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CLERK OF THE BOARD
ORANGE COUNTY
BOARD OF SUPERVISORS



Agenda Item No. 5
March 3, 2010 Meeting

DATE: February 23, 2010

TO: Children and Families Commission of Orange County

FROM: Michael M. Ruane, Executive Director

SUBJECT: Early Math Literacy Initiative

SUMMARY:

There is a growing national concern regarding the preparedness and competitiveness of U.S. children in the scholastic areas of science, technology, engineering and math (STEM). Prior to kindergarten, many children acquire considerable mathematics knowledge. Early childhood programs however do not always challenge and extend children's mathematical knowledge. Young children from low-socioeconomic status backgrounds are especially vulnerable in that they show lower mathematics knowledge than their peers. Children with early math skills correlate strongly with future school achievement. This report outlines the current strategies for increasing early math literacy among Orange County children as well as current efforts for increasing awareness of this issue at a national level.

STEM Summit 2010

On February 18 and 19, 2010 a national conference, STEM Summit 2010 – Early Childhood through Higher Education, was convened at the Beckman Center. This National Summit was sponsored by the Samuelli Foundation, the National Academy of Engineering, University of California, Irvine and the Commission. The Summit provided a forum to share recent findings and research connecting early math proficiency and skills to addressing national crisis related to STEM disciplines as well as health professions. A report on the Summit proceedings and findings will be provided at March 3, 2010 meeting.

Bridgespan Assessment – Review of Early Learning Programs

The Bridgespan Group was engaged by your Commission to conduct a review of your Early Learning Program investments with a goal of having specific recommendations for full implementation by FY 2011/12. Their scope of work includes a review of current pilot programs, such as the early math program presented below. In addition, our engagement partner from The Bridgespan Group attended the STEM Summit and had an opportunity to meet with leading experts and national foundations. There will be a report from The Bridgespan Group at your April meeting. The recommendations presented today are consistent with the work plan for the Bridgespan Group engagement.

MIND Research Institute Early Math Literacy Project Results

One of the Commission's strategies for increasing early math literacy among Orange County children includes a partnership with the MIND Research Institute to develop a math program

targeting preschool-aged children in schools of lower academic performance. The MIND Research Institute, an Orange County based nonprofit organization, has developed interactive math instructional software programs to engage and train students at varying levels of academic and language proficiency. MIND's programs have been used at the kindergarten level for four years. This past year, the Commission engaged MIND to develop a math program component for preschool aged children; specifically targeting schools in the lower three deciles of California's Academic Performance Index. MIND previously proposed a project scope to be accomplished in three phases:

- Phase I: Initial Pilot – Preliminary adaptation of kindergarten games for preschool and pilot use in schools.
- Phase II: Development – Based on pilot results, further modification of the interactive computer programs, development of new programs and features including a parental education component, and pilot use in schools.
- Phase III: Final Development and Release – Pilot software, conduct final evaluation, and prepare for release of product.

Students who participated in Phase I of the project exhibited increases in their pre-test to post-test scores after one month of program implementation. Phase II of the project was implemented for three months prior to post-assessment. The data analysis of Phase II (Attachment 1) indicated that all three participating sites demonstrated steady progress throughout the program. The majority of students who completed more of the math games scored higher on the post-tests whereas the majority of the students who completed less of the math games scored lower on the post-tests. Study observations have allowed MIND staff to identify learning barriers and areas in the software that need to be enhanced during Phase III of the project to ensure that the program is age appropriate and accessible for all preschool students regardless of socioeconomic or cultural background. As was evidenced during the STEM Summit, additional future enhancements will also continue to emphasize teacher training, parent involvement, and home-school connections.

MIND Research Institute Early Math Literacy Project Results

Phases I and II of the MIND Pre-Kindergarten Math Literacy Project are now complete. Staff has reviewed the work completed to date and is recommending funding for Phase III, the final development and release of the project, as indicated in Attachment 2. Commission consultants will continue to provide professional technical expertise to strengthen the project's focus on early learning and to facilitate partnerships within the early learning community.

STRATEGIC PLAN & FISCAL SUMMARY:

The proposed action for the MIND Research Institute has been specifically reviewed in relation to the Strategic Plan and is consistent with the Early Learning goal, among others. This funding request is for the amount of \$331,600 for an additional eight-month term to implement Phase III of the project. Funding for this item is included in the 2009-10 Budget within the Early Learning budget category.

PRIOR COMMISSION ACTIONS:

1. July 2009 – Awarded funding to the MIND Research Institute to implement Phase II of the Pre-Kindergarten Spatial-Temporal Math Project
2. November 2008 – Awarded funding to the MIND Research Institute to implement Phase I of the Pre-Kindergarten Spatial-Temporal Math Project
3. July 2008 – Received MIND Research Institute’s Strategic Funding Plan and approved recommendations
4. June 2008 – Commission Planning Retreat - Received report on the Innovation Network concept and MIND performance data

RECOMMENDED ACTIONS:

1. Receive Early Math Literacy Initiative update.
2. Adopt resolution (Attachment 3) authorizing the Executive Director or designee to prepare and negotiate the third amendment to Agreement PS-69 with the MIND Research Institute for the expansion of early learning investments as described in Attachment 2, extending the term through February 28, 2011 and adding an amount not to exceed \$331,600 for a new maximum obligation not to exceed \$520,000.

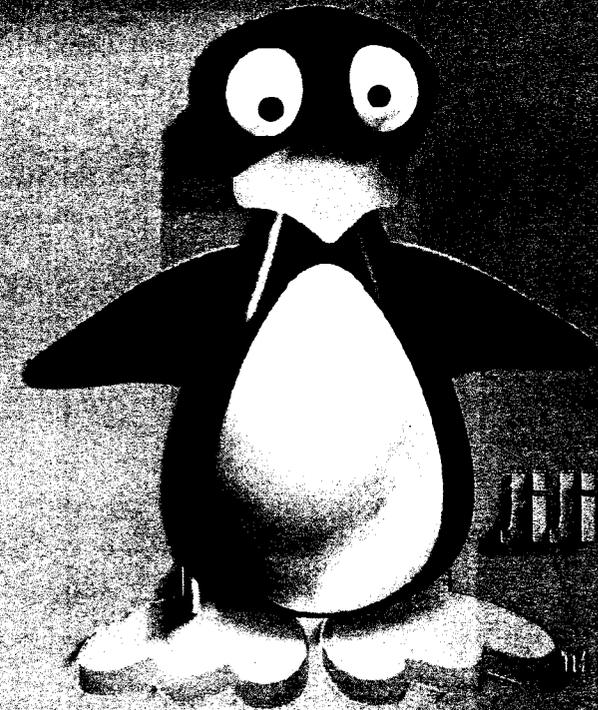
ATTACHMENTS:

