DOCUMENT RESUME

ED 453 597 EA 031 045

AUTHOR Fuller, June Lade
TITLE Effective Strategies for Creating Change within the Educational System: A Three-Cycle Action Research Study.
PUB DATE 2001-04-00
NOTE 121p.; Paper presented at the Annual Meeting of the American Educational Research Association (Seattle, Washington, April 10-14, 2001).
PUB TYPE Numerical/Quantitative Data (110) -- Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS Academic Achievement; *Cooperative Learning; *Educational Change; Educational Policy; Educational Quality; Elementary Secondary Education; *Professional Development; *Teacher Attitudes; *Teacher Effectiveness; Teacher Evaluation; Teaching Styles
IDENTIFIERS Massachusetts

ABSTRACT

A study examined the participation of K-12 teachers from an urban school district in ongoing reform efforts, initiated under Massachusetts' 1993 Education Reform Act. The study's purpose was to identify the initial factors underlying changes in teacher attitudes, factors encouraging use of a new educational model, and the impact of reforms on classroom practices. Yearly since 1993, teachers have participated in events, workshops, and support activities using the Partners Advancing the Learning of Math and Science (PALMS) educational model. The PALMS model is based on cooperative learning and uses student research, primary resources, critical thinking, ongoing assessment, student presentations, and comprehensive, standards-based state testing. The first PALMS cycle (1993-94) involved overcoming initial resistance and stimulating teacher interest in the new approach to teaching and learning. The second cycle (1995-1997) consisted of in-depth staff development to prepare teachers to implement mandated reforms. The third cycle (1998-99) evaluated the effectiveness of the training program and the effect of PALMS on teaching and learning practices in terms of student growth, classroom management, and school culture. The data from this study indicate that active training events significantly influence the willingness of teachers to use PALMS, that students enjoy substantial educational benefits from adoption of the model, and that the model provides teachers time to observe and assist students individually. (Contains 57 references and three appendices of survey instruments, evaluation forms, and event materials.) (TEJ)

Effective Strategies for Creating Educational Change within the Educational System: A Three-Cycle Action Research Study

June Lade Fuller, Ed.D.
New Bedford Public School System

Paper presented at the Annual Meeting of the American Educational Research Association, Seattle, Washington, 2001

Abstract

This research study dealt with how change agents overcome the reluctance of teachers in order to implement mandated educational reform. The purposes of this study were to (a) identify the initial factor that allowed teachers to make a paradigm shift so change could occur; (b) to discover the factors that transformed teachers from non-utilization to routine utilization; and (c) to determine how educational reform affected classroom teaching and learning practices. This study contributes to and was designed around the concepts of implementing educational change and staff development (Evans, 1989, May, 1993, September; Fullan, 1982, 1990, 1993; Fullan & Hargreaves, 1992; Fullan & Stiegebauer, 1991; Fullan & Miles, 1992, June; Hall & Hord, 1987; Hord, Ruterford, Huling-Austin, & Hall, 1987; Schlechty, 1993; Senge, 1990).

Participants in this study consisted of K-12 teachers in an urban Massachusetts School District. During the last six years, the teachers in this system have been involved in implementing the statewide educational reform measures initiated by the 1993 Education Reform Act. The teachers participated in all day hands-on events, teacher workshops and ongoing support activities utilizing the Partners Advancing the Learning of Math and Science (PALMS) approach. This integrated hands-on on inquiry based cooperative learning approach utilizes student research, primary resources, higher level critical thinking, ongoing authentic assessment, student presentations and comprehensive standards-based state testing.

The cycle one PALMS all day training event was the initial interest hook that overcame teacher resistance and attracted teacher interest in utilizing this learning approach. Cycle two consisted of in-depth staff development, and cycle three evaluated the effectiveness of the teacher training program and the PALMS utilization effect on teaching and learning practices within the teachers' classrooms in terms of student growth, classroom management, classroom culture, and school culture.

The data suggested that: (a) active training and events significantly influenced teacher utilization; (b) the educational benefit for students made the extra worked involved in teachers utilizing this approach worth their time and effort; (c) utilizing the PALMS approach gave teachers time to observe and help students with their individual learning needs in order to maximize the students' learning potential.

Introduction

The experiences of this researcher introducing teachers to the Partners Advancing Learning in Math and Science (PALMS) approach by working as a Lead Teacher and PALMS Specialist promoting educational change within schools for the last six years, affirmed Schön's research (1987) that educators needed to become reflective practitioners in order to improve the educational system. This action research study was conducted so that the collective voices of the teachers who participated in The Massachusetts Education Reform Act of 1993 Project PALMS training sessions and implemented the reform measures into their routine daily classroom teaching and learning practices would be heard regarding the effectiveness of the change process.

The teacher participants involved in this study worked in an urban Southeastern Massachusetts school system. This school system consisted of 22 K–6 elementary and preschool classroom schools, three grade 7 and 8 junior high schools, one grade 9-12 regular high school, and one grade 7–12 alternate school. This system had 771 regular education teachers serving 13,293 students, 148 special education teachers serving 2,437 students, and 61 bilingual teachers serving 757 students which represented a total population of 980 teachers in the system servicing 16,487 students.

Procedures

Action research involves teachers solving real problems through research (Calhoun, 1994). The results of this action research study dealt with how change agents overcome teacher reluctance to implement the provisions of educational reform. Figure 1 reflects the change continuum stages that teachers move through during the implementation process of an innovation or approach as they move from non-utilization to utilization (Hord, Ruterford, Huling-Austin, & Hall, 1987).

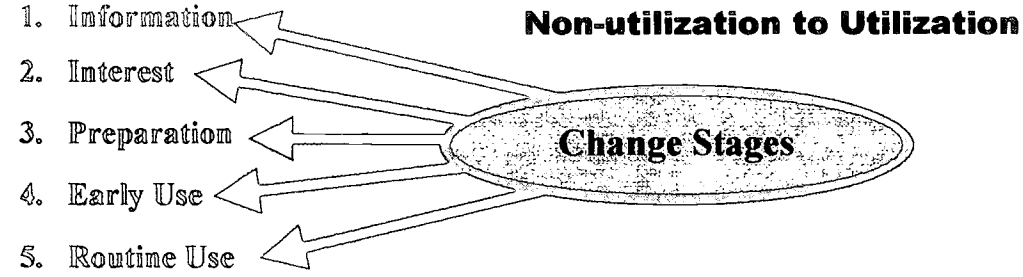


Figure 1. The change stages teachers must move through before implementation of an innovation or approach can be achieved.

Lewin's (1951) Field Theory: Unfreezing to Refreezing was the action research model used in this study. Figure 2 visually outlines the educational reform strategies involved in the entire change process of this urban Southeastern Massachusetts school system conducted by this researcher from 1993 to the 1999.

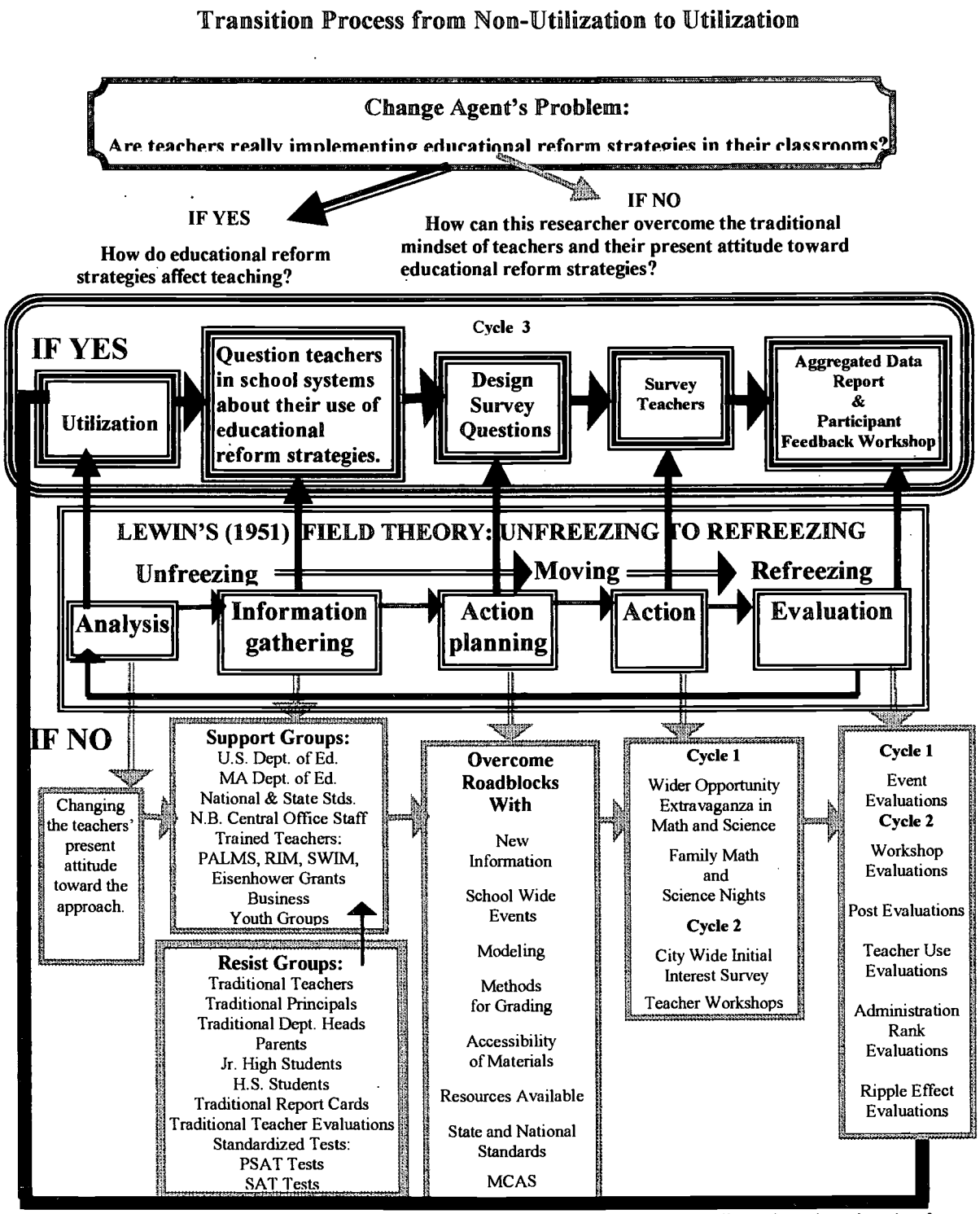


Figure 2. Transition Process from Non-Utilization to Utilization. This chart outlines the educational reform strategies involved in the change process of the New Bedford Public School System and this researcher from 1993 to 1999.

As a Lead Teacher and PALMS Specialist trained in the PALMS approach, it was this researcher's task to train other teachers in this approach. During the first year of the change process, this researcher discovered by informally talking with teachers, that most teachers were skeptical and not motivated to learn about educational reform strategies for the following reasons:

1. This new legislative policy revoked the lifetime certification that teachers had previously earned and held. Now the Education Reform Act of 1993 required teachers to be re-certified every 5 years by taking 120 hours of training in their certification area.
2. The success record of prior education reform measures was terrible. Most teachers felt that this Educational Reform Act would end up being just a passing fad, soon to be forgotten, as all the other change strategies over the years had been.
3. Many veteran teachers felt the methods and strategies were ineffective and would cause discipline problems.
4. Many teachers also felt that this process approach did not emphasize enough content and fact memorization.

This researcher quickly learned, like Fullan and Stiegebauer (1991), that mandating and training teachers in new methods and strategies did not automatically mean that classroom implementation took place. This three-cycle action research study also agreed with their research findings that change is not easy to implement, but it is possible. Educational change takes time, and teachers must be shown that the student outcome benefits outweigh their input costs.

Project PALMS: A Statewide Systemic School Change Initiative

Systemic school change was defined by the Massachusetts Department of Education as "fundamental changes in traditional school organization, governance, policies, programs, and practices. The goals of systemic change were to raise academic achievement, improve students' social-emotional growth and development, enhance the school climate, and expand roles of staff" (French, Dunn, & Nellhaus, 1990, February). This educational change process was promoted throughout the state by Project PALMS.

Project PALMS was "a Cooperative Statewide Systemic Initiative of the Massachusetts Department of Education and the National Science Foundation" which acts as "the vanguard of educational reform" in Massachusetts (PALMS, 1995, October, p. 1). The PALMS teaching and

learning components included higher level critical thinking as reflected in Bloom's (1956) taxonomy, cooperative learning (Johnson, Johnson & Holubec, 1991; Kagan, 1992), an integrated across the curriculum approach and thematic units (Fogarty, 1991; Jacobs, 1997), constructivism (Brooks and Brooks 1993, 1999), inquiry-based learning (Marsono 1992), brain based learning (Jensen 1995; Caine & Caine, 1990, October, 1991, 1994), accelerated learning (Grassi, 1993; Rose 1985), multiple intelligences (Gardner, 1993), learning styles (Carbo, Dunn & Dunn, 1986; Engle & Arthur 1994; Dunn & Dunn, 1978; Mc Carthy 1980, 1990).

The project PALMS change implementation teacher support personnel consisted of PALMS Lead Teachers, PALMS Specialists, PALMS Partnerships, Support Groups, Team Teaching, Peer Coaching and Mentoring. The PALMS curriculum methods included cooperative learning, integration across the curriculum, thematic unit, constructivisim, inquiry-based learning, brain-based learning, accelerated learning, multiple intelligences, and learning styles. The 1993 Education Reform Act components impacting teachers to change their teaching practices included the formation of school councils, the continuous professional development and recertification requirements, the Massachusetts Curriculum Framework Teacher Guides, the Massachusetts Comprehensive Assessment System (MCAS), the new Time and Learning Regulations and the restructuring of the state's school budget allocation formula which equalized the per pupil expenditure amount available to all cities and towns.

Cycle One

Cycle one (1993 - 1994) involved the information and interest change stages. The purpose of cycle one was to provide teachers with information about the PALMS approach in order to spark their interest in learning about and trying the strategies with their students in their classroom teaching practices. How can you change teachers' present attitudes toward the approach or innovation? This was the challenging problem facing this research that had to be resolved in cycle one. The 1993 Massachusetts Education Reform Act had just taken away teachers' lifetime certification status, as well as completely overhauling the structure, funding and requirements for education throughout the state. The budget and standard requirements were removed from local city and town school committee control and placed under the jurisdiction of the state. The entire state's educational system was in a state of turmoil and flux. This mandated change had created a state of confusion, anger, and resistance that crossed all levels, starting with students, parents,

teachers, and principals which continued to work its way up to central education administrators and government officials.

Cycle Two

Cycle two (1995 - 1997) involved the preparation and early use change stages. The purpose of cycle two was staff development. The Project PALMS Systemic Change Initiative provided in-depth ongoing training for teachers, administrators, school councils, and school committee members across the state. A core of Lead Teachers and PALMS Specialists worked with and received in-depth training from the state department of education liaison staff, local university professors, museum staff, and local business partnerships in order to become district experts capable of providing additional training and ongoing support to other teachers within their buildings and system. Winter workshops and Summer Institutes were offered around the state. Numerous voluntary training sessions were constantly being offered. PALMS Specialists and Lead Teachers worked at the schools helping teachers learn about the new curriculum strategies, techniques and approaches mandated under the 1993 Education Reform Act. The questions asked in this cycle of the research were: (a) Do teachers understand the teaching and learning components of education reform? (b) Are teachers really implementing education reform in their classrooms? (c) Are teachers currently using the methods, techniques and strategies supported by PALMS and The 1993 Education Reform in their classrooms teaching and learning practices? (d) How can you change the present utilization of the PALMS approach? (e) What are the current staff development training needs of teachers relative to the PALMS strategies, methods and techniques.

Cycle Three

Cycle three (1998 - 1999) involved the routine use and program evaluation change stages. The purpose of cycle three was utilization effectiveness of the PALMS approach and effective change process strategies. Teachers were asked to identify the change process factors involved in moving teachers across the change continuum from non-utilization to utilization of the PALMS approach to help change agents plan, create and conduct effective program strategies for creating educational change within the educational system. The questions dealt within cycle three were: (a) How can a change agent promote effective change within the school system? (b) What facilitated the paradigm shift in order to create an interest in education reform? (c) What factors in the change process influenced teachers to utilize the innovation? (d) What effect did

this change process have on teaching and learning practices in teachers' classrooms utilizing this approach or innovation?

Table 1 here

Purposes of the Study

The purposes of this study were: (a) to identify the initial factor that allowed teachers to make a paradigm shift so change could occur; (b) to discover the factors that transformed teachers from non-utilization to routine utilization; and (c) to determine how educational reform affected classroom teaching and learning practices. This study contributes to and was designed around the concepts of implementing educational change and staff development (Evans, 1989, May, 1993, September; Fullan, 1982, 1990, 1993; Fullan & Hargraeves, 1992; Fullan & Stiegebauer, 1991; Fullan, & Miles, 1992, June; Hall, & Hord, 1987; Hord, S. Rutherford, W. Huling-Austin, & Hall, 1987; Schlechty, 1993; Senge, 1990).

Significance of the Study

The answers supplied by the teachers who participated in this PALMS training process for the last 6 years in order to implement education reform practices in their classrooms have added further insight into the factors that help teachers implement educational change. By utilizing the results of this study, a change agent could determine the factors that were effective in promoting educational change within a school system.

The key factors coded from the participants' open-ended survey responses revealed what influenced the personal and professional change process of teachers involved in this study. These responses, combined with the before and after statements regarding the effects of the PALMS approach, supplied concrete information about the change process needed to create effective educational change that enhances and improves teaching and learning practices within educational systems. The variables identified from the research survey data pointed out the factors and supports that a change agent needs to have in place during a change process in order to have educational reform measures become part of the daily routine teaching practices of teachers. The change agent's improvement strategies resulting from this study were grounded in

the data supplied by the participants that showed what worked for teachers and their students in urban Southeastern Massachusetts classrooms.

Method

Participants in this project were K-12 teachers in an urban Massachusetts School District. During the last six years, the teachers in this school system have been involved in implementing the statewide educational reform measures initiated by the 1993 Educational Reform Act. This six-year, three-cycle action research study provided information on how to overcome teacher resistance to change in order to make a transition from traditional classroom teaching and learning practices to a hands-on, inquiry based, cooperative learning classroom approach. Videotape, evaluation forms, and teacher surveys provided data about the Partners Advancing the Learning of Math and Science (PALMS) approach and the implementation process that led teachers across the change continuum through the stages of information, interest, preparation, early use and routine use.

Traditional classroom teaching and learning practices where based on the Old Factory Model of Schools (Brooks & Brooks, 1993). The curriculum under this model emphasized basic skills and stressed the utilization of a textbook-based approach. Students were viewed as blank slates upon which teachers disseminated information. Testing was separated from teaching and learning and relied heavily on a "one correct answer" approach to validate student learning. Student work was done independently. Many teachers under this model viewed collaboration as a form of cheating.

However, in the hands-on inquiry based cooperative learning model utilized by the PALMS approach the curriculum stressed a "whole to part approach" with an emphasis on big concepts. Student questioning was highly valued and curriculum activities relied on primary sources of data and manipulatives. The student's theories and understandings about the world were developed through critical thinking and problem-solving strategies. In this approach, teachers became facilitators who sought the student's views in order to understand the student's present conceptions regarding the topic of study. Authentic assessment was ongoing throughout the learning process. Teachers observed students at work and during presentation exhibitions. Students primarily worked together in small groups and saved their work in portfolios. (Brooks & Brooks, 1993; PALMS, 1995, October).

Results

The cycle one PALMS all day training event was the initial interest hook that overcame teacher resistance and attracted teacher interest in utilizing this learning approach. Overcoming this teacher resistance led to cycle two of this action research project because teachers were requesting further training in utilizing the PALMS approach. The teachers' requests led to the development of a citywide survey to find out what teachers already knew about the PALMS approach, and in which areas the teachers desired additional training. The 20-week, three-hour workshop series was designed based on the results of this initial registration request data. Each workshop was video taped for data analysis. The participant volunteers' weekly workshop series evaluation forms and detailed post evaluations suggested that further research would be needed in the future to determine the effects that routinely utilizing this approach had on teaching and learning. This led to cycle three, in which the teachers were asked to identify the factors that first attracted their interest in the PALMS approach, rate the effectiveness of the training program, and assess the effects that their utilization had on the teaching and learning practices within their classrooms in terms of student growth, classroom management, classroom culture, and school culture. Surveys also included questions about the effectiveness of the PALMS teaching techniques in an inclusive classroom.

Cycle One 1993 - 1994

The change stages in cycle one were information and interest. From December of 1993 to May of 1994, this researcher informally discussed the 1993 Educational Reform Act and tried unsuccessfully to fulfill her required task of sharing her in-depth training of the teaching and learning curriculum requirements of the PALMS approach with colleagues. Finally, this researcher coordinated and held a Wider Opportunity Extravaganza on May 10, 1994, which was an all day integrated hands-on inquiry-based cooperative learning training event for teachers, students, parents and the community. The purpose of this event and follow up Family Math and Science Nights was to spark the interest of the teachers, students, parents, and the community in the integrated hands-on inquiry based cooperative learning approach utilized by the 1993 Education Reform Act and the Massachusetts Curriculum Framework Subject Guides. The data from cycle one consisted of event evaluations, pictures, and a brief videotaped presentation of the Wider Opportunity Extravaganza in Math and Science initial training event.

