in later years. It was also evident from the conversations with teachers in the case study schools who talked about their new constructivist philosophy of teaching that they said that they had acquired and were beginning to apply in the classroom as a result of the efforts of the Detroit USI program.

If the results of this study indicate that reform is changing instructional practice and curriculum adequacy in the Detroit schools, then one might speculate as to why. Teachers were integrally involved in the development of the Detroit USI grant proposal for change. Also, in the first year of the project, a constructivist vision statement for teaching, learning, and staff development was developed cooperatively with the Wayne State University and the Detroit Public Schools. The school district administration and supervisors believed in the vision for change in this project and gave it a high priority. Likewise, the teachers believed in this vision for change. The staff development program has also focused on this constructivist vision. Perhaps the most important factor that distinguishes this reform from past reform efforts is it systemic nature. Many of the past reforms were often done in a piecemeal fashion and did not integrally involve the various stakeholders in decisions. These factors were key to the success thus far of the Detroit USI. Overall, these data support the contention that the DUSI resulted in changes in teacher instructional practice and curriculum toward a more standards-based science and mathematics model.

CASE STUDY VISITATION FOR USI EVALUATION

The purpose of this case study will be to assess what effect the Urban Systemic Initiative program has had on teachers, students, and curriculum at the school level. A copy of the protocol questions will be sent to the unit/department heads of science and mathematics and the school principal prior to the school visit so that needed materials can be gathered, particularly with regard to question V. The WSU evaluator will spend approximately two days at the school. The evaluator will talk to individual faculty and administrators, examine student learning logs, observe classes, and observe other evidence of change in the school science and mathematics program that has resulted in improved instructional opportunities for student learning in the last three years.

QUESTIONS:

I. What was the extent of this school's participation in the staff development activities in the past year? Impact?

II. Did this school send a team to the Summer Institute at Northwestern High School? No___ Yes____ (If yes, find out which years) What impact did the Summer Institute have on changing the science and/or mathematics curriculum? What impact did this have on student learning? Evidence?

III. Is their an adequate climate (environment) for learning to take place in science and mathematics? Look for attractiveness of classrooms, school facilities/equipment, instructional support, student behavior, and other indicators..

IV. To what extent do the science and mathematics programs promote inquiry learning? (Look for such items as: hand-on inquiry activities, student/teacher interactions, environments that support student learning, use of assessments that probe for student understanding and reasoning, and student involvement).

V. What changes in student learning in the science and mathematics programs have occurred in the last three years? Evidence? Give emphasis to inquiry-based learning. (Look at student learning logs and such items as: student projects, lesson plans, student portfolios, use of technology, observations, communities of student learners, interviews with staff, documents, school improvement plans, reports, and other relevant information. (Note: Evaluators must provide examples of evidence for changes in student learning in their report so that the richness of the changes are fully described)

VI. How has technology been incorporated in the program in the last three years to enhance student learning? (Look for use of activities that encourage students to design or propose a solution to a problem, to evaluate a product or design, to communicate a problem or design a solution *in a variety of ways, to promote a better understanding technology, to distinguishing people-made objects from natural objects, and/or to use up-to-date technological tools(calculators, computers, laser discs, etc.) for enhance student learning.*

VII. How has the program encouraged a better understanding of science and mathematics with regard to personal and social perspectives? (Look for applications of science and mathematics to the personal lives of students and to the community; use of cooperative and group learning, multi cultural perspectives, environmental issues, personal health, and societal issues)

VIII. Is the staff using appropriate assessments to inform and to evaluate student learning? (Look at learning logs, student projects, student portfolios, multimedia student presentations, use of visual representations, tests, and other indicators)

IX. What additional support is needed by school staff in order to improve the science and mathematics program?

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