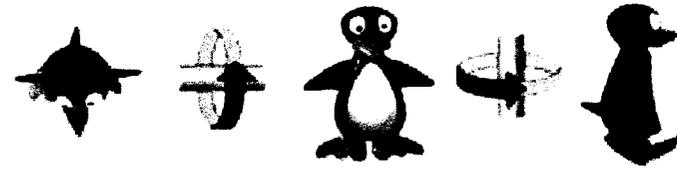
1. Pre-Kindergarten Math Project (Pre-K Math Project)
2. MIND Research Institute Project Scope, Timeline and Budget
3. Resolution for the MIND Research Institute

Contact: Alyce Mastrianni

Attachment 1 – MIND Research Institute PreK ST Math Project – Phase III

March 3, 2010 Agenda





Objectives and Outcomes of Phase II

Objectives:

1. Continue developing components of the Pre-K math curriculum:
 - a) Spatial-temporal math software
 - b) Corresponding teacher-guided activities and manipulatives
2. Expand pilot study to more schools in collaboration with the Santa Ana Unified School District and conduct observations

Outcomes:

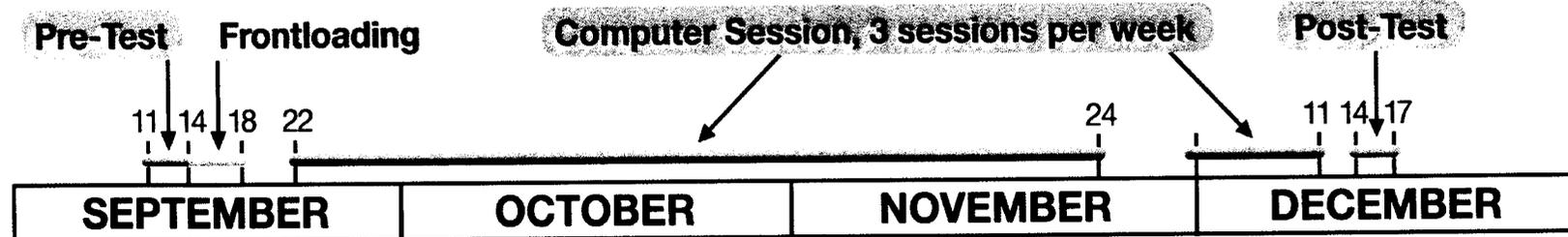
1. Seven new games along with supplemental activities and manipulatives were developed and tested; three Phase I games were re-tested as well
2. We tested the games and activities at three different school sites, with 6 classes of students. Students showed a double-digit mean percent increase on the post-assessment compared to the pre-assessment. We obtained valuable information from observations and suggestions from everyone on ways to improve the program. Response and attitude toward the program were positive for students, teachers and parents.

◆ **Teacher trainings and meetings**

- Overview of the pilot logistics and ST Math games in phase II
- Demonstration on how to front-load the program and integrate the hands-on activities into the classroom
- Sharing of feedback and suggestions about the program

◆ **Schedule and timeline of pilot**

- From 10th September 2009 – 17th December 2009 (over 3 months)
- Computer sessions: 6-7 minutes per session, 3 days per week – a total of 35 sessions
- Math activity implementation at least twice a week to introduce concept and reinforce learning



Observation Outcomes – based on teachers’ feedback and pilot team members’ observations, we identified what worked as well as areas that needed improvement.

• **Technology Component**

- Revised games were effective
- Graphical changes to some new games
- Suggestions to scaffold progression of games

• **Non-Technology Component**

- Received positive feedback from teachers about newly developed activities and manipulatives
- Some teachers were more successful than others at integrating the hands-on activities into their classroom instruction
- More aggressive trainings and communication opportunities are needed
- Parent involvement is vital in children’s learning
- ST Math program should start later in the year (e.g. November)

• **Teachers, Parents and Students’ responses**

- Teachers showed great appreciation for the program and parents were becoming more involved in their children’s education. The students’ interests and enthusiasm in learning math also increased.

◆ Pre- and Post-Tests

- Same tests
- 5 different assessments
 - Perform one-to-one correspondence of object to object
 - Count objects arranged in linear and random form
 - Recognize a numeral (in both verbal and written forms) and its corresponding quantity
 - Ordering numbers in the correct numeric sequence
 - Identify, extend and create simple patterns
- One-on-one sessions

Name: _____

[Post-Assessment of Skills]

Assessment 1 – One-to-One Correspondence

	0	1	2	3	4	5	6	7	8	9	10
Linear											
Random											

Notes: _____

Assessment 2 – Counting Skills

	0	1	2	3	4	5	6	7	8	9	10
Linear											
Random											

Notes: _____

Assessment 3 – Identify Quantity from Given Amount / Numeral recognition

	0	1	2	3	4	5	6	7	8	9	10
Verbal											
Written											

Notes: _____

Assessment 4 – Numerical Order (Placing Number Cards in Order to Demonstrate "Counting On")

