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ABSTRACT

This paper presents an assessment of teacher training models in a multi-year (1984-1989) early childhood computer literacy program conducted in a bilingual setting. The project was known by the acronym CLIC and focused on the needs of poor Hispanic children in the El Paso (Texas) urban school district. Although CLIC was a computer literacy project, it was designed to address multiple curriculum issues, particularly language arts skills, by aiming for general academic success. The project director trained a group of teachers to train additional project teachers. Each of these two groups was designated as a pilot group. The second pilot group trained another cohort group of faculty, known as the spread group. The curriculum for both teacher training and student classrooms was the same for pilot and spread settings. The final evaluation of the project suggested that the level of student performance in achieving project objectives was directly related to the trainee cohort membership of the teachers. Although student computer literacy was enhanced among both the pilot and spread students, the gains of the pilot group students exceeded gains of spread students. These differences suggest that being a mentor is more helpful to one's teaching than being mentored and that full teaching competence in a computer literacy program is not acquired in the first or second year of the project. (IAH)

In-service Teacher Training for Computer Literacy: Resource Implications Resulting From A Longitudinal Evaluation

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Introduction

This paper will present an assessment of teacher training models involving three levels of trainer/supervisory resource commitment in a multi-year early childhood computer literacy program in a bilingual setting. The design of the program was based on the need to minimize training expense. The project director trained a group of teachers to train additional project teachers. This second group of teachers trained yet another cohort group of faculty.

The use of teachers as trainers has been popular in recent years among funding agencies because maximizes the apparent use of scarce project funds. The model has also been popular with professors and school district consultants because it extends their apparent productivity without excessive increases in work load.

The authors of this paper, the outside evaluator of the project and the project director noted apparent discrepancies in the final evaluation of the project which suggested that the level of student performance in achieving project objectives was directly related to the trainee cohort membership of their teachers.

The present paper will review the data which was obtained during the project evaluation (Heger, and Ainsa, 1991.) and present a narrative analysis of likely causes of the performance differences.

The areas identified in this paper will become part of a planned long term follow-up survey of teachers regarding the impact of the computer literacy project on their professional productivity. It is believed that this study will have implications for training theory and strategy, assuming that genuine program productivity changes are desired by decision makers.

The General Nature of the Project

The project under discussion was of a multi-year computer literacy project for children in an early childhood, bilingual setting and was know by the acronym C.L.I.C. Funded by the Office of Bilingual Education and Minority Language Affairs, U.S. Department of Education, this project focused on the needs of poor Hispanic children in an El Paso urban school district.

El Paso, although a poor city, is one of the largest communities on the United States - Mexico border. El Paso has about 500,000 people and Cuidad Juarez has about 1.3 million residents. Personal income in El Paso has declined from 80% of the national average in 1969 to 40% of the national average in 1989 with 40% of that small amount coming from transfer payments rather than from economically productive employment. The El Paso population is majority Hispanic; elementary school enrollment exceeds 75% Hispanic. Many, even most, El Paso area students are poor, disadvantaged, and are native speakers of the El Paso variety of Tex-Mex Spanish. All too many know little or no English.

Although C.L.I.C. was a computer literacy project, it was designed to address multiple curriculum issues found in the poorer parts of El Paso by aiming for general academic success, as well as for computer literacy. It was believed that early computer literacy would enhance the long term chances of students for academic success. A particular aspiration of the project was that language arts skills would be especially enhanced.

The basic curriculum, described in more detail elsewhere, (Ainsa, 1992.) was typical of computer literacy curricula in the mid 1980s. Students were taught with Apple IIe computers a variety of skills with the computer and Logo. Parents were also given computer literacy preparation. None the project participants, including teachers, had been oriented to computers prior to the project. Nor did any student have computers at home.

The project began with implementation in four schools and was expanded to additional sites each year over the four year life of the project. To minimize expense, the project director trained a group of teachers to train additional project teachers. Teachers in the first group were designated the Pilot group. This second group of teachers trained yet another cohort group of faculty, known as the Spread group.

1988-89 Student Results

The customary C.L.I.C. evaluation instruments were administered during the 1988-1989 project year. Pre-post student skill mastery levels were determined on the 20 basic computer literacy skills. Pre-post assessments were obtained from teachers and parent volunteers as well. Project data were collected by outside collectors employed by Texas Region XIX Educational Service Center staff according to project proposal specifications.