This all day introductory training event transformed an urban elementary school into a giant math and science laboratory with the help of 57 presenters trained in the PALMS approach. Invitations, presenter information packets, and response forms were mailed out to potential presenters. The day's events and activities were planned based on the responses of the presenters, who graciously donated their time to teach four separate 45-minute lessons on a pre-determined theme using the PALMS approach. Table 2 describes the participants who attended this all day training event. The presenters consisted of UMASS professors, Lead Teachers, PALMS Specialists, and state PALMS liaison staff. Community businesses donated all the needed supplies for the event, and youth group volunteers familiar with putting on hands-on events, such as Scout-o-Ramas, Wider Opportunities, and Junior Achievement Trade Fairs came to help. Thirty-four high school and 15 junior high Honor Society members assisted the presenters by being peer tutors helping the elementary students with the various lesson activities. Twenty classrooms, containing 20 teachers, and 300 students plus their parents from preschool to the six grade, participated in four of the 57 learning stations. Ten teachers from other elementary schools, five central office administrators, the mayor, two city councils, and five media personnel also attended this event.

Table 2 here

This hands-on, all-day participatory training event attended by parents, teachers, and students was what initially changed the attitude of the teachers. After this event, the staff borrowed the thematic unit center kits that had been compiled by this researcher and a volunteer parent. Teachers also requested this researcher's assistance to learn more about the PALMS approach. The 57 different hands-on, inquiry-based, cooperative learning thematic units used at the "Wider Opportunity Extravaganza in Math and Science" event were placed in the school's library at the end of the day's activities for further teacher utilization. During the 1994-95 school year, the staff asked this Lead Teacher researcher to hold training workshops after school. The staff's initial interest had been sparked, but how did this researcher continue to hold this mostly mid-career-stage teaching staff's interest in the teaching practices of PALMS and move them forward through the change process into the early and routine implementation utilization stages?

Cycle Two 1995 - 1997

The change stages involved in cycle two were preparation and early use. The purpose of cycle two was additional in-depth staff development and ongoing support. Cycle two consisted of 106 teachers in the city returning a survey about their knowledge of the PALMS approach, the type of additional training they desired, and registration for workshops being offered during a year-long series involving curriculum methods, materials and integrated thematic unit ideas. Data analysis revealed that 13 teachers understood that PALMS was an acronym that means Partners Advancing the Learning in Math and Science. Table 3 revealed that 66 teachers were familiar with the PALMS Educational Philosophy but only 53 teachers actual utilized the approach in their classroom. One hundred and three teachers were familiar with cooperative learning, however, only 53 actually utilized it in their classrooms. Twenty-four teachers were familiar with the constructivist approach and only sixteen utilized it in their classroom. Fifty-six teachers were familiar with inquiry-based learning; only 34 actually utilized it. One hundred and two teachers were familiar with hands-on learning but only 94 actually utilized it. Eighty-five teachers were familiar with thematic units, and only 64 actually utilized it. Fifty-six teachers were familiar with an integrated across the curriculum approach, and only 39 teachers actually used it. Eighty-four teachers checked off that they utilized a combination of the above approaches which included: PALMS 43, cooperative 74, constructivism 17, inquiry based learning 30, hands-on learning 73, thematic units 48, and an integrated across the curriculum approach 31.

Table 3 here

Table 4 indicates that the 106 participants filling out the initial citywide research survey requested training in the following areas: PALMS, 12; cooperative learning, 8; constructivism, 18; inquiry-based learning, 13; hands-on learning, 9; thematic units, 11; integrated across the curriculum, 19; multiple intelligences, 4; brain-based learning, 4; and accelerated learning, 3. The following topic workshops were also requested: acids & bases, 8; artifacts, 2; bubbles, 12; classroom gardening, 19; changing states of matter, 10; crystals, 14; earthworms, 13; electricity, 14; estimating, 4; magnets, 17; nature journals, 10; oobleck, 4; rockets, 4; structures, 8; and water, 11.

Table 4 here

Based on the information from this initial citywide research survey teachers were provided with in-depth ongoing training and support for implementing the PALMS approach, techniques, and activities into their classroom teaching and learning practices. The PALMS training workshops utilized an active participation approach where teachers became students utilizing the approach in order to learn the educational benefits this approach had for classroom learning. The lead teacher workshops presented by this researcher were videotaped and participants filled out nightly evaluation forms and a detailed post evaluation survey at the end of the workshop series.

After the city and state in-depth staff development program had been completed in June of 1997, another citywide survey was sent out to determine the current utilization level of the PALMS approach. Did this in-depth city and state training program move teachers along the change continuum from interest to utilization? Table 5 shows that fifty-four participants responded to this survey. Of those who responded, 31.5% represented 17 administrators, 35.2% represented PALMS trained teachers, and 33.3% represented 18 colleagues of trained teachers.

Table 5 here

Table 6 shows the before and after training utilization percentages for each learning component. Out of the 54 participants who returned this before and after training "Levels of Use" survey, data analysis revealed that before the PALMS training, 72.2% of the participants were not familiar with the PALMS Philosophy, and after the training 90.0% of the participants were utilizing this approach. Before the training, 77.0% of the participants were not familiar with the cooperative learning approach and after the training, 94.5% of the participants were utilizing this approach. Before the training, 74.0% of the participants were not familiar with integrated across the curriculum and thematic units and after the training, 91.0% were utilizing them. Before the training, 90.8% of the participants were not familiar with the constructivist approach, and after the training, 72% of the participants were using it. Before the training, 87.0% of the participants were not familiar with the inquiry-based learning approach, and after the training, 88.9% were using it. Before the training, 83.0% of the participants were not

familiar with the brain-based learning approach, and after the training, 76.0% were using it. Before the training, 87.1% of the participants were not familiar with the accelerated learning approach, and after the training, 70.4% were using it. Before the training, 83.4% of the participants were not familiar with multiple intelligences and after the training, 80.0% were using it. Before the training, 72.0% of the participants were not familiar with learning styles, and after the training, 89.0% were using them.

Table 6 here

Cycle Three 1998 - 1999

The change stages dealt with in cycle three involved routine use and program evaluation. The purpose of cycle three was to evaluate the effectiveness of the PALMS training program and to assess the effects that utilizing the PALMS approach had on the teaching and learning practices within classrooms in terms of student growth, classroom management, classroom culture, and school culture. This cycle's citywide survey collected both qualitative and quantitative data regarding the teachers' reflections on what they found influenced their implementation process and continued use of the innovation after they had been actively involved in the change process for 6 years and had used the innovation in their classroom. This cycle isolated the relevant factors that teachers felt influenced them to change their attitude toward the PALMS approach and implement the educational reform measures into their classroom teaching and learning practices. The qualitative, open-ended response data were analyzed by categorizing common themes and patterns identified from the data. The before and after PALMS five-point Likert scale quantitative data responses were examined using SPSS, to determine the frequency distribution, mean, standard deviation and percentile ranking. T-tests and ANOVAs were run. The data they provided will help change agents determine the factors that influenced what the system did:

- to impact teacher utilization of an innovation;
- that has little or no influence on teacher utilization of an innovation.

Sixty-two K - 12 teachers responded to a survey packet answering questions explaining how the Education Reform Act of 1993, promoted through the Project PALMS educational change

initiative training process, had affected teaching and learning practices within their classrooms. Table 7 describes the background characteristics of the teacher participants. Female teachers comprised 91.8% of the study. The majority of the teachers were Caucasian (93.9%), regular education classroom (65.6%) elementary teachers (85%) with a BS or BA degree (66.6%). The remaining teacher participants were junior high teachers (10%) and high school teachers (5%). The type of class and teacher's position responses further revealed that the teacher participant population also included inclusion classroom teachers (18%), special education classroom teachers (9.8%), bilingual education classroom teachers (4.9%), elementary permanent substitute teachers (4.8%), Title I teachers (1.6%), and teachers who service all types of classrooms (1.6%).

Table 7 here

Table 8 shows that the average age of the teacher participants was 47.78 years (SD=8.91), and that participants had an average of 21.61 years in the education profession (SD=10.5). Participants had taught an average of 21.50 years in Title I (SD=2.12), 19.62 years in regular education (SD=11.77), 16.92 years in special education (SD=7.45), 14.50 years in bilingual education (SD=10.21), and 4.84 years in inclusion (SD=5.95). The average class size of the teacher participants was 19.29 students (SD=4.59), and the average grade level was 3.67 (SD=2.67).

Table 8 here

Table 9 reports the results of the ANOVAs for the hours and years of PALMS training by level taught. Thirty-four elementary teachers averaged 55.50 hours (SD=111.47) of training per participant from 1993 to 1996, and 35 elementary teachers averaged 22.64 hours (SD=33.78) per participant from 1997 to 1999. Two junior high teachers averaged 67.00 hours (SD=54.01) of training per participant from 1993 to 1996, and three junior high teachers averaged 67.00 hours (SD=54.01) per participant from 1997 to 1999. One high school teacher attended training for 6.00 hours from 1993 to 1996, and two high schools teachers averaged 8.00 hours (SD=2.83) per participant from 1997 to 1999. The data disclosed that from 1993 to 1996, junior high teachers participated in the most training per participant (X=69.00, SD=55.15), and high school teachers

participated in the least (X=6.00) (F=.12, p=.89). From 1997 to 1999, junior high teachers also participated in the most training per participant (X=67.00, SD=54.01) while the high school teachers' training participation was still the least (X=8.00, SD=.2.83) (F=2.51, p=.095).

Table 9 here

Table 10 provides the ANOVA results for training hours by educational level. These data revealed that teacher participants with advanced degrees had higher per participant training hour averages. The average total PALMS training hours for 34 participants with BA/BS degrees was 48.19 (SD=57.31), while 17 MA/MS participants averaged 189.82 training hours (SD=442.11) per participant (t=1.32, p=.207). The early PALMS Program training years from 1993 - 1996 showed a higher training average for participating teachers with advanced degrees (t=1.37, p=.189). Twenty-two BA/BS participants from 1993 to 1996 averaged 39.55 training hours (DS=45.56) per participant, while 16 MA/MS participants averaged 128.81 training hours (SD257.41) per participant. In latter PALMS training years from 1997 - 1999, 28 BA/BS participants averaged 27.45 training hours (SD=40.90) per participant, while 14 MA/MS participants averaged 83.29 training hours (SD=235.90) per participant (t=.88, p=.395). During 1993, the first year of PALMS, 9 BA/BS participants averaged 6.11 training hours (SD=7.32), and 11 MA/MS participants averaged 44.55 training hours (SD=89.27) per participant (t=1.28, p=.216). During 1994, the second year of the PALMS training program, 10 BA/BS participants averaged 15.70 training hours (SD=22.04), while 8 MA/MS participants averaged 70.75 training hours (SD=114.51) per participant (t=1.50, p=1.54). The third year of the program, 1995, had 16 BA/BS participants average 24.19 training hours (SD=45.12), while 10 MA/MS participants averaged 50.30 training hours (SD=92.40) per participant (t=.83, p=.421). During 1996, the fourth year of PALMS training, 20 BA/BS participants averaged 13.55 training hours (SD=14.57), and 12 MA/MS participants averaged 41.83 training hours (SD=82.96) per participant (t=1.50, p=.143). During 1997, the fifth year of PALMS training, 21 BA/BS participants averaged 15.07 training hours (SD=14.91), while 11 MA/MS participants averaged 38.09 training hours (SD=87.43) per participant (t=1.19, p=.243). The sixth year of the training program, 1998, had 19 BA/BS participants average 12.03 training hours (SD=16.88), while 9 MA/MS participants averaged 42.00 training hours (SD=997.14) per participant (t=1.33,

p=.195). From January to October of 1999, 15 BA/BS participants averaged 14.9 training hours (SD=25.27), and 7 MA/MS participants averaged 52.71 training hours (SD=109.52) per participant (t=1.30, p=.209).

Table 10 here

Table 11 shows that the teacher participants' satisfaction with their PALMS training based on 49 responses was 3.98 on a 5-point scale (SD=.72). This corresponded with the teachers' response (N=48) rating on the overall effectiveness of the PALMS approach, which was 3.92 on a 5-point scale (SD=.71). The teachers' response (N=49) rating describing how their students liked the PALMS approach was 4.20 (SD=.82) on a 5-point scale.

Table 11 here

Table 12 shows that 41 teacher participants (73.2%) still indicated a desire for more training six years after initial implementation the of the PALMS approach, while 15 (26.8%) felt that additional training was not necessary.

Table 12 here

Table 13 shows the specific areas in which additional training was desired. Categories include: Curriculum - Grade Level / Subject, 25 responses (Science, 5 responses; Grade Level Applications, 3 responses; State Framework Standards, 3 responses; Math, 3 responses; Reading, 2 responses; Language Arts, 2 responses; Social Studies, 2 responses; Thematic Units, 2 responses; All Subjects, 2 responses; Integrating Curriculum, 1 response); Additional Ideas / Support, 3 responses; Teaching Methods, 3 responses; Classroom Management, 3 responses; Cost Effective Material Ideas, 2 responses; High Quality Training Applicable for Classroom Utilization, 2 responses.

Table 13 here

Table 14 shows that out of 54 teacher responses regarding PALMS utilization since the last training session, 14 teachers (25.9%) had increased their use of PALMS, 15 teachers (27.8%) had decreased their use, and 25 teachers (46.3%) had remained the same in their utilization.

Table 14 here

Table 15 reveals that 55 teachers (88.7%) participated in and rated the PALMS training; however, 4 teachers did not list the number of training hours taken. Seven (11.3%) of the 62 participants involved in this study had not participated in PALMS training. Fifty-one teacher participants (82.3%) out of the 62 teachers participating in this study have utilized PALMS. Forty-eight (94.1%) of the 51 utilizing teachers were trained, and 3 (5.9%) were untrained. Seven (12.7%) of the 55 trained teachers and 4 (57.1%) of the 7 untrained teachers did not utilize PALMS. The untrained teachers simply followed the State Curriculum Framework subject guides developed as a result of the 1993 Education Reform Act that were sent to all teachers and school systems throughout the state.

Table 15 here .

Factors in Training Influencing Use

Table 16 lists the number of participant responses for each training factor that influenced teacher utilization of PALMS. The results of this study revealed five main factors that influenced whether or not the teacher participants used PALMS: "Approach Fit with Teachers Philosophy" - 20 responses; "Approach Good for Students" - 16 responses; "The Effectiveness of the Training" - 10 responses; the fact it was "Mandated" - 5 responses; and "More Training Needed" - 2 responses.

Under the category, "Approach Fits with Teacher Philosophy," the following training factors influenced teacher acceptance of PALMS (20 responses):

- PALMS encouraged utilization of higher level thinking skills and helped students to express their ideas, which teachers wanted.
- Teachers liked using different approaches to teaching; cooperative learning was non-competitive, and LINKS was an organized daily approach.

- The approach was enjoyable; exciting; high interest; creative; effective, appealed to all learning styles; was student centered; hands-on; utilized manipulatives; was project based; involved self-discovery; students constructed their own knowledge; it used real life experiences.
- The approach was similar to how the teacher taught, and it reflected the teaching nature of the subject matter. It was easy to implement.
- The approach utilized peer coaching.
- PALMS provided a different way of introducing lessons without textbooks, and it encompassed more than one curriculum area at a time. It was a thematic unit approach that did not depend on textbooks.

Under the category, "Approach Good for Students," the following training factors influenced teacher classroom application of PALMS (16 responses):

- PALMS involved students; students enjoy it; when students enjoy learning, they learn more; everyone gets a chance to contribute; children learn best by doing; students benefit from the hands-on approach; hands-on learning works well with students needing a multi-sensory approach; the hands-on approach has a high student interest; and the hands-on approach provides a tactile approach for learning.
- PALMS was a self-discovery approach; the concept stayed with the students; it kept all the students engaged in the lesson; students discussed what they had learned; it met the needs of students not successful in other avenues; it allowed students to construct their own meaning and understanding of concepts; it provided a great number of ideas that enriched curriculum; and active learning builds on students' interest and experiences.
- Group activities teach students socialization skills and responsibility.

Under the "Effectiveness of Training" category, the following training factors influenced teacher classroom adoption (10 responses):

- According to the data, teachers believed that the specific training in the various methods utilized in PALMS made learning fun. These methods included: hands-on learning, learning styles, cooperative learning, knowledge acquisition and construction, and inquiry-based learning. Methods were presented during training to make implementation easier.
- Teachers were encouraged to try new strategies like cooperative learning and thematic units. Graduate course work influenced teachers to take the time to prepare occasional lessons.
- Teachers liked the wealth of interesting and varied ideas presented to enrich the curriculum. Teachers enjoyed the training because it was fun, their input had value,

and it was a non-threatening, hands-on group effort. The teachers enjoyed the activities and felt their students would, too.

- Free materials necessary to utilize approach were provided.
- Teacher and students were able to participate in training events.

Under the category of "Being mandated," the following training factors influenced teacher classroom employment of PALMS (5 responses):

- The nature of the course required utilizing this type of an approach (food lab).
- The PALMS approach initiated the changes mandated by the Education Reform Act of 1993.
- The state Comprehensive Assessment System (MCAS) was based on utilizing the PALMS approach.

Under the category of "More Training Needed," the following training factors must be employed before classroom application of PALMS could be instituted (2 responses):

- The teachers would like to or plan to use the approach with more training.

Table 16 here

Factors Influencing Initial Interest in PALMS

Table 17 displays the number of responses for factors that initially got teachers interested in the PALMS approach. The participants' comments disclosed that the following seven factors sparked their initial interest in the PALMS approach: Training - 20 responses; Approach Fits with Teacher's Philosophy - 11 responses; The Education Reform Act of 1993/Teacher Manuals - 11 responses; Approach Good for Students - 10 responses; Colleagues/Lead Teacher - 3 responses; Paid Training Sessions/Free Materials - 2 responses; Class Participating in Event Utilizing this Approach - 1 response.

"Training" was the first major categorical factor that hooked teachers' initial interest (20 responses). Teachers explained that:

- Training sessions, well presented and interesting, were factors that initially sparked teacher interest in utilizing PALMS. The fact that the organization presenting the training had a reputation for high quality training programs was also a factor.

- Coursework explaining the PALMS approach sparked an interest to learn more. Project PALMS and the Buzzards Bay Rim Project (partner university grant providing funding for Education Reform teacher training) presented training sessions and courses conducted by the local university partnership training team which sparked the participating teacher's initial interest in this approach.
- The trainers encouraged and helped teachers to implement the approach. Workshops demonstrated ways the approach could be utilized. After attending training workshops, teachers realized the potential and benefits of this approach.
- Volunteers were asked to take science training, and teachers who liked science volunteered.
- An interest in science project ideas led to an initial awareness in the PALMS approach.
- Administrators introduced and suggested the approach.

The second factor sparking teachers' initial interest was the fact that the "Approach Fit with the Teacher's Philosophy" (11 responses). Here, teacher participants indicated:

- Initial interest was sparked because teachers liked to keep up with the latest teaching and learning classroom practices. Teachers liked trying new teaching and learning approaches, and if the approach worked, they continued utilizing it.
- The teachers enjoyed working with their hands. The teachers liked utilizing classroom learning centers.
- PALMS involved thematic units, and teachers could expand on the knowledge learned from previous lessons.
- The previous classroom experiences of the teachers dictated utilizing this approach.
- Teachers believed that PALMS took a multi-sensory learning approach a step further.
- The PALMS approach was a good way to organize and conduct science projects with students.
- Teachers believed that this was a good approach, and just felt there was a better way to teach.
- Teachers liked the fact that this approach developed thinking and reading skills.
- The way this approach broke down the skills needed for each subject area made it easier to write and follow Individual Educational Plans (IEPs).

The fact that the approach was "Mandated" by the state was another category sparking initial teacher interest (11 responses). Teachers explained that:

- The new teacher manuals utilized the strategies of this approach.

- Project PALMS was the first step explaining how to implement the Education Reform Act of 1993 curriculum mandates.
- The curriculum had changed, and to be effective, teachers had to use it.
- Getting information to study for teacher certification tests sparked an interest in learning more about this approach.
- The nature of the subject or course necessitated using this type of an approach (home economics - cooking).

The fourth factor that sparked initial interest in PALMS was the fact that teachers believed that the "Approach was Good for Students" (10 responses). Here, teachers acknowledged that:

- It was fun and exciting for both adults and students. It was fun and got away from just using the textbook. The approach maintained student interest. It was an attention grabber, and it motivated students.
- It was easy and effective. It helped students learn. Students grasped ideas more easily using a hands-on approach.
- The hands-on learning and an awareness of learning styles enhanced student learning.

The recommendation of "Colleagues or Lead Teachers" also sparked teachers' initial interest in PALMS (3 responses).

- Lead Teachers / Colleagues were doing many interesting things that worked with students, and they were enthusiastic about the results they were getting.

Another categorical factor involved having the teachers' initial interest sparked by the fact that they received some form of "Monetary Gain" such as (2 responses):

- Being paid to attend training sessions to learn about the approach.
- Receiving free manipulatives, classroom materials, or supplies for learning about the approach.

The last category sparking teacher interest in utilizing the PALMS approach involved "Attending Events" where the presenters, colleagues, or Lead Teachers modeled teaching the approach to the class (1 response). This was done through:

- The classroom participating in an event or school-wide function that utilized this approach.

Table 17 here

Factors Influencing Adoption and Continued Utilization

Participants ranked the factors that influenced their attitude to adopt and continue to utilize PALMS in order of importance. Table 18 lists the quantitative factors that the participants

checked off as influencing their utilization of PALMS. All factors were based on 59 participant responses. The most frequently mentioned factor was "PALMS Training Sessions," where 43 participants (72.9%) listed this as an important factor influencing their attitude toward utilizing PALMS. The 2nd highest factor, with 28 participants (47.5%) listing it as important, was "The Class Participating in an Event" such as "PALMS Extravaganza in Math and Science, "Hands-on Math and Science Fairs," and "Hands-on University or Museum Partnership Inquiry Center Based Field Trips Events." The 3rd highest factor, with 23 participants (39%) stating this influenced their utilization, was "The Educational Reform Act of 1993."