0	1	2	3	4	5	6	7	8	9	10

Notes: _____

Assessment 5 – Patterns

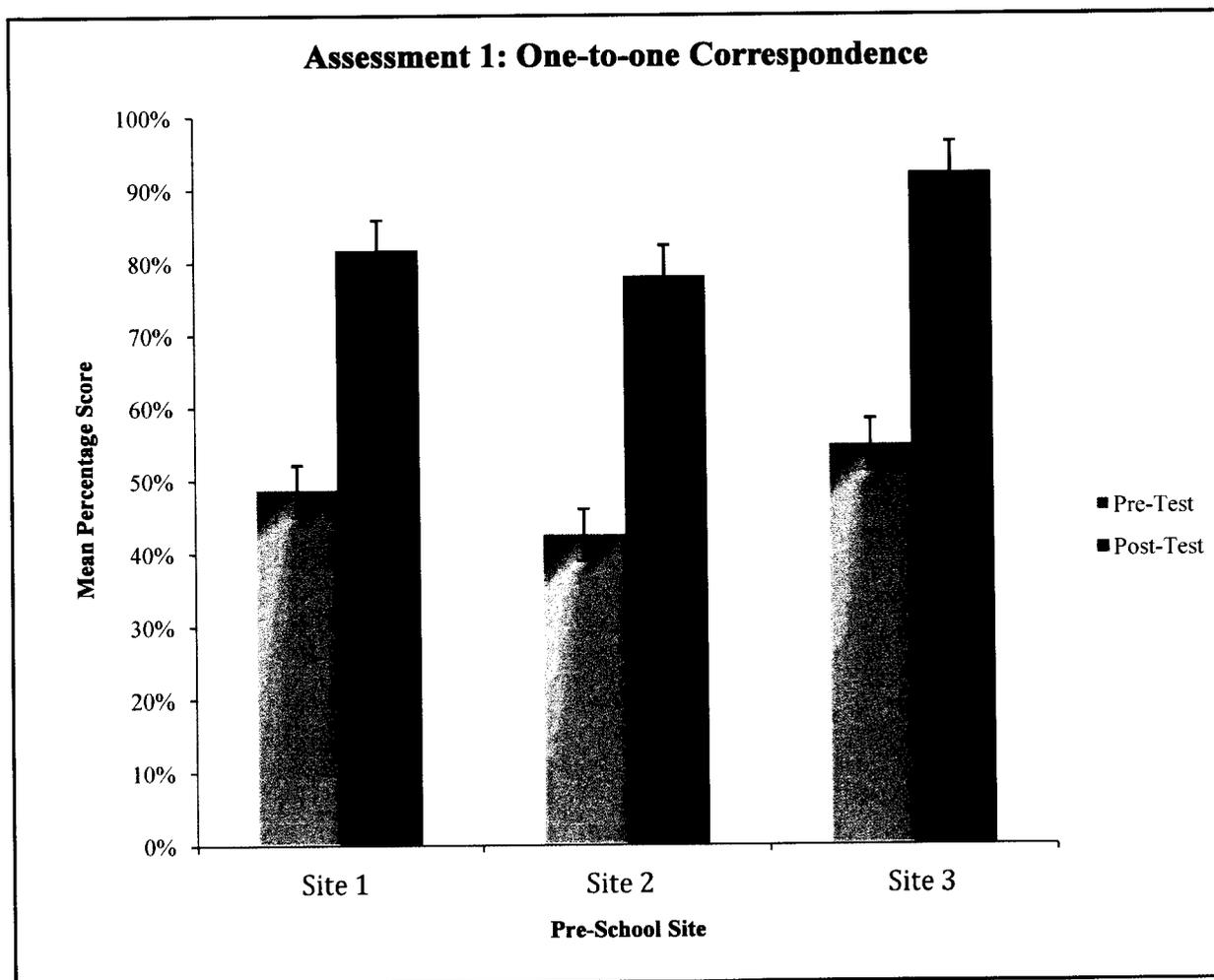
	A/B or Attribute A/ Attribute B	A/B/C Attribute A/ Attribute B/ Attribute C	AA/BB Attribute A/A then Attribute B/B	AA/B Attribute A/A then Attribute B	A/BB Attribute A/ then Attribute B
Identify					
Extend					
Create					

Notes: _____

Assessment Form

◆ Data Analysis and Results

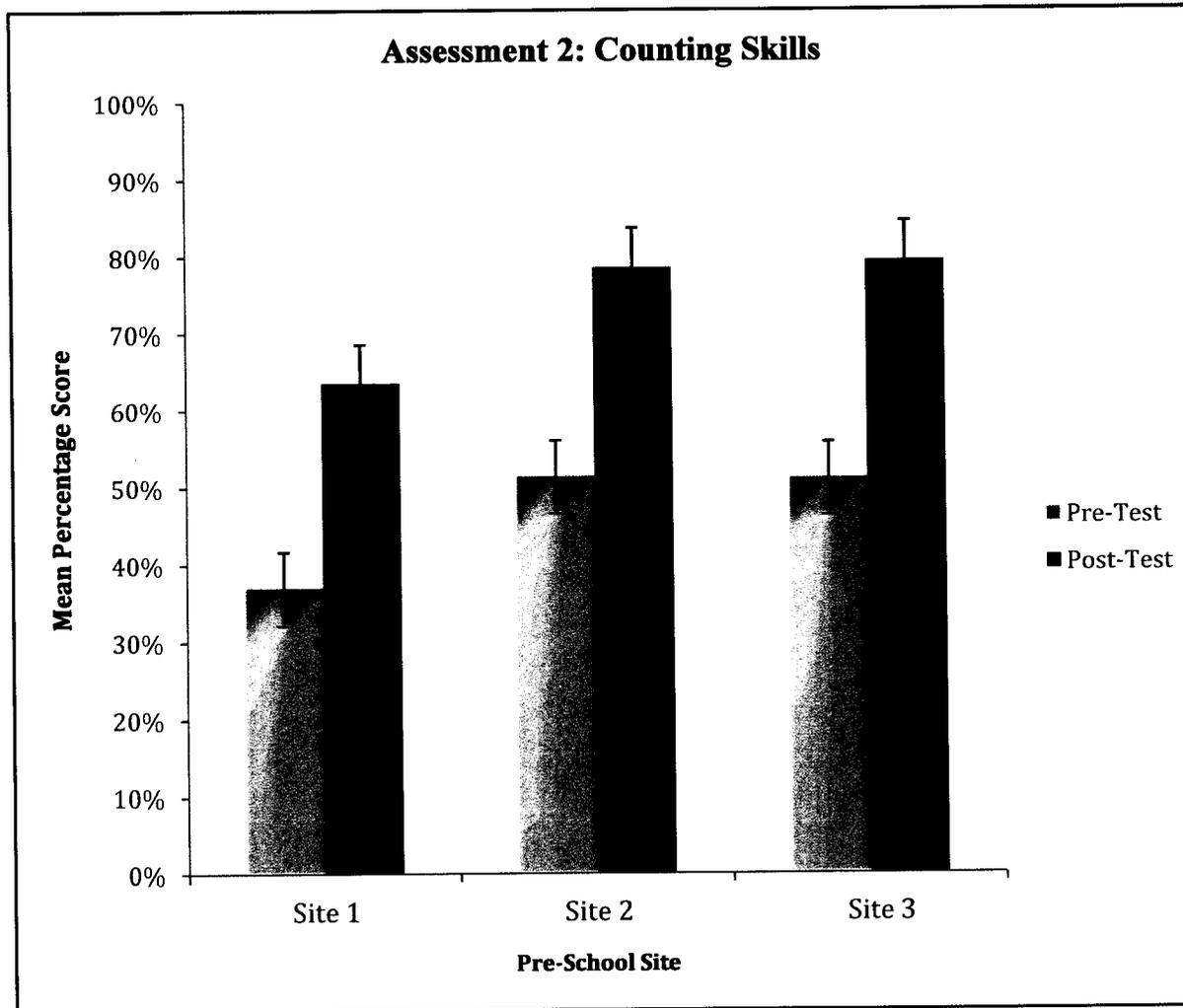
- On average, students from all three pilot sites scored higher on the post-test compared to the pre-test for Assessments 1-4.
 - Mean percent increase of test scores for Assessments 1-4 combined
 - Site 1 – 26%
 - Site 2 – 27%
 - Site 3 – 27%
- More students at all three sites were able to identify, extend, and create AB, ABC, and ABB patterns on the post-test.
- Students progressed through the software at a steady rate at all three sites.
- For all three sites, positive correlation was found between how much of the program the students completed and their post-test scores.



