Report to the Legislative Education Interim Committee on the Internal and External Evaluations of Programs Funded Under HB 181 (2006), the Mathematics Improvement Program

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Introduction

The 2006 Utah Legislature passed House Bill 181, which, among other things, created a multi-faceted, state-funded program to enhance the performance of Utah students in mathematics at grades 4 through 6. H.B. 181 called for efforts to enhance math performance through teacher incentives and/or staff development. Subsequently, the Utah State Office of Education issued a request for proposals, thirteen of which were funded. There are twelve projects at individual districts and one for a multi-district consortium. The language of H.B. 181 called for rigorous evaluation of the program on several levels. The external three-year evaluation is being conducted by the Institute for Behavioral Research in Creativity (IBRIC) and ultimately will examine student academic performance, student attitudes toward math, level of implementation of scientifically-based mathematics instruction, and overall program implementation and functioning.

Districts must also complete their own internal project reports for each year of the funding. The following section of this report summarizes the internal reports submitted by participating districts after year one of implementation.

District Performance Summaries for Year One

Table 1 presents a summary of district-reported internal evaluation results after the first year of implementation of the Mathematics Improvement Program. There were approximately equal numbers of score improvements and score declines for the participating districts during year one. This is about what might be expected in the initial year of projects such as this. Years two and three should begin to show score improvements as programs become more fully implemented.

Table 1

Summary of District-Reported Evaluation Results for Year One of the Mathematics Improvement Program

District	Number of Teachers Participating	Year One Performance Trends on Math Criterion-Referenced Tests		
		Grade 4	Grade 5	Grade 6
Alpine	75	Minimal Change	Minimal Change	Minimal Change
Carbon	23	Declined	Declined	Declined
Duchesne	18	Minimal Change	Improved	Improved
Emery	22	Minimal Change	Improved	Improved
Granite	50	Declined	Declined	Mixed Results
Jordan	300	Minimal Change	Declined	Declined
Juab	20	Declined	Improved	Declined
Multi-District	50	N/A		
Nebo	297	Improved	Improved	Mixed
Ogden	25	N/A		
Salt Lake	41	Minimal Change	Declined	Minimal Change
San Juan	25	Improved	Declined	Declined
Washington	40	Improved	Mixed Results	N/A

The following paragraphs summarize each district's program and briefly describe year-one criterion-referenced test results.

Alpine District. The primary emphasis in the Alpine program is professional development leading to elementary mathematics endorsements for approximately 25 teachers during each year of implementation. There is no direct incentive component to the program. Year-one performance showed very slight positive changes for participating teachers on Utah math CRT scores between 2006 and 2007 at grades 4 and 6. A very slight decline was noted at grade 5.

Carbon District. The Carbon program features math coaching and opportunities for all participating teachers to obtain a mathematics teaching endorsement. There are incentive and developmental components to the program. All five of the district's elementary schools are participating, with all grade 4-6 teachers at four of the schools on board for the 2007-2008 school year. Between 2006 and 2007, Carbon schools showed slight declines in CRT math performance at all three grade levels. This was typically true both for total math scores and for the targeted standards of number sense and measurement.

Duchesne District. The Duchesne program includes both professional development and incentive components, and stresses total-school math teacher involvement at one school, Roosevelt Middle. A key element of the program is work to align lesson plans for the newly adopted Saxon math texts with Utah's core curriculum. Duchesne's reported year-one performance (2006-2007) showed substantial gains on Utah math CRTs at grade 6, modest gains at grade 5, and very slight gains at grade 4.

The district targeted its efforts on growth in number sense, geometry, and measurement at all three grade levels.

Emery District. For their implementation, Emery stresses a multidimensional professional development effort in all six of its elementary schools. Included is one math coach to support the schools, grade-level training, and support for teachers seeking to obtain an elementary mathematics endorsement. The incentive aspect of the program is tied both to student performance and the endorsement effort. Between 2006 and 2007, the district's elementary schools demonstrated improvement at grades 5 and 6 on the math CRT total score. At grade 4 a very slight decline was noted.

Granite District. The Granite program includes six of the district's elementary schools – those that serve students who are most at-risk. The effort provides two math coaches to serve these schools, plus intensive training for teachers of grades 4 through 6. Incentives are tied to curriculum development and student performance. Between 2006 and 2007, CRT math total score performance declined for most of these schools. Bright spots were substantial performance improvements at grade 5 at Farnsworth and Grade 6 at Western Hills.

Jordan District. The Jordan program features professional development for both principals and teachers. Over the full term on the project, the intent is that 300 teachers be involved in training. The district has retained an elementary mathematics specialist to work with participating teachers. The incentives dimension of the program rewards teachers for improved student performance and for higher levels of implementation as measured by classroom observation. Thus far, internal evaluation of the program has focused specifically on the number sense standard from the math core curriculum.

Between 2006 and 2007, Jordan students showed very slight improvement in number sense at grade 4 and a slight decline on the same standard at grades 5 and 6.