The next five factors all had a similar rank in terms of their influence on implementation of PALMS: "Family Math and Science Nights" - 15 participants (25.4%); "Massachusetts Comprehensive Assessment System" (MCAS) - 15 participants (25.4%); "PALMS Specialist" - 14 participants (23.7%); "Colleague" - 14 participants (23.7%); "PALMS Lead Teacher" - 13 participants (22%). The next level of influential factors listed the "Building Administrator" - 10 participants (16.9%). The next three responses can be grouped again because of their similar ranking status: "Ongoing Support" - 8 participants (13.6%); "Peer Coaching" - 7 participants (11.9%); and "Central Administration" - 6 participants (10.2%). Participants in this study were mostly veteran teachers (see Table 2 & Table 15); consequently, very few new teachers needing mentors responded to this survey. Four participants (6.8%) listed "Receiving Mentoring Assistance" as a factor. Four participants (6.8%) wrote in an answer for "Other." The influencing factors represented under "Other" were:

- Textbook changes
- My own belief that this was a good approach
- There was no other option because the course (home economics) must be taught this way.
- It worked—have always tried new approaches and utilized what worked.

Since each influencing factor was based on the responses of 59 participants checking off the important factors affecting their adoption of PALMS consequently, the data also revealed the following non-influencing results: "Ongoing Support" - 51 participants (86.4%); "Building Administration" - 49 participants (83.1%); PALMS Lead Teacher - 46 participants (78%); Colleague - 45 participants (76.5%); PALMS Specialist - 45 participants (76.3); MCAS - 44

participants (74.6%); Family Math and Science Nights - 44 participants (74.6%); Education Reform Act - 36 participants (61%); Your Class Participating in an Event - 31 participants (52.5%); and PALMS Training Sessions - 16 participants (27.1%). Please note that ranking non-influencing factors in order from most to least necessitates reading Table 17 from the bottom up.

Table 18 here

The paired samples t-tests for factors influencing utilization in Table 19 show the following significant points about the factors mentioned above and their influence on teacher utilization. The teachers who used PALMS because of the Education Reform Act of 1993 ranked the quality of the PALMS training lower ($t = 2.86$; $p = .006$). Teachers who said that the Education Reform Act of 1993 was the reason they utilized PALMS tended to use an integrated, across-the-curriculum approach less than those for whom the Education Reform Act of 1993 was not a factor ($t = 2.49$, $p = .016$). Teachers who indicated that training influenced their decision to utilize PALMS rated the effectiveness of the training quality higher ($t = 2.28$, $p = .027$).

Teachers who stated that colleagues influenced their decision to adopt PALMS had taught fewer years ($t = 2.33$, $p = .023$) and had fewer years in regular education ($t = 2.97$, .005). This shows that colleagues had more influence over new teachers utilizing PALMS. Teachers who said that peer coaching was an important factor influencing their utilization of PALMS ranked the effectiveness of the PALMS approach lower ($t = 2.19$, $p = .034$), taught at a lower grade ($t = 2.93$, $p = .14$), and had fewer students in their class ($p = 2.54$, $p = .014$). Teachers who stated that receiving mentoring assistance was an influencing factor in utilizing PALMS had taught fewer years ($t = 8.64$, .001) and utilized the PALMS approach less in social studies ($t = 3.16$, $p = .006$). Teachers stating that the central administration was a factor influencing their PALMS utilization ranked the overall effectiveness of PALMS lower ($t = 2.95$, $p = .005$), and the student enjoyment of PALMS lower ($t = 2.31$, .026) than the teachers for whom central administration was not a factor. When the central administration was the influencing utilizing factor, teachers also used the approach less in social studies ($t = 3.10$, $p = .004$) and science ($t = 2.36$, $p = .038$).

The data affirmed that teachers scored the effectiveness of PALMS lower when they felt they were being forced to utilize the PALMS approach by both the state in terms of the Education Reform of 1993 and by the central administration of their school system. The results also acknowledged that teachers who listed building administration as an important influence over

their decision to use PALMS taught in the lower grades ($t = 2.94$, $p = .006$). Younger teachers felt more insecure utilizing PALMS and wanted ongoing support ($t = 2.03$, $p = .048$). Teachers who listed ongoing support as a factor utilized PALMS less in reading ($t = 2.76$, $p = .010$) and social studies ($t = 3.10$, $p = .004$). When MCAS testing was listed as a factor influencing utilization, teachers ranked the quality of the training lower ($t = 2.10$, $p = .041$) and utilized the approach less in science ($t = 2.93$, .005).

Table 19 here

Factors Inhibiting Utilizing PALMS

The factors inhibiting utilizing PALMS fell into the six main categories listed in Table 20: "Lack of Time" - 10 responses / "Increased Preparation" - 9 responses; "Lack of Resources" - 12 responses / "High Cost of Materials" - 2 responses / "Need for Space" - 1 response; "Class Type Not Conducive to Using PALMS" - 2 responses / "Class Size Not Conducive to Using PALMS" - 6 responses / "Class Management Problems Using PALMS" - 7 responses; "Subject Content Not Conducive to Using PALMS" - 6 responses / "Alignment with Curriculum Frameworks" - 1 response / "Preparation for State Testing (MCAS)" - 1 response / "Adequate Assessments" - 1 response; "Lack of Training" - 3 responses / "Lack of Support" - 3 responses; and the "Approach Doesn't Fit with Teachers Philosophy" - 4 responses.

Teachers listed 19 responses under the first category, "Lack of Time," for not utilizing PALMS:

- This approach takes a lot more time, management strategies, and reflection. Teachers did not have adequate time to research a topic, find resources and materials, prepare unit plans, set up lessons, and pass out materials for this type of an approach. Blocks of uninterrupted time to integrate a project fully are missing. There are too many subjects to teach to find time to develop lessons required for curriculum frameworks.
- The PALMS approach takes too much time, and teachers needed an assistant.
- There was not enough time to complete all that needed to be done in half-day kindergarten sessions.
- The "Won Way" reading approach used by teachers limited the time for utilizing PALMS because it was a highly structured, time consuming, phonetic approach.

Under the second category, teachers listed 16 inhibiting reasons for not utilizing the PALMS approach involving problems with the class type, class size, and classroom management.

- The approach caused a problem for the students who preferred to work alone or had difficulty working with their peers. Some students sat back in the group and let others do all the work.
- Adjusting cooperative teams to accommodate all the various personalities in the classroom was a problem. Classroom behavior problems made utilizing this approach difficult. Extremely difficult classes that were too competitive and too talkative also made utilizing this approach difficult. Most lessons were 90% discipline and 10% teaching. Manipulatives were distracting and toy-like, and allowing students to have some time for free play using the manipulatives before starting the lesson helped. This approach was noisy and disturbed others.
- The age and number of students in the classroom affected utilizing this approach. Twenty-five to 30 students for one teacher inhibited the full exploration of interrelated topics. Classrooms operated best with 16 students or less.
- Teaching special education prevented the teacher from utilizing cooperative groups.

Under the third category, teachers cited 15 responses that inhibited utilizing PALMS based on the lack of resources, the cost factor involved, and the need for more classroom space.

- Teachers lacked the manipulatives, materials, supplies, and resources to utilize the PALMS approach in their classroom. Teachers had a problem finding materials and lesson ideas to fit this approach. The school did not have books available to enhance interest and understanding. The school did not supply the materials, and teachers had to pay for them out of their own pockets if they utilized this approach. Teachers could not afford to pay for the needed materials themselves.
- Large classes required so many desks in the room that there was not enough space available to do the hands-on activities.
- The school system used basal tests. Between the required curriculum frameworks and the required texts, it was too difficult to do the PALMS approach.

Under the category area "Subject Content, Curriculum Frameworks, MCAS and Assessment," teachers listed eight responses that inhibited utilizing PALMS.

- Utilizing only this approach created a problem getting concrete marks for grading. Standford Achievement Tests (SAT) and MCAS exams did not test this approach adequately.

- Teachers did not feel confident with their background information in the area of scientific knowledge. Students lacked basic general knowledge. Teachers had to align their lessons with the state curriculum frameworks and make significant progress covering the specified topics. Teachers were concerned with the applicability of the PALMS approach to the subject matter. There were skills taught and tested at each grade level that could not be taught utilizing this approach.

Teachers listed six responses under the category of "Lack of Training and Support" that inhibited utilizing this approach.

- Teachers lacked training for this approach. Teachers needed more training to feel comfortable utilizing this approach.
- Teachers did not receive the support they needed for using this approach.
- Teachers needed classroom assistance to help with lessons when utilizing this approach.

The last area, "Approach Doesn't Fit with Teachers Philosophy," contained four responses that inhibited using this approach. Here, teachers commented that:

- The approach stifled individual teacher creativity.
- The approach could not be utilized all day. The students were not learning enough because teachers were not directly involved.
- Using just one approach made teaching and learning too narrow and stifled the free flow of ideas.

Table 20 here

How Teaching and Learning Changed as a Result of Utilizing PALMS

Table 21 presents the teaching changes cited by participants resulting from utilizing PALMS. The data disclosed the following seven major categories: "Improved Teaching Practices" / "Reflective Teaching" - 23 responses; "Approach Good for Students" - 18 responses; "Changed Teaching Methods" - 13 responses; "No Change" / "Remained the Same" - 5 responses; "Increased Stress" - 3 responses; "Increased Preparation Time" / "Teaching" / "Remediation Time" - 2 responses; and "Increased Use of Teaching Materials" - 1 response.

The most frequently mentioned category with 23 responses, "Improved Teaching Practices and Reflective Teaching," revealed the following teaching changes:

- Teachers went from total pencil-and-paper tasks to more hands-on, inquiry-based cooperative learning. Teachers now utilized cooperative groups for subjects other than science. Cooperative learning really changed the teachers' teaching approach. Some teachers utilized hands-on, inquiry-based cooperative learning for science and social studies, with a peer group approach in math and reading. Cooperative learning utilizes a highly structured student-assigned role task-oriented project approach, while a peer group approach just has students working together for drill and practice.
- The PALMS approach caused teachers to implement more cross-curriculum lessons and become less traditional in their teaching methods. Teachers constructed lessons around themes like they did in the 70s, rather than isolated subject areas. However, PALMS added cooperative group projects and hands-on learning to the thematic unit teaching approach.
- Teachers took "Math Their Way" (a manipulative-based math approach) and "AIMS" (an activities integrating math and science approach) training workshops.
- Some teachers tried cooperative learning but did not continue using it.

Five teachers stated the following reasons why "No Change" had taken place in their teaching practices.

- This was because they had always used an-inquiry based, hands-on approach. They had always related subject content to familiar concepts. The type of course had always been hands-on.

Three comments under the category, "Increased Stress" disclosed:

- Teachers felt guilty for not utilizing the PALMS approach more.
- Teachers felt an increase in their stress level because the pace had become too fast for the age level of the students.

The following two responses fell under the category, "Increased Preparation Time / Teaching / Remediation Time."

- Teachers stated that it took hours longer to prepare lessons and gather materials.
- The PALMS approach was more work, but more fun. It was an evolutionary process.

Under "Increased Use of Teaching Materials," one teacher revealed that:

- A lack of science materials necessitated borrowing them from other teachers.

Table 21 here

Using a 5-point scale where 1 was the lowest and 5 the highest, participating teachers rated 35 variables based on their classroom teaching and learning practices before and after utilizing the PALMS approach in the areas of "Student Growth," "Classroom Management and Teaching Resources," "Classroom and School Culture," and "Concluding Remarks." Each topic was analyzed separately. Table 22 provides the results of paired samples t- tests for "Student Growth," revealing a significance increase ($p = .001$) for each teaching and learning variable after utilizing PALMS. Significant differences were found for student time on task ($t = 10.95$, $p = \leq .001$), student interest ($t = 15.96$, $p = \leq .001$), student motivation ($t = 14.34$, $p = \leq .001$), student self-esteem ($t = 4.38$, $p = \leq .001$), student learning ($t = 9.43$, $p = \leq .001$), student participation ($t = 14.17$, $p = \leq .001$), student verbal communication ($t = 10.10$, $p = \leq .001$), student written responses to essay ($t = 6.07$, $p = \leq .001$), student problem-solving ability ($t = 10.66$, $p = \leq .001$), student utilization of higher level critical thinking skills ($t = 9.67$, $p = \leq .001$), student test scores ($t = 6.91$, $p = \leq .001$), student appropriate behavior ($t = 4.67$, $p = \leq .001$), student ability to work together ($t = 7.09$, $p = \leq .001$), student ability to relate to others and respect each other's individual contributions to the group's project ($t = 9.11$, $p = \leq .001$), student ability to self-evaluate their own work ($t = 8.42$, $p = \leq .001$), and positive student attitude toward lifelong learning ($t = 8.69$, $p = \leq .001$).

Table 22 here

Table 23 provides the results of the paired samples t - tests for "Classroom Management and Teaching Resources." Significant differences were found for the teachers' ability to meet the individual learning needs of every student to develop to their fullest potential ($t = 6.22$, $p \leq .001$); actual teaching time ($t = 4.50$, $p \leq .001$); time to remediate individual students' special learning disabilities ($t = 5.09$, $p \leq .001$); time to remediate students who just need extra help with certain concepts, tasks, or skills ($t = 5.51$, $p \leq .001$); teacher planning time ($t = 4.41$, $p \leq .001$); time to organize and assemble teaching materials ($t = 5.43$, $p \leq .001$); classroom use of manipulates ($t = 10.47$, $p \leq .001$); classroom use of trade books ($t = 6.21$, $p \leq .001$); classroom use of reference resources ($t = 6.57$, $p \leq .001$); classroom use of office supplies ($t = 3.22$, $p = .002$); and classroom use of art, craft, and science materials ($t = 8.84$, $p \leq .001$). Significant differences were not found for classroom use of textbooks ($t = -1.88$, $p = .066$).

Table 23 here

Table 24 provides the results of the paired samples t - tests for the questions about "Classroom Culture," "School," and "Concluding Remarks." Significant differences were found for teachers' stress level ($t = 2.27$, $p = .028$); pleasant, enjoyable, positive classroom environment ($t = 3.14$, $p = .003$); staff morale ($t = 3.74$, $p \leq .001$); student morale ($t = 6.62$, $p \leq .001$); students' ability to develop to their fullest learning potential ($t = 9.90$, $p \leq .001$); and effectiveness of teaching techniques in an inclusive classroom ($t = 9.29$, $p \leq .001$).

Table 24 here

Summary of Findings

The major factors influencing initial interest were:

- training;
- the approach fit with the teacher's philosophy;
- its use was mandated (state, administration or teachers manual);
- the approach was good for students.

The major qualitative factors influencing PALMS utilization were:

- the importance of training;
- approach strategies must be good for students;
- strategies needed to fit the teachers personal philosophy of education.

The quantitative data also listed training as the strongest utilizing factors. However, this data revealed that teacher and class participation were more influential on teacher utilization than the recommendations of administrators, specialists and colleagues.

The major factors found as inhibiting utilization were:

- increased time and preparation;
- resources and materials;
- personal expense/cost;

- classroom space;
- composition of class;
- state testing requirements;
- lack of training and support;
- approach conflicted with teachers philosophy of education.

Clarity was a factor listed under inhibiting and preventing utilization plus as a reason for requesting additional training.

Discussion

The significant result of cycle one was the attitude change of teachers, which demonstrated that teachers were interested in change and innovation once they saw the approach or change was a worthwhile teaching practice that would benefit student learning. After the Wider Opportunity Extravaganza, teachers were actively borrowing the PALMS thematic unit kits, requesting additional training, asking for classroom demonstrations and assistance from their building Lead Teacher.

The video taped results of cycle two revealed that teachers overcame their initial workshop active participation reluctance and became reflective practitioners (Schön, 1987) sharing classroom experiences, problem solving specific situations and adapting lessons to their various grade levels. The "Levels of Use" citywide survey revealed that the ongoing training and support enhanced teacher utilization of the PALMS approach for participating teachers and their colleagues.

The data from the responses that influenced, enhanced, inhibited or prevented utilization based on the teacher participants' experiences over the six year period, identified the following key implementation factors necessary for supporting change:

- quality training;
- ongoing support;
- resources and materials;
- planning time;
- classroom management strategies.

The major factors influencing PALMS utilization brought out by study participants in the qualitative data were the importance of quality training, the fact that the approach strategies must be good for students, and the fact that the strategies needed to fit with the teacher's personal philosophy of education. Lack of support was a factor influencing non-utilization. According to the qualitative data, the approach being mandated affected the teachers' initial interest in finding out about the approach and their decision to take training, but the fact that it was mandated was not reason enough alone for the teachers to utilize the approach.

The quantitative data also listed training as the strongest influence affecting the teachers' attitude toward utilizing the approach. The class participating in an event utilizing the approach was the second strongest influence, and the Education Reform Act was the third strongest influence. Family Math and Science Nights, state testing, trained specialists, and utilizing colleagues were influencing factors all basically having the same effect on the teachers' attitudes toward utilization.

The data revealed that utilizing the PALMS approached had a positive effect on teaching and learning. The findings of this study revealed that significant positive learning outcome benefits resulted from implementing and utilizing PALMS in routine daily classroom teaching practices in all areas of student growth. The qualitative data relative to continued utilization indicated that most teachers believed that the student learning benefits outweighed the increased teacher workload and stress involved in implementing and utilizing this approach. This was revealed through the quantitative data in all areas of classroom management, except classroom use of textbooks. This finding is consistent with the fact that the PALMS approach stressed curriculum activities and lessons based on inquiry and problem solving strategies that utilized primary resources and manipulatives. The research findings also showed that teachers believed that significant positive benefits resulted from utilizing this approach in all areas affecting the classroom and school culture. The findings regarding the concluding remarks showed that teachers believed that significant positive benefits resulted from implementing and utilizing this approach in both the students' ability to develop to their fullest learning potential and in the effectiveness of teaching techniques utilized in an inclusive classroom (classroom containing both regular and special education students). Both the quantitative and qualitative results on why teachers implemented the PALMS approach validated Guskey's (1986) findings that student progress and learning feedback were essential factors in promoting a change in teachers' beliefs

and attitudes toward utilization. The findings of this research and Guskey's (1986) experienced-based staff development model both demonstrated that a change agent can significantly change teachers' beliefs and attitudes by providing evidence that the innovation will produce positive results in student learning. The training results, combined with these teaching and learning results, also supported Stallings' (1989) staff development research that found that a direct relationship existed between teacher training, school achievement, and student performance.

However, data analysis revealed that when teachers felt they were pressured into utilizing the approach, they rated both the overall effectiveness of the approach and how the students liked the approach lower.

The quantitative data revealed that teachers believed that the approach took more time planning and increased the amount of materials, resources, and time needed to conduct lessons, but it had significant positive learning outcomes in all the listed areas affecting student growth. Utilizing the PALMS approach allowed teachers more time to observe and help students with their individual learning needs in order to maximize their students' ability to develop to their fullest learning potential.

Implications for Practice

Mandated Change

Mandated changes has a strong influence on a teacher's initial interest and decision to take training but is not a factor affecting implementation and continued utilization.

Training

Training influenced initial interest, utilization, and non-utilization. Quality training enhanced utilization and lack of training inhibited use. Some participants stated that paid training sessions and free materials were the initial reason they took PALMS training. Change agents need to address the participants' concerns regarding utilizing the approach during ongoing training sessions. Participants in this study were concerned about the extra time required for both planning and conducting lessons, the cost factor and space required for the needed additional resources, class management issues relating to class size and type and the assessment strategies needed to properly to evaluate and implement this approach into their classrooms. These all needed to be addressed by the change agent in follow up training sessions.

The state and local school system offered training sessions because they wanted the PALMS approach utilized, and participants voluntarily participated in the training because they were unfamiliar with this mandated approach. The career stage of the teacher influenced participation, the desire for additional training, and the type of training requested.

Communication techniques based on information sharing and dialogue overcame organizational barriers and resistance to change through a process of analysis, problem-solving, generating solutions, and evaluating results that involved participants throughout the entire change process. The qualitative data and quantitative data results clearly suggest that an effective change agent needs to understand and combine both the human relationship problem-solving strategies used by learning organizations, and the utilization-focused evaluation approach used by Patton (1997). This combination approach made it possible to assess the improvement, growth and development fostered within the organization, that took place both within the individuals in the educational system and the system through a process of continuous learning, discussion and feedback. Communication techniques based on information sharing and dialogue were key ingredients for success. The teachers and the system worked together to analyze the situation, problem-solve, share information, generate solutions, and evaluate the results. Strategies such as site-based management teams, training sessions, feedback, collaboration, mentoring, peer coaching, applied research, and reflective practice were employed to overcome organization barriers and resistance to change (Argyris & Schön, 1978; Blanchard & Lober, 1984; Blanchard, John, & Randolph, 1996; Covey, 1989, 1990; Putnam, 1994; Schein, 1993, Autumn, 1997; Senge, 1990). These are key ingredients and effective strategies for change agents planning educational change.

Attitude, Belief and Ownership

Teacher attitude directly influenced utilization. If the teachers felt the approach was good for students they utilized it. Eighteen of the 23 participants responding to the 1999 survey who participated in the 1997 Levels of Use survey are still using PALMS. Only 4 participants using it in 1997 are not still using it, and one participant from 1997 still has not utilized it. If the approach agreed with the teachers' educational philosophy, they utilized it.