Mean Percent Increase

- Site 1 (33%)
- Site 2 (35%)
- Site 3 (37%)

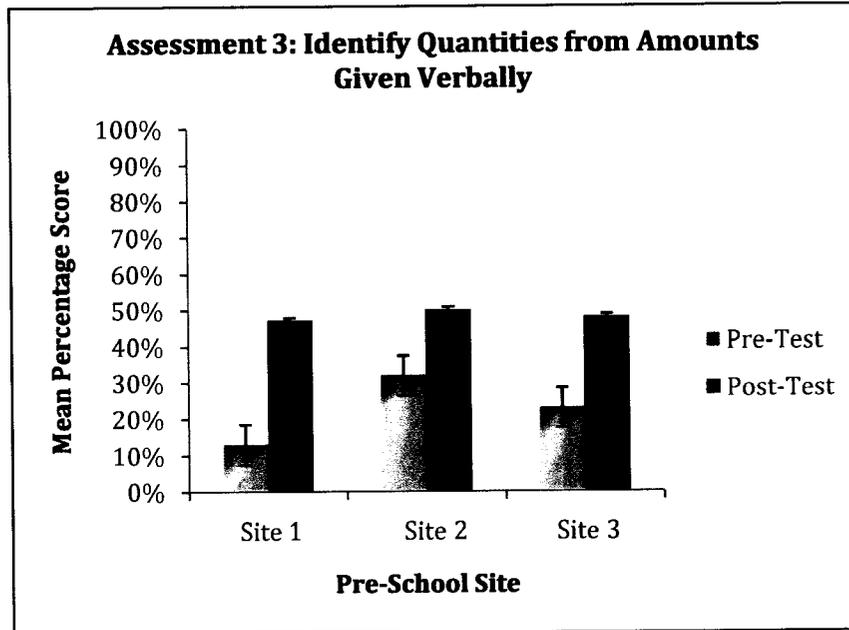
- All Sites (35%)



Mean Percent Increase

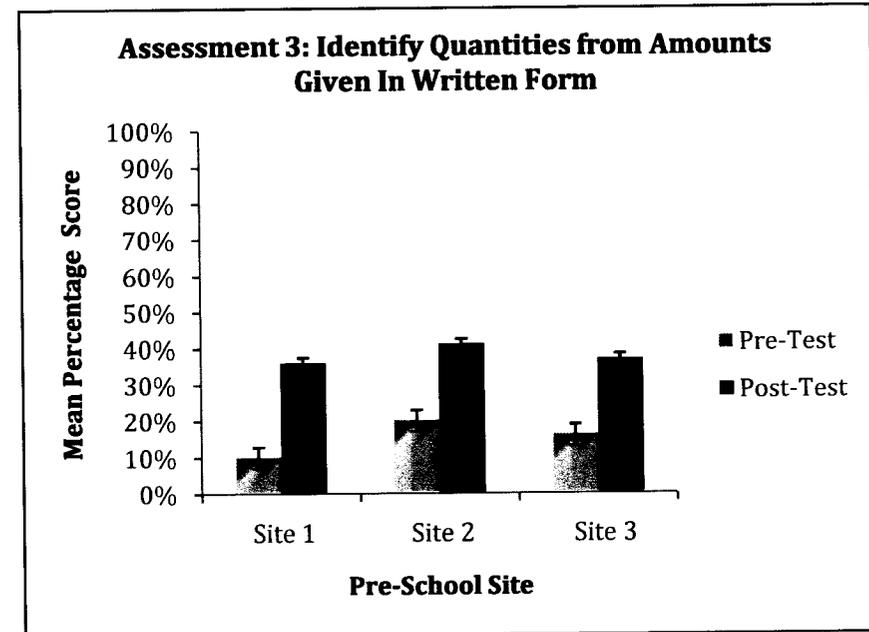
- Site 1 (26%)
- Site 2 (28%)
- Site 3 (28%)

- All Sites (27%)