Juab District. Juab also has both professional development and incentive components in its program. Elements included are curriculum alignment, creation of targeted benchmark exams, and assistance to teachers in gaining elementary mathematics endorsements. The incentive component is linked to student performance and the creation of mathematics instructional materials. Between 2006 and 2007, CRT performance improved substantially district-wide at grade 5, while falling moderately at grades 4 and 6. Grade 6 had shown a substantial increase the year before.

Multi-District Consortium. This program involves Box Elder, Davis, and Weber districts, plus the Utah Schools for the Deaf and Blind. It includes plans for both professional development and incentives. The professional development aspect revolves around Elementary Math Endorsement and is being accomplished in cooperation with Weber State University math instructors. The incentive component is to reward improvement in the teacher's own skills and knowledge and improvement in student performance.

Nebo District. The Nebo program will eventually include all of the district's 4-6 teachers. Each year, approximately one-third of the grade 4-6 teachers are to be provided high intensity math instructional strategy training. Professional development includes assessment and technology elements, and some percentages of teachers are expected to enroll in elementary mathematics teaching endorsement programs or Masters programs. The incentive component of the program is linked to student performance. Between 2006 and 2007, grade 4 performance improved slightly on targeted math standards.

Grade 5 performance was substantially higher by 2007, while the grade 6 results were mixed.

Ogden District. The Ogden District program focuses on grade 4 and 5 teachers in Title I elementary schools and 6th grade teachers in targeted middle schools. Professional development includes after-school sessions with accompanying grade-specific meetings during the first year of implementation and additional sessions the following summer. Run by math specialists and including professional collaboration, the intent of the development work is to increase content knowledge and improve instructional strategies, all aimed at increasing student learning. The program also has an incentive component.

Salt Lake City District. The Salt Lake City effort focuses on the district's Title I schools and includes both professional development work and incentives. Professional development is centered on the creation of a math proficiency network that includes 41 fourth, fifth, and sixth grade teachers. The program stresses enhancing the teachers' math content knowledge and assessment skills, plus teacher collaboration and parental involvement. Beyond professional development, the incentive component rewards teachers for improved student performance. The program focuses on improving student performance on the number sense and operations standard. Between 2006 and 2007, CRT performance on this standard declined very slightly at grade 4, declined slightly at grade 5, and improved very slightly at grade 6. The 2007 results were based on nearly 1000 students spread across the three grade levels.

San Juan District. Unlike other districts joining this effort, the San Juan program is based exclusively on incentives for teachers; all of the district's grade 4-6 teachers are eligible to participate. Teacher incentive levels are predicated on improvement of math

CRTs using a system of points derived from students attaining absolute levels of proficiency. Between 2006 and 2007, the district showed substantially improved CRT performance at grade 4, but lower performance at both grades 5 and 6.

Washington District. The Washington implementation features a multi-dimensional program with both professional development and incentives for teachers based on student performance. One key element in the Washington professional development component is the retention and training of five math staff developers who are to orchestrate training of teachers in five of the district's highest-risk elementary schools. Incentives are dependent on level of implementation as judged by classroom observations and on reduction of the percentage of students scoring below the proficient level on math CRTs. The program is targeted on grades 4 and 5. Between 2006 and 2007, proficiency improved on the math CRTs in four of the five participating schools (grade 3 compared to grade 4). The grade 4 to grade 5 performance changes were positive for two of the five schools.

Design of the External Evaluation

The design of the external evaluation of the Mathematics Improvement Program, being conducted by IBRIC, has three major components. For several of the measures used, participating experimental schools will be examined in a time series analysis; each school will serve as its own control, and performance trends will be profiled over time. The second component of the evaluation involves the selection of control schools matched individually to experimental schools on demographic measures, such as socio-economic status, size, location, etc. Experimental versus control analyses will examine

performance on the state's criterion-referenced tests in mathematics and on math scores from statewide use of norm-referenced tests at grade 5. The third major component of the evaluation will examine the relationships between level of implementation of scientifically-based math instruction and measures of both cognitive and non-cognitive outcomes. Attention also will be focused on possible differences between schools that primarily use incentives versus those more heavily relying on staff development versus those with combined strategies in their individual programs for math improvement.

Measures to be Used. The primary outcome measures to be used in the external evaluation are the age-appropriate (grades 4-6) Utah Criterion-Referenced Tests in Mathematics and the state's norm-referenced testing instrument applied at grade 5. During the 2007-2008 school year, IBRIC will construct a math attitude questionnaire for students in experimental schools to complete in the spring. IBRIC will also construct a questionnaire to gather information about teacher reaction to the program and about their level of implementation of scientifically-based instructional procedures in mathematics. The IBRIC-developed measures will be reported in the year two and year three final reports.

Reports to be Produced. For each year of project implementation, IBRIC will produce two written reports. Each November, a report will present initial criterion-referenced test results based on the previous school year's test administrations. This is the first of these November reports. Each following January, more extensive reporting will present the results from all aspects of the evaluation based on information derived during the previous academic year.