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FINAL IMPACT EVALUATION OF THE  
PEP PILOT RADIO BROADCASTS

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Applied Communication Technology

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**LIBERIAN PRIMARY EDUCATION PROGRAM (PEP)**

**FINAL IMPACT EVALUATION OF THE PEP  
PILOT RADIO BROADCASTS**

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**for**

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and  
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## EXECUTIVE SUMMARY

The Liberian Primary Education Program (PEP) is an instructional system adopted by the Ministry of Education as the national program for primary education in Liberia. PEP, formerly called the Improved Efficiency of Learning (IEL) Project, was designed to overcome a shortage of adequately trained primary school teachers, textbooks and other educational materials.

The Program includes 510 instructional modules (or lessons). Each module is comprised of reading booklets, practice booklets, review booklets tests to determine how well students have mastered the material of each module, block and semester.

A program to train teachers in the methodology of the system comprises an additional component.

In 1989, 60 in-service PEP Pilot Radio Programs were produced to follow-up on the initial training by reinforcing elements of the programmed instruction modules for selected groups of PEP teachers (second-grade reading and fifth-grade science teachers) and principals. The broadcasts began on June 5, 1989, and ran during that semester and the following.

In 1989 The Academy for Educational Development (AED) contracted with Applied Communication Technology (ACT) to conduct an evaluation of the Pilot Radio Programs. The purpose of the evaluation was to determine the impact of the Pilot Radio Programs on the administrative performance of school principals and the teaching performance of second and fifth grade PEP teachers. To measure changes in job performance, we collected self-reported information from the target groups using a pre-test/post-test design.

Because we did not know prior to collecting data on the characteristics of schools whether we would be able to arrive at quasi-equivalent intervention and control groups, we decided to include as many of the 360 PEP schools as possible in our sample.

We evaluated the pilot radio programs by testing teachers and principals both before and after the programs were broadcast, to see if there was any detectable difference in what they did as PEP teachers after the broadcasts. We found that the **radio programs alone (after removing the impact of in-service supervision visits) did indeed help to improve about one-third of the skills that we measured.** The specific instances in which this occurred were helping principals to handle teacher shortages and to prepare for and monitor faculty meetings; helping second-grade teachers to read poetry

and identify vowel sounds and word sounds, and helping fifth-grade teachers to prepare for class by taking module booklets home and to administer tests.

We also found that the **combination of supervision and radio improved teachers' and principals' performance** on almost every item except those on which the initial score was so high to begin with that there was little room for improvement. Skills which improved as the result of a combination of radio and supervisory visits were, for principals, keeping attendance records, taking responsibility for module and test booklets, and holding faculty meetings more frequently; for second grade teachers, going to the principal or Ministry for more booklets, taking modules home to prepare for class, and providing remedial help to students; for fifth-grade teachers, providing remedial help to students, using PEP methodology to promote and monitor student progress, and forming peer groups. In several of these instances, we observed that groups which lagged behind on the pre-test were brought up to the level of the other groups on the post-test.

In the case of helping second-grade teachers pronounce vowel sounds, our results indicate that **supervisory visits** made an impact, but that the radio programs did not.

The results of the evaluation indicate that radio and supervision play an important role in improving the performance of those teachers and principals whose skills are not up to the standard of the group as a whole. We saw several times cases in which the score of a group which was notably lower on the pre-test rose to the level of the other groups on the post-test: principals keeping attendance and taking responsibility for booklets, and second-grade teachers turning to principals and the Ministry for additional booklets.

Almost all of the teachers and principals (99% or more) reported that they liked the radio programs, that the programs were helpful, and that there should be more programs next semester. On the basis of these positive (though possibly inflated) assessments, and the improvements in performance that have been recorded in this report, the PEP Program should look favorably on the continuance of radio broadcasting to PEP schools.

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	i
I. BACKGROUND OF THE PRIMARY EDUCATION PROGRAM .....	1
II. THE PEP PILOT RADIO PROGRAMS .....	3
III. EVALUATION PURPOSE .....	6
IV. SAMPLING AND METHODOLOGY .....	6
V. ANALYTICAL FRAMEWORK .....	7
The radio transmission range problem .....	7
Contrast groups .....	8
The cohort problem .....	8
Categories of listeners .....	9
In-service supervision .....	9
VI. CHARACTERISTICS OF PEP SCHOOLS .....	11
VII. PEP SCHOOL PRINCIPALS .....	13
Characteristics of principals .....	13
What principals learned from supervision and radio .....	14
VIII. SECOND-GRADE READING (PT) TEACHERS .....	20
Characteristics of PT teachers .....	20
What PT teachers learned from supervision and radio .....	20
IX. FIFTH-GRADE SCIENCE (PL) TEACHERS .....	24
Characteristics of PL teachers .....	24
What PL teachers learned from supervision and radio .....	25
X. SUMMARY AND CONCLUSIONS .....	29

In 1989 The Ministry of Education in Liberia broadcast a series of radio programs designed to help teachers and principals perform their jobs better. This is a report on the evaluation of those radio programs and the in-service teacher training (supervisory visits) which accompanied the programs. We will first describe the context in which these radio programs were used, and their objectives. Then we will discuss the evaluation methodology and our findings.

## I. BACKGROUND OF THE PRIMARY EDUCATION PROGRAM

The Liberian Primary Education Program (PEP) is an instructional system adopted by the Ministry of Education as the national program for primary education in Liberia. PEP, formerly called the Improved Efficiency of Learning (IEL) Project, was designed to overcome a shortage of adequately trained primary school teachers, textbooks and other educational materials.

The IEL Project began in 1979 and lasted for six years. It was supported with funding from the United States Agency for International Development (USAID). Technical assistance was provided by the Institute for International Research (IIR).

During the first phase of the project, a set of programmed instructional materials was developed and introduced to about 130 schools in Liberia. The materials were based on the national curriculum for elementary education (grades one to six) in Language, Reading, Mathematics, Science, and Social Studies.

The Program includes 510 instructional modules (or lessons). Each module is comprised of reading booklets, practice booklets, review booklets tests to determine

how well students have mastered the material of each module, block and semester.

A program to train teachers in the methodology of the system comprises an additional component.

The system is based on two forms of programmed instruction: one is called Programmed Teaching (PT) and the other Programmed Learning (PL).

**Programmed Teaching** is designed for use by teachers of grade one, grade two and the first semester of grade three. The modules give the teacher both the content that students are to learn and the methods of instruction that the teacher is to use.

**Programmed Learning** is designed for use by teachers of the second semester of grade three, and grades four, five and six. The modules are limited to self-instructional materials for use by the students in group study. The content of what students are to learn, and the instructional methods they are to follow are specified in the modules. In contrast to Programmed Teaching, Programmed Learning does not require the teacher to give instruction; the teacher's role is to monitor, correct, and reinforce the students' positive learning behaviors.

As described by the Ministry of Education<sup>1</sup>:

"The programmed instructional package (module) is designed to control the behavior of the teacher (Programmed Teaching) or the learner (Programmed Learning)... The PT materials are for use by paraprofessionals (unqualified or underqualified teachers) in a face to

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<sup>1</sup> Samba, N. Saa-Wander. "The Improved Efficiency of Learning Project: An Overview." Gbarnga, Liberia: IEL Project, 1982.

face situation with small groups of about 15 learners. They differ from conventional textbooks in that they control the behavior of the teacher. That is, they specify 'what' to teach and 'how' to teach it. On the other hand, the PL modules contain materials and group procedures for facilitating learning through the use of self-instructional modules. Here, the teacher serves as a monitor who diagnoses difficulties, and provides remediation, guidance and positive reinforcement. He/she groups students for group activities and monitors individual student progress."