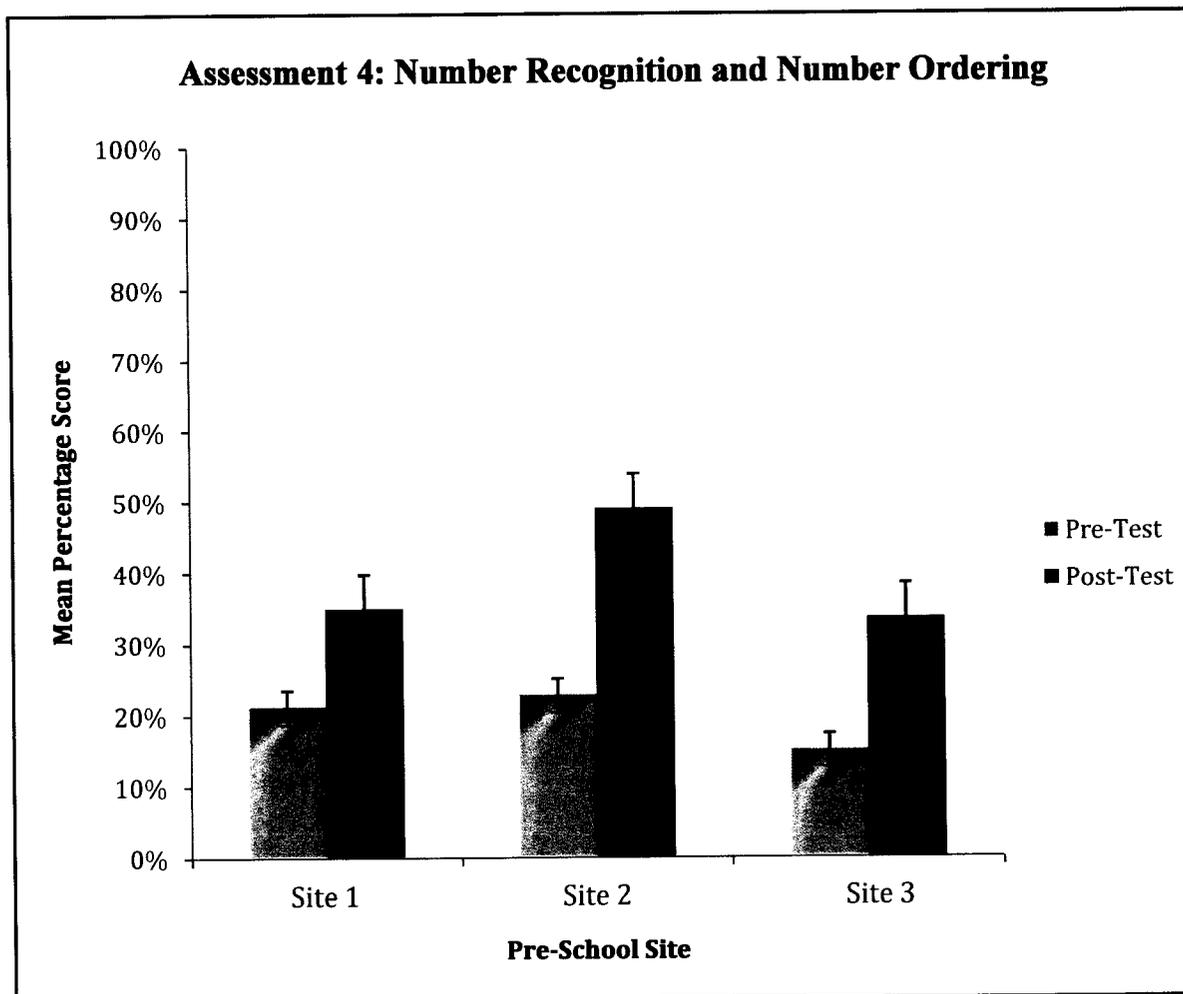
Mean Percent Increase

- Site 1 (34%)
- Site 2 (18%)
- Site 3 (26%)
- All Sites (26%)



Mean Percent Increase

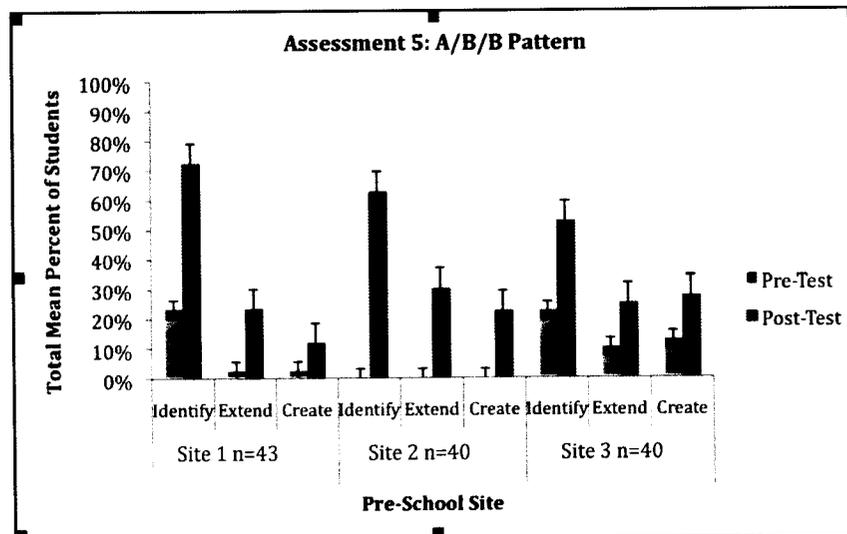
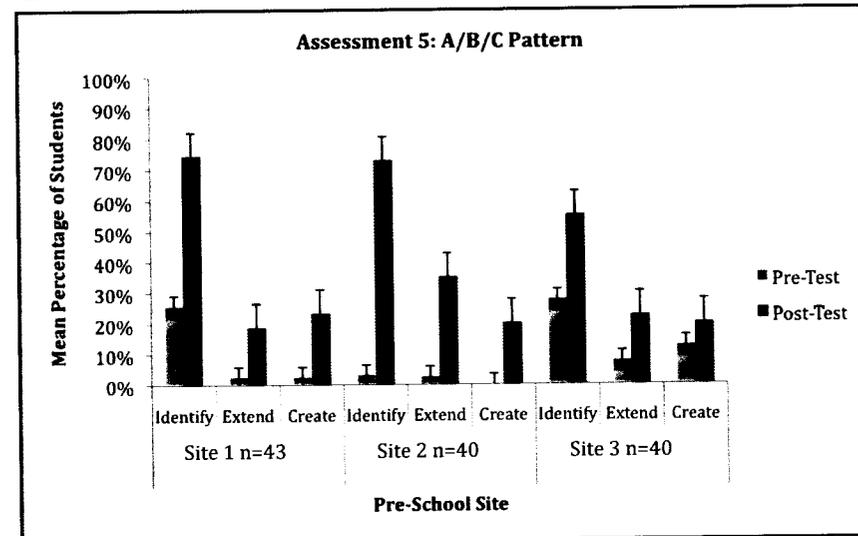
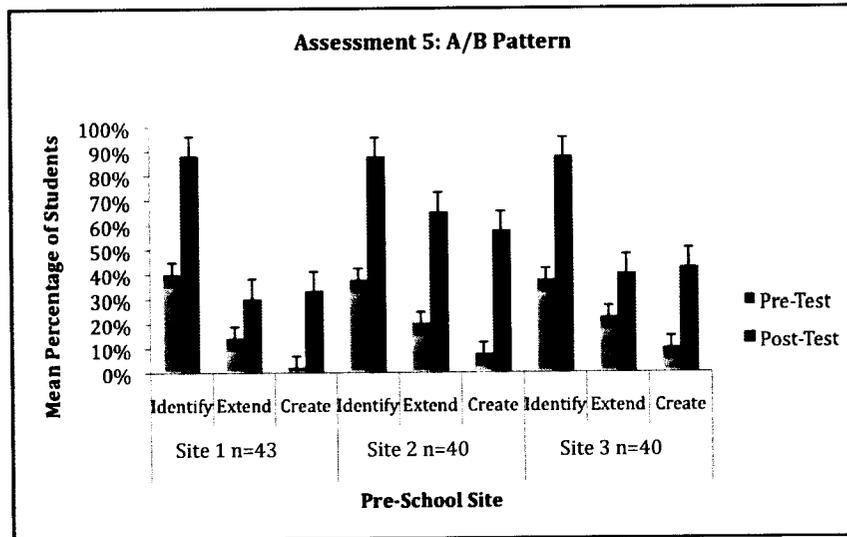
- Site 1 (26%)
- Site 2 (21%)
- Site 3 (21%)
- All Sites (23%)