Availability and Cost of Resources

Having the needed resources influenced whether or not teachers utilized PALMS. The lack of resources and the personal cost factor involved in supplying materials inhibited or prevented utilization. Change agents need to make sure the system supplies teachers with the needed materials necessary to properly implement and continue to utilize the approach.

Time

Increased planning, preparation and instruction time were listed by participants as areas of concern influencing utilization, factors inhibiting utilization and reasons for non-utilization.

Space, Class Size, Class Type and Subject Content

Qualitative responses included these factors as inhibiting or preventing utilization. The classroom was too small for group projects. There wasn't any storage space for all the need materials. The class was too young, too low, academically challenged, too noisy and/or too hyper. The teacher's subject area was not suitable for utilizing the approach.

However, the quantitative data revealed that K-12 teachers who taught all size and types of classes utilized and rated the approach as being effective. Therefore, this study found that class size and type utilization concerns are really classroom management training issues. Change agents need to constantly evaluate the success of the change process by having participants provide them with constructive feedback regarding their utilization concerns and needs.

Building Administrator, Central Administration, and Administrative Commitment

Both the quantitative and qualitative results revealed that administrative commitment influenced teacher utilization. Teachers were concerned that the decrease in training sessions and support by the Lead Teachers and PALMS Specialist meant that the administration was no longer committed to or supporting this approach. Participants also felt that the administration had abandoned this approach to focus on building literacy strengths in reading. Some participants also felt that the need to raise MCAS scores would cause the system to revert back to the traditional "drill and kill" approach.

Recommendations for the Change Agent Creating Change in Education Systems

This study suggests the following recommendations for change agents to use in planning, promoting, and conducting activities with teachers to implement change effectively within the educational system. Each recommendation is based on the data findings and prior research.

1. Utilize teachers with advanced degrees as trailblazers.
2. Plan training sessions that target and attract specific teacher populations.
3. Show benefits to student learning by conducting hands-on activities utilizing the innovation.
4. Enlist all levels of administrative support and plan high-quality training sessions.
5. Conduct classroom management training sessions utilizing the innovation.
6. Conduct routine, ongoing collaboration and feedback sessions.
7. Continue to provide new ideas and classroom support after implementation.
8. Provide materials necessary for implementation and utilization of the innovation.
9. Build commitment to change based on the management research of Blanchard (1986) and Deming (1986).
10. Enhance the systems communication, collaboration, and problem-solving skills.
11. Pay attention to career stages and offer training incentives.
12. Promote adoption choice and demonstrate that the outcome benefit outweighs the investment cost.

Utilize Teachers with Advanced Degrees as Trailblazers

Initially contact and utilize teachers with advance degrees as trailblazers to promote the desired change. Teachers with Master's degrees participated in more training initially, as well as throughout the entire study. Therefore, based on the data from this study and prior research findings, the change agent would benefit from contacting and utilizing these teachers first. Schlechty (1993, Fall) referred to the teachers who show an early interest in innovations and change as trailblazers because these teachers are motivated by novelty, have a clear vision, continuously engage in professional development to look for somewhere different to go, and believe in what they do. Therefore, bring teachers known for continuously engaging in professional development activities on board early in the change process to pilot the innovation, share ideas, inspire, and motivate other teachers.

Plan Training Sessions that Target and Attract Specific Teacher Populations

The results of this study revealed that teachers who participated in less training utilized the approach less. Based on this utilization data, and the qualitative data that indicated that teachers desired specific subject and grade level training, the change agent should plan training sessions that target and attract specific teacher populations. The utilization data in this study indicated that the change agent working with this urban school system should plan additional PALMS training sessions that target teachers who teach at the junior high and high school levels, as well as teachers with one to 20 years of teaching.

Show Student Learning Benefits: Conduct Hands-on Activities Utilizing the Innovation

Change agents should show teachers the value and learning benefits of utilizing the innovation with their students. This can be accomplished by modeling the innovation in the teachers' classrooms with the assistance of the trained trailblazers. Change agents should also utilize trailblazers to coordinate school events where teachers and students are actively involved in utilizing the innovation as a strategy to spark the participating teachers' initial interest in the innovation. This study found that conducting hands-on activities that involved both the teacher and students as active participants gave the teachers time to explore the learning possibilities of the innovation in a non-threatening environment. It also provided teachers with an opportunity to evaluate how the innovation fit with their philosophy of education.

This study found that an active, hands-on, all-day, school-wide event training teachers, students, and parents in the PALMS approach provided the "magical moment," the catalyst, the difference that made the difference in an urban Southeastern Massachusetts school. This event transformed the teachers who were not interested in the PALMS approach into eager interested learners. It overcame 9 months of resistance when the teachers saw firsthand, with their own students, that the approach was an effective teaching tool. The hands-on activities conducted by trained trailblazers demonstrated that the approach highly motivated students and kept the students' attention focused on the task at hand by utilizing higher level critical thinking skills and problem-solving strategies.

Once these training activities and the trailblazers show the teachers that the innovation is worthwhile, they will support the initiative and willingly volunteer for formal training sessions.

Based on the data, this researcher recommends that teachers who utilize the approach because it is good for students should be the second group that the change agent targets to bring on board during change initiatives. They reflect the pioneers that Schlechty (1993, Fall) described as the teachers who are willing to take the risk if they are assured that the journey is worthwhile. Conducting hands-on activities with the innovation where the teachers and their students are both participants will give these teachers the assurance they need.

Enlist All Levels of Administrative Support and Plan High Quality Training

This study, like Fullan's research (1982), found that the approach being mandated by both the state and the system was not enough for successful implementation. The utilization data clearly revealed that the deciding factor on whether or not the approach or innovation was actually utilized depended on each individual classroom teacher's perception of the approach. The utilization data also revealed that when teachers felt they were being forced to implement the innovation, they rated the effectiveness of the approach and student learning enjoyment when the approach was utilized lower.

However, the qualitative data showed that when teachers felt that the administration was not supporting the innovation or had switched emphasis to a different curriculum area, like reading literacy, utilization of the innovation declined. This finding suggests that a critical balance is necessary. It also indicates that administrators and teachers both need training in the reform measures. This research recommends that the change agent provide training sessions to show teachers how the PALMS approach can be utilized to enhance reading literacy, as well as the other approaches that teachers feel the administration is supporting utilizing now. It is important for teachers to understand the link between PALMS, reading literacy, and other approaches so that they continue using PALMS, as well as the new approaches and strategies.

Therefore, based on the data, this researcher suggests that administrators show their support and interest in the innovation but not force staff members to implement the innovation. Administrators can accomplish this by making sure that multiple opportunities are available that provide staff members with time to investigate the innovation, see how it fits with their own educational philosophy, and find out, for themselves, if the approach would be good for their students. The teachers need time to explore the innovation within a non-threatening environment in order to determine if the student learning benefits are worth the teachers' investment costs.

Administrators can show their support by notifying staff members when and where training sessions are being offered and show that they are interested enough in the innovation to attend the training sessions. Administrators can invite trained piloting teachers within the system, the trailblazers, who have already utilized the approach and found it effective, to model hands-on activities for school staff and students through school-wide events or classroom demonstrations. Administrators can also provide the opportunity and time for the teachers to visit the classrooms of colleagues who are successfully utilizing this approach.

Administrators, by making materials available within the school, give teachers a chance to explore utilizing the innovation on their own, at their leisure. This will promote and support additional teacher interest in the innovation. Administrators can provide teachers with the opportunity and time to establish peer coaching and Cognitive Coaching (Costa & Garmston, 1994) sessions around utilization of the innovation to enhance teacher comfort in utilizing the innovation. Administrators, by providing multiple professional development opportunities for teachers to learn about the innovation, leave the final decision to implement the innovation up to the teachers' individual perception of the innovation's worth.

The change agent needs to be aware that the data from this study affirmed that the teacher is the key to successful change. It is the teacher who will or will not implement the desired change. Therefore, based on the data results, this researcher recommends that the change agent carefully plan high quality training that makes it worth the teacher's time to attend the training sessions. This study, like Fullan's (1990) research, found that staff development and implementation go hand in hand. Fullan (1990) stated that "successful change involves learning how to do something new. As such, the process of implementation is essentially a learning process. Thus, when it is linked to specific innovations, staff development and implementation go hand and hand" (p. 4).

Conduct Classroom Management Training Sessions Utilizing the Innovation

The qualitative data also suggest that if the change agent wants teachers to invest the time and effort that is required to implement the innovation, the training should show teachers that the innovation is worthwhile at their grade level, with their class size and their particular type of classroom. The quantitative data indicated that teachers at all grade levels, in all types of classrooms, having both large and small populations of students, utilized the approach and stated

that the approach was enjoyed by their students as well as being an effective teaching and learning approach. Yet, the qualitative data disclosed concerns and non-utilization based on class type and size. This research suggests that the change agent provide teachers with training sessions that stress classroom management strategies for utilizing the innovation at the various grade levels, with various class sizes and different types of classrooms.

Conduct Routine Ongoing Collaboration and Feedback Sessions

Based on the data results, this researcher recommends that the change agent provide routine, ongoing training both during and after innovation implementation. This will keep communication lines between the teachers and the system open, and promote continuous teacher collaboration which allows information sharing and provides teacher feedback within a problem-solving, school-improvement, structural context. The qualitative data results revealed that when the Lead Teachers and PALMS Specialists discontinued modeling lessons, and when PALMS training sessions became less frequent, teachers believed that the system was no longer supporting utilization of this approach and was stressing reading literacy instead. The recommendation of routine, ongoing training sessions is made in order to avoid this type of misconception.

This approach validates the teachers' professionalism and allows the teachers an active voice in the change process. This approach also improves the change process by providing formative evaluative feedback regarding the effectiveness of the innovation within different classroom settings and student populations at different educational levels within individual schools and the school system. This collaborative training technique involving routine, ongoing support and feedback is supported in the learning organization research of Senge (1990) and the utilization-focused evaluation work of Patton (1997). Senge (1990) and Patton (1997) found that this approach enhances risk taking and fosters an openness and receptivity toward change developed through a gradual, ongoing process of continuous change.

This technique establishes a cultural climate that supports change within the school system. This cultural climate accepts change as a natural growth process that develops improvement strategies as part of the normal routine learning operation of the system. Fullan (1990) also suggested transforming the culture of the organization by refocusing staff development so that it becomes part of the overall change process. Fullan (1990) suggested that staff development

should be continuous and include a variety of formal training workshops as well as informal teacher exchange sessions.

This recommendation to provide ongoing collaboration, feedback, and problem-solving training sessions agrees with Stalling's (1989) staff development model for promoting teacher change. Stallings' (1989) model included: (a) learn by doing—try, evaluate, and try again; (b) linking prior knowledge to the new innovation; (c) learn by reflection and problem-solving; and d) learn in a supportive environment where teachers can share both problems and success situations.

Continue to Provide New Ideas and Classroom Support After Implementation

The results support Evans' (1993, September) findings that change is a generative process that is personal, and is accomplished by the people within an organizational system. Evans (1993, September) explained that during the change process, the very culture of the workplace changes, causing a sense of loss in the individuals involved in the change because it discredits the assumptions by which the people live and make sense of their world.

This researcher recommends, based on the study findings, that the change agent provide the teachers with new ideas and classroom support during ongoing lesson modeling and active participation training sessions. The sense of loss was demonstrated in the study findings by the fact that the participants' teaching comfort zone had been interrupted because their "tried and true" teaching methods and instructional units were altered with the implementation of this hands-on, inquiry-based, cooperative learning problem-solving approach. This factor was supported by the fact that teachers were requesting additional training sessions in management strategies and curriculum ideas to fill this gap and support their transition into a new level of professional comfort utilizing the innovation.

The qualitative data found that teachers desired both additional concept and content ideas, not only to implement the innovation in their classroom, but to also continue to utilize the approach in their classroom. The qualitative data indicated that teachers wanted specific grade level training sessions that provided ideas and support on how to correlate the approach with the state-mandated curriculum frameworks. The data also revealed that teachers wanted thematic unit ideas and suggestions for incorporating the approach in different subject areas.

The data found that teachers requested behavior management strategies and organization help utilizing the approach with large classes and diversified student populations. Both the qualitative and quantitative data revealed that the teacher participants listed ongoing support as having a high influence on affecting their decision to utilize the innovation, as well as to insure continued utilization. Based on the fact that this study was conducted 6 years after initial implementation of the PALMS approach, the study findings suggest that change agents continue to provide new ideas and classroom support after the innovation has been implemented.

Provide Materials Necessary for Implementation and Utilization of the Innovation

The data strongly suggest the importance of the change agent listening to the teacher's feedback needs during the ongoing training sessions in order to supply the necessary resources and materials that the teachers stated were necessary for them to utilize the innovation in their classrooms. Not all teachers were willing to take the time or pay the expense to provide the materials on their own to utilize an innovation mandated by a system when the resources and materials were not provided. This researcher suggests, based on the data and change literature, that it is the responsibility of an effective change agent to see that the system has the needed resources in place in order for the change process to succeed (Fullan & Stiegebauer, 1991; Fullan & Miles, 1992, June).

Blanchard's and Deming's Management Research Builds Commitment to Change

The data revealed that the teachers' initial interest was sparked through the recommendations of others. However, teacher adoption and utilization were influenced by the teachers' perception of the effectiveness of the innovation on student learning. This finding affirms Evans' (1993, September) research that teachers need reassurance that what they replaced their past "tried and true" teaching and learning methods with does, in fact, work effectively with their students. This finding further supports Evans' (1993, September) recommendation that the change agent be motivational and "build a commitment to the innovation among those who must implement it" (p. 20).

Blanchard and Johnson (1986), Blanchard and Lober (1984), and Blanchard et al. (1996) captured the essence of the change agent's role when they explained that managers need to manage both people and results to be effective, and neither should be at the expense of either

one. Based on the findings from this study and prior research, this researcher suggests and recommends that the change agent utilize and provide training sessions based on the "One Minute Manager" and empowerment research of Blanchard and Johnson (1986), Blanchard and Lober (1984), and Blanchard et al. (1996). Their management research suggests how the change agent and the teachers can work together to develop effective strategies to create educational change within school systems. Their research stressed the importance of sharing information, utilizing feedback, and enhancing job performance and learning by investing in people through training, developing job skills, modeling quality performance and effective work habits, plus learning problem-solving techniques and recording data strategies.

This researcher further recommends that the change agent conduct training sessions explaining Deming's *14 Total Quality Control Management and Leadership Principles* for both administrators and teachers. Like Deming's Total Quality Management (Deming Institute, 1966, 1994; Deming, 1986), Blanchard taught employees how to evaluate their work in terms of quantity and quality. Once this was done, the manager, or in this case, the change agent, looked to see what the employee (teachers) had done right and supported their efforts.

Enhance the Systems Communication, Collaboration, and Problem-Solving Skills

The work of Covey (1990), Patton (1997), Putnam (1994), Schön (1987), and Argyris (1993, 1993, Winter) also promoted effective communication strategies to help the change agent and teachers work together as a team to create ways to promote educational change within the education system. This researcher recommends offering communication and teamwork problem-solving strategy training sessions for teachers and administrators based on this research. Their strategies will help the change agent to further develop communication strategies for working with the teachers who are the human resource needed to promote effective change within the educational system. Effective teamwork and communication skills will foster ways the change agent can work together with the teachers, and teachers can work with each other to improve and enhance the factors that the teacher participants in this study indicated influenced their initial interest, adoption, utilization, and non-utilization of the innovation. This recommendation is based on the research work of Fullan (1990) that explains that school systems utilize staff development: (a) to facilitate implementation, (b) as an innovation in itself, and (c) as a means of

institutional development. However, in order to sustain change, Fullan (1990) found that the school systems must look at and utilize staff development in terms of institutional development.

Pay Attention to Career Stages and Offer Training Incentives

This study, like studies done by Evans (1989, May), found that teachers have multiple and diverse needs at different career stages, which the change agent must take into consideration when planning training sessions. For instance, this study found that colleagues had more influence over the utilization decisions of new teachers who were learning to apply theory than they did over veteran teachers. The study also found that the desire for ongoing support was expressed by teachers with fewer teaching years more than by veteran teachers.

Another finding of this study was that the building administrator had more influence over the decision process of teachers to implement the approach in the lower grades. However, the most crucial study finding affecting training was that whenever teachers felt they were being forced to utilize the approach by the state, the system, or administrators, the teachers ranked the effectiveness of the training, the approach, and the student enjoyment of the approach lower.

This researcher recommends that the change agent offer a training incentive. This recommendation is based on the wide range of teacher training needs and interests, and the prior research work of Larson (1992) that found that using rewards to induce change fit with the concept of creating self-renewing schools. This incentive should reward voluntary teacher participation with some type of free classroom material or pay the teacher for attending the training session. The incentive must be perceived as worthwhile to the teacher participants if it is going to attract teachers from all career stages to volunteer for the additional training sessions.

This incentive should be utilized to eventually attract the interest of all teachers in the innovation. However, it is a good idea to start the training initiative with the MS/MA teachers who enjoy participating in training sessions. By training these highly interested teachers first, the change agent creates a group of pilot teachers who are willing to try out the innovation. Then this trained group of teachers, who have experience in utilizing the innovation, can be utilized as trailblazers during future training incentives to engage the interest of their colleges. This recommendation is grounded in the research indicating that an original reason for the teachers' initial interest in PALMS stemmed from being offered free materials or being paid for attending

PALMS training sessions. Following this recommendation will provide the change agent with a group of interested trailblazers that will spread the word about the student learning benefits attained from utilizing this approach, as well as the free materials or payment they received for participation in the training.

Promote Adoption Choice: Demonstrate that the Outcome Benefit Outweighs the Investment Cost

Based on the data from this study and past research, this researcher recommends that the change agent provide active, hands-on training sessions that demonstrate the benefits to students from utilizing the approach without enforcing direct supervision methods designed to force teacher utilization of the approach (Guskey, 1986). Rogers (1983) discussed the importance of the individual or group participating in activities that promote a choice to adopt or reject the innovation. The research of Fullan and Stiegebauer (1991) found that for implementation to be successful, the utilization benefits must outweigh the teacher's personal commitment cost. Therefore, based on the data and prior research, this researcher recommends that the change agent avoid pressure and forced utilization strategies. This study suggests promoting adoption choice by demonstrating through active, hands-on utilization with teachers and their students that the benefits of the approach are worth the investment cost placed on the teacher's time and energy to change their teaching practices and adopt the innovation.

Research Limitations

The significance of this study lies in its value for change agents working in school systems to plan, create and provide effective quality training that meets the implementation needs of teachers. The results of this study were based on one urban school system. Therefore future research studies need to investigate to see if the same results are obtained in other urban school districts as well as suburban school districts.

Conclusion

The data collected in cycle three suggested that: (a) active training and events significantly influenced teacher utilization of PALMS; (b) the educational benefit for students made the extra work involved in teachers utilizing this approach worth their time and effort; (c) utilizing the

PALMS approach gave teachers time to observe and help students with their individual learning needs in order to maximize the students' learning potential.

The findings of this action research study confirmed: (a) Fullan and Stiegebauer's (1991) findings that a positive balance must exist between need, clarity, the personal commitment cost and the achievable outcome benefits before teachers will utilize an innovation or adopt the change; (b) that a positive relationship exists between training, successful innovation implementation and continued utilization (Fullan, Bennett, & Rolheiser-Bennett, 1990, May); (c) that high quality training motivated the teachers to be interested in the approach and developed the teachers' understanding and performance competence in utilizing the approach (Fullan et al., 1990, May; Newmann, 1993). Thus, training provided the linking relationship between the process of change (the how) and the content of change (the what) necessary for implementation or change to occur (Fullan & Stiegebauer, 1991).

References

Argyris, C., & Schon, A. (1978). Organizational learning: A theory of action perspective. Reading, MA: Addision Whesley.

Blanchard, K., & Johnson, S. (1986). *The one minute manager: The quickest way to increase your own prosperity* [Cassette Recording]. Canada: Random House Audio.

Blanchard, K., & Lober, R. (1984). *Putting the one minute manager to work: How to turn three secrets into skills.* New York: Berkeley Books.

Blanchard, K. C., John, P., & Randolph, A. (1996). *Empowerment takes more than a minute.* San Francisco: Berret-Koehler.

Bloom, B. S. (Ed.). (1956). *Taxonomy of educational objectives: The classification of educational goals, handbook 1: Cognitive domain.* New York: David McKay.

Brooks, J. G., & Brooks, M. G. (1993). In search of understanding: The case for constructivist classroom. In R. S. Brandt, N. Modrak, G. R. Miller, & J. Beun (Eds.). Alexandria, VA: Association for Supervision and Curriculum Development.

Brooks, J. G., & Brooks, M. G. (1999). *In search of understanding: The case for constructivist classrooms.* Alexandria, VA: ASCD.

Caine, R., & Caine, G. (1990, October). Understanding a brain-based approach to learning and teaching. *Educational Leadership.*

Caine, R., & Caine, G. (1994). *Making connections: Teaching and the human brain.* Menlo Park: Innovative Learning Publications.

Caine, R. N., & Caine, G. (1991). *Teaching and the human brain.* Alexandria, VA: ASCD.

Calhoun, E. F. (1994). How to use action research in self-renewing school. Alexandria, VA: Association for School Supervision And Curriculum Development.

Carbo, M., Dunn, R., & Dunn, K. (1986). Teaching students to read through their individual learning styles. Reston, VA: Reston Division of Prentice-Hall.