After a number of independent evaluations found the IEL system to be an effective and appropriate vehicle for meeting educational needs in Liberia, USAID signed an agreement to further disseminate the instructional program that had been developed. Technical assistance from the Academy for Educational Development (AED) began in 1988.

## II. THE PEP PILOT RADIO PROGRAMS

Purpose and format. Teachers and principals must be trained to use the Programmed Teaching and Programmed Learning materials. When a school is selected to participate in PEP, the principal and the teachers are asked to attend a five-week workshop on how to use the materials. Follow-up training is offered to supplement the initial workshop.

In 1989, 60 in-service PEP Pilot Radio Programs were produced to follow-up on the initial training by reinforcing elements of the programmed instruction modules for selected groups of PEP teachers (second-grade reading and fifth-grade science teachers) and principals. Several working groups were organized in Monrovia in February 1989

to specify the content of the broadcasts. The broadcasts began on June 5, 1989, and ran during that semester and the following.

Topics were selected so that lessons could be taught using radio alone. Given limited resources, teachers and principals could not be supplied with special printed matter or other materials to facilitate learning by radio. A limited number of topics were selected so that radio messages could present ideas clearly using ample repetition to convey difficult points.

The programs for principals and fifth-grade science teachers concentrated on mastering PEP administration and methodology. Programs for second-grade reading teachers covered methodology as well as mastering the content of selected reading modules.

Although the pilot programs were designed specifically for principals, second-grade reading teachers, and fifth-grade science teachers, other PEP teachers were also encouraged to listen since much of the material (especially methodology) was appropriate for them as well.

Over a 20-week period, 20 programs were aired for second grade PT teachers, 20 for fifth grade PL teachers, and 20 for school principals. Programs for PT and PL teachers were broadcast twice during the week so that anyone absent on one day would have an additional opportunity to hear them. The programs were broadcast during a fifteen minute recess period at starting at 10:00 a.m. The topics for each of the target groups are outlined below.

The programs for school principals concentrate on teaching administrative skills. Principals are taught how to conduct a faculty meeting, to manage resources effectively, especially a shortage of classrooms and teachers. Other programs provide information

about how to check-out and maintain PEP instructional materials.

Second-grade reading (PT) teachers needed more opportunity to hear vowel sounds pronounced correctly, and radio provided an excellent means of doing this. Several programs help them distinguish between long and short vowel sounds. Other programs help them improve pronunciation and understanding of words with the following sounds: AR, OR, UR, OO, OW, OU, OI, and OY. Some programs use examples in poetry to improve teachers' pronunciation and use of punctuation marks.

Programs generally try to encourage PT teachers to prepare in advance for each class and to take appropriate steps to monitor students' progress.

Programs for fifth-grade science PL teachers stress learning the methodology behind PL instruction. PL teachers are taught to prepare for each class and to follow the proper instructional sequence: pronounce and define difficult words, introduce the lessons, sit with each group of students, and model correct learning procedures for students. PL teachers are taught how to form effective study groups and how to keep students from getting test questions in advance.

Several programs are designed to assist teachers to single out and help students needing remedial help. Other programs provide information about how to keep PL groups progressing with lessons, and how to know when PL groups are ready for sequenced tests.

### III. EVALUATION PURPOSE

In 1989 The Academy for Educational Development (AED) contracted with Applied Communication Technology (ACT) to conduct an evaluation of the Pilot Radio Programs. The purpose of the evaluation was to determine the impact of the Pilot Radio Programs on the administrative performance of school principals and the teaching performance of second and fifth grade PEP teachers. To measure changes in job performance, we collected self-reported information from the target groups using a pre-test/post-test design.

### IV. SAMPLING AND METHODOLOGY

Populations in the study. The three populations that were evaluated are (1) second-grade reading teachers who use Programmed Teaching, (2) fifth-grade science teachers who use Programmed Teaching, and (3) principals of the PEP schools.

Selection of the sample. Because we did not know prior to collecting data on the characteristics of schools whether we would be able to arrive at quasi-equivalent intervention and control groups, we decided to include as many of the 360 PEP schools as possible in our sample. In fact, we were able to reach 305 schools<sup>2</sup>, making our sample close enough to a census of all PEP schools that it obviated the need to make statistical inferences about the outcomes that are reported.

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<sup>2</sup> The total number (n) of respondents varies from item to item. In some cases a teacher or principal who was surveyed in the pre-test was not available for the post-test, and had to be dropped from the sample. In other cases, he or she did not respond to a particular item. And, in many cases, the item contained a filtered question, so fewer respondents were qualified to answer.

## V. ANALYTICAL FRAMEWORK

The radio transmission range problem. In an ideal experimental situation, the PEP schools in Liberia would have been randomly assigned to the intervention and control groups. However, the nature of radio transmission prevented us from achieving this high degree of equivalence between groups. Let us explain.

The pilot radio intervention was primarily targeted to schools in three counties: Bong County, Lofa County, and Grand Gedeh County. Each of these counties are served by the Liberian Rural Communications Network (LRCN), a medium-wave broadcasting network consisting of a station in each of those counties. While LRCN stations are not present in other counties, some PEP schools adjacent to Bong, Lofa, and Grand Gedeh counties are able to receive LRCN broadcasts given their proximity.

This resulted in three rather distinct groups of PEP schools:

- (1) The schools in Bong, Lofa and Grand Gedeh counties, where they were able to receive LRCN broadcasts. Each PEP school in this group was given a radio receiver and batteries to facilitate their listening to the programs.
- (2) The schools beyond those counties that were still within reception range of the LRCN network. These schools were not supplied with dedicated radios, although teachers and principals were encouraged to listen if they could gain access to a radio.
- (3) The schools which did not lie within the reception range of the LRCN network and therefore were not exposed to the radio programs.

We were able to assess the impact of the pilot radio broadcasts by comparing changes in teachers' and principals' performance in the intervention group (those in three targeted counties reached by the broadcast network) with the changes of those in the control group (outside the broadcast range). As our preliminary analysis revealed few teachers and principals outside of the three targeted counties listened to the programs (Tables V-1 to V-3), we included teachers and principals who listened to programs in a single intervention group.

Tables V-1 to V-3 also show that the majority of teachers and principals who had access to radio programs (in LRCN counties) report listening to more than half (11-20) of the programs.

Contrast groups. We were able to establish quasi-equivalence between the intervention and control groups on the basis of important school characteristics: size, enrollment, accessibility, teacher/principle education and training, number of teachers, number of classrooms, classroom facilities, etc. TABLE V-4 illustrates that the intervention and control groups were equivalent with respect to these characteristics. To construct this table, we calculated an average score for the schools in each of the two groups.

The cohort problem. TABLE V-4 also reveals, however, an important distinction between the groups in the period of time they entered the PEP program. Between 1980 and 1985, almost all of the schools selected into the PEP program were located in LRCN counties. After 1985, most of the schools selected were located outside of LRCN counties. Whereas most PEP schools in LRCN counties were selected prior to 1988, most PEP schools outside LRCN counties were selected in 1988 and 1989. Thus our attempts to isolate the impact of radio on teachers' and principals' performance might be confounded by the length of time they had participated in PEP.