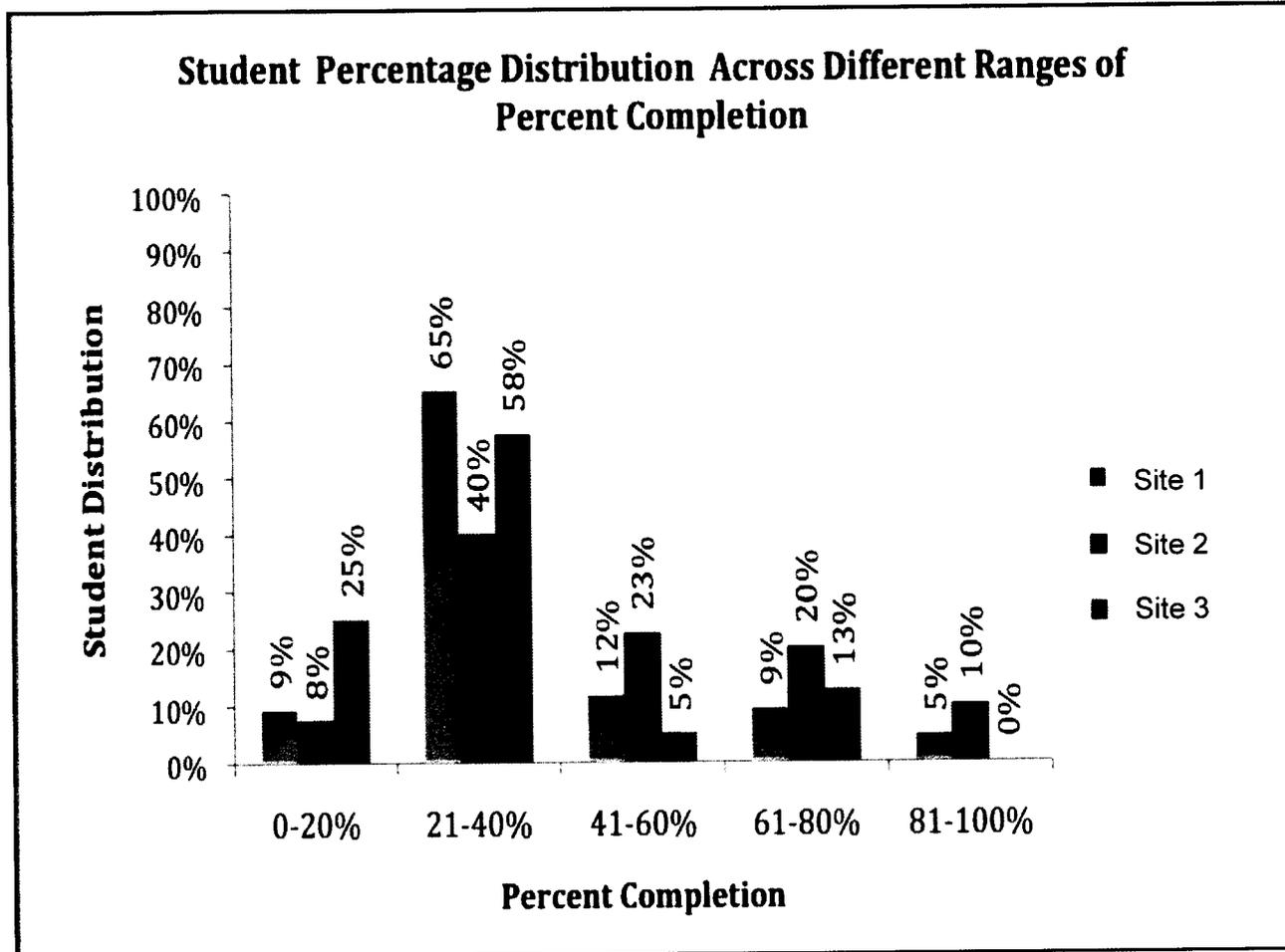
Mean Percent Increase

- Site 1 (14%)
- Site 2 (26%)
- Site 3 (19%)

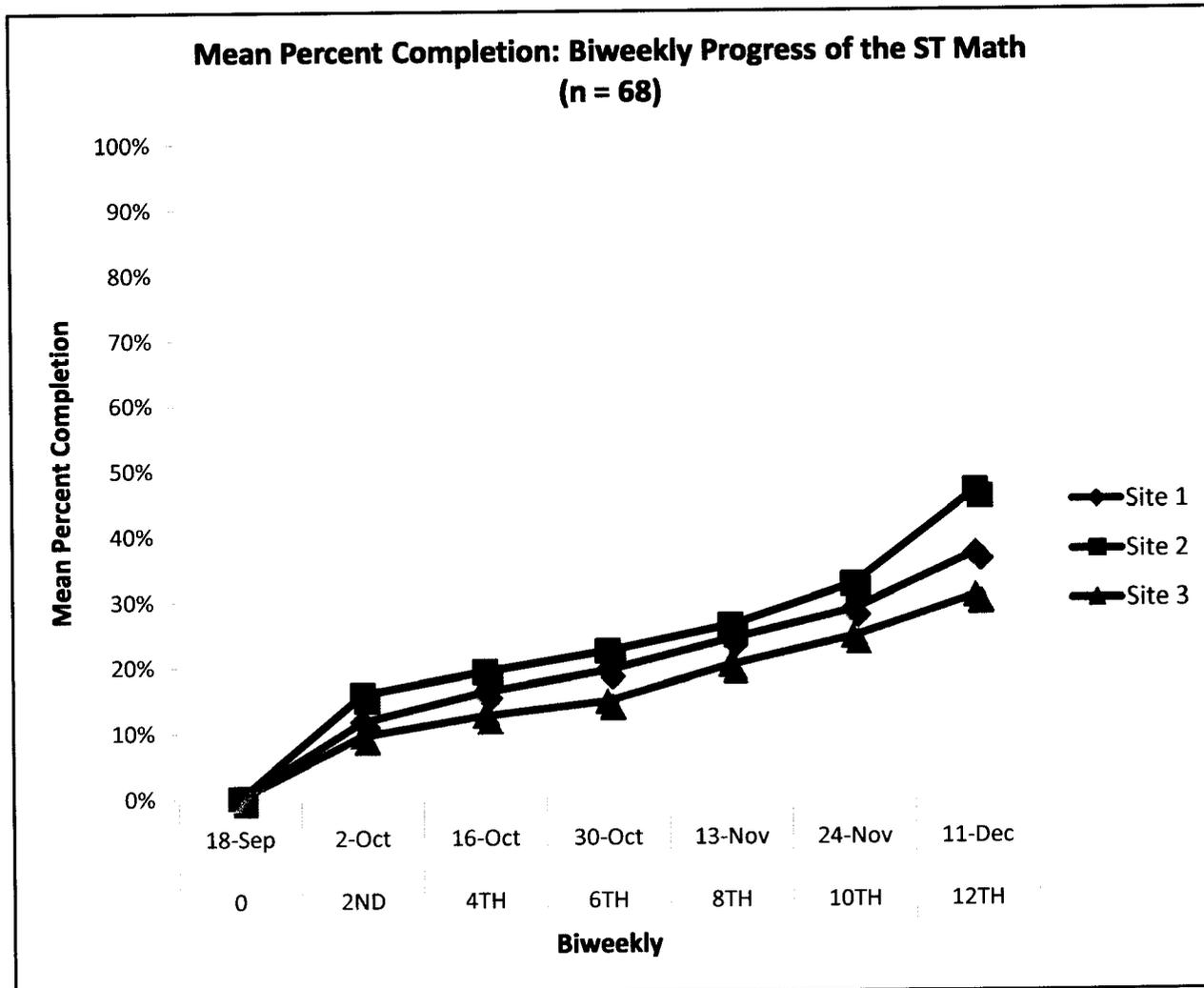
- All Sites (20%)