Costa, A., & Garmston, R. (1994). *Cognitive coaching: A foundation for renaissance schools.* Norwood, MA: Christopher-Gordon.

Covey, S. R. (1989). *The 7 habits of highly effective people: Powerful lessons in personal change.* New York: Fireside Book.

Covey, S. R. (1990). *Principle - centered leadership audio learning system* [Cassette Recording]. Provo: Covey Leadership Center.

Deming Institute. (1966). *The Deming system of profound knowledge*. [0n-line]. Evolving Systems, Inc. Available: www. Staff@deming.org

Deming Institute. (1994). *The new economics for industry, government, education* (2nd ed.). Cambridge: MIT Center for Advanced Educational Services.

Deming, W. E. (1986). *Out of the crisis*. Cambridge: Massachusetts Institute of Technology, Center for Advanced Educational Services.

Dunn, R., & Dunn, K. (1978). *Teaching students through their individual learning styles: A practical approach*. Reston, VA: Reston Publishing.

Engel, G., & Arthur, J. (1994). *The neuro-linguistic programming personal profile: Visual, auditory, kinesthetic assessment*: NLP: Neuro-linguistic Programming Personal Profile.

Evans, R. (1989, May). The faculty in mid-career: Implications for school improvement. *Educational Leadership*, 10-15.

Evans, R. (1993, September). The human face of reform. *Educational leadership*, 19-23.

Fogarty, R. (1991). *The mindful school: How to integrate the curricula*. Palatine: IRI/Skylight Training & Publishing, Inc.

French, D., Dunn, T., & Nellhaus, J. (1990, February). *Structuring schools for student success... Systemic school change: A comprehensive approach to raising achievement and keeping students in school*. Malden, MA: Massachusetts Department of Education.

Fullan, M. (1993). *Change forces: Probing the depths of educational reform*. New York: The Falmer Press.

Fullan, M. (1994, September). Coordinating top-down and bottom-up strategies for educational reform. *System Reform: Perspectives on personalizing education.*

Fullan, M., & Hargreaves, A. (Eds.). (1992). *Teacher development and educational change*. Washington, DC: The Falmer Press.

Fullan, M., & Stiegebauer, S. (1991). *The new meaning of educational change*. (2nd ed.). New York: Teachers College Press, Columbia University.

Fullan, M. G. (1982). *The meaning of educational change*. New York: Teachers College Press, Columbia University.

Fullan, M. G. (1990). Staff development, innovation, and institutional development. In B. Joyce (Ed.), *Changing School Culture through staff development*. Alexandria, VA: ASCD.

Fullan, M. G., Bennett, B., & Rolheiser-Bennett, C. (1990, May). Linking classroom and school improvement. *Educational Leadership, 47*(8), 13-19.

Fullan, M. G., & Miles, M. B. (1992, June). Getting reform right: What works and what doesn't. *PHI DELTA KAPPAN, 73*(10), 744-752.

Gardner, H. (1993). *Multiple intelligences: The theory in practice*. New York: Basic Books.

Grassi, J. (1993). The ALPS method: Accelerated learning and teaching. Training Manual. Cambridge: Cambridge College.

Guskey, T. R. (1986). Staff development and the process of teacher change. *Educational Researcher, 15*(5), 5-12.

Hall, G. E., & Hord, S. M. (1987). *Change in schools: Facilitating the process*. Albany, NY: State University of New York Press.

Hord, S., Rutherford, W., Huling-Austin, L., & Hall, G. (1987). *Taking charge of change*. Alexandria, VA: ASCD.

Jacobs, H. H. (1997). *Mapping the big picture: Integrating curriculum and assessment K-12*. Alexandria, VA: ASCD.

Jensen, E. (1995). *Brain-based learning and teaching*. Del Mar, CA: Turning Point Publishing.

Johnson, D. W., Johnson, R. T., & Holubec, E. J. (1991). *Cooperation in the classroom*. Edina: Internation Book.

Kagan, S. (1992). *Cooperative learning*. San Juan Capistrano: Resources for Teachers.

Larson, R. (1992). *Changing schools from the inside out*. Lancaster, PA: Technomic.

Lewin, K. (1951). *Field theory in social science*. New York: Harper & Row.

Marsono, R. (1992). *Dimensions of learning: Introduction* [Video Tape]. Alexandria, VA: ASCD.

Mc Carthy, B. (1980). *The 4MAT system*. Arlington Heights, IL: Excel.

Mc Carthy, B. (1990). Using the 4MAT system to bring learning styles to schools. *Educational Leadership*, 48(2), 31-37.

Newmann, F. M. (1993) Beyond common sense in educational restructing: The issues of content and linkage. *Educational Researcher*, 22(2), 4-13.

PALMS. (1995, October). *Thinking beyond tomorrow... Hands-on, minds-on problem-solving in today's PALMS classroom: Partnerships advancing the learning of mathematics and science* (Brochure). Malden, MA: Massachusetts Department of Education.

Patton, M. Q. (1997). *Utilization-focused evaluation: The new century text* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Putnam, R. (1994). *Overcoming cultural barriers to organizational learning. Systems Thinking Conference* [Cassette Recording]. Cambridge, MA: Pegasus Communications.

Rogers, E. M. (1983). *Diffusion of innovations*. New York: Free Press.

Rose, C. (1985). *Accelerated learning*. New York: A Dell Trade Paperback.

Schein, E. H. (1993, Autumn). On dialogue, culture, and organizational learning. *Organizational Dynamics*, 40-51.

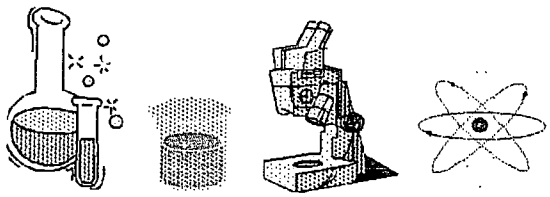
Schlechty, P. (1993, Fall). On the frontier of school reform with trailblazers, pioneers and settlers. *Journal of Staff Development*, 46-51.

Schon, D. A. (1987). *The reflective practitioner: How professionals think in action*. New York: Basic Books.

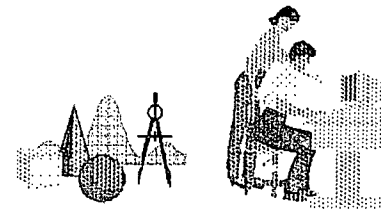
Senge, P. (1990). *The fifth discipline: The art and practice of the learning organization*. New York: Doubleday Currency.

Stallings, J. A. (1989). *School achievement effects and staff development*. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.

Appendix A: Cycle One Instruments



Wider Opportunity Extravaganza in Math and Science May 10, 1994



Evaluation

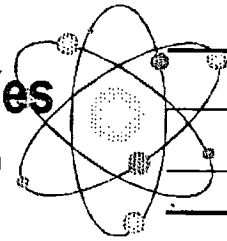
Please take a few minutes to answer the following questions:

1. Did you and your child enjoy today's activities? Yes 67 No 0 No Response (4)
2. What was your favorite activity?

_____

_____

3. Would you come to another day of activities like today's session? Yes 68 No 0 No Response (3)
4. Will you be able to use any of the ideas you saw today at home with your child? Yes 58 No 1 No Response (12)
5. How else could we help you and your child enjoy learning Math and Science?



_____

_____

_____

_____

6. Did you get a better understanding of the new hands-on inquiry approach for teaching Math and Science? Yes 60 No 0 No Response (11)
7. Feel free to write any other comments or suggestions:

_____

_____

_____

Thank you for attending our festivities today.

Appendix B: Cycle Two Instruments

June 1996

INITIAL RESEARCH SURVEY

School System_____ **School**_____**Grade**_____**Name**_____
(Your Name is Optional)

1. What does PALMS stand for?

2. Are you familiar with the PALMS Educational Philosophy? Yes____ No_____
Do you use this approach in your classroom? Yes_____ No_____If yes: for what subjects and what % of the time? Place an **X** in the % box for each subject you use this approach with.

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____, weekly _____, or monthly _____?

If yes: briefly describe what this approach involves.

3. Are you familiar with cooperative learning? Yes _____ No_____
Do you use this approach in your classroom? Yes _____ No_____If yes: for what subjects and what % of the time? Place an **X** in the % box for each subject you use this approach with.

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____, weekly _____, or monthly _____?

If yes: briefly describe what this approach involves.

4. Are you familiar with the constructivist approach? Yes _____ No_____
Do you use this approach in your classroom? Yes _____ No_____If yes: for what subjects and what % of the time? Place an **X** in the % box for each subject you use this approach with.

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____,
weekly _____,
or monthly _____?

If yes: briefly describe what this approach involves.

5. Are you familiar with inquiry based learning? Yes_____ No_____
Do you use this approach in your classroom? Yes _____ No_____If yes: for what subjects and what % of the time? Place an **X** in the % box for each subject you use this approach with.

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____,
weekly _____,
or monthly _____?

If yes: briefly describe what this approach involves.

6. Are you familiar with a hands - on learning approach? Yes _____ No_____
Do you use this approach in your classroom? Yes _____ No_____If yes: for what subjects and what % of the time? Place an **X** in the % box for each subject you use this approach with.

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____,
weekly _____,
or monthly _____?

If yes: briefly describe what this approach involves.

7. Are you familiar with Thematic Units? Yes_____ No_____
Do you use this approach in your classroom? Yes _____ No_____If yes: for what subjects and what % of the time? Place an **X** in the % box for each subject you use this approach with.

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____,
weekly _____,
or monthly_____?

If yes: briefly describe what this approach involves.

8. Are you familiar with an Integrated Across the Curriculum Approach? Yes_____ No_____
Do you use this approach in your classroom? Yes _____ No_____If yes: for what subjects and what % of the time? Place an **X** in the % box for each subject you use this approach with.

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____,
weekly _____,
monthly _____?

If yes: briefly describe what this approach involves.

9. Do you utilize a combination of the above educational approaches in your classroom? Yes___ No___
If yes: please check which ones.
PALMS ____ Cooperative learning ____ Constructivism ____ Inquiry Based learning ____
Hands - on learning _____ Thematic Units _____ Integrated Across the Curriculum Approach ____
Please explain how you use them, in what subject areas and what % of the time?

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____,
weekly _____,
or monthly _____?

Explain:

10. I would like to attend a workshop to learn more about the following approach /approaches?
PALMS ___ Cooperative learning Constructivim _____ Inquiry based learning ____
Hands - on learning _____ Thematic Units ____ Integrated Across the Curriculum Approach ____
Multiple Intelligences_____ Whole Brain Approach to Learning_____ Accelerated Learning_____

11. I would like to attend the following specific topic workshops to get more ideas on how to use and implement the above approaches in my classroom.
Acids & Bases ____ Artifacts _____Bubbles_____ Classroom Gardening ____ Changing States of Matter____ Crystals ____ Earthworms ____ Electricity ____ Estimating ___ Magnets___ Nature Journals ___ Oobleck_____ Rockets____ Structures_____Water ____

Please check the best day & time for workshops: 3:30 - 5:30 P.M. M __ T __ W __Th__ F__ 9 - 12 S__

Please send workshop information to:

Name_____ **Teaching Grade**_____

School_____**Address**_____**Phone**_____

Home_____**Address**_____**Phone**_____

**** If you wish to keep survey questions 1 - 9 confidential cut and remove this last section and place it in a separate pile. ****

Thank you for taking the time to fill out this survey.

June L. Fuller
PALMS Specialist
E-mail: jfuller @massed.net

Workshop Participant Evaluation Form

Date 10/15/96 Workshop Title Integrated Across The Curriculum Approach

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	2	3		
2. Please rate the overall quality of the workshop presentation.	3	2		
3. The presentation held my interest.	3	2		
4. The presentation addressed my needs.	3	2		
5. The presentation of material was :	4	1		
6. The hands-on experience provided was :	4	1		
7. Knowledge / skills gained was:	2	3		
8. Balance of lecture / hands-on was:	4	1		
9. Usefulness / applicability for use in my classroom was:	3	2		

Something New I Learned Today:

- Classifying
- KLW charting (What children know about topic already.)
- Ideas for categorizing with science, and working with themes.
- How to set up a thematic unit. Use music to set up themes.
- I learned more about spiders and insects and how to bring them into the classroom on a knowledgeable basis.

Something I Can Use Immediately in My Classroom:

- I loved the art activity with the insects and bugs. I will use it in my class, maybe at a Center on Insects since it is not part of my curriculum.
- Classifying insects (using hoops).
- Art project with painting (prints).
- Leaf rubbings, hands on approach.

Something I Would Like to Learn More About:

- **How to incorporate music into my curriculum. Excellent ideas for my class.**
- **Using music to accelerate learning.**
- **Specifics and or Research on Spiders.**

Workshop Participant Evaluation Form

Date: 10/8/96 Workshop Title: Cooperative Learning

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	3	1		
2. Please rate the overall quality of the workshop presentation.	3	1		
3. The presentation held my interest.	1	2		
4. The presentation addressed my needs.	1	3		
5. The presentation of material was :	3	1		
6. The hands-on experience provided was :	2	2		
7. Knowledge / skills gained was:	3	1		
8. Balance of lecture / hands-on was:	3	1		
9. Usefulness / applicability for use in my classroom was:	4			

Something New I Learned Today:

- Brain gym, I love the talking chips. It is an excellent idea to control talkers and to get others to talk.
- How important it is to how children work together in groups toward a group goal, reinforcing positive attitude and systems.
- Naming Team, Making Cheer, Doing Handshake. Group Cooperative Learning. Working together.
- Brain Gym.

Something I Can Use Immediately in My Classroom:

- Brain gym, my poster that I made in class. Talking chips.
- Cooperative Learning poster, tokens, etc. to reinforce what is expected, T Chart use.
- Brain gym activities. Visualizing.
- My poster.

Something I Would Like to Learn More About:

- **Brain gym.**
- **Pulling knowledge learned together.**
- **Some of strategies we talked about today.**

1996 -1997 DATA TOTALS OF PALMS WEEKLY WORKSHOP SERIES

Workshop Participant Evaluation Form

Date: 10/1/96 Workshop Title: PALMS Philosophy: Hands - on Minds on Learning

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	7	1		
2. Please rate the overall quality of the workshop presentation.	7	1		
3. The presentation held my interest.	4	3		
4. The presentation addressed my needs.	5	2	1	
5. The presentation of material was :	7	1		
6. The hands-on experience provided was :	7	1		
7. Knowledge / skills gained was:	4	4		
8. Balance of lecture / hands-on was:	5	3		
9. Usefulness / applicability for use in my classroom was:	4	2	1	

Something New I Learned Today:

- What PALMS stands for. (2 responses)
- Ideas for working in classroom groups. What Palms is.
- PALMS Philosophy.
- Guessing game with treats.
- How to make ice cream.
- The importance of letting children work hands-on to learn rather than strictly from rote. Present interesting topics and guide them to work on their own. Expect students to succeed and they will. Set high expectations for them.
- I Learned why this approach works well. The hands-on activity, making ice cream, was interesting. I learned to record the experiment results, timing, materials etc. I learned why salt is put on icy roads - never thought of it!

Something I Can Use Immediately in My Classroom:

- Thematic Units
- Project on ice cream is really cute. My kids will enjoy it.
- A better integration of poetry with various activities.
- Most things - Feelings.
- "Today I Feel..."& other charting activities.
- More fun filled activities to incorporate math, science, reading as we did in making ice cream.
- I learned to lecture less and to try to draw out what the student is learning by directed questions.

Something I Would Like to Learn More About:

- Block Scheduling.
- Sign-up - more workshops.
- Classroom Centers. Being more organized.

Workshop Participant Evaluation Form

Date 10/22/96 Workshop Title Constructivism

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	1	2		
2. Please rate the overall quality of the workshop presentation.	1	2		
3. The presentation held my interest.	1		2	
4. The presentation addressed my needs.	1	2		
5. The presentation of material was :	1	1		
6. The hands-on experience provided was :	2	1		
7. Knowledge / skills gained was:	1	2		
8. Balance of lecture / hands-on was:	1	1	1	
9. Usefulness / applicability for use in my classroom was:	1	2		

Something New I Learned Today:

- I have a better understanding of constructivism. I only had a vague idea of what it was. Also, I learned a new technique to introduce a unit on H_2O in my class.
- Experiments - How to get questions answered through Constructivism learning.
- Constructivist learning.

Something I Can Use Immediately in My Classroom:

- Water mini-cycle. I will put it in my class and have the students keep a journal in it.
- The experiments we did in the workshops.
- Experiment on how a cloud is formed.

Something I Would Like to Learn More About:

- **Water cycles. I think I need more background information in Science.**
- **How to bring this type of learning into a classroom of today.**
- **How to set up a constructivist classroom.**

Workshop Participant Evaluation Form

Date 11/5/96 Workshop Title Inquiry Based Learning

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	5	2		
2. Please rate the overall quality of the workshop presentation.	7			
3. The presentation held my interest.	6	1		
4. The presentation addressed my needs.	4	3		
5. The presentation of material was :	4	3		
6. The hands-on experience provided was :	6		1	
7. Knowledge / skills gained was:	4	3		
8. Balance of lecture / hands-on was:	4	3		
9. Usefulness / applicability for use in my classroom was:	4	2	1	

Something New I Learned Today:

- Difference between guppies and goldfish. Difference between inquiry-based learning and constructivism. Glad June put it in easy to understand terms.
- I learned that there are many different things that affect learning in the classroom that are around the room (all around you.) Exposure - without actually directing teaching and guiding questioning.
- Difference in method of giving birth of goldfish and guppies. The differences and similarities of constructivism and inquiry-based learning.
- The importance of inquiry-based teaching and learning, use of Topic Web in learning, positive approach in all areas, integrating all subjects, how to stimulate students and keep their interest.
- How to use the inquiry-based technique. Teachers can get a library card to enable them to take out many books on a topic.
- What inquiry-based learning was.

Something I Can Use Immediately in My Classroom:

- Poems sung to tunes- values.
- I liked the method of using music with lessons. I also liked the books that were displayed. I know that they are great for children.
- Contemplating something about nature.
- Observations of nature.
- Topic Web, having children use observations in nature to help them learn.
- Using positive comments to enhance learning. Using music(classical) more often as they work.
- Worksheets given.

Something I Would Like to Learn More About:

- **Brain gym. (Yes, I can't wait!!)**
- **Indoor/Outdoor planting. Organic planting.**
- **Materials and visual aids.**
- **More Materials and reference for these topics.**
- **Using plants, seeds, etc. as a topic for a unit.**
- **More ideas of IBL and KWL charts.**

Workshop Participant Evaluation Form

Date 11/12/96 Workshop Title Structures

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	2	2		
2. Please rate the overall quality of the workshop presentation.	4			
3. The presentation held my interest.	2	2		
4. The presentation addressed my needs.	2	2		
5. The presentation of material was :	3	1		
6. The hands-on experience provided was :	3	1		
7. Knowledge / skills gained was:		4		
8. Balance of lecture / hands-on was:	1	3		
9. Usefulness / applicability for use in my classroom was:		2	2	

Something New I Learned Today:

- I learned about the different ways to build things, how to balance them and support the structures.
- The Brain Gym usefulness for the children.
- More Brain Gym activities.
- Structure building. Geometric figure building.

Something I Can Use Immediately in My Classroom:

- The Brain gym activities. In the future, I would like to try one structure activity perhaps tied into the literature part of the curriculum.
- Brain Gym Activities to see integration for the students in the class.
- Read story of the 3 Pigs and have students make their own structures.
- Relaxation techniques. Hands-On building depends upon availability of materials.

Something I Would Like to Learn More About:

- **Brain Gym Activities.**
- **How to organize more effectively.**

Workshop Participant Evaluation Form

Date 11/19/96 Workshop Title Electricity

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	2			
2. Please rate the overall quality of the workshop presentation.	2			
3. The presentation held my interest.	2			
4. The presentation addressed my needs.	2			
5. The presentation of material was :	2			
6. The hands-on experience provided was :	2			
7. Knowledge / skills gained was:	2			
8. Balance of lecture / hands-on was:	2			
9. Usefulness / applicability for use in my classroom was:	2			

Something New I Learned Today:

- Electromagnets (How to make one). Insulators. Conductors.
- Well, just about everything was new to me. I did not have much knowledge of electricity to begin with so almost everything was new.

Something I Can Use Immediately in My Classroom:

- Parallel and Series circuit experiments. Excellent teacher materials.
- I am glad to know that I can get the kit from Katie immediately for my class. I will use this at centers since electricity is not in my modules.

Something I Would Like to Learn More About:

- **Background knowledge of electric**

Workshop Participant Evaluation Form

Date 1/7/97 Workshop Title Crystals

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	1			
2. Please rate the overall quality of the workshop presentation.	1			
3. The presentation held my interest.	1			
4. The presentation addressed my needs.	1			
5. The presentation of material was :		1		
6. The hands-on experience provided was :	1			
7. Knowledge / skills gained was:	1			
8. Balance of lecture / hands-on was:		1		
9. Usefulness / applicability for use in my classroom was:		1		

Something New I Learned Today:

- The different types of crystals found in everyday objects. That crystals can be drawn and assembled for the math section of the unit.

Something I Can Use Immediately in My Classroom:

- The rock candy and rock garden experiments can be done easily.