Data were available on 687 student participants, 55 parents, and 33 teachers for 1988-1989. The attainment of the short term objectives of the project is clearly visible in Table 1. Children were evaluated as having gained important new computer literacy skills during 1988-1989. Student computer skill mastery was rated as 59% of the 20 project skills. Adult participants also reported gains in computer literacy skills. Teacher self-evaluations showed a mastery rating of 41% (Table 2.) while Table 3 reports parent mastery of computer skills. Clearly the project delivered the services it was intended to deliver. The 1988-89 results mirrored the annual results in prior years (84-85, 85-86, 86-87, 87-88).

It should be noted that Table 1 holds the project to the highest possible standards by presenting the most conservative possible assessment of student outcomes. This is accomplished by reporting the skills which were mastered as compared to the few skills which remain to be taught. It can be expected that students will retain mastered skills over the long term. The mid level performance, "skills needing reinforcement" is bound to have a smaller long term impact and is therefore omitted from Table 1. Anyone interested in this number can merely calculate the difference between the two reported statistics to determine the number of skills which have been partially learned and which need reinforcement.

Language achievement gains on the 1988-1989 student population were tabulated according to treatment group. Some students had been given the SUCCESS test and other had been given the BSM.(Table 4) Unfortunately, control group data for the SUCCESS test population were largely unusable due to recording errors.

It appears that the Pilot group gained more on English proficiency than the control group. The Pilot group in Table 4 experienced a mean gain of 2.333 points as compared to a control group gain of 1.038 points. These are significant results. ($t=1.701412$, $p<.05$, $df=56$) When a more conservative statistical approach was used and a chi square was calculated, the results were almost significant. (Chi Square= 19.47144, $df=12$, $p<.075$)

Long Term Student Results

English proficiency gains over the long term were assessed among students served in 1984 by means of re-administration of the language dominance instrument used in 1984. Pilot group students who were served by C.L.I.C. in 1984-1985 and more recently were traced. Some of these students were still in bilingual education and the only long term scores available were re-administrations of an initially used language dominance test. In some cases Metropolitan Achievement Test scores and SUCCESS achievement test scores were available. A randomly selected control group was also used to compare with the available C.L.I.C. population on all measures.

A group of 13 of the first year C.L.I.C. population had progressed through the grades far enough to be assessed with the Metropolitan Achievement Test during 1988-89. The mean score on the language section of this test was 62.38 (std.dev. 19.48) for the treatment group as opposed to 13.54 (std.dev. 8.93) for the control group. On the basic section, the treatment group scored a mean of 64.77 (std.dev. 18.99) vs. a control mean of 18.46 (std.dev. 9.36). An Analysis of Variance was performed and the differences were significant at the .0001 level ($df=24$) on the matter of treatment vs. control.

For another 77 early project participants SRA language achievement scores were available, although control group data were unusable for this sample. The overall current SRA MEAN reading percentile rank was 38.9997. On the language measure the MEAN percentile rank was 39.9914. Both scores are very respectable for the C.L.I.C. project region.

Impact on Teachers

The impact of the project on teachers included a variety of tangible and intangible rewards from project participation as determined by a 1988-89 survey. Participating teachers ($n=33$) found that they felt significantly more empowered on 3 of 10 measures than a control population. (Ainsa, p.13.)

Teachers in the first group were designated the Pilot group. This second group of teachers trained yet another cohort group of faculty, known as the Spread group. It should be noted that the curriculum for teacher training and for students was the same in both Pilot and Spread settings.

The differences between Pilot and Spread teachers were several:

1. Pilot teachers were give the leadership role of training and mentoring other teachers (Spread teachers).
2. Pilot teachers received university credit and were trained by the project director, a university professor.
3. Pilot teachers received two support visits weekly during the first two years.
4. Pilot teachers, as a group, had more years experience with the project and with the curriculum, by 1988-89 than Spread teachers.
5. Spread teachers received bi-weekly support visits.

Performance data on project classrooms were sorted into three groups:

1. Classes taught by teachers trained by the project trainer, (Pilot)
2. Classes taught by teachers trained by peers, (Pilot) and
3. Classes taught by teachers trained by peers who had been trained by peers. (Spread)

The BSM results (Table 4) indicate better project performance that control group performance. Not much else can be indicated due to the delimited range (from 1 to 5) and high positive skew on the pre-test scores. The decline in Spanish is interesting however.