- More students at all three sites were able to identify, extend and create AB, ABC, and ABB patterns.



•The majority of students from all three sites were able to complete 21-40% of the ST Math software.



- Students from all three sites progressed through the program at a steady rate.

Summary and Conclusions of Phase II

- Developed and tested 7 spatial-temporal math games and a set of corresponding activities and manipulatives
- Retested revised games from Phase I
- Piloted the program with 6 classes of students
- Conducted observations and gathered useful information
- Administered pre- and post-tests, and students exhibited double-digit mean percent increase for assessments 1-4.
- Response and attitude toward the curriculum was positive for teachers, parents and students.

MIND

Research Institute

Phase III

- Put together professional development trainings with emphasis on:
 - Developing understanding of all components of the program
 - Deepening of math content knowledge
 - Teacher and parent involvement in the program
 - Demonstrating ways to integrate the program into daily classroom activities naturally
- Improve and retest Phase II games
 - Include game tutorials
 - Make graphical and programming changes
 - Scaffold progression of games further
- Build new games to extend alignment to Foundations
- Develop additional activities and manipulatives
- Incorporate automated rotation system
- Expand pilot to additional pilot sites
 - Include treatment and control groups

Pre-Kindergarten Math Literacy Project (Pre-K Math Project)
MIND Research Institute – Contract # PS-69

Project Description	Design and build a Pre-K math software program and pilot curriculum at early childhood education sites in Orange County.																
Timeline And Costs	<table border="0"> <tr> <td>Phase I</td> <td>4 months</td> <td>\$ 73,400</td> <td>status: completed</td> </tr> <tr> <td>Phase II</td> <td>8 months</td> <td>\$115,000</td> <td>status: completed</td> </tr> <tr> <td>Phase III</td> <td>13 months</td> <td>\$331,600</td> <td>status: proposed</td> </tr> <tr> <td colspan="2">Total Project Costs</td> <td>\$520,000</td> <td></td> </tr> </table>	Phase I	4 months	\$ 73,400	status: completed	Phase II	8 months	\$115,000	status: completed	Phase III	13 months	\$331,600	status: proposed	Total Project Costs		\$520,000	
Phase I	4 months	\$ 73,400	status: completed														
Phase II	8 months	\$115,000	status: completed														
Phase III	13 months	\$331,600	status: proposed														
Total Project Costs		\$520,000															
Project Objectives	<p>Develop a developmentally appropriate approach to teaching mathematics to improve the math proficiency and problem solving skills of pre-kindergarten children with measurements to include:</p> <ol style="list-style-type: none"> 1. Preschool students participating in Pre-K Math master early childhood development foundations, as defined by the California Department of Education. 2. Preschool students participating in Pre-K Math exhibit fluency and proficiency in math and problem-solving skills at the end of kindergarten. 3. Preschool students participating in Pre-K score “Proficient” or higher on 2nd grade California Standards Test. 																
Criteria for Development	<ul style="list-style-type: none"> • Design product responsive to the California Preschool Learning Foundations. • Garner support from districts to implement a preschool math strategy • Consultant with Early Childhood Education expertise/math literacy specialization retained to ensure developmentally appropriate instructional content and professional development components for preschool educators. 																
Outcomes of Phase I Initial Pilot	<p><i>Objective: Develop a pre-K math curriculum involving spatial-temporal math software and pilot test the curriculum in collaboration with a school district.</i></p> <p>Outcome: Four interactive computer programs were developed, along with manipulatives (in collaboration with Santa Ana Unified School District) and curriculum was tested with 2 classes of students.</p>																
Outcomes of Phase II	<p><i>Objective: Improve Phase I software based including adding tutorials, audio components, wording / graphical changes; build interactive exercises aligned to Foundations.</i></p> <p>Outcome: Phase II project scope was completed. Three preschool sites (2 classes per site; 140 students, 6 teachers) participated in the pilot study. Pre and post-tests were used to examine the effectiveness of the treatments on student performance. Observation notes were also taken.</p>																
Phase III Project Scope	<ul style="list-style-type: none"> • Final development of Pre-K Math software aligned to California Foundations; in conjunction with the 3 currently participating schools (Spring) • Develop professional training and materials for Pre-K teachers • Develop parent education components, translate into Spanish • Pilot Pre-K Math at up to 10 sites within 2 school districts serving high-need population (Fall) • Continue efforts with Commission consultant support • Develop a job description for a Pre-K Specialist proposed to be hired at the completion phase of the project. 																