TABLE V-1

EXPOSURE TO PEP RADIO PROGRAMS BROKEN  
DOWN BY INTERVENTION GROUPS -- PT TEACHERS

INTERVENTION GROUPS

	LRCN County	Listen Outside LRCN County	CONTROL GROUP
	-----		
Never Listen	1.9%	--	100.0%
1-10 Programs	44.8%	80.0%	--
11-20 Programs	53.3%	20.0%	--
N of Cases	(105)	(20)	(114)

GR

TABLE V-2

EXPOSURE TO PEP RADIO PROGRAMS BROKEN  
DOWN BY INTERVENTION GROUPS -- PL TEACHERS

	INTERVENTION GROUPS		
	LRCN County	Listen Outside LRCN County	CONTROL GROUP
Never Listen	1.1%	--	100.0%
1-10 Programs	47.1%	75.0%	--
11-20 Programs	51.7%	25.0%	--
N of Cases	(87)	(20)	(106)

8B

TABLE V-3

EXPOSURE TO PEP RADIO PROGRAMS BROKEN  
DOWN BY INTERVENTION GROUPS -- PRINCIPALS

	INTERVENTION GROUPS		
	LRCN County	Listen Outside LRCN County	CONTROL GROUP
Never Listen	6.0%	--	100.0%
1-10 Programs	24.1%	86.4%	--
11-20 Programs	69.8%	13.6%	--
N of Cases	(116)	(22)	(122)

84

TABLE V-4

## EQUIVALENCE OF EXPERIMENTAL AND CONTROL GROUPS

	LRCN Counties	Other Counties
Year Selected	1986	1988
Road Access	good	good
Population	1,000-1,999	1,000-1,999
# Primary Classrooms	5	5
Condition of Buildings	average	average
Condition of Roof	some leaks	some leaks
Sex of Teachers	male	male
Sex of Principal	male	male
Age of Teachers	35-44	35-44
Age of Principal	35-44	35-44
Qualification of Teachers	C-certificate	C-certificate
Qualification of Principal	C-certificate	B-certificate
(N of Cases)	(125)	(180)

9/21

In order to take into account the possibility of such confounding, we have reported on each table below, where our findings are presented, the change in score of each of the two cohorts (1980-1987 and 1988-1989), and we have pointed out instances in which the difference between these is noteworthy.

Categories of listeners. Finally, after re-examining the data we had collected, we divided the intervention group into frequent listeners and occasional listeners. Frequent listeners were those who had heard between 11 and 20 broadcasts, and occasional listeners were those who had heard between one and ten broadcasts. The non-listeners (outside LRCN counties) remained as our control group.

In-service supervision. While our primary aim was to compare the performance of teachers and principals before they listened to the radio programs with their behavior after they had listened, the comparison was complicated by the impact of the periodic visits to PEP schools by Liberian Instructional Supervisors, Peace Corps Volunteers, and District Education Officers. On these visits, supervisors were teaching some of the same skills as those addressed in the radio programs. Not all of the change in teacher/principal performance of these skills can be attributed solely to the radio intervention; some of it is attributable to supervisory visits.

In cases where the intervention and control groups received similar scores prior to the radio intervention (pre-test scores), the impact of radio can be estimated by subtracting the improvement in the intervention group from the improvement in the control group. (The improvement in the control group, for the most part, represents the impact of periodic supervisory visits).

However, in cases where the pre-test scores of intervention and control groups are not similar, it would be inappropriate to attempt to estimate the net impact of radio since

the intervention and control groups may be at different points on the learning curve.

In an oversimplified example, suppose the control group receives a score of 10% correct on the pre-test and the intervention group receives a pre-test score of 90%. The control group starts so close to the floor that it is relatively easy for it to show improvement on the post-test than the intervention group that (to begin with) is almost at the ceiling. In this case, since the control group is so low on the learning curve, its improvement may be easy to notice, whereas the intervention group may be constrained being so close to the ceiling.

In cases where the pre-test scores of intervention and control groups are dissimilar, it is inappropriate to estimate the net impact of radio (by subtracting the impact of supervision) since it is easier for one group to improve relative to the other (given their position on the learning curve). As we shall see, the group starting closer to the floor (be it intervention or control) generally demonstrates the greatest improvement. In attempting to assess the net impact of radio, we shall focus on examples where the pre-test scores of experimental and control groups are similar.

Although we have focused primarily on the impact of the radio programs, we think it is important to regard these programs in the broader context of the schools, principals, teachers and supervisors which they were intended to support. Much of the discussion in the remaining sections of the report is of the characteristics and conditions of PEP schools, and the characteristics, training and experience of principals and teachers in those schools.

In addition, while the main objective of the evaluation was to discover what some of the impact on teacher and principal behavior has been of the pilot radio programs, we also learned something about the impact of supervisors who visit the schools.

We will begin with a description of the schools, then move on to look at school principals, second-grade (PT) reading teachers, and fifth- grade (PL) science teachers. For each of these groups of school personnel, we will summarize what we have found out about their age, sex, training and teaching experience, and how their teaching performance changed (or did not change) as a result of being visited by supervisors and of listening (or not listening) to the radio programs.

Since the data we report are based on the self-reports of teachers and principals, it may tend to reflect what teachers/principals perceive as correct answers, rather than what they actually think and do. The data reported should be not be confused with actual behaviors in the classroom, although one would hope that the two are closely related.

Wherever possible, we have compensated for the effect of self-reporting in our analysis of the data, striving to be conservative in our representations of the impact of supervision and radio broadcasts.

Let us now look at the results of the evaluation surveys.

## **VI. CHARACTERISTICS OF PEP SCHOOLS**

Our characterization of the PEP schools is based on the data collected from the 305 schools in the sample. There are no notable differences between the characteristics of PEP schools in the three counties where the intervention took place and those of other schools.

On average, a PEP school has between 7 and 8 teachers, although 63 schools (21%) have three teachers or less.

PEP schools operate in both urban and rural areas. Schools in the Greater Monrovia area are urban. About 15% of the schools outside of this area are located in towns with a population of 5,000 or more; twenty-three percent (23%) are located in villages with a population of under 500. Although some schools are very remote, 73% can be reached by road on any given day, even in the rainy season.

Facilities and equipment. Just over half (53%) of the PEP schools are housed in a single building. About one-third of the schools were judged to be in good condition, one-third were in poor condition, and the remainder were in average condition. (The condition of the building was rated on the basis of the state of repair of doors, windows, and floors).

The majority of schools (67%) have roofs that leak. Thirty-seven percent (39%) have some leaks, 27% have many leaks, and a few schools have no roof at all.

The typical PEP school has 5 classrooms, although 9 schools (3.3%) have just one classroom. On average, 52% of the classrooms have a place for every student to sit (although seating may be very cramped); 44% have a writing surface for every student, and 67% have a blackboard. Only 36 schools (12%) have electricity, although 68% have adequate lighting for students to read and write.

That 67% of the schools have a roof that leaks, that 27% of the classrooms do not have room for every student to sit, and that 17% of the classrooms have inadequate lighting, indicates that many schools are characterized by a harsh learning environment.

In one-half of the schools, the principal has neither a cupboard nor a cabinet to store documents and materials. Teachers do not fare well either. Only 29% of the classrooms have a desk or other furniture where the teacher can sit.

Very few of the schools (5%) have a library. However, many schools have a kitchen (63%), and a toilet (57.7%). About one-quarter of the schools have a water pump or well.

While most PEP schools seem to offer the basic facilities needed to conduct classes, the teaching and learning environments seem to present many challenges. Some schools face serious constraints that would seem to jeopardize their ability to function. It is against this background that the next section reports data about the training and performance of PEP teachers and principals.

## VII. PEP SCHOOL PRINCIPALS

Characteristics of principals. Most principals (93%) at PEP schools are male. As a group they are older than PT and PL teachers: 37% percent are between the ages of 25 and 34, 40% are between 35 and 44, and 18% are between 45 and 54. None is less than 25 years old, and 5% are 55 years or older.

Principals tend to be better educated than PT and PL teachers. Only two are not high school graduates, while 35 (12%) have college degrees. Principals have, on average, 13 more years of teaching experience than PT and PL teachers. The majority (60%) received PEP training in 1988 or 1989, and 28% have received some follow-up PEP training.

What principals learned from supervision and radio. We asked principals, both before and after the radio programs were broadcast, how they handled certain administrative matters that are important to the success of the PEP program. In particular, we wanted to know:

If they keep attendance records;

What they do on days when there is a shortage of teachers;

How they divide a classroom when space is insufficient for each class to have its own classroom;

How frequently they hold faculty meetings;

How they plan for and conduct faculty meetings;

How they prepare for and perform during faculty meetings;

How well they like being a principal;

How well they like the PEP method.

We first asked principals to show us their **attendance records**, and we gave them a positive score on this item if they could do so. Most principals do a good job at keeping attendance records (Table VII-1). Prior to the radio broadcasts, those in the non-listener (control) group were not as diligent record keepers as the listeners: 85% of non-listeners kept records, as compared to 95% of occasional and 90% of frequent listeners. But after the broadcasts, 92% of all three groups were keeping records. Here we see the gap between the first wave of scores being closed on the second wave of scores.

The improvement made by non-listeners seems to be due mostly to the help they received from supervisors. Since occasional and frequent listeners scored so high to begin with, it was difficult for them to improve further, even after exposure to radio broadcasts (a "ceiling effect").

TABLE VII-1

PERCENTAGE OF PRINCIPALS ABLE  
TO SHOW SCHOOL ATTENDANCE RECORDS

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Able to Show Attendance Records	85.1	92.8	95.2	93.5	90.0	92.4
(N of cases)	(107)	(125)	(42)	(46)	(80)	(79)

P R E / P O S T C H A N G E

TOTAL	7.7	- 1.7	2.4
- 1980-87 Cohort	- 4.5	- 4.0	2.5
- 1988-89 Cohort	16.4	1.0	2.1

*11a*

The negative change for occasional listeners (-1.7%) is small and would seem to be an artifact of the exceptionally high pre-test scores, which could have been more inflated by measurement error during the pre-test than during the post-test. It is unlikely that the decline represents a negative impact of radio.

Table VII-1 shows that non-listeners improved by 7.7 percent overall. However, when we focus on PEP schools recently selected (1988-89), we find that the impact of supervision is more pronounced (leading to an improvement of 16%). The impact of supervision is greatest for schools that recently incorporated PEP methods, probably because there was more room for improvement than for schools that had been PEP participants for a longer time (i.e., they were lower on the learning curve and improvement came more easily).

We asked what principals do on days when there was a **shortage of teachers**. To receive a positive score on this item, a principal had to respond that when there is a teacher shortage he either combines PT classes, or combines PL classes, finds an extra teacher or teaches the class himself. If he responded that he either let the students sit without a teacher, sent them home, or combined PT classes with PL classes, he received a negative score.

Table VII-2 shows that, prior to the period of radio broadcasts, less than half of each group followed this instruction (42% of non-listeners did, 33% of occasional listeners and 45% of frequent listeners). After the broadcasts (and supervision visits), occasional listeners improved by 11% and frequent listeners by 7%, while non-listeners showed no improvement.

TABLE VII-2

PERCENTAGE OF PRINCIPALS ABLE TO  
HANDLE A SHORTAGE OF TEACHERS EFFECTIVELY

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Know How to Handle a Shortage of Teachers	41.9	41.1	33.3	44.7	45.1	52.4
(N of cases)	(117)	(129)	(45)	(47)	(82)	(84)

P R E / P O S T C H A N G E

TOTAL	- 0.8	11.4	7.3
- 1980-87 Cohort	2.8	23.2	13.9
- 1988-89 Cohort	- 3.6	- 2.1	1.2

15a

As non-listeners and frequent listeners had close scores on the pre-test (42% and 45% respectively), we can attribute the 7% improvement rate of listeners to radio (since they started at roughly the same point on the learning curve). The 11% improvement of occasional listeners though, seems to be due partly to their low pre-test scores, making it somewhat easier for them to show improvement than for frequent listeners.

We see a relatively large jump in score among principals in the 1980-87 cohort of PEP schools who listened to the radio occasionally (23%) and those who were frequent listeners (14%). For frequent listeners, about 11% of this change can be attributed to radio (13.9% minus 2.8%) since frequent listeners and non-listeners had similar pre-test scores. Apparently, radio was more successful for principals who were most familiar with PEP methods (1980-87 cohort).

In compensating for inadequate classroom space, principals had been instructed to keep PT and PL classes in separate classrooms. A positive score was given to those who responded that they did not put PT and PL classes together when dividing classrooms.

Table VII-3<sup>3</sup> shows that over half the principals did manage to separate PT and PL classes. Except for principals who listened occasionally to the radio, neither supervisors nor radio broadcasts had a positive effect on administrative behavior here. In fact, while the net change in occasional listeners' behavior was a 20% rise, from 53% to 73%, the change in that of non-listeners and frequent listeners was negative (down 7%, from 68% to 61% for non-listeners and down 16%, from 67% to 51% for frequent listeners).

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<sup>3</sup> Note that the total number (n) of cases is lower than usual on this table. This is because not all teachers were faced with the problem of dividing classrooms. On the other hand, sometimes, classroom space is so scarce that this is not possible; 3% of schools have only one classroom.

TABLE VII-3

PERCENTAGE OF PRINCIPALS ABLE TO  
DIVIDE CLASSROOMS CORRECTLY

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Know How to Divide Classroom	68.3	61.4	53.3	73.5	66.7	50.8
(N of cases)	(79)	(88)	(30)	(34)	(69)	(65)

P R E / P O S T C H A N G E

TOTAL	- 6.9	20.2	- 15.9
- 1980-87 Cohort	- 11.0	25.1	- 13.1
- 1988-89 Cohort	- 3.7	13.5	- 18.1

16a

The decline in this measure for non-listeners and frequent listeners might be due in part to measurement error, especially if principals tended to divide classrooms during the first semester (at the time of the pre-test) rather than the second semester. The positive change recorded for occasional listeners seems to be more pronounced in the first cohort (selected between 1980 and 1987).

We asked who was responsible for the availability of module booklets and tests. A principal received a positive score if he responded that he was responsible for their availability, and that when more were needed he notified the Ministry).

Table VII-4 reveals that roughly one-third of the principals were aware of this responsibility before the supervision and broadcasts, and their awareness had risen afterward. Non-listeners had a net gain of 6% (from 35% to 41%); frequent listeners gained only 2% (from 39% to 41%), and occasional listeners made the most gains (14%, from 24% to 38%). Here again the initial gap between scores is closed in on the second round of scores.

It appears that supervisors were able to influence non-listeners, and that supervisors and radio combined influenced listeners. Some of the gain for occasional listeners is probably due to their low pre-test scores with respect to other groups. Accordingly, it would be inappropriate to simply subtract the improvement for non-listeners from the improvement for occasional listeners to arrive at the net impact of radio. Being at different points on the learning curve, improvement may come more easily for the group with more room to improve.

The PEP staff encouraged principals to hold **faculty meetings**, and it advised them on how to plan for and direct the meetings. To score this item, we recoded the responses

to create a scale of midpoints in the interval between the last reported faculty meeting and the time of the interview. For example, one whose faculty meeting was held between one and two weeks ago received a score of 1.5; a meeting less than a week ago was scored 0.5, etc.

Table VII-5 lets us see whether or not principals held faculty meetings more frequently after hearing the radio programs. The numbers in the table represent the number of weeks since the last faculty meeting. Both before and after the radio broadcasts, principals had held the latest faculty meeting two or three weeks ago. Before the broadcasts, the number of weeks since the last faculty meeting were: for non-listeners 3.1, occasional listeners 2.2, and frequent listeners 2.6. After the broadcasts, those intervals improved only for non-listeners (increasing in frequency by 1.1 weeks). This impact of supervision was most pronounced in principals selected between 1980 and 1987.

Although radio appears to have had very little impact on the frequency of faculty meetings, it should be noted that occasional and frequent listeners scheduled faculty meetings more frequently than non-listeners to begin with (at the time of the pre-test). Since they were doing better to begin with, it was more difficult to make further improvements than for non-listeners.

Principals were asked how they prepared for and performed during faculty meetings. We gave a positive score for each of the following responses: preparing an agenda; notifying all teachers; calling the meeting to order; following the agenda; asking for comments and suggestions; recognizing people before they speak; letting only one person talk at a time; asking questions to clarify understanding; handling different points of view, and summarizing the main points. Then we calculated the average percent of correct responses.

TABLE VII-4

PERCENTAGE OF PRINCIPALS TAKING RESPONSIBILITY  
FOR THE AVAILABILITY OF MODULE BOOKLETS AND TESTS

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Responsible for Module Books/Tests	35.1	40.9	24.4	37.8	38.8	41.0
(N of cases)	(114)	(127)	(41)	(45)	(80)	(83)

P R E / P O S T C H A N G E

TOTAL	5.8	13.4	2.2
- 1980-87 Cohort	3.7	14.2	7.0
- 1988-89 Cohort	8.6	12.9	- 2.3

TABLE VII-5

FREQUENCY OF FACULTY MEETINGS

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
# Weeks Since Last Faculty Meeting	3.1	2.0	2.2	3.1	2.6	2.6
(N of cases)	(115)	(129)	(45)	(47)	(81)	(84)

P R E / P O S T C H A N G E

TOTAL	- 1.1	0.9	0.0
- 1980-87 Cohort	- 2.9	0.3	- 0.9
- 1988-89 Cohort	0.1	1.6	0.7

Table VII-6 indicates that before listening to radio broadcasts, each group responded positively to about 34% of the items. After the broadcasts, non-listeners improved about 3%, while listeners improved on the average of about 6-8%. In this case we can conclude that radio had a net impact of about 3-5%. Again, we find the improvement most pronounced in the first cohort of principals (selected between 1980 and 1987).

Finally, we assessed the extent to which in-service supervision and radio broadcasts had affected principals' attitudes toward their jobs and the PEP program. If, when asked whether he liked his job as a principal better than other jobs he could be doing, the principal answered that being a principal was a better job than others, he received a positive score. On another question, if he said that he liked the PEP instruction better than conventional methods, his score was positive.

We found that 70-80% of the principals liked their job better than other jobs, and that there was little change between the pre-test and post-test surveys (Table VII-7). Although there appears to be a 4% decline in the score of frequent listeners, the small decline probably reflects some measurement error since the pre-test score was notably higher (80%) than all others.

When asked whether they preferred the PEP instruction to conventional methods, both non-listeners and frequent listeners showed slightly less satisfaction after the broadcasts than before them, moving from 84% to 80% and 90% to 80% satisfaction respectively (Table VII-8). In both groups, the scores of the first cohort of principals pulled down the total score. The scores of occasional listeners, in contrast, rose from 68% to 81%, with the strongest rise being among the first cohort.

TABLE VII-6

PREPARATION AND PERFORMANCE DURING FACULTY MEETING  
(PERCENT CORRECT ON 10-POINT SCALE)

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent Correct on Faculty Meeting Scale	35.7	39.1	32.7	40.2	34.6	40.7
(N of cases)	(116)	(129)	(44)	(46)	(82)	(84)

PRE / POST CHANGE

TOTAL	3.4	7.5	6.1
- 1980-87 Cohort	1.3	10.0	8.2
- 1988-89 Cohort	5.0	4.6	4.2

1 ✓

TABLE VII-7

PERCENTAGE REPORTING THAT BEING A PRINCIPAL IS BETTER  
 THAN OTHER JOBS HE/SHE COULD BE DOING

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent Mentioning Principal is Better	69.9	70.4	72.1	72.3	80.3	75.9
(N of cases)	(113)	(125)	(43)	(47)	(81)	(83)

P R E / P O S T C H A N G E

TOTAL	0.5	0.2	- 4.4
- 1980-87 Cohort	6.7	2.8	- 1.3
- 1988-89 Cohort	- 3.0	- 2.7	- 7.0

TABLE VII-8

PERCENTAGE OF PRINCIPALS REPORTING THAT PEP INSTRUCTION  
IS BETTER THAN CONVENTIONAL METHODS

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent Mentioning PEP is Better	84.4	80.3	68.2	80.9	90.1	88.1
(N of cases)	(115)	(127)	(44)	(47)	(81)	(84)

P R E / P O S T C H A N G E

TOTAL	- 4.1	12.7	- 2.0
- 1980-87 Cohort	- 15.8	17.7	- 7.1
- 1988-89 Cohort	3.9	6.4	2.2

10

We believe that what might appear to be a decrease in satisfaction among non-listeners and frequent listeners is due largely to the relatively high initial scores of each group, which were probably corrected in the second survey.

## VIII. SECOND-GRADE READING (PT) TEACHERS

Characteristics of PT teachers. The overwhelming majority (84%) of second grade reading teachers are male. Over half (57%) of the teachers are between the age of 25 and 34, and another 26% are between the ages of 35 and 44. Only 12 teachers (4%) are under 25 years of age, and 37 teachers (13%) are 45 years of age or older.

While almost all (95%) of the second-grade teachers are high school graduates, only 3 teachers have received college degrees. On average, the second grade reading teacher has 9 years of teaching experience. The majority (60%) received PEP training in 1988 or 1989. Consequently, only 27% have had the opportunity to receive follow-up PEP training.

What PT teachers learned from supervision and radio. We were interested in PT teachers' administrative and methodological skills, as well as their own abilities as readers. We asked about:

- What responsibility they took for making module and test booklets available;
- How frequently they took module booklets home to prepare lessons;
- How they handled remedial students;
- How well they read punctuation in poetry;
- How well they could identify vowels, pronounce vowels and identify word sounds (phonemes), and

## How they liked their job as a teacher and the PEP methodology.

We first asked PT teachers what they did when a **module or test booklet was missing**, and gave them a positive score if they responded that they notified the principal or the Ministry. Table VIII-1 illustrates that the group which had scored the poorest on the pre-test (frequent listeners at 52%) made the most improvement (to 83%). We believe that combined supervision and radio played an important remedial role--helping those whose performance had been below par. PT teachers selected recently (1988-89) improved by almost twice as much as the earlier cohort (1980-87), probably due to their lower position on the learning curve.

Non-listeners fell from 76% to 73%, and occasional listeners from 65% to 62%. These scores are close enough to be unremarkable.

To estimate how frequently **second-grade teachers took module books home to prepare lessons**, we asked when the last time was that they did so. To create a score, we recoded the mid-point of the interval between the time of the survey and the time they took a book home.

We found that the average interval was about four weeks before the period of supervision and radio broadcasts (Table VIII-2). After this period, the intervals for non-listeners and frequent listeners improved from 4.0 to 2.4 and from 3.9 to 2.8 weeks respectively, while the occasional listeners interval fell from 4.5 to 4.0 weeks. Using these rough measures, we see no notable impact of radio alone on teacher's home preparations, but supervision and radio combined appears to have had a positive effect.

We asked ten questions to find out whether teachers were using PEP methods with **students who needed remedial help**, and calculated the average percent of questions

TABLE VIII-1

PERCENTAGE OF PT TEACHERS TAKING RESPONSIBILITY  
FOR THE AVAILABILITY OF MODULE BOOKLETS AND TESTS

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Responsible for Module Books/Tests	75.6	73.2	65.0	61.5	52.2	83.3
(N of cases)	(41)	(41)	(20)	(26)	(23)	(30)

\*\*\*

P R E / P O S T C H A N G E

TOTAL	- 2.4	- 3.5	31.1
- 1980-87 Cohort	- 3.3	1.7	23.7
- 1988-89 Cohort	- 2.2	- 16.7	42.9

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TABLE VIII-2

FREQUENCY OF PREPARING FOR PT CLASS  
BY TAKING MODULE HOME

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
# Weeks Since Taking Module Home	4.0	2.4	4.5	4.0	3.9	2.8
(N of cases)	(105)	(112)	(59)	(62)	(57)	(59)

P R E / P O S T C H A N G E

TOTAL	- 1.6	- 0.5	- 1.1
- 1980-87 Cohort	- 1.2	- 1.4	- 0.2
- 1988-89 Cohort	- 1.9	0.3	- 2.1

*rb*

answered correctly by each group. The questions concerned the kinds of students who were given remedial work, how pronunciation problems were diagnosed, and how remedial help was given to transfer students.

Table VIII-3 shows that all groups scored around 43% on the pre-test (non-listeners 41%, occasional listeners 43% and frequent listeners 46%), and the scores for each group rose about 5% on the post-test (to 47% for non-listeners, 50% for occasional listeners and 51% for frequent listeners. This modest rise in scores appears to be a result of both supervision and radio.

The Ministry personnel were interested in knowing whether radio could be used as a means to help teachers with aural/oral skills such as **reading poetry and pronouncing vowels and word sounds**. First, teachers were asked to read lines from a poem, and we assessed their ability to follow the rhythm of the poem as indicated by its punctuation, and to recognize which words rhymed. We averaged for each group the percent of the four questions answered correctly.

Table VIII-4 illustrates that there was little gain in **poetry-reading skills** by the entire group of teachers (5% for non-listeners, 0% for occasional listeners and 3% for frequent listeners). However, the gains among the second cohort were relatively strong (8% for non-listeners, 10% for occasional listeners, and 15% for frequent listeners), while the scores of listeners in the first cohort fell (-8% for both groups of listeners). We would conclude that radio accounted for roughly 2% to 7% of the positive gain of listeners in the second cohort.

Then, to see how well teachers could identify and pronounce vowel sounds, we presented them with a series of seven words, and gave a separate scores on vowel identification and pronunciation. A positive score on each item was given to those who

TABLE VIII-3

PT TEACHER REMEDIATION PERFORMANCE  
(PERCENTAGE CORRECT ON 10-POINT SCALE)

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent Correct on Remediation Scale	41.2	46.8	42.7	50.0	45.9	50.5
(N of cases)	(105)	(114)	(59)	(63)	(58)	(60)

P R E / P O S T C H A N G E

TOTAL	5.6	7.3	4.6
- 1980-87 Cohort	2.8	7.4	5.1
- 1988-89 Cohort	7.1	7.1	4.0

*206*

TABLE VIII-4

PT TEACHER PERFORMANCE ON POETRY READING  
(PERCENT CORRECT ON 4-POINT SCALE)

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent Correct on Poetry Scale	52.5	57.5	47.5	47.5	50.0	52.5
(N of cases)	(99)	(107)	(58)	(61)	(56)	(56)

P R E / P O S T C H A N G E

TOTAL	5.0	0.0	2.5
- 1980-87 Cohort	2.5	- 7.5	- 7.5
- 1988-89 Cohort	7.5	10.0	15.0

726

got all seven correct.

Table VIII-5 shows that the scores on **vowel identification** improved for each group, except for the occasional listeners in the second cohort of schools. For teachers selected more recently (1988-89) who were frequent listeners, we can attribute about 4% of the increase to radio alone, as the scores rose 13% for non-listeners and 17% for frequent listeners.

Table VIII-6 illustrates that scores on **pronouncing vowel sounds** improved for each group, though only in the case of non-listeners was the improvement noteworthy--a gain of 10% from 47% to 57%. This is another case in which the lowest scoring group on the pre-test (non-listeners) rose to about the same level as the other two groups on the post-test (57%). We can conclude that supervision without radio helped bring the group that lagged behind up to par. Both in the identification and the pronunciation of vowel sounds, the second cohort of schools made dramatic improvement (13% and 14% respectively) in contrast to the first cohort. This indicates that in-service training probably has a greater effect when it is given sooner rather than later after the initial training.

We also asked teachers to identify a series of **word sounds**, and calculated the average percentage of correct responses for each group. Table VIII-7 shows that the average scores on this item ranged around 70% at the time of the pre-test, compared to an average of under 60% for identifying vowel sounds. While the average score of the non-listeners rose only about 3%, that of occasional listeners rose 13% and frequent listeners 9%. In this case we can attribute the rise to radio, roughly 10% for occasional and 6% for frequent listeners.

TABLE VIII-5

PT TEACHER PERFORMANCE IDENTIFYING VOWELS  
(PERCENT CORRECT ON 7-POINT SCALE)

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent of Vowels Identified Correctly	55.7	67.1	61.4	62.9	51.4	64.3
(N of cases)	(92)	(110)	(55)	(61)	(52)	(55)

P R E / P O S T C H A N G E

TOTAL	11.4	1.5	12.9
- 1980-87 Cohort	7.2	5.8	10.0
- 1988-89 Cohort	12.8	- 2.8	17.2

3a

TABLE VIII-6

PT TEACHER PERFORMANCE PRONOUNCING VOWELS  
(PERCENT CORRECT ON 7-POINT SCALE)

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent of Vowels Pronounced Correctly	47.1	57.1	54.3	57.1	51.4	54.3
(N of cases)	(91)	(108)	(55)	(60)	(51)	(55)

P R E / P O S T C H A N G E

TOTAL	10.0	2.8	2.9
- 1980-87 Cohort	4.3	1.4	5.7
- 1988-89 Cohort	14.2	5.7	2.8

n36

TABLE VIII-7

PT TEACHER PERFORMANCE IDENTIFYING WORD SOUNDS  
(PERCENT CORRECT ON 8-POINT SCALE)

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent of Sounds Identified Correctly	76.3	78.8	71.3	83.8	71.3	80.0
(N of cases)	(101)	(112)	(58)	(62)	(54)	(58)

P R E / P O S T C H A N G E

TOTAL	2.5	12.5	8.7
- 1980-87 Cohort	- 1.3	11.3	7.5
- 1988-89 Cohort	3.8	12.5	8.8

1/30

Overall, the indications of radio's usefulness in helping teachers improve their pronunciation is mixed: it seems to have improved their ability to read poetry and to identify vowel and word sounds, but not to pronounce vowel sounds.

As we did with principals, we assessed the extent to which in-service supervision and radio broadcasts had affected second-grade teacher's attitudes toward their jobs and the PEP program. If, when asked whether he liked his job as a teacher better than other jobs he could be doing, the teacher answered that it was a better job than others, he received a positive score. On a second question, if he said that he liked the PEP instruction better than conventional methods, his score was positive.

Results presented in Tables VIII-8 and VIII-9 show high levels of satisfaction across the board, with most scores being in the 80% or high 70% range. In most cases the score slipped slightly from the pre-test to the post-test, but we attribute this to measurement error rather than to a decrease in satisfaction, as the scores were so high and the differences between them so small. The only noteworthy exception to this trend is in the case of first cohort non-listeners' attitudes toward PEP instruction, in which the score fell nearly 23%.

## IX. FIFTH-GRADE SCIENCE (PL) TEACHERS

Characteristics of PL teachers. Almost all fifth grade PL science teachers are male (96%). Their age distribution is similar to that of second grade reading teachers. Half of the teachers are between the age of 25 and 34, and another 36% are between the ages of 35 and 44. Only 6 teachers are below the age of 25, while 31 teachers (11%) are 45 years of age or older.

TABLE VIII-8

PERCENTAGE REPORTING THAT BEING A TEACHER IS BETTER  
THAN OTHER JOBS HE/SHE COULD BE DOING

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent Mentioning Teaching is Better	84.2	78.8	83.9	78.7	77.2	75.0
(N of cases)	(101)	(113)	(56)	(61)	(57)	(60)

P R E / P O S T C H A N G E

TOTAL	- 5.4	- 5.2	- 2.2
- 1980-87 Cohort	- 9.5	7.0	- 5.7
- 1988-89 Cohort	- 3.3	- 18.5	1.5

*246*

TABLE VIII-9

PERCENTAGE OF PT TEACHERS REPORTING THAT PEP INSTRUCTION  
IS BETTER THAN CONVENTIONAL METHODS

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent Mentioning PEP is Better	85.6	80.2	86.2	85.5	86.4	86.7
(N of cases)	(104)	(116)	(58)	(62)	(59)	(60)

P R E / P O S T C H A N G E

TOTAL	- 5.4	- 0.7	0.3
- 1980-87 Cohort	- 22.5	- 0.6	- 3.2
- 1988-89 Cohort	3.3	0.0	4.0

24b

Virtually all of the teachers (98%) have graduated from high school, but only 11 have received a college degree. On average, the fifth grade science teacher has 9 years of experience teaching. About 63% of the teachers received PEP training in 1988 or 1989, and 25% have received some follow-up PEP training.

Overall, the demographic characteristics of fifth grade science teachers and second grade reading teachers are quite similar, except that science teachers are somewhat more likely to have graduated from high school.

What PL teachers learned from supervision and radio. Some of the questions we asked fifth-grade PL teachers were the same as those we asked second-grade PT teachers. In these cases, the scoring procedures were also the same. Specifically, we asked fifth-grade teachers:

- What responsibility they took for making module and test booklets available;
- How frequently they took module booklets home to prepare lessons;
- How they handled remedial students;
- How they prepared for new modules and monitored students during modules;
- How they formed peer groups;
- How they administered tests;
- How they liked their job as a teacher and the PEP instructional methodology;

Roughly half of the fifth-grade teachers had been faced with **missing module or text booklets**. Table IX-1 shows that neither supervision nor radio seems to have influenced many of them to report missing items to the principal or the Ministry. In fact, the results indicate a decrease in average scores for non-listeners (from 82% to 73%).

TABLE IX-1

PERCENTAGE OF PL TEACHERS TAKING RESPONSIBILITY  
FOR THE AVAILABILITY OF MODULE BOOKLETS AND TESTS

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Responsible for Module Books/Tests	81.8	72.7	75.0	74.1	64.0	64.3
(N of cases)	(44)	(55)	(20)	(27)	(25)	(28)

P R E / P O S T C H A N G E

TOTAL	- 9.1	- 0.9	0.3
- 1980-87 Cohort	- 11.0	13.2	9.0
- 1988-89 Cohort	- 5.7	- 25.7	- 6.7

75a

Only in the case of first cohort schools can we see the positive influence of radio: scores in this group show a net positive change of 24% for occasional listeners and 20% for frequent listeners when the percent change of non-listeners is subtracted from that of listeners.

Like second-grade teachers, fifth-grade teachers were asked about their preparation for teaching lessons, and their responses were scored in the same manner. Supervision and radio appear to have helped persuade teachers to **take home module booklets to prepare for class.**

Table IX-2 reveals that scores improved across the board on this item: the interval between taking a booklet home fell by 1.2 weeks for non-listeners, .7 weeks for occasional listeners, and 2.5 weeks for frequent listeners. By subtracting the increase for non-listeners (1.2 weeks) from that of frequent listeners (2.5 weeks) we can attribute about half of the gain to radio alone.

Fifth-grade teachers were asked similar questions as second-grade teachers about how they diagnosed and treated **students who needed remedial help**, and we scored their responses in the same manner.

As shown in Table IX-3, we found that the scores of each group increased a few percentage points. Non-listeners went from 50% to 55%; occasional listeners from 53% to 59%, and frequent listeners from 55% to 60%. Radio generally increases scores above and beyond the impact of supervision alone, although the added contribution is never more than a few percentage points.

TABLE IX.2

FREQUENCY OF PREPARING FOR PL CLASS  
BY TAKING MODULE HOME

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
# Weeks Since Taking Module Home	3.5	2.3	3.8	3.1	3.6	1.1
(N of cases)	(96)	(105)	(53)	(55)	(50)	(50)

P R E / P O S T C H A N G E

TOTAL	- 1.2	- 0.7	- 2.5
- 1980-87 Cohort	- 2.4	- 0.9	- 2.8
- 1988-89 Cohort	- 0.3	- 0.6	- 1.9

266

TABLE IX-3

PL TEACHER REMEDIATION PERFORMANCE  
(PERCENTAGE CORRECT ON 10-POINT SCALE)

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent Correct on Remediation Scale	50.4	54.8	52.6	58.6	55.3	60.2
(N of cases)	(96)	(104)	(53)	(56)	(47)	(50)

P R E / P O S T C H A N G E

TOTAL	4.4	6.0	4.9
- 1980-87 Cohort	3.3	6.9	1.0
- 1988-89 Cohort	5.1	5.3	9.8

263

To find out whether teachers were following the procedures they had been taught to **introduce and monitor new modules**, we asked what they did to prepare for the first lesson for a whole class and for a peer group on the module, what they did to make sure the groups were making progress, and how students used their notebooks during their work. Teachers were given a point for each correct response to these questions. To get a perfect score, a teacher would have identified 18 correct preparation and monitoring behaviors, such as he or she read over the module, studied how to pronounce difficult words, explained difficult concepts, and sat with each peer group individually. The teacher's response would include that students were to use their notebooks to write summary/frame notes, to write answers and to copy assignments. We calculated the average percent of correct responses given by each group.

Table IX-4 indicates that each group improved between the pre- and post-tests. Non-listeners and occasional listeners both started at about 27% correct responses and rose to about 39%, and frequent listeners went from 30% to just over 40%. Thus we can see that supervision alone accounted for most of the improvement in scores. Also, we see that most improvement occurred in the second cohort of teachers recently selected into the PEP program. Again, it seems that in-service training has its biggest impact shortly after the initial training.

We asked teachers how they **formed peer groups**, and gave them a positive score if they said they considered the sex and age of students, their learning pace, whether they were new or old, and their compatibility with other students in the group.

On this item (Table IX-5), each group gained 6% in their score between the pre-test and post-test. Non-listeners were at the low end, moving from 24% to 30%, occasional listeners moved from 26% to 32%, and frequent listeners went from 28% to 34%. Supervision alone appears to account for most of the gains.

TABLE IX-4

PL TEACHER METHODOLOGY PERFORMANCE  
(PERCENTAGE CORRECT ON 18-POINT SCALE)

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent Correct on Methodology Scale	26.7	39.4	27.2	38.9	30.0	40.6
(N of cases)	(95)	(104)	(53)	(56)	(49)	(50)

P R E / P O S T C H A N G E

TOTAL	12.7	11.7	10.6
- 1980-87 Cohort	8.9	9.4	7.3
- 1988-89 Cohort	15.5	13.3	13.9

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TABLE IX-5

PL TEACHER PERFORMANCE FORMING PEER GROUPS  
(PERCENTAGE CORRECT ON 5-POINT SCALE)

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent Correct on Peer Group Scale	24.0	30.0	26.0	32.0	28.0	34.0
(N of cases)	(96)	(106)	(53)	(56)	(50)	(50)

P R E / P O S T C H A N G E

TOTAL	6.0	6.0	6.0
- 1980-87 Cohort	8.0	10.0	4.0
- 1988-89 Cohort	6.0	4.0	10.0

Teachers were asked about how they prepared for module tests to peer groups and to the class, and how they prevented students from getting questions and answers in advance. They were given points for correct responses to each question--that they asked review questions to the group, made sure there were no problems with any lessons, asked "answer in notebook" questions, reviewed all modules, wrote test questions on the board, changed the order of test questions, and did not allow students to keep test papers. We calculated the average percent of correct answers given in each group.

Table IX-6 shows that while supervision contributed to improved scores among non-listeners on this item, radio helped raise the scores of listeners even higher. Both non-listeners and occasional listeners averaged about 31% on the pre-test; frequent listeners averaged about 36%. On the post-test, non-listeners scores rose 7% to 38%, occasional listeners rose 14% to 45%, and frequent listeners rose 17% to 53%.

The improvement was particularly noticeable among the second cohort of schools, in which occasional listeners and frequent listeners rose in score 20% and 21% respectively. About half of this increase can be attributed to radio alone. This kind of improvement among the schools which have more recently entered the PEP program contributes to our conclusion that in-service training, including radio, have a greater impact in the initial years of participation in PEP.

Finally, we assessed the extent to which in-service supervision and radio broadcasts had affected fifth-grade teacher's attitudes toward their jobs and the PEP program. The results concerning their attitude toward their jobs were similar to those of second-grade teachers (Table IX-7). Scores were high (between 80% and 86%) to begin with, and they fell some in every case except that of frequent listeners in the second cohort,

TABLE IX-6

PL TEACHER PERFORMANCE ADMINISTERING TESTS  
(PERCENTAGE CORRECT ON 7-POINT SCALE)

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent Correct on Testing Scale	31.4	38.6	31.4	45.7	35.7	52.9
(N of cases)	(94)	(106)	(52)	(56)	(50)	(50)

P R E / P O S T C H A N G E

TOTAL	7.2	14.3	17.2
- 1980-87 Cohort	1.4	7.1	14.3
- 1988-89 Cohort	11.4	20.0	21.4

TABLE IX-7

PERCENTAGE REPORTING THAT BEING A TEACHER IS BETTER  
THAN OTHER JOBS HE/SHE COULD BE DOING

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent Mentioning Teaching is Better	81.5	79.4	86.5	76.8	85.7	83.7
(N of cases)	(92)	(102)	(52)	(56)	(49)	(49)

P R E / P O S T C H A N G E

TOTAL	- 2.1	- 9.7	- 2.0
- 1980-87 Cohort	- 4.4	- 2.4	- 7.8
- 1988-89 Cohort	- 0.4	- 15.2	5.4

where they rose 5.4%. The only notable slippage is among occasional listeners in the second cohort (15%).

The scores on attitudes toward the PEP program (Table IX-8) were also high to begin with, ranging from 80% to 91%), and the change in scores between pre-test and post-test is so erratic and lacking in pattern, that we conclude that neither supervision nor radio had an impact on what were already positive attitudes.

## X. SUMMARY AND CONCLUSIONS

We evaluated the pilot radio programs by testing teachers and principals both before and after the programs were broadcast, to see if there was any detectable difference in what they did as PEP teachers after the broadcasts. We found that the **radio programs alone (after removing the impact of in-service supervision visits) did indeed help to improve about one-third of the skills that we measured.** The specific instances in which this occurred were helping principals to handle teacher shortages and to prepare for and monitor faculty meetings; helping second-grade teachers to read poetry and identify vowel sounds and word sounds, and helping fifth-grade teachers to prepare for class by taking module booklets home and to administer tests.

We also found that the **combination of supervision and radio improved teachers' and principals' performance** on almost every item except those on which the initial score was so high to begin with that there was little room for improvement. Skills which improved as the result of a combination of radio and supervisory visits were, for principals, keeping attendance records, taking responsibility for module and test booklets, and holding faculty meetings more frequently; for second grade teachers, going to the principal or Ministry for more booklets, taking modules home to prepare

TABLE IX-8

PERCENTAGE OF PL TEACHERS REPORTING THAT PEP INSTRUCTION  
IS BETTER THAN CONVENTIONAL METHODS

	NON-LISTENERS		OCCASIONAL LISTENERS		FREQUENT LISTENERS	
	(pre)	(post)	(pre)	(post)	(pre)	(post)
Percent Mentioning PEP is Better	82.4	84.0	88.7	91.1	89.8	88.0
(N of cases)	(91)	(106)	(53)	(56)	(49)	(50)

P R E / P O S T C H A N G E

TOTAL	1.6	2.4	- 1.8
- 1980-87 Cohort	- 8.9	7.1	- 3.6
- 1988-89 Cohort	8.7	0.0	0.7

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for class, and providing remedial help to students; for fifth-grade teachers, providing remedial help to students, using PEP methodology to promote and monitor student progress, and forming peer groups. In several of these instances, we observed that groups which lagged behind on the pre-test were brought up to the level of the other groups on the post-test.

In the case of helping second-grade teachers pronounce vowel sounds, our results indicate that **supervisory visits** made an impact, but that the radio programs did not.

The results of the evaluation indicate that radio and supervision play an important role in improving the performance of those teachers and principals whose skills are not up to the standard of the group as a whole. We saw several times cases in which the score of a group which was notably lower on the pre-test rose to the level of the other groups on the post-test: principals keeping attendance and taking responsibility for booklets, and second-grade teachers turning to principals and the Ministry for additional booklets.

Also, the second cohort of schools (those which had entered the PEP program more recently) made stronger gains on the whole than the first cohort, demonstrating that radio and supervision have a greater impact on those who are on the lower end of the learning curve. Principals in the second cohort of schools improved their keeping of attendance records and increased the frequency of faculty meetings; second-grade teachers made gains in poetry reading and pronouncing vowel sounds, and fifth-grade teachers were better able to perform the PEP teaching methodology and administer tests.

Greater gains in the first cohort were made by principals in the frequency with which they hold faculty meetings, and by fifth-grade teachers in seeking additional booklets

from the principal or Ministry.

In conclusion, the results of our evaluation show that radio programs, combined with supervisory visits, scheduled within a year after teachers and principals receive their initial training in the PEP instructional methodology, help to reinforce that training, and to provide remedial help to those who are weak in particular skills.

The provision of radios to schools in LRCN counties seems to have encouraged the success of the pilot radio programs. Very few teachers or principals in other counties listened to any programs at all.

Where radios were provided, very few problems were reported. Only 11 principals reported having problems with batteries and 7 reported that reception was sometimes a problem.

Almost all of the teachers and principals (99% or more) reported that they liked the radio programs, that the programs were helpful, and that there should be more programs next semester. On the basis of these positive (though possibly inflated) assessments, and the improvements in performance that have been recorded in this report, the PEP Program should look favorably on the continuance of radio broadcasting to PEP schools.