Something I Would Like to Learn More About:

- **I'd like to expand this unit to include gemstones as many students seem to be interested in them.**

Workshop Participant Evaluation Form

Date 1/14/97 Workshop Title Oobleck

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	2	1		
2. Please rate the overall quality of the workshop presentation.	2	1		
3. The presentation held my interest.	2	1		
4. The presentation addressed my needs.	1	2		
5. The presentation of material was :	2	1		
6. The hands-on experience provided was :	3			
7. Knowledge / skills gained was:	2	1		
8. Balance of lecture / hands-on was:	2	1		
9. Usefulness / applicability for use in my classroom was:	1	2		

Something New I Learned Today:

- Consistency and how to make Oobleck versus that of jello and cookie dough.
- I did not know what polymers were. I had a lot of fun playing with the different textures(as I'm sure my class will.)
- That plastics are polymers. The plastic bag experiment was very interesting!

Something I Can Use Immediately in My Classroom:

- The making of Oobleck.
- I can use any of the experiments in my class. Also, I do a lot of creative this is conducive to this.
- I can design a science experiment using polymers.

Something I Would Like to Learn More About:

- **Strictly Science - Polymers**
- **The different kinds of Polymers and the uses.**

Workshop Participant Evaluation Form

Date 1/21/97 Workshop Title Ideas for Estimating, Graphing and Venn Diagrams

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	2	1		
2. Please rate the overall quality of the workshop presentation.	2	1		
3. The presentation held my interest.	2	1		
4. The presentation addressed my needs.	2		1	
5. The presentation of material was :	2	1		
6. The hands-on experience provided was :	2	1		
7. Knowledge / skills gained was:	3			
8. Balance of lecture / hands-on was:	2	1		
9. Usefulness / applicability for use in my classroom was:				

Something New I Learned Today:

- Tons, Lots of different ideas on how to do graphs. I'm currently teaching a unit on graphs and this information is very pertinent and helpful for my unit.
- Graphing (capacity, weight). Venn diagrams. Excellent classroom activities to use for today's topic.
- That lifesavers have a pattern! The same pattern. I also learned that graphing and estimating each day only takes a few minutes.

Something I Can Use Immediately in My Classroom:

- Actually, almost everything, except at a higher level. This was one of the best workshops I have ever been to.
- Most everything.
- Graph keeping ice experiment.

Something I Would Like to Learn More About:

- **Higher level thinking.**
- **Hands on math fact activities (upper grades.)**
- **Graphs and estimating for older students learning math times and division facts.**

Workshop Participant Evaluation Form

Date 2/4/97 Workshop Title Acids and Bases

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	4	1		
2. Please rate the overall quality of the workshop presentation.	5			
3. The presentation held my interest.	5			
4. The presentation addressed my needs.	4		1	
5. The presentation of material was :	5			
6. The hands-on experience provided was :	5			
7. Knowledge / skills gained was:	4	1		
8. Balance of lecture / hands-on was:	4	1		
9. Usefulness / applicability for use in my classroom was:	3	2		

Something New I Learned Today:

- That several ingredients that I predicted as acidic actually alkaline.
- That many things I thought were acids were actually bases and vice versa.
- How one could hold my interest - time wise.
- That acids will turn red and bases blue in reaction to a neutral (red cabbage) base.
- Making (Hands) on bases/acids. Implementation of learning activities. How lemon juice (an acid) and tums(an acid) a base interacts with red cabbage juice.

Something I Can Use Immediately in My Classroom:

- A science lesson on the effects on antacids on common foods.
- I can use this whole experiment in my class.
- The entire concept.
- I can test fruits/vegetables for acidity.
- Red Cabbage Juice experiment using different acids or bases.

Something I Would Like to Learn More About:

- **Testing soil samples for farming.**
- **Compare the ingredients in acids compared to ingredients in bases.**
- **Products according to acid or base that are used in every day living.**
- **More how to test different chemical reactions.**
- **Additional hands on experiments using the activity objective of bases and acids in relation to plants and soil.**

Workshop Participant Evaluation Form

Date 2/25/97 Workshop Title Magnets

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	4	1		
2. Please rate the overall quality of the workshop presentation.	5			
3. The presentation held my interest.	4	1		
4. The presentation addressed my needs.	5			
5. The presentation of material was :	5			
6. The hands-on experience provided was :	5			
7. Knowledge / skills gained was:	5			
8. Balance of lecture / hands-on was:	5			
9. Usefulness / applicability for use in my classroom was:	3	2		

Something New I Learned Today:

- How to make an electromagnet was interesting but I don't think I'll do it with first graders.
- I learned about the different metals that are attracted to magnets. I also learned that paper clips are conductors.
- What magnets are attracted to. I also, learned how to make an electromagnetic field. How many magnets we use in our daily lives.
- That only four metals are attracted to magnets.
- How to make an electromagnet and how to defy gravity. What a lodestone is.

Something I Can Use Immediately in My Classroom:

- Would like to use the iron filings experiments to make class magna doodle with aluminum pie plates.
- I can allow my students to make predictions and discuss the answers on their own.
- I could use all of these experiments in my class. They are applicable to the grade level that I teach.
- North and South pole of a magnet.
- Magnetic attraction experiments. Making your own magnets.

Something I Would Like to Learn More About:

- **I will try other magnet experiments that are in the packets to get more info.**
- **Magnetic fields.**
- **Electromagnetic field.**
- **Atoms.**

Workshop Participant Evaluation Form

Date 3/11/97 Workshop Title Classroom Gardens

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	5			
2. Please rate the overall quality of the workshop presentation.	5			
3. The presentation held my interest.	5			
4. The presentation addressed my needs.	3	2		
5. The presentation of material was :	4	1		
6. The hands-on experience provided was :	5			
7. Knowledge / skills gained was:	5			
8. Balance of lecture / hands-on was:	5			
9. Usefulness / applicability for use in my classroom was:	4	1		

Something New I Learned Today:

- How many seeds are in fruit that we eat everyday; yet fail to notice.
- I learned that certain fruits and veggies had more seeds than I thought.
- Terrarium making. Goldfish Bowl Model. Seed starter.
- Seed content - blew my mind.
- I had no idea that some fruits and vegetables had so many seeds. The estimation part was difficult.

Something I Can Use Immediately in My Classroom:

- I can use the activity with the lima beans and corn. I will show my class all my experiments, which they love to see and always want to do.
- Counting the different seeds - create graphs.
- My class would enjoy the terrarium models. Green house (making a miniature.)
- I would like to try the greenhouse bags with the class. I like the goldfish idea to combine with the terrarium unit. I would need volunteers to help cut the bottles.

Something I Would Like to Learn More About:

- **I will go home and read my papers to see if I can gain any background information.**
- **How trees grow - the type of plants growing in this area.**
- **What plants grow well in this area.**

Workshop Participant Evaluation Form

Date 3/18/97 Workshop Title Bubbles

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	4	1		
2. Please rate the overall quality of the workshop presentation.	4	1		
3. The presentation held my interest.	5			
4. The presentation addressed my needs.	2	3		
5. The presentation of material was :	5			
6. The hands-on experience provided was :	4	1		
7. Knowledge / skills gained was:	3	2		
8. Balance of lecture / hands-on was:	5			
9. Usefulness / applicability for use in my classroom was:	1	4		

Something New I Learned Today:

- I learned how to predict when a bubble was about to burst.
- Bubbles - What colors are they? Formation of geometric shapes with bubbles. Use of different solutions and effect on bubbles. Enjoyed bubble and food coloring drawing.
- I learned that many different closed shaped objects can make bubbles. You can predict when a bubble will pop by observing the colors.
- How to "paint" with bubbles.

Something I Can Use Immediately in My Classroom:

- We are about to start circumferences and diameters in math. I can use the: make the biggest bubble contest and have them measure their bubbles.
- Bubble and food coloring drawings. Also of large wands produce wonderful shapes and colors.
- I could use this unit on bubbles in warm weather for teaching about shapes and measuring.
- Make shapes with toothpicks and gumdrops to try making bubbles.

Something I Would Like to Learn More About:

- **I would enjoy reading about what the different colors of light do to the colors of a bubble.**
- **Art projects.**
- **I have done bubbles with a summer group I will read materials to try more experiments with the students.**

Workshop Participant Evaluation Form

Date 3/25/97 Workshop Title Rockets

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	3	1		
2. Please rate the overall quality of the workshop presentation.	4			
3. The presentation held my interest.	3	1		
4. The presentation addressed my needs.	2	2		
5. The presentation of material was :	4			
6. The hands-on experience provided was :	3	1		
7. Knowledge / skills gained was:	3	1		
8. Balance of lecture / hands-on was:	4			
9. Usefulness / applicability for use in my classroom was:	1	1	1	

Something New I Learned Today:

- How to build a rocket.
- Rocket Propulsion. Fuel is no longer needed out in space. Oxygen supply must be taken at different levels of gravity. How to construct rocket.
- How to make rockets with bottles, water, air pressure and launchers.

Something I Can Use Immediately in My Classroom:

- Space Exploration. In the spring I will probably launch the rockets. However, I will buy the pressure kicker.
- How to construct rockets. Information on solar system and our position.(earth)
- Rocket balloons (not messy). Decide how to do as a cooperative project.

Something I Would Like to Learn More About:

- **I will have to read my packets first, but it was pretty self-explanatory.**
- **Rocket propulsion - What type of atomic power does it use.**
- **How to make a launcher from the materials given.**

Workshop Participant Evaluation Form

Date 4/18/97 Workshop Title Nature Journals: Seashore & Forest

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	2			
2. Please rate the overall quality of the workshop presentation.	2			
3. The presentation held my interest .	2			
4. The presentation addressed my needs.	1	1		
5. The presentation of material was :	2			
6. The hands-on experience provided was :	2			
7. Knowledge / skills gained was:	2			
8. Balance of lecture / hands-on was:	2			
9. Usefulness / applicability for use in my classroom was:		1		

Something New I Learned Today:

- Classification of trees, seashells, forest plant life. How marsh/pond life differs from urban plant life.
- I learned the difference between a sea scallop shell and a bay scallop shell.

Something I Can Use Immediately in My Classroom

- Have students classify leaves and trees from the area. Have students go to seashore and pick up various examples of seashore life.
- Using classification to teach my students about their surroundings.

Something I Would Like to Learn More About:

- **Rainforest**
- **Local Vernal ponds. How the birds migrate.**

Workshop Participant Evaluation Form

Date 4/15/97 Workshop Title Artifacts and Earthworms

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	4			
2. Please rate the overall quality of the workshop presentation.	3	1		
3. The presentation held my interest .	4			
4. The presentation addressed my needs.	2	2		
5. The presentation of material was :	3	1		
6. The hands-on experience provided was :	4			
7. Knowledge / skills gained was:	4			
8. Balance of lecture / hands-on was:	4			
9. Usefulness / applicability for use in my classroom was:	2	1		

Something New I Learned Today:

- I have a better idea about what inferences are(a very important scientific term!)
- How to make a pot, which when broken, could be put together to construct an "idea" of that point in "history."
- Being an excavator is hard tedious work! Archaeologists must be patient people. It is difficult to remove artifacts without damaging them.

Something I Can Use Immediately in My Classroom:

- Two activities that I can immediately use in my classroom since we are studying paleontology.
- Make a mitten to show inquiry based on prior knowledge and make inferences based on this information.
- Small groups for archaeological digs. Using a mittens to learn about the different things in the environment.

Something I Would Like to Learn More About:

- **I will go home and read my papers on archaeology.**
- **Red wiggles - because they seem to behave differently from a common earthworm.**
- **The archaeological artifacts that would most likely be found in our area.**

Workshop Participant Evaluation Form

Date 4/20/97 Workshop Title Campbell School Family Math & Science Night

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	2	1		
2. Please rate the overall quality of the workshop presentation.	2	1		
3. The presentation held my interest.	2	1		
4. The presentation addressed my needs.	2	1		
5. The presentation of material was :	2	1		
6. The hands-on experience provided was :	2	1		
7. Knowledge / skills gained was:	2	1		
8. Balance of lecture / hands-on was:	2	1		
9. Usefulness / applicability for use in my classroom was:	2	1		
10.				

Something New I Learned Today:

- I learned how to demonstrate Science projects. I've always been unsure of myself and this experience has helped build my confidence.
- How to tell your fortune. We turned a blue bottle silver with silver nitrate! It was very interesting and my students loved it.
- Because I was "working my magnet table I could only make a cursory look at the other tables.

Something I Can Use Immediately in My Classroom:

- I enjoyed watching the Sink and Float prediction demonstration. My class will enjoy predicting if various fruits and veggies will float in a large bowl of water.
- One of my students loved the Snow White Math lesson. This is a good indicator that it will probably go over big in class! I will probably be doing this tomorrow!
- Excellent presentation with silver nitrate with Toby Dills and also acids with Kate O'Sullivan.

Something I Would Like to Learn More About:

- **I missed the water workshop so being next to the water presentation has aroused my curiosity.**
- **I'm pretty satisfied with the knowledge I gained tonight.**

Workshop Participant Evaluation Form

Date 5/6/97 Workshop Title Whole Brain, Accelerated Learning, Multiple Intelligences & Learning Styles

	Above Average	Good	Satisfactory	Unsatisfactory
1. Please rate your overall satisfaction with this workshop.	4		1	
2. Please rate the overall quality of the workshop presentation.	4	1		
3. The presentation held my interest.	2	2	1	
4. The presentation addressed my needs.	2	2		
5. The presentation of material was :	4	1		
6. The hands-on experience provided was :	4		1	
7. Knowledge / skills gained was:	3	1	1	
8. Balance of lecture / hands-on was:	4		1	
9. Usefulness / applicability for use in my classroom was:	2	2	1	

Something New I Learned Today:

- I learned that I am a visual learner. I never considered myself to be a kinesthetic learner but I scored a 6 in that area on the VAK test.
- I learned what type of learner I am and how to read the differences in my student's body language and behaviors so that I am able to tell what type of learners they are.
- I felt that (although it was not new) what I learned today, reinforced what I experienced last summer as well as the workshops I attended this year.
- How my learning preference affects my teaching style and how I can change this.

Something I Can Use Immediately in My Classroom:

- I plan to pay attention to my student's different learning styles. This will help me to be more flexible with my lessons.
- Any and all brain activities and the background information in the type of learners I have in class.
- I want to make "brain hats" tomorrow!
- I can try to rearrange the seating in a modified V to enhance the learning.

Something I Would Like to Learn More About:

- **How does someone become a certain type of learner? Can a teacher modify a students multiple intelligence preference?**
- **I will go home and show my papers to get more background papers.**
- **I will read the brain activities more thoroughly.**

RESEARCH SURVEY 1997 POST EVALUATION

_____ School_____Grade_____Name_____
(Your Name is Optional)

1. What does PALMS stand for?

2. Are you familiar with the PALMS Educational Philosophy? Yes____ No_____
Do you use this approach in your classroom? Yes_____ No_____If yes: for what subjects and what % of the time? Place an **X** in the % box for each subject you use this approach with. Has your use of this approach increased because of your workshop participation? Yes___ by ___% No_____

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily ____
weekly _____,
or monthly ____?

If yes: briefly describe what this approach involves.

3. Are you familiar with cooperative learning? Yes _____ No_____
Do you use this approach in your classroom? Yes _____ No_____If yes: for what subjects and what % of the time? Place an **X** in the % box for each subject you use this approach with. Has your use of this approach increased because of your workshop participation? Yes___ by ___% No_____

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____,
weekly _____,
or monthly _____?

If yes: briefly describe what this approach involves.

4. Are you familiar with the constructivist approach? Yes _____ No_____
Do you use this approach in your classroom? Yes _____ No_____If yes: for what subjects and what % of the time? Place an **X** in the % box for each subject you use this approach with. Has your use of this approach increased because of your workshop participation? Yes___ by ___% No_____

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____,
weekly _____,
or monthly _____?

If yes: briefly describe what this approach involves.

5. Are you familiar with inquiry based learning? Yes_____ No_____
Do you use this approach in your classroom? Yes _____ No_____If yes: for what subjects and what % of the time? Place an **X** in the % box for each subject you use this approach with. Has your use of this approach increased because of your workshop participation? Yes_____ by ____% No_

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____,
weekly _____,
or monthly _____?

If yes: briefly describe what this approach involves.

6. Are you familiar with a hands - on learning approach? Yes _____ No_____
Do you use this approach in your classroom? Yes _____ No_____If yes: for what subjects and what % of the time? Place an **X** in the % box for each subject you use this approach with. Has your use of this approach increased because of your workshop participation? Yes___ by ___% No_____

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____,
weekly _____,
or monthly _____?

If yes: briefly describe what this approach involves.

7. Are you familiar with Thematic Units? Yes_____ No_____
Do you use this approach in your classroom? Yes _____ No_____If yes: for what subjects and what % of the time? Place an **X** in the % box for each subject you use this approach with. Has your use of this approach increased because of your workshop participation? Yes_____ by _____% No___

Subject	10%	20%	30%	40%	5 0%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____,
weekly _____,
or monthly_____?

If yes: briefly describe what this approach involves.

8. Are you familiar with an Integrated Across the Curriculum Approach? Yes_____ No_____
Do you use this approach in your classroom? Yes _____ No_____If yes: for what subjects and what % of the time? Place an **X** in the % box for each subject you use this approach with. Has your use of this approach increased because of your workshop participation? Yes___ by ___% No_____

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____,
weekly _____,
or monthly _____?

If yes: briefly describe what this approach involves.

9. Do you utilize a combination of the above educational approaches in your classroom? Yes___ No___
If yes: please check which ones.
PALMS ____ Cooperative learning ____ Constructivism ____ Inquiry Based learning ____
Hands - on learning _____ Thematic Units _____ Integrated Across the Curriculum Approach ____
Please explain how you use them, in what subject areas and what % of the time? Has your use of this approach increased because of your workshop participation? Yes_____by _____% No_____

Subject	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Reading										
Math										
Social Studies										
Science										
Thematic Unit										
Integrated Across the Curriculum Approach										

Is this daily _____, weekly _____, or monthly _____?

Explain:

10. I attended workshops on the following approach /approaches and implemented ideas from these workshops into my classroom?

PALMS ___ Cooperative learning Constructivism _____ Inquiry based learning ____
Hands - on learning _____ Thematic Units ____ Integrated Across the Curriculum Approach ____
Multiple Intelligences_____ Whole Brain Approach to Learning_____ Accelerated Learning_____

11. I implemented activities from the following workshops in my classroom.

Acids & Bases ____ Artifacts _____Bubbles_____ Classroom Gardening ____ Changing States of Matter____ Crystals ____ Earthworms ____ Electricity ____ Estimating ___ Magnets___ Nature Journals ___ Oobleck_____ Rockets____ Structures_____Water ____

12. What benefits have you personally derived from participating in this workshop series?

13. What was the benefit to your classroom?

14. How have you modified your teaching beliefs from the workshop theory presentations?

15. What did you learn from attending these workshops?

16. Do you feel this philosophical approach has enhanced student learning? If so, how?

17. Describe how this approach influences the student's ability to relate to others, problem solve, communicate, be self - evaluative, self - reliant, and develop positive attitudes as well as their self esteem.

18. List what you have done at a school wide event to utilize the philosophy, activities and/or approaches outlined over the course of this workshop series.

19. Please examine the list of activities done at each workshop. **Check off the ones you utilized** in your classroom and **comment about what happened, its educational value and effectiveness**.

10/1/96 PALMS Philosophy

- Discussion of all theories involved.
- Processing -
  - KWL Charts
  - Topic Webs
  - Thematic Topic Chart: Alphabetized Vocabulary Class Generated Words
- Cooperative Learning
- Constructivist
- Inquiry Based
- Across the Curriculum
- Literature Connections
- Poetry Connections
- Journals
- Literature Connection: Curious George at the Ice Cream Store
- Ice Cream Activities
- **Comments:** As a result of this workshop my class - did/changed:

10/8/97 Cooperative Learning

- Today I Feel - Validating Children
- Team Building
- T - Charts - Social Skills for Cooperative Learning
- Six Inch Voices
- Face to Face
- Learning Game Techniques
- Team Members: Roles___ Badges____
- Talking Tokens
- Reward Chips
- Active Listening
- Conflict Resolution
- Boom's Taxonomy - Higher Level Think Skills Chart
- No Put Downs: 99 Positive Comments
- Group On Task Evaluations
- Feelings Character Chart
- A Story Web
- A Character Study Chart
- Brain Gym Activities
- Drinking Water Available to Students - Brain Stimulation
- **Comments:** As a result of this workshop my class - did/changed:

10/15/96 Integrated Across the Curriculum Approach Workshop

- ***Thematic Unit Example: Spider & Insects***
- Creating Creature Activity
- Creative Written Story about your creature.
- Poetry about Spider and/or Insects
- Characteristics and/or Properties
- Classifying Activities
- Literature Connection
- Processing Techniques: Before & After: Topic Webs, KWL Charts
- Journals: Individual & Groups
- ***Thematic Unit Example: Trees***
- Literature Connection
- Leaf Transfer Prints
- Leaf Hunt
- Leaf Classification
- Leaf Graphing Activities
- Activities Related to: Science __, Math __ , Literature __, Language Arts __ Reading __, Social Studies __, Geography __
- Classifying: Hula Hoops
- Graphs
- Guessing Jar Activities Related to Theme
- Creating Your Own Thematic Unit
- Integrating Thematic Units Across the Curriculum
- **Comments:** As a result of this workshop my class - did/changed:

10/22/96 Constructivism

- ASCD Theory Approach Tape
- Traditional Versus Constructivist Lesson Game
- Where does water come from?
- Water Cycle Experiment
- Literature Connection: Rain
- Globe Toss - Land/Water - %
- Clothesline activities - Evaporation
- Condensation Experiments:
  - Water, food coloring, ice, can, baggie
  - Glass, baggie, water
- Processing Charts:
  - What do you think will happen?
  - What we did.
  - What did happen?
  - Why?
- **Comments:** As a result of this workshop my class - did/changed:

11/5/96 Inquiry Based Learning Workshop

- Respect yourself, others and the environment.
- How do you want to be treated by others? Brainstorm - List
- Class Values Chart.
- Class Values Song.
- Preserve the Earth.
- Why recycle?
- Comparing Animals - Foss Kits: Animals Two by Two.

    - Goldfish - Guppies.
    - Sow Bug - Pig Bugs.
- Accelerated Learning.
- Subliminal Learning: Visuals Around the Room.
- Observing Nature.
- Positive Comments to Enhance Learning.
- **Comments:** As a result of this workshop my class - did/changed:

11/12/96 Structures

- Literature Connection: New Version of Three Little Pigs: Wolf's View
- Construct Houses - straw, yarn, clay, sugar, cubes, Styrofoam pieces
- Wolf Huff and Puff Test Endurance
- Tallest Structure - Clay, straws
- Platform (Cup) Challenge
- Bridge Construction
- Balanced Geometric Figure - Hanging Colleague
- Build a Cube - coffee stirrers
- Geometric Shapes
- Processing Activities
- Journals
- **Comments:** As a result of this workshop my class - did/changed:

11/19/96 Electricity

- Insights Kit:
    - Circuit and Pathways
    - Closed and Open Circuits
    - Parallel and Series Circuits
    - Circuits and Motors
    - Lighting the Bulb
    - Electricity Insights EI 7152
    - Static Electricity
    - Magic Rabbits
    - Com Electric Booklets and Tapes
    - Electromagnets
    - Insulators
    - Conductors
- **Comments:** As a result of this workshop my class - did/changed:

1/7/97 Crystals

- Literature Connection: Two Bad Ants
- Coal Crystals
- Rock Candy
- Ants and Crystals: Visualization: Draw picture of what you think.
- Making Crystals Slide: 5 different film container substances: examine and figure out substance
- Rock Collection
- Literature Connection
- Geography
- **Comments:** As a result of this workshop my class - did/changed:

1/14/97 Oobleck

- Literature Connection: Bartholomew and the Oobleck - Dr. Seuss
- Topic Web: Group Brainstorming
- Mix:
  - Oobleck
  - Jello and Freeze
  - Slime
  - Cookies and Bake
- Use Sense Observation Sheet: Looks like, feels like, smells like, sounds like,
- Taste: ~~Science~~ Taste only if cooking edible food. Call it cooking not science.
- Bounce, Roll, Stretch, Toss, Bake and Freeze
- Create Rocketship on Planet Oobleck
- Write Story about Planet Oobleck and Rocketship
- Create a Poem about Oobleck
- Polymers Experiments: Spaghetti, zip lock bag, balloon experiments.
- **Comments:** As a result of this workshop my class - did/changed:

1/21/97 Ideas for Estimating, graphing and Venn Diagrams

- Graphing Charts: Daily
  - Yes/No Clothespin and Yarn Chart
  - Venn Diagrams
- Index card daily question supply.
- Life Saver Activity.
- Raisin Activity and Product Comparison Activities.
- Candy Fruit Asst. which has most, least.
- M & M - Colors, quantity
- Liquorice - Length, guess total measure.
- Guess Value of Jar: Higher Level Thinking: Quantity plus cost factor per item.
- Jelly Beans - Quantity, color, length of 10 beans = entire jar equals.
- Now and Later Square Candy = Sack Guess Height of 10 = entire jar.
- Hearts - Most of which Color, least of which color, count by place value 1's, 10's, 100's. Graph by Colors and quantity.
- Milk Box Child's Picture Graphing tool for voting activities.
- Shower Curtain Graphs
- Window Shade Graphs
- Hula Hoop Venn Diagrams
- Laminated topic Charts
- Graph by size, shape, texture, color, favorite items, body parts etc.
- Zip Lock Baggie Candy Estimating Homework Bag
- Guessing Jar Chart
- Laminated Graph Chart
- Today I Feel Chart
- Dichotomous Key
- **Comments:** As a result of this workshop my class - did/changed:

2/4/97 Acids and Bases

- Cabbage Juice Experiments
- Grape and Lemon Juice Experiments
- Fruit Experiments
- pH Scale

- Graphing Liquid Results: by color change
- Indicator
- Acids
- Bases
- Foods
- House hold Chemicals
- Processing Data
- Sharing Results
- Journals
- Poems
- **Comments:** As a result of this workshop my class - did/changed:

2/11/97 Magnets

- What is a magnet?
- What makes an object a magnet?
- What do they do?
- Can we make a magnet?
- Types of magnets: ring, bar, horseshoe, square, disc, rod.
- Cow magnets.
- Attraction activities
- What will a magnet attract through? wood, skin, plastic, glass, water, Styrofoam, fabric, tin.
- Holding Power - Will putting magnets together do more work?
- Magnetic Force.
- Magnet Poles.
- True North.
- Compasses.
- Processing.
    - Venn Diagrams.
    - Graphs.
    - Journals.
- Make a magnet do somersaults.
- Electromagnets
- Metals: iron, nickel, cobalt.
- Iron filings.
- Overhead projector magnet activities.
- Coins before 1950.
- Natural magnet found in earth.
- **Comments:** As a result of this workshop my class - did/changed:

3/11/97 Classroom Gardens

- Estimating Seeds in Fruit
- Graphing Predictions and Results.
- Parts of a Plant.
- Germination - Zip Lock Baggy Greenhouse.
- Terrariums.
- Fish Bowl Terrariums.
- Sprout Film Container.
- Plant Cuttings .
- **Comments:** As a result of this workshop my class - did/changed:

3/18/97 Bubbles

- Bubble characteristics. Shape, size, color .
- What makes a bubble? Different Solutions.
- Kitchen bubble gadgets.
- Straws, baskets, pipe cleaners, soda bottle funnels: straight, slanted.
- Straw and string window shade film and bubbles.
- Swimming pool and hula hoop bubbles.
- Unbelievable bubbles.
- Large bubble wands.
- Children toy bubble making gadgets.
- Largest bubble on table, measure diameter.
- Color of bubbles: black plate and white color.
- Bubble prints.
- Soda bottle bubble geometry.
- Bubble skeletons: Structure bubble designs with toothpicks and gum drops: triangles, cubes, diamonds. Dip structures in solution and blow bubbles inside.
- Draw bubbles showing colors.
- Chain of bubbles.
- Bubble story
- **Comments:** As a result of this workshop my class - did/changed:

3/25/.97 Rockets

- Made soda bottle rockets.
- Launched soda bottle rockets.
- Drew rocket and wrote poem about a rocket.
- Discussed space unit.
- Read space literature books.
- Discussed model of solar system.
- Designed space unit.
    - Corker Flyer.
    - Rocket Balloons.
    - Solar System.
    - Planetary Scavenger Hunt.
- **Comments:** As a result of this workshop my class - did/changed:

4/8/97 Nature Journals

- Sorted and classified forest items.
- Used field guides to identify forest items.
- Made nature journal booklets.
- Selected forest item to draw in journal, describe item utilizing five senses and write a poem about it.
- Discussed nature walks and utilization of squaring off area as mini habit identify all life items. Use hula hoops, squares, or string.
- Discuss field trips to forest.
- Magnifying glass activity with tree cookies.
- Sorted and classified seashore items.
- Used field guides to identify seashore items.
- Made seashore journal picture, describe it through the five senses and wrote poem.
- Look at materials to design forest and seashore unit across the curriculum.

Comments: As a result of this workshop my class - did/changed:

4/15/97 Artifacts & Earthworms

- Midden: Archaeology Dig Activity
- Midden mapping
- Midden graphing
- Myths & Nature American stories
- Read fossil literature books
- Made earthworm bins
- Compared earthworms and red wigglers
- Discussed earthworm activities
    - wet verses damp soil
    - light verses dark
    - body parts
    - water and vinegar experiment
    - Read under the ground literature books
    - **Comments:** As a result of this workshop my class - did/changed

4/30/97 Presentations at Campbell Family Math & Science Night

- Magnets
- Bubbles
- Water Exploration
- Acids & Bases
- Magical Bottles
- Healthy Eating- "Get Growing from the Ground Up"
- Self Directing Card Activities for: Venn diagrams, multiplication, division, pattern sequencing, estimating, measuring, copy cat auditory pattern block designs, and problem solving.
- Math & Science Computer Games
    - **Comments:** As a result of this workshop my class - did/changed:

5/8/97 Whole Brain, Accelerated learning, Multiple Intelligences, & Learning Styles

- Breathing exercises - baby breathing, arms or head, balloon under arm and horse riding position
- Relaxing exercises - shake out tension hands, feet, arms, legs, do neck rolls, tense and relaxed all muscles feet to head.
- Care box visualization, 1-2-3 yes
- Recalling & Anchoring Previous, Positive Learning Experience
- Warm caring classroom environment
    - Mutual teacher - student respect (no negative words or gestures)
    - compassionate facilitator yet authority role
    - Infantilization: openness, awe, playfulness, confident, childlike, games, puppets, role play, improvisation + learning is fun, easy and joyful
    - Lights: natural, full spectrum
    - Seating arrangements
    - Groups
    - Music: baroque - largo tempo, Vivaldi, Bach
    - Fresh air
    - Plants, flowers - spider plants
    - Subliminal Visuals, Peripheral stimuli related to topic of study
    - Affirmation signs: The More We Relax, the Better We Learn- high on walls above eye level
    - Student art work, murals, drawings etc.
    - Videos
    - Left Brain, Right Brain
    - Costumes around topics

- Koosh balls
- Integrated learning units across the curriculum as well as utilize and integrate:
  - plays
  - dance
  - movement activities
  - art
  - posters
  - models
  - songs
  - chants
  - raps
  - group sculptures
- Double - planeness
  - Conscious
  - Paraconscious
  - Congruent verbal and nonverbal (facial, gestures, vocal intonations) communication messages
- Intonation: variations in tone, volume, pitch of voice and artistic intonation (using voice with musical background) used to emphasize certain words or concepts
- Rhythm - affects child physically and emotionally = easier to retain
- pseudopassivity - supermemory state mental state enjoyable classical music performance
- Teaching Cycle
  - Identities- new identities related to topic, name tags
  - Decoding - Global Introduction 5 minutes elementary, 10 - 15 middle grades: KWL, or Topic Web, acting out vocabulary, koosh ball free association, song, video, pre-test, puppets
  - Active Concert - Story/Dialogue: vocabulary & concepts to classical music - scripts highlighted 5- 10 minutes elementary, 15 - 20 older students
  - Passive Concert - Guided Visualization using five senses in pseudopassive state (relaxed but alert) baroque period Bach, Teleman = largo tempo
  - Activations - Learning Activities 45 minutes (start day after passive concert) focus is on game learning comes in peripherally: role play, songs, skits, chants, raps, model making, art projects, guessing games, body kinesthetic activities, films, videos, slides. experiments, field trips, cooperative learning activities, projects, story writing, poetry writing, solving puzzles,
  - Culminating Activities: bring closure, summarize & celebrate their learning: play, drama, science fair, social studies fair, puppet show, parent presentation, video documentary, art show, party and then anticipate new learning cycle
  - Assessment: pre and post tests, journal writing, assessment portfolios, show that you know demonstrations, video portfolios, summary paper, Project Demonstrations, self - assessment mind maps
- Multiple Intelligences
  - Verbal - linguistic: ability to use language and words
  - Logical - Mathematical: capacity for inductive and deductive thinking and reasoning, use of numbers, and recognition of abstract patterns.
  - Visual - Spatial: ability to visualize objects and spatial dimensions, and create internal images and pictures.
  - Body - Kinesthetic: ability to control bodily motion.
  - Musical - Rhythmic: ability to recognize tonal patterns and sounds, and a sensitivity to rhythms and beats.
  - Interpersonal - capacity for person to person communication and relationships
  - Intrapersonal - inner states of being, self - reflection
- Learning Styles:
  - Left Brain: logical, sequential, rational, analyzes, objective, parts
  - Right Brain: random, intuitive, holistic, synthesizes, subjective, wholes
  - Visual, Kinesthetic, Auditory

- analytic, expressive, intuitive, directive
- **Comments:** As a result of this workshop my class - did/changed:

20. Any comment or opinions you would like to make about this series of workshops usefulness or value to you personally or professionally. Any suggestions you have for additional workshops: changes, topics, etc.

RESEARCH METHODOLOGY SURVEY
Research Construct: Teachers' Levels of Use Evaluation

Please Return to:
June L. Fuller
Thank you.

_____ School_____Grade_____Name_____
Number of Years in Education Profession _____
Please check appropriate use level for each of the listed teaching approaches and/or strategies.

Use Code Before Workshops = B After Workshops = A	Not Familiar with / Not Interested 1 B A	Interested in Exploring 2 B A	Know about / Don't use 3 B A	Use occasionally 1 - 40% 4 B A	Use moderately 41 -6 0% 5 B A	Use frequently 61 - 85% 6 B A	Use daily 86 - 100% 7 B A
PALMS Philosophy							
Cooperative Learning							
Integrated Across the Curriculum & Thematic Units							
Constructivism							
Inquiry Based Learning							
Whole Brain (Brain Based Learning)							
Accelerated Learning							
Multiple Intelligences							
Learning Styles							

What factors enhanced use?

What factors inhibited use?

Other comments:

Appendix C: Cycle Three Instruments

Please Return to:
June L. Fuller
Thank you.

RESEARCH METHODOLOGY SURVEY

Teaching Components Evaluation by Approach Utilization

Dear Colleague,

The voices of educators need to be heard for effective realistic educational reform. Please take a few minutes to fill out this survey.

Thank you.

June L. Fuller

Name_____ (Optional) **Gender** ____ **Ethnicity**_____ **Year Born** ____

** Please sign the informed consent form even if you have selected not to fill in your name here.

The Fielding Institute requires a signed consent form from every research participant. The last page may be detached and returned separately if you so desire. Check this box to show you have signed and returned the consent form separately. ** ☐

School System_____ **School**_____ **Grade** ___ **Class Size**___

Type of Class: Regular Ed. ___**Special Ed.**___ **Inclusion** ___**Bilingual Ed.**___

Position _____ **Number of Years in Education Profession** ___**Degree Level** __

Please indicate how many years you have spent in each position: Teaching ____

Reg. Ed. ____ **Special Ed.** ____ **Inclusion Setting** ____ **Bilingual Ed.** _____

- **Please list the approximate number of PALMS training hours you have had each year.**

  1993 ___ **1994** ___ **1995** ___ **1996** ___ **1997** ___ **1998**___ **1999**___ **= Total Training Hours** ___

  Using the following code please rate the quality of the overall PALMS training you received.

  TOTAL OVERALL PALMS TRAINING QUALITY: LOWEST HIGHEST

  1 2 3 4 5

- **Are you currently using the PALMS integrated hands-on inquiry based cooperative learning approach in your classroom? YES**___ **NO**___

  If yes, please rate the overall effectiveness of the PALMS approach.

  NOT VERY EFFECTIVE HIGHLY EFFECTIVE

  1 2 3 4 5

  If yes, please rate how your students like using this approach.

  STUDENTS HATE IT STUDENTS LOVE IT

  1 2 3 4 5

  If no, are you planning to use the PALMS approach in your classroom? YES __NO__

  If no, why not?

- If you are using or planning to use the PALMS approach, please list the factors in the training that influenced you to use this approach in your classroom.

- Please check if your utilization of PALMS has increased, decreased or remained the same since your last training session and explain why.

  INCREASED _____ DECREASED _____ REMAINED THE SAME_____ BECAUSE:

- Do you feel more PALMS training would be beneficial? YES___ NO ____
  If yes, please list specific areas you would like more training in:

- How has utilizing the PALMS approach involving an integrated hands-on inquiry based cooperative learning approach changed your teaching?

- Please place an X beside the subject(s) in which you utilize this approach and indicate the percentage of time on a weekly basis that you utilize this approach.

_____ Reading	_____% Weekly
_____ Math	_____% Weekly
_____ Social Studies	_____% Weekly
_____ Science	_____% Weekly
_____ Integrated Across the Curriculum Approach	_____% Weekly

- What initially got you interested in utilizing this approach? Please explain.

- Please list in numerical order of importance (1=most important, 2 = next most important etc.) only the factors that influenced you to adopt the PALMS approach.
  DO NOT LIST EVERY CHOICE. LIMIT YOUR RESPONSE to only those factors that actually related to what influenced your own personal attitude toward UTILIZING THIS APPROACH.

  _____ 1993 Mass. Ed. Reform Act
  _____ PALMS Training Sessions
  _____ PALMS Lead Teacher
  _____ PALMS Specialist
  _____ Colleague
  _____ Family Math & Science Nights
  _____ Peer Coaching
  _____ Receiving Mentoring Assistance
  _____ Your Class Participating in an Event utilizing this approach
  _____ Central Administration
  _____ Building Administration

_____ **Ongoing Support**

_____ **MCAS (State Testing)**

_____ **Other (please explain):**

- **What are your concerns regarding this approach?**

- **What factors enhance utilizing this approach? Please explain why for each factor?**

- **What factors inhibit utilizing this approach? Please explain why for each factor?**

- **Other comments:**

How has utilizing the PALMS Philosophical approach involving an integrated hands-on inquiry based cooperative learning approach changed your teaching? Please respond to the following questions comparing the approach you used before your PALMS training to your approach since utilizing PALMS.

Using the following code, please rate each:

LOW 1	BELOW AVERAGE 2	AVERAGE 3	ABOVE AVERAGE 4	HIGH 5

STUDENT GROWTH	BEFORE PALMS	AFTER PALMS
Sample: Student time on task	3	5
1. Student time on task		
2. Student interest		
3. Student motivation		
4. Student self esteem		
5. Student learning		
6. Student participation		
7. Student verbal communication skills		
8. Student written responses to essay questions		
9. Student problem solving ability		
10. Student utilization of higher level critical thinking skills		
11. Student test scores		
12. Student appropriate behavior		
13. Student ability to work together		
14. Student ability to relate to others and respect each other's individual contributions to the group project		
15. Student ability to self - evaluate their own work		
16. Positive student attitude toward lifelong learning		

Using the following code, please rate each:

LOW 1	BELOW AVERAGE 2	AVERAGE 3	ABOVE AVERAGE 4	HIGH 5

CLASSROOM MANAGEMENT	BEFORE PALMS	AFTER PALMS
17. The teacher's ability to meet the individual learning needs of every student to develop to their fullest potential		
18. Actual teaching time		
19. Time to remediate individual students' special learning disabilities		
20. Time to remediate students who just need extra help with certain concepts, tasks, or skills		
21. Teacher planning time		
22. Time to organize and assemble teaching materials		
23. Classroom use of manipulatives		
24. Classroom use of textbooks		
25. Classroom use of technology		
26. Classroom use of trade books		
27. Classroom use of reference resources		
28. Classroom use of office supplies		
29. Classroom use of art, craft, and science materials		

Using the following code, please rate each:

LOW 1	BELOW AVERAGE 2	AVERAGE 3	ABOVE AVERAGE 4	HIGH 5

SCHOOL CULTURE	BEFORE PALMS	AFTER PALMS
30. Teacher's stress level		
31. Pleasant, enjoyable, positive classroom environment		
32. Staff morale		
33. Student morale		

Using the following code, please rate each:

LOW 1	BELOW AVERAGE 2	AVERAGE 3	ABOVE AVERAGE 4	HIGH 5

CONCLUDING REMARKS	BEFORE PALMS	AFTER PALMS
34. Student's ability to develop to their fullest learning potential		
35. Effectiveness of teaching techniques in an inclusive classroom		

Appendix D: Tables

Table 1

Action Research Cycles

Cycle	Change Stage	Purpose	Questions
1	Information Interest	Interest Hook	- How can you change teachers' present attitudes toward the approach or innovation?
2	Preparation Early Use	Staff Development	- Are teachers really implementing education reform in their classrooms? - Do teachers understand the teaching and learning components of education reform? - Are teachers currently using them in their classrooms?
3	Routine Use Program Evaluation	Utilization Effectiveness Effective Change Process Strategies	- How can a change agent promote effective change within the school system? - What facilitated the paradigm shift in order to create an interest in education reform? - What factors in the change process influenced teachers to utilize the innovation? - What effect did this change process have on teaching and learning practices in teachers' classrooms utilizing this approach or innovation?

Table 2

Wider Opportunity Extravaganza in Math and Science Participants

n	N
Presenters	57
Classrooms Preschool to Sixth grade	20
20 teachers	
300 students and their parents	
Student Peer Coaches	49
34 High School Honor Society Members	
15 Jr. High Honor Society Members	
Teachers From other Schools	10
Central Office Administrators	5
Mayor	1
City Councilors	2
Members of the Media	5

Table 3

June 1996 Pre Research Survey: Approach Knowledge and Use

	Familiar With / Knowledge Of	Utilizing Approach
	N	N
PALMS	66	53
Cooperative Learning	103	90
Constructivist	24	16
Inquiry Based Learning	56	34
Hands-On	102	94
Thematic Units	85	64
Integrated Across the Curriculum	56	39
Combination of Approaches		84

If Yes: Check which ones:	n
PALMS	43
Cooperative	74
Constructivism	17
Inquiry Based Learning	30
Hands-on Learning	73
Thematic Units	48
Integrated Across the Curriculum Approach	31

Note: A total of 106 participants responded to survey.

Table 4

June 1996 Pre Research Survey: Training Workshop Interest

	Training Interest
	N
Approach Training Workshops	
PALMS	12
Cooperative Learning	8
Constructivism	18
Inquiry Based Learning	13
Hans-on Learning	9
Thematic Units	11
Integrated Across the Curriculum	19
Multiple Intelligences	4
Brained Based Learning	4
Accelerated Learning	3
Special Topic Workshops for Utilizing the Above Approaches	
Acids & Bases	8
Artifacts	2
Bubbles	12
Gardening	19
Changing States of Matter	10
Crystals	14
Earthworms	13
Electricity	14
Estimating	4
Magnets	17
Nature Journals	10
Oobleck	4
Rockets	4
Structures	6
Water	11

Note: Total participants that responded to the survey were 106.

Table 5

June 1997 Level of Use Survey Participant Categories

	%	N
Administrators	31.5	17
PALMS Trained Teachers	35.2	19
Colleagues of Trained Teachers	33.3	18

Note: Total participants responding to this survey equaled 54. The range of educators that were surveyed went from one year of service to 44 years of service. The average respondent had worked as an educator for 22.5 years.

Table 6

June 1997 Levels of Use: Approach Utilization Percentages Before and After PALMS Training

	BEFORE Non Utilization Rate %	AFTER Utilization Rate %
PALMS	72.2	90.0
Cooperative Learning	77.0	94.5
Integrated Across the Curriculum or Thematic Unit approach	74.0	91.0
Constructivist	90.8	72.0
Inquiry Based Learning	87.0	88.9
Brain Based Learning	83.4	76.0
Accelerated Learning	87.1	70.4
Multiple Intelligences	83.4	80.0
Learning Styles	72.0	89.0

Table 7

Background Characteristics of Teacher Participants

	%	N
Gender		61
Female	91.8	56
Male	8.2	5
Ethnicity		49
Caucasian	93.9	46
Hispanic	2.0	1
Black	2.0	1
Other	2.0	1
School level		60
Elementary	85.0	51
Junior High	10.0	6
High School	5.0	3
Degree		61
BS/BA	66.6	40
MS/MA	34.4	21
Type of Class		61
Regular Education	65.6	40
Inclusion	18.0	11
Special Education	9.8	6
Bilingual Education	4.9	3
Teachers who service all types of classrooms: Regular Education / Special Education / Inclusion / Bilingual Education	1.6	1
Position		62
Teacher	90.3	56
Permanent Substitute Teacher	4.8	3
Special Education Teacher	3.2	2
Title I Teacher	1.6	1

Table 8

Background Characteristics of Teacher Participants

	$\overline{X}$	SD	N
Age	47.78	8.91	50
Number of Years in Education Profession	21.61	10.05	61
Number of Years in Various Educational Positions			
Title I	21.50	2.12	2
Regular Education	19.62	11.77	47
Special Education	16.92	7.45	13
Bilingual Education	14.50	10.21	4
Inclusion	4.84	5.95	19
Average Class Size	19.29	4.59	55
Grade Level	3.67	2.67	52

Table 9

ANOVAs for Hours and Years of PALMS Training by Level Taught

	1993 - 1996 Total Training Hours					1997 - 1999 Total Training Hours				
Level Taught	N	$\bar{X}$	SD	F	p	N	$\bar{X}$	SD	F	p
Elementary	34	55.50	111.47	.12	.89	35	22.64	33.78	2.51	.095
Junior High	2	69.00	55.15			6	67.00	54.01		
High School	1	6.00	-			3	8.00	2.83		

Note. While not significant, the data suggest that change agents target junior high and high school teachers for further training.

Table 10

ANOVAs for Training Hours by Educational Level

	BA or BS			MA or MS				
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	t	p
Total Hours of Training	34	48.19	57.31	17	189.82	442.11	1.32	.207
1993 - 1996 Total Hours of Training	22	39.55	45.56	16	128.81	257.41	1.37	.189
1997 - 1999 Total Hours of Training	28	27.45	40.90	14	83.29	235.90	.88	.395
1993	9	6.11	7.32	11	44.55	89.27	1.28	.216
1994	10	15.70	22.04	8	70.75	114.51	1.50	.154
1995	16	24.19	45.12	10	50.30	92.40	.83	.421
1996	20	13.55	14.57	12	41.83	82.96	1.50	.143
1997	21	15.07	14.91	11	38.09	87.43	1.19	.243
1998	19	12.03	16.88	9	42.00	97.14	1.33	.195
1999	15	14.90	25.27	7	52.71	109.52	1.30	.209

Note. $p \leq .05$. While most of the data were not significant, they provide change agents with information relating to who the early adopters were, as well as the teachers who still need to be targeted for further training.

Table 11

Rating of the PALMS Approach and Training

	$\overline{X}$	SD	N
Rating of PALMS Training	3.98	.72	49
Overall Effectiveness of PALMS Approach	3.92	.71	48
How Students Like PALMS Approach	4.20	.82	49

Note. A 1-5 scale was used to rate each response where 1 = lowest and 5 = highest.

Table 12

October of 1999 Desire for Additional Training

Desire for More Training	%	N 56
Yes	73.2	41
No	26.8	15

Table 13

Specific Areas of Desired Additional PALMS Training

Category Factor Totals		Specific Areas	Total Training Requests
	# of Responses	# of Responses	N
			38
Curriculum: Grade Level / Subjects	25		
Science		5	
Grade Level Applications		3	
State Framework Standards		3	
Math		3	
Reading		2	
Language Arts		2	
Social Studies		2	
Thematic Units		2	
All Subjects		2	
Integrating Curriculum		1	
Additional Ideas / Support	3		
Teaching Methods	3		
Classroom Management	3		
Cost Effective Material Ideas	2		
Effective Beneficial Training	2		

Note. The question to which participants responded was, "Did you feel more PALMS training would be beneficial? YES_X_ NO____ If yes, please list specific areas you would like more training in: _____."

Table 14

Change in Use of PALMS Since Last Training

Change in Use of PALMS Since Last Training	%	N 54
Increased	25.9	14
Decreased	27.8	15
Remained the Same	46.3	25

Table 15

The Effect Training Participation Had on Teacher Utilization of PALMS

Training Influence on Utilization	N 62	%	n
Trained in PALMS Approach		88.7%	55
Not Trained in PALMS Approach		11.3%	7
Teachers Using PALMS in October of 1999		82.3%	51
Trained Teachers Who are Using PALMS		94.1%	48
Untrained Teachers Who are Using PALMS		5.9%	3
Teachers Not Using PALMS in October of 1999		17.7%	11
Trained Teachers Not Using PALMS		12.7%	7
Untrained Teachers Not Utilizing PALMS		57.1%	4

Table 16

Training Factors Influencing Utilizing PALMS

	# of Responses
Approach Fits with Teacher's Philosophy	20
Approach Good for Students	16
Effectiveness of the Training	10
Approach Mandated	5
More Training Needed	2

Note. N = 53. The question to which participants responded was, "If you are using or planning to use the PALMS approach, please list the factors in the training that influenced you to use this approach in your classroom."

Table 17

Factors Influencing Initial Interest in Implementing the PALMS Approach

	# of Responses
Training	20
Approach Fits with Teacher's Philosophy	11
1993 Education Reform Act / Teacher's Manual	11
Approach Good for Students	10
Colleague / Lead Teacher	3
Paid Training Sessions / Free Materials	2
Class Participating in Event Utilizing This Approach	1

Note. N = 58. The question to which participants responded was, "What initially got you interested in utilizing this approach? Please explain."

Table 18

Factors Influencing Utilization of PALMS

	Yes		No	
	n	%	n	%
PALMS Training Sessions	43	72.9	16	27.1
Your Class Participating in an Event	28	47.5	31	52.5
Education Reform Act of 1993	23	39.0	36	61.0
Family Math and Science Nights	15	25.4	44	74.6
MCAS	15	25.4	44	74.6
PALMS Specialist	14	23.7	45	76.3
Colleague	14	23.7	45	76.3
PALMS Lead Teacher	13	22.0	46	78.0
Building Administrator	10	16.9	49	83.1
Ongoing Support	8	13.6	51	86.4
Peer Coaching	7	11.9	52	88.1
Central Administration	6	10.2	53	89.8
Receiving Mentoring Assistance *	4	6.8	55	93.2
Other	4	6.8	55	93.2

Note. Listing on table in order from most to least level of use. N = 59 for each factor. Other factors influencing participants utilizing PALMS that were listed by one person each included: "textbook changes," "my own belief that this is a good approach," "there was no other option— course (home economics) must be taught this way," it worked— always try new things and utilize what works (paraphrased). * This urban area of Southeastern Massachusetts has a veteran staff of teachers, consequently there were very few new teachers with mentors.

Table 19

Paired Samples T - Tests for Factors Influencing Utilization

	NO			YES				
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	t	p
Education Reform Act								
Total Overall PALMS Training Quality †	31	4.16	.73	17	3.59	.51	2.86	.006 **
Use of Integrated Approach †	34	24.71	32.03	20	8.50	15.65	2.49	.016 *
PALMS Training Sessions								
Total Overall PALMS Training Quality †	11	3.55	.69	37	4.08	.68	- 2.28	.027 *
Colleague								
Number of Years in Education Profession	44	23.55	9.55	14	16.57	10.35	2.33	.023 *
Number of Years in Regular Education Position	34	22.32	11.08	12	11.42	10.55	2.97	.005 **
Peer Coaching								
Overall Effectiveness of PALMS Approach †	41	3.98	.69	6	3.33	.52	2.19	.034 *
Grade	43	3.60	2.08	6	2.00	1.10	2.93	.014 *
Number of Students with Whom you Work Average Class Size	47	19.53	4.40	5	14.40	2.88	2.54	.014 *
Receiving Mentoring Assistance								
Utilization Percent in Social Studies	52	15.29	23.59	4	2.50	5.00	3.16	.006 **
Number of Years in Regular Education Position	43	20.58	11.47	3	3.67	1.53	8.64	.001 ***
Central Administration								
Overall Effectiveness of PALMS Approach †	41	4.00	.67	6	3.17	.41	2.95	.005 **
How Students Like PALMS Approach †	42	4.29	.81	6	3.50	.55	2.31	.026 *
Utilization Percent in								

Social Studies	50	15.70	23.95	6	3.33	5.16	3.10	.004 **
Utilization Percent in Science	49	31.02	30.03	6	13.33	15.06	2.36	.038 *
Building Administration								
Grade	40	3.65	2.17	9	2.33	.87	2.94	.006 **
Ongoing Support								
Utilization Percent in Reading	50	15.94	25.12	5	4.00	5.47	2.76	.010 **
Utilization Percent in Social Studies	50	15.70	23.95	6	3.33	5.16	3.10	.004 **
Age	42	49.00	8.73	7	41.86	7.69	2.03	.048 *
MCAS Testing								
Total Overall PALMS Training Quality †	35	4.09	.70	13	3.62	.65	2.10	.041 *
Utilization Percent in Science	41	34.07	30.91	14	14.50	17.24	2.93	.005 **

Note. † 1 - 5 Scale where 1 = lowest, 5 = highest. * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Table 20

Factors Inhibiting Utilizing PALMS

	# of Responses
Lack of Time / Increased Preparation	19
Class Type Not Conducive to Using PALMS / Class Size Not Conducive to Using PALMS / Class Management Problems Using PALMS	16
Lack of Resources / High Cost of Materials / Need for Additional Space	15
Subject Content Not Conducive to Using PALMS / Alignment with Curriculum Frameworks / Preparation for State Testing (MCAS) / Adequate Assessments	9
Lack of Training / Lack of Support	6
Approach Doesn't Fit with Teachers Philosophy	4

Note. N = 69. The question to which participants responded was, "What factors inhibit utilizing this approach? Please explain why for each factor."

Table 21 ·

Changes in Teaching Resulting from Utilizing PALMS

	# of Responses
Improved Teaching Practices / Reflective Teaching	23
Approach Good for Students	18
Changed Teaching Methods	13
No Change / Remained the Same	5
Increased Stress	3
Increased Preparation Time / Teaching / Remediation Time	2
Increased Use of Teaching Materials	1

Note. N = 65. The question to which participants responded was, "How has utilizing the PALMS approach involving an integrated, hands-on, inquiry-based cooperative learning approach changed your teaching?"

Table 22

Paired Samples T - Tests for Student Growth

	BEFORE			AFTER			
	N	$\bar{X}$	SD	$\bar{X}$	SD	t	p
Student Time on Task	51	2.71	.73	3.88	.74	10.95	.001 ***
Student Interest	52	2.79	.72	4.38	.63	15.96	.001 ***
Student Motivation	52	2.77	.73	4.21	.64	14.34	.001 ***
Student Self-Esteem	52	2.69	.70	3.87	.71	4.38	.001 ***
Student Learning	52	2.85	.72	3.87	.74	9.43	.001 ***
Student Participation	52	2.85	.67	4.33	.79	14.17	.001 ***
Student Verbal Communication	52	2.69	.81	3.71	.87	10.10	.001 ***
Student Written Responses to Essay	49	2.41	.89	3.24	1.01	6.07	.001 ***
Student Problem-Solving Ability	52	2.37	.86	3.50	.94	10.66	.001 ***
Student Utilization of Higher Level Critical Thinking Skills	52	2.37	.84	3.48	.90	9.67	.001 ***
Student Test Scores	46	2.57	.72	3.22	.79	6.91	.001 ***
Student Appropriate Behavior	51	2.71	.73	3.39	1.00	4.67	.001 ***
Student Ability to Work Together	50	2.58	.78	3.64	1.14	7.09	.001 ***
Student Ability to Relate to Others and Respect Each Other's Individual Contributions to the Group's Project	50	2.60	.70	3.64	.85	9.11	.001 ***
Student Ability to Self - Evaluate Their Own Work	52	2.46	.70	3.37	.91	8.42	.001 ***
Positive Student Attitude Toward Lifelong Learning	50	2.60	.70	3.46	.84	8.69	.001 ***

Note. *** $p \leq .001$.

Table 23

Paired Samples T - Tests for Classroom Management and Teaching Resources

	BEFORE			AFTER			
	N	$\bar{X}$	SD	$\bar{X}$	SD	t	p
The Teacher's Ability to Meet the Individual Learning Needs of Every Student to Develop to Their Fullest Potential	51	3.00	.77	3.63	.96	6.22	.001 * * *
Actual Teaching Time	49	3.18	.88	3.76	.90	4.50	.001 * * *
Time to Remediate Individual Student's Special Learning Disabilities	49	2.73	.70	3.33	.99	5.09	.001 * * *
Time to Remediate Students Who Just Need Extra Help With Certain Concepts, Tasks, or Skills	48	2.81	.61	3.54	.94	5.51	.001 ***
Teacher Planning Time	49	2.65	.80	3.33	1.38	4.41	.001 ***
Time to Organize and Assemble Teaching Materials	48	2.54	.77	3.33	1.34	5.43	.001 ***
Classroom Use of Manipulatives	51	2.67	.79	4.08	.84	10.47	.001 ***
Classroom Use of Textbooks	50	3.12	.77	2.80	1.01	-1.88	.066
Classroom Use of Technology	50	2.74	.66	3.54	.93	6.11	.001 ***
Classroom Use of Trade Books	49	2.71	.74	3.55	.98	6.21	.001 ***
Classroom Use of Reference Resources	50	2.86	.83	3.64	.92	6.57	.001 ***
Classroom Use of Office Supplies	47	2.87	.54	3.32	1.02	3.22	.002 **
Classroom Use of Art, Craft, and Science Materials	50	2.96	.64	4.08	.80	8.84	.001***

Note. ** $p \leq .01$; *** $p \leq .001$. Significant differences were not found for Classroom Use of Textbooks.

Table 23

Paired Samples T - Tests for Classroom Management and Teaching Resources

	BEFORE			AFTER			
	N	$\bar{X}$	SD	$\bar{X}$	SD	t	p
The Teacher's Ability to Meet the Individual Learning Needs of Every Student to Develop to Their Fullest Potential	51	3.00	.77	3.63	.96	6.22	.001 * * *
Actual Teaching Time	49	3.18	.88	3.76	.90	4.50	.001 * * *
Time to Remediate Individual Student's Special Learning Disabilities	49	2.73	.70	3.33	.99	5.09	.001 * * *
Time to Remediate Students Who Just Need Extra Help With Certain Concepts, Tasks, or Skills	48	2.81	.61	3.54	.94	5.51	.001 ***
Teacher Planning Time	49	2.65	.80	3.33	1.38	4.41	.001 ***
Time to Organize and Assemble Teaching Materials	48	2.54	.77	3.33	1.34	5.43	.001 ***
Classroom Use of Manipulatives	51	2.67	.79	4.08	.84	10.47	.001 ***
Classroom Use of Textbooks	50	3.12	.77	2.80	1.01	-1.88	.066
Classroom Use of Technology	50	2.74	.66	3.54	.93	6.11	.001 ***
Classroom Use of Trade Books	49	2.71	.74	3.55	.98	6.21	.001 ***
Classroom Use of Reference Resources	50	2.86	.83	3.64	.92	6.57	.001 ***
Classroom Use of Office Supplies	47	2.87	.54	3.32	1.02	3.22	.002 **
Classroom Use of Art, Craft, and Science Materials	50	2.96	.64	4.08	.80	8.84	.001***

Note. ** $p \leq .01$; *** $p \leq .001$. Significant differences were not found for Classroom Use of Textbooks.

Table 24

Paired Samples T - Tests for Classroom Culture, School Culture, and Concluding Remarks

	BEFORE			AFTER			
	N	$\bar{X}$	SD	$\bar{X}$	SD	t	p
Teacher's Stress Level	49	3.20	.71	3.53	.94	2.27	.028 *
Pleasant, Enjoyable, Positive Classroom Environment	49	3.20	.68	3.61	.95	3.14	.003 **
Staff Morale	44	2.84	.57	3.25	.89	3.74	.001 ***
Student Morale	49	3.00	.58	3.80	.87	6.62	.001 ***
Students' Ability to Develop to Their Fullest Learning Potential	51	2.80	.60	3.80	.63	9.90	.001 ***
Effectiveness of Teaching Techniques in an Inclusive Classroom	46	2.83	.49	3.80	.69	9.29	.001 ***

Note. * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Table 21

Changes in Teaching Resulting from Utilizing PALMS

	# of Responses
Improved Teaching Practices / Reflective Teaching	23
Approach Good for Students	18
Changed Teaching Methods	13
No Change / Remained the Same	5
Increased Stress	3
Increased Preparation Time / Teaching / Remediation Time	2
Increased Use of Teaching Materials	1

Note. N = 65. The question to which participants responded was, "How has utilizing the PALMS approach involving an integrated, hands-on, inquiry-based cooperative learning approach changed your teaching?"

AERA ®

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

REPRODUCTION RELEASE

(Specific Document)

I. DOCUMENT IDENTIFICATION:

Title: Effective Strategies for Creating Educational Change with the Educational System: A Three-Cycle Action Research Study

Author(s): June Lade Fuller, Ed.D.

Corporate Source: New Bedford Public Schools

Publication Date: 2001

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, *Resources in Education* (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic media, and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following three options and sign at the bottom of the page.

The sample sticker shown below will be affixed to all Level 1 documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

Level 1

☒

Check here for Level 1 release, permitting reproduction and dissemination in microfiche or other ERIC archival media (e.g., electronic) *and* paper copy.

The sample sticker shown below will be affixed to all Level 2A documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2A

Level 2A

☐

Check here for Level 2A release, permitting reproduction and dissemination in microfiche and in electronic media for ERIC archival collection subscribers only

The sample sticker shown below will be affixed to all Level 2B documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2B

Level 2B

☐

Check here for Level 2B release, permitting reproduction and dissemination in microfiche only

Documents will be processed as indicated provided reproduction quality permits.
If permission to reproduce is granted, but no box is checked, documents will be processed at Level 1.

I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche or electronic media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries.

Sign here, → please

Signature: June Lade Fuller

Printed Name/Position/Title: June Lade Fuller, Ed.D. PRIMS Specialist

Organization/Address: New Bedford Public Schools, Campbell School, 145 Essex St., New Bedford, MA 02745

Telephone: 508 997 4511 ext. 2208

FAX:

E-Mail Address: jfuller@massed.net

Date: 2001

(over)

III. DOCUMENT AVAILABILITY INFORMATION (FROM NON-ERIC SOURCE):

If permission to reproduce is not granted to ERIC, *or*, if you wish ERIC to cite the availability of the document from another source, please provide the following information regarding the availability of the document. (ERIC will not announce a document unless it is publicly available, and a dependable source can be specified. Contributors should also be aware that ERIC selection criteria are significantly more stringent for documents that cannot be made available through EDRS.)

Publisher/Distributor:
Address:
Price:

IV. REFERRAL OF ERIC TO COPYRIGHT/REPRODUCTION RIGHTS HOLDER:

If the right to grant this reproduction release is held by someone other than the addressee, please provide the appropriate name and address:

Name:
Address:

V. WHERE TO SEND THIS FORM:

Send this form to the following ERIC Clearinghouse:

University of Maryland
ERIC Clearinghouse on Assessment and Evaluation
1129 Shriver Laboratory
College Park, MD 20742
Attn: Acquisitions

However, if solicited by the ERIC Facility, or if making an unsolicited contribution to ERIC, return this form (and the document being contributed) to:

ERIC Processing and Reference Facility
1100 West Street, 2nd Floor
Laurel, Maryland 20707-3598

Telephone: 301-497-4080
Toll Free: 800-799-3742
FAX: 301-953-0263
e-mail: ericfac@inet.ed.gov
WWW: http://ericfac.piccard.csc.com

EFF-088 (Rev. 9/97)
PREVIOUS VERSIONS OF THIS FORM ARE OBSOLETE.