Success scores are more useful.(Table 5) All project students scored significant gains. However the gains of Spread students were not sizable. Pilot group gains were much larger than those of the Spread students.

Limitations

Several major limitations affected the study. Student mobility affected the sample size available in this study as is the case in most longitudinal studies. Because any student who left the school district was lost to the sample one cannot determine if departing students were more or less successful students than stable children. Additionally, the participating schools, which were located in three different school districts, did not share common academic testing policies, so the data were analyzed according to the test given.

Long term data was available only on Pilot group students, because teachers participating in the first project year, 1984-85, were all Pilot teachers. This was due to the need to train the first cohort before training the Spread cohort. Each year, as the project expanded to new sites, the number of Spread teachers increased until, in 1988-89, the majority of teachers were Spread group members.

Data compression was a problem on the BSM test since the BSM scale scores language competency in five, or fewer categories, thereby artificially compressing natural skill variations into a very small range. In particular, the upper range of students - those who are most competent are arbitrarily compressed into other levels of performance. Still, all gains, save one, were significant. Suggesting that the project clearly has a positive impact on the language development of the population served. The BSM was used in order to keep the project in compliance with district policies.

Conclusions

Adults rated the project as successful in giving them better computer literacy. Students were assessed as having achieved on the computer literacy goals. Data suggest that student literacy was enhanced among both the Pilot and Spread students, although Pilot group students exceeded gains of the Spread students. Preliminary long term indications are that the project continues to make an important contribution to the education of this population of at-risk children.

Whether one examines the Pilot or Spread groups, it seems clear that the project functioned successfully and relevant services were provided within the computer literacy dimension.

Pilot and Spread differences suggest that it is probable that being a mentor is more helpful to one's teaching than being assisted by a mentor. Finally, it is likely that full teaching competence in a computer literacy program is not acquired in the first or even second year of a project.

It seems reasonable that a follow-up study should be conducted on project students. Given that the C.L.I.C. project taught specific computer literacy skills, it is reasonable to hypothesize that students transferred computer skills to motivation, work habits, and study skills.

At this time, however, the gains on language achievement scores suggest that computer literacy training for non-English speaking students can have multiple benefits for students. That is good news for curriculum workers.

TABLE 1
The Twenty C.L.I.C. Skills for Students

School	(n=)	Mean Number of Skills Mastered at Entry and Exit: Entry	Exit Skills	Needing Reteaching at Exit
P	(80)	1.2	18.8	0.0
R	(73)	3.6	9.0	2.5
T	(119)	3.2	14.3	1.2
Y	(415)	1.1	10.4	0.7
Overall	(687)	1.7	11.9	0.9

Mastery Level at Exit 59.5% of skills
Reteaching Needs at Exit 4.5% of skills

TABLE 2
The Sixteen C.L.I.C. Skills for Teachers

School	Overall Mean Per Cent Self Rating of Gain in Mastery: Number	Mean Rating
P	4	54.1
R	2	62.2
T	11	71.8
Y	16	39.6
Overall	33	41.5

TABLE 3
The Thirteen C.L.I.C. Skills for Parents

Overall Mean Per Cent Self Rating of Gain in Mastery

School	Number	Mean Rating
P	8	73.2
R	12	71.3
T	15	64.1
Y	20	47.6
Overall	55	60.6

TABLE 4
Summary Data 1988-1989

Gains on Language Proficiency on the BSM Test

	ENGLISH	SPANISH
PILOT GROUP	0.73395 (N.S.)	0.76563 p<.0008
SPREAD GROUP	1.15223 p<.00001	1.38684 p<.00001
CONTROL GROUP	1.34849 p<.00001	1.10769 loss p<.00001

TABLE 5
Summary Data 1988-1989

Gains on Language Proficiency on the SUCCESS Test
(Control Group Data Was Not Available For This Population.)

	SKILLS AREA		
	COGNITION	MOTOR	LANGUAGE
PILOT	15.2456 p<.00000	10.5964 p<.00001	12.7679 p<.00001
SPREAD	2.3695 p<.00000	0.8913 p<.0076	2.4783 p<.00001

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