CHILDREN AND FAMILIES COMMISSION OF ORANGE COUNTY

RESOLUTION NO. ___-10-C&FC

March 3, 2010

A RESOLUTION OF THE CHILDREN AND FAMILIES COMMISSION OF ORANGE COUNTY DIRECTING THE EXECUTIVE DIRECTOR OR DESIGNEE, TO PREPARE AND NEGOTIATE A THIRD AMENDMENT TO AGREEMENT PS-69 WITH MIND RESEARCH INSTITUTE TO PROVIDE ADDITIONAL OR EXPANDED SERVICES; AND, AUTHORIZING APPROVAL AND EXECUTION OF SUCH AMENDMENT TO AGREEMENT ON BEHALF OF THE COMMISSION

WHEREAS, in order to facilitate the creation and implementation of an integrated, comprehensive, and collaborative system of information and services to enhance optimal early childhood development, the legislature adopted legislation set forth in the California Children and Families Act of 1998, Health and Safety Code Section 130100, *et seq.* (as amended, the "Act") implementing the Children and Families First Initiative passed by the California electorate in November, 1998 and establishing the California Children and Families Commission and County Children and Families Commissions, including this Children and Families Commission of Orange County ("Commission"); and

WHEREAS, Commission adopted its Strategic Plan to define how funds authorized under the Act and allocated to the Commission should best be used to meet the critical needs of Orange County's children prenatal to five years of age as codified in the Act; and

WHEREAS, On November 5, 2008 Commission authorized the Executive Director or designee to negotiate and enter into Agreement PS-69 with the MIND Research Institute hereinafter referred to as the "Contractor," to provide Pre-Kindergarten Spatial-Temporal Math Project services for the period March 1, 2009 through June 30, 2009.

WHEREAS, On July 1, 2009, Commission authorized a First Amendment to Agreement PS-69 with the Contractor, adding an amount not to exceed \$115,000 and extending the term of the Agreement through December 31, 2009; and

WHEREAS, On October 19, 2009, Commission entered into a Second Amendment with the Contractor which extended the term of the Agreement through January 31, 2010 to continue to provide services without adding additional funds under the terms and conditions of the Original Agreement.

WHEREAS, the Commission desires to enter into a Third Amendment to Agreement PS-69 with the Contractor, to add an additional \$331,600 for a total Maximum Payment Obligation of \$520,000 and extending the term of the Agreement by eight months through February 28, 2011 in order to provide increased or additional services related to the Pre-Kindergarten Spatial-Temporal Math Project as specified in the March 3, 2010 staff report for this Agenda Item, and

WHEREAS, the Contractor desires to enter into the Third Amendment to Agreement PS-69 in furtherance of the purposes of the Act and the Strategic Plan on the terms and conditions set forth in the applicable Amendment to Agreement; and

WHEREAS, Commission has reviewed the staff report relating to the Scope of Services to be provided and hereby finds and determines that the proposed Amendment to Agreement is in furtherance of and consistent with the Commission's Strategic Plan; and

NOW, THEREFORE BE IT RESOLVED BY THE COMMISSIONERS OF THE CHILDREN AND FAMILIES COMMISSION OF ORANGE COUNTY AS FOLLOWS:

Section 1 Commission finds and determines the foregoing Recitals are true and correct and are a substantive part of this Resolution.

Section 2 Commission hereby authorizes the Executive Director or designee to prepare and negotiate the terms, conditions and final form of a Third Amendment to Agreement PS-69 with MIND Research Institute to add an additional \$331,600 for a total Maximum Payment Obligation of \$520,000 and extending the term of the Agreement through February 28, 2011 in order to provide increased or additional services related to the Pre-Kindergarten Spatial-Temporal Math Project under the terms and conditions of the Original Agreement consistent with the March 3, 2010 staff report and scope of services referenced therein; and

Section 3 The approval by the Executive Director or designee of the final Third Amendment to Agreement PS-69 shall be conclusively evidenced by the execution of such Amendment to Agreement by the Commission Chair and delivery thereof to the Commission Clerk.

Section 4 Commission hereby approves the Third Amendment to Agreement PS-69 with the Contractor, to add an additional \$331,600 for a total Maximum Payment Obligation of \$520,000 and extending the term of the Agreement through February 28, 2011 in order to provide increased or additional services related to the Pre-Kindergarten Spatial-Temporal Math Project under the terms and conditions of the Original Agreement as specified in the March 3, 2010 staff report for this Agenda Item.

Section 5 The Commission Chair and the Clerk of the Commission are hereby authorized to execute and attest, respectively, the Third Amendment to Agreement PS-69 on behalf of the Commission.

Section 6 A copy of the final Third Amendment to Agreement when executed by the Commission Chair and attested by the Clerk of the Commission shall be appended hereto as a part of Exhibit A to this Resolution. Exhibit A is hereby fully incorporated as a part of this Resolution by this reference and made a part hereof. The final executed Amendment to Agreement PS-69 shall be placed on file in the office of the Clerk of the Commission.

Section 7 In addition to the authorization of Section 2 above, the Executive Director, or designee, is hereby authorized, on behalf of the Commission, (i) to sign all documents necessary and appropriate to carry out and implement the Amendments to Agreement(s), (ii) to cause the issuance of warrants, (iii) to administer the Commission's obligations, responsibilities, and duties to be performed under such agreement(s), and (iv) during the term thereof to provide waivers, administrative interpretations, and minor modifications of the provisions of such agreement(s) in the furtherance thereof.

Section 8 The Clerk of the Commission shall certify to the adoption of this Resolution.

The foregoing resolution was passed and adopted by the following vote of the Children and Families Commission of Orange County on March 3, 2010 to wit:

AYES: Commissioners: _____

NOES: Commissioner(s): _____

EXCUSED: Commissioner(s): _____

ABSTAINED: Commissioner(s) _____

CHAIR

STATE OF CALIFORNIA)
)
COUNTY OF ORANGE)

I, DARLENE J. BLOOM, Clerk of the Commission of Orange County, California, hereby certify that a copy of this document has been delivered to the Chair of the Commission and that the above and foregoing Resolution was duly and regularly adopted by the Children and Families Commission of Orange County.

IN WITNESS WHEREOF, I have hereto set my hand and seal.

DARLENE J. BLOOM
Clerk of the Commission, Children and Families Commission of
Orange County, County of Orange, State of California

Resolution No: ___-10-C&FC

Agenda Date: March 3, 2010

Item No. ____



I certify that the foregoing is a true and correct copy of the Resolution adopted by the

DARLENE J. BLOOM, Clerk of the Commission

By: _____
Deputy

EXHIBIT A TO RESOLUTION OF COMMISSION

(Attach copy of final executed Amendment to Agreement PS-69 with MIND Research Institute)