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THE RADIO LEARNING PROJECT

FINAL REPORT

DECEMBER 1990

TABLE OF CONTENTS

INTRODUCTION 1

INFORMATION DISSEMINATION AND PROJECT DEVELOPMENT 2
- NETWORK 2
- PUBLICATIONS 2
  - Newsletters 2
  - Technical Briefs 3
  - Book 3
  - Brochure 3
- VIDEOS 3
- PAPERS AND PRESENTATIONS 4
  - World Conference on Education for All - Thailand 4
  - A.I.D. Basic Education Workshop 4
  - Symposium on Educational Broadcasting - Philippines 4
  - World Bank Workshop on Educational Technology 4
  - African Experiences in Education 5
- PUBLISHED PAPERS 5
- CONFERENCES 5
  - Second Latin American Conference on Interactive Radio - Honduras 5
  - African Conference on Educational Radio - Zimbabwe 6
- WORKSHOPS 6
  - Uganda, 1988 6
  - Honduras, 1990 6
  - Zimbabwe, 1990 7

IMPLEMENTATION 7
- LATIN AMERICA 7
  - Bolivia 7
    - IRI Math Lessons 7
    - IRI Health Lessons 12
  - Costa Rica 14
  - Ecuador 16
  - Honduras 16
    - IRI Math 16
    - IRI English 21
    - Social Marketing 21
- THE CARIBBEAN 22
  - Belize 22
  - Dominican Republic 22
- AFRICA 23
  - Lesotho 23
  - Swaziland 25

EXTERNAL EVALUATION OF RLP 27
A. Promoting Adoption of IRI Programs 27
B. Internationalizing RLP 28
C. Preliminary Site Development Activities 28
D. Insuring Long-term Sustainability 28

LESSONS LEARNED 29
IRI is a Cost-Effective Intervention 29
More Than Achievement Gains is Necessary 29
Generic Programs are Still Elusive 30
Successful Marketing Components 31
Social Marketing is Still Underutilized 32
Growing Interest in Less Traditional Subjects 32
Successful Projects Can Be Based in Government or Private Institutions 33
Developing Local Capacity 33
Still Limited Appeal for Using IRI to Improving Access 34
Support from Other Donors is Slowly Developing 34

SUMMARY OF RLP'S 5-YEAR EXPERIENCE 34

THE RADIO LEARNING PROJECT
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INTRODUCTION

The Radio Learning Project (RLP) was established by the Agency for International Development (A.I.D.), Bureau for Science and Technology, Office of Education, to disseminate information about interactive radio instruction and to encourage and support the development of interactive radio projects. Begun in October, 1985, the project was administered by a consortium that comprised the Education Development Center, Inc. (EDC) of Newton, Massachusetts, as prime contractor, the Academy for Educational Development, Inc. (AED) in Washington, D.C., and Friend Dialogues of North Carolina, Inc.

The aim of RLP was to improve the learning of basic primary school skills in developing countries through the use of interactive radio instruction (IRI). The project based its work on fifteen years of research and development of the IRI methodology, resulting in effective, low-cost, radio-based curricula for developing nations.

At its inception RLP was specifically charged with three major tasks: (a) **information dissemination**, (b) **project development**, and (c) **project implementation**. Information dissemination refers to broad marketing activities designed to familiarize educational leaders around the world about IRI; project development refers to more intensive promotional efforts in countries where IRI activities were likely to develop. Project implementation refers to the develop of IRI activities. In reality, there was considerable overlap between information dissemination and project development; thus, these categories will be combined in this report.

This report will highlight RLP's main achievements during its five-year term; in addition, it will summarize the project's work in 1990. Earlier annual reports provide details on accomplishments of the previous years. This report will conclude with a summary of lessons learned that can be applied to the RLP follow-on project Learning Technologies for Basic Education (LearnTech) Project beginning in September, 1990, which is also funded by A.I.D., Bureau for Science and Technology, Office of Education, and administered by a consortium lead by EDC.

By September, 1990, when RLP activities ended, the project had established a network of educators throughout the developing world. It had successfully developed, tested and implemented programs of interactive radio instruction in mathematics, languages, health,

science, and in-service teacher training. IRI programs are now reaching 600,000 children in ten countries in Latin America, Asia, and Africa.

INFORMATION DISSEMINATION AND PROJECT DEVELOPMENT

The RLP consortium developed a multifaceted strategy for promoting IRI in developing countries. This involved the establishment of a network of educators knowledgeable about IRI; the creation of print and video materials; and presentations at conferences and workshops.

At the beginning of the project, RLP hired a marketing consultant to help develop a promotional strategy. This consultant assisted the project in identifying primary and secondary target audiences, and the types of promotional efforts that might be most effective.

NETWORK

The RLP developed a network of some 700 individuals and institutions. The network was derived from culling the mailing list of the Development Communication Report, from A.I.D. and other donor contacts, from project inquiries, conference participants, and from individuals on our consultant network lists.

This master list was used for occasional, large-scale mailings including such items as the RLP brochure and newsletters.

PUBLICATIONS

Newsletters

The RLP produced three reports in the form of a newsletter. The first report was released in August, 1986. It contained articles on the IRI methodology and the development of IRI projects in Kenya, Papua New Guinea, Nepal, and the Dominican Republic. The newsletter also included a brief report on estimating costs of IRI projects.

The second report, in April, 1988, contained articles on IRI's role in improving basic education in different parts of the world, and provided brief reports about IRI in Honduras, Bolivia, the Dominican Republic, Ecuador, Costa Rica, Papua New Guinea, Thailand and Lesotho.

The final report, in March, 1990, featured special discussions on the development of generic or regional programs and the second language factor in IRI, as well as summaries and reports of current projects.

Technical Briefs

Technical briefs are 1-2 page documents on specific aspects of IRI. They included summaries of activities by sites and by subject. A technical brief was prepared for each country that implemented an IRI activity; these briefs contained a summary of the IRI activity and the results of evaluations. Other briefs focused on certain themes such as student achievement in IRI classes and the role of classroom teachers.

Book

The RLP published Interactive Radio Instruction: Confronting Crisis in Basic Education, an A.I.D monograph, in February 1990. Written by Joan Zirker, the book includes a history and overview of IRI and an appendix on costs.

Brochure

The most useful marketing tool for providing an introduction to IRI and RLP was our brochure. During the life of the project, two editions of the brochure were prepared.

VIDEOS

Videos were probably the most effective marketing tools. RLP used videos produced for previous projects (Radio Mathematics in Nicaragua), Radio: The Interactive Teacher [Radio Language Arts Project, Kenya], and RADECO [Dominican Republic]. RLP developed a composite video from these earlier versions, but the result was not satisfactory. What was very successful, however, was taking excerpts from the Kenyan and Nicaraguan videos that showed only classroom scenes of children using IRI, without any narration. These video clips show in just a few minutes what an IRI classroom is like.

The RLP also produced videos of its own. It produced a 12-minute tape on the Bolivian radio mathematics project. Like the video clips just described above, this video has no narration; however, it shows very well a variety of broadcast and postbroadcast activities in a second grade IRI math class.

The project also produced two video tapes as part of the IRI English pilot project in Swaziland. These tapes provide new perspectives on IRI activities. One tape focuses on the role of the teacher in an IRI English class; the other tape presents an overview on an IRI pilot project -- the project objectives, the recording of lessons, the selection of classes, the training of teachers, and the evaluation of the lessons.

PAPERS AND PRESENTATIONS

Approximately twice a year RLP staff gave presentations at conferences. These presentations, although of some use for promoting IRI, did not have a major impact on our marketing efforts.

The RLP representatives gave presentations at each annual CIES conference, and at a regional CIES meeting in Cambridge, Mass.

The RLP staff have also given presentations at the World Bank including the Economic Development Institute seminar in April, 1988, to the World Bank's Africa Region Technical Department staff, and, in May 1990, to a workshop on educational technology for World Bank staff.

World Conference on Education for All - Thailand

The World Conference on Education for All, held in Thailand from March 5-9, 1990, was a major conference co-sponsored by the World Bank, UNESCO, UNICEF and UNDP, with contributions from A.I.D. and many other donors. The purpose of the conference was to develop support and a strategy for a major increase in emphasis on basic education.

IRI was well represented at the conference. A.I.D. and several other organizations displayed videos on IRI. Interactive radio was also featured at A.I.D.'s round table on distance education. A live demonstration of Thai children learning English by radio offered convincing testimony to IRI's effectiveness.

A.I.D. Basic Education Workshop

The RLP Director gave a presentation on IRI at the A.I.D. Basic Education Workshop, held in Washington, D.C. in February, 1990. The workshop provided an opportunity to share with other donors A.I.D.'s experience in supporting basic education programs.

Symposium on Educational Broadcasting - Philippines

Two RLP staff members presented an overview of IRI at the 1990 Symposium on Educational Broadcasting in Asia and the Pacific Region, held in Manila, Philippines from March 28-30, 1990. They showed "Science on Air," the new Radio Science Project video, to the plenary session. There was considerable interest in IRI, especially among Filipino participants.

World Bank Workshop on Educational Technology

The RLP Project Director was a member of a team that conducted a workshop on educational technology for World Bank staff in Washington, D.C. in May, 1990. His presentation focused on IRI.

African Experiences in Education

In September, 1990, the RLP Project Director gave a presentation on IRI at the A.I.D.-sponsored conference in Lome, Togo, Workshop on Basic Education Development in Africa: Lessons Learned.

PUBLISHED PAPERS

Interactive Radio Instruction: Developing Instructional Methods published in the British Journal of Educational Technology by Jamesine Friend, 1989.

The Strange Case of the Oddly Shaped Exercises (Tech.Rep.904) by Jamesine Friend, 1989.

Computer Analysis of the Textbook Español 1 (Tech.Rep.904) by Jamesine Friend, 1989.

Sequence of Instruction in Syllables in Español 1, Series Mi Honduras (Tech.Rep.1002) by Jamesine Friend, 1990.

Ecuador Radio Mathematics Pilot Project (Tech.Rep.1005) by Jamesine Friend, 1990.

Health Education Through Interactive Radio: A Child-to-Child Project in Bolivia by Michelle L. Fryer.

CONFERENCES

RLP organized two major conferences which were effective in promoting IRI.

Second Latin American Conference on Interactive Radio - Honduras

Sixty-five delegates from eleven Latin America, African and Asian countries and the United States attended the conference in Tela, Honduras, from November 14-18, 1988.[1] Most delegates represented nations where IRI was already in use or where its adoption was likely. Workshops were held on the use of IRI in basic education and teacher training. Topics included project design, adaptation, financing, evaluation, information dissemination, and potential use in non-formal education. Co-hosted by AVANCE[2], the Honduran Ministry of Education, the Radio Learning Project, and

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[1] The first international IRI conference was held at the conclusion of the RADECO project in the Dominican Republic in December, 1985.

[2] AVANCE is the Honduran private organization that developed the new IRI mental mathematics series.

A.I.D.'s Bureau for Science and Technology, Office of Education, the conference provided delegates with opportunities for technical exchange at a time when the dissemination of IRI was rapidly increasing.

African Conference on Educational Radio - Zimbabwe

African educators from 16 countries attended the African Conference on Radio Education in Harare, Zimbabwe, from January 22-26, 1990. Sponsored by the Radio Learning Project and Zimbabwe's Ministry of Education and Culture, the conference focused on problems facing educators in Africa and possible ways in which radio could help meet those needs.

The conference provided a forum for educators to share their experiences with the use of radio in formal and non-formal basic education. Participants agreed that radio is an efficient and cost-effective medium for achieving educational goals, and urged renewed emphasis on the technology's role in both formal and non-formal education in Africa. They resolved to promote closer collaboration between countries and regions to investigate educational radio on the continent.

A presentation on IRI comprised only a part of the conference, yet it evoked considerable interest among twelve of the participating countries.

WORKSHOPS

Uganda, 1988

The RLP and the Ministry of Education conducted a four-day workshop to acquaint Ugandan education officials with the IRI methodology in November, 1988. Attended by thirty-five officials from various departments of the Ministry, the workshop explored the potential uses of radio in general, and IRI in particular, to meet Uganda's educational challenges. The consensus was that IRI should be implemented in Uganda.

Honduras, 1990

In September, 1989, RLP sponsored a seminar, hosted by AVANCE, to discuss possibilities for developing regional IRI programs. Representatives participated from Honduras, Costa Rica, Bolivia, Ecuador, Guatemala and El Salvador. The purpose of the meeting was to explore ways of making new IRI programs more generic so that other countries could use the lessons with only minor modifications. There was general support for such an approach and different levels of generic programming were specified.

Zimbabwe, 1990

A workshop on *Radio for Effective Teaching* was conducted by RLP and Zimbabwe's Ministry of Education and Culture in September, 1990. Attended by thirty-five officials from the Ministry, the workshop examined ways in which radio could be used to enhance the quality of education in Zimbabwe. The workshop investigated the potential of IRI to improve Zimbabwe's educational quality.

IMPLEMENTATION

A review of RLP's implementation activities is provided in the following section.

LATIN AMERICA

Bolivia

IRI Math Lessons

In 1987, Bolivia completed a successful pilot activity in which the first twenty grade 2 lessons from the Nicaraguan radio math lessons developed were adapted, re-recorded and tried out in eleven schools.

In 1988, Bolivia then proceeded to implement a major IRI math project with Fe y Alegria, a Catholic private voluntary organization, as the host institution and RLP providing technical assistance. In 1990 lessons were broadcast to 25,000 children in rural and urban schools; the plan is to make the lessons available to 50,000 children in 1991. The Ministry of Education would like to implement the programs in all schools throughout Bolivia as soon as possible.

Summative evaluations of the impact of the radio lessons on student achievement have been conducted for Grades 2, 3 and 4. The results are now available for grades 2 and 3. For Grade 2 the introduction of interactive radio resulted in a jump of the average posttest score from 47.0% correct to 66.3%.[3] The effect size is .91[4]. It is particularly interesting to note the impact on the rural and urban schools. As shown in Figure 1, both groups of

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[3] Fryer, M. and Jamison, D. "*Math and Health Education Through Interactive Radio: The Bolivian Radio Education Project*," prepared for the World Bank, September 28, 1990.

[4] Effect size is a useful statistical measure for comparing educational interventions. It is calculated by taking the difference in mean scores between the experimental and control groups and dividing by the standard deviation of the control group. An effect size greater than .25 is generally considered to demonstrate a significant impact.

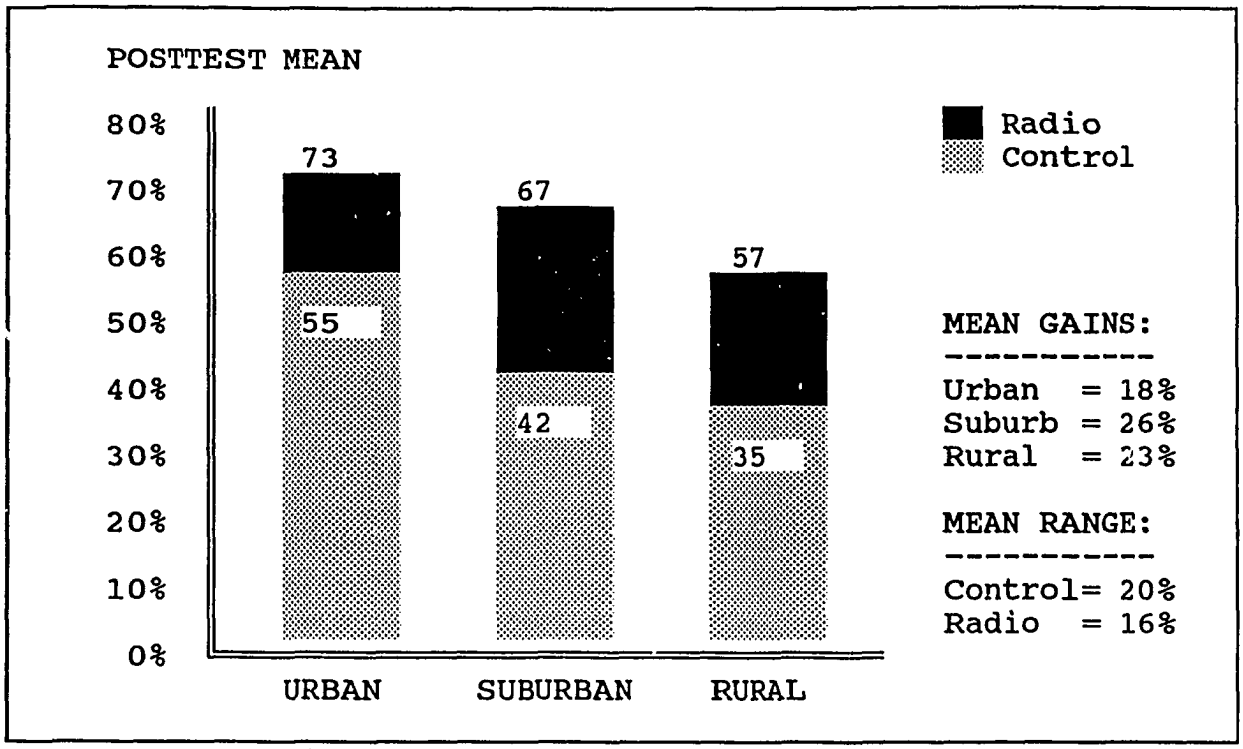

Figure 1 Comparison of Posttest Score for Urban, Suburban, and Rural Students

schools benefitted, but the improvement was more marked in the rural schools. In fact, with the intervention of the IRI lessons, the score of the rural schools exceeded those of the conventionally-instructed urban schools.

The results for Grade 3 are even more striking. A comparison was made between those children who had radio math lessons for just one year (Grade 3 only) and those who had IRI two years (Grades 2 and 3). As can be seen in Figure 2, the children who had just one year of the IRI lessons did much better (51.9% correct) than the control group (35.0% correct). However, the score of the children who had the radio lessons for two years was even higher (61.6% correct). The effect size scores for both experimental groups (1.29 and 2.03 respectively) are exceptionally high.

In September, 1990, Prof. Dean Jamison[5] in collaboration with Michelle Fryer, Chief of Party in Bolivia, conducted a cost-effectiveness study. For this study a new set of achievement data was collected in order to determine the relationship between learning gains and the amount of time studying mathematics in

[5] The cost studies done in 1990 in Bolivia, Honduras, and Lesotho were funded, in part, from a grant by the World Bank. All three studies are summarized in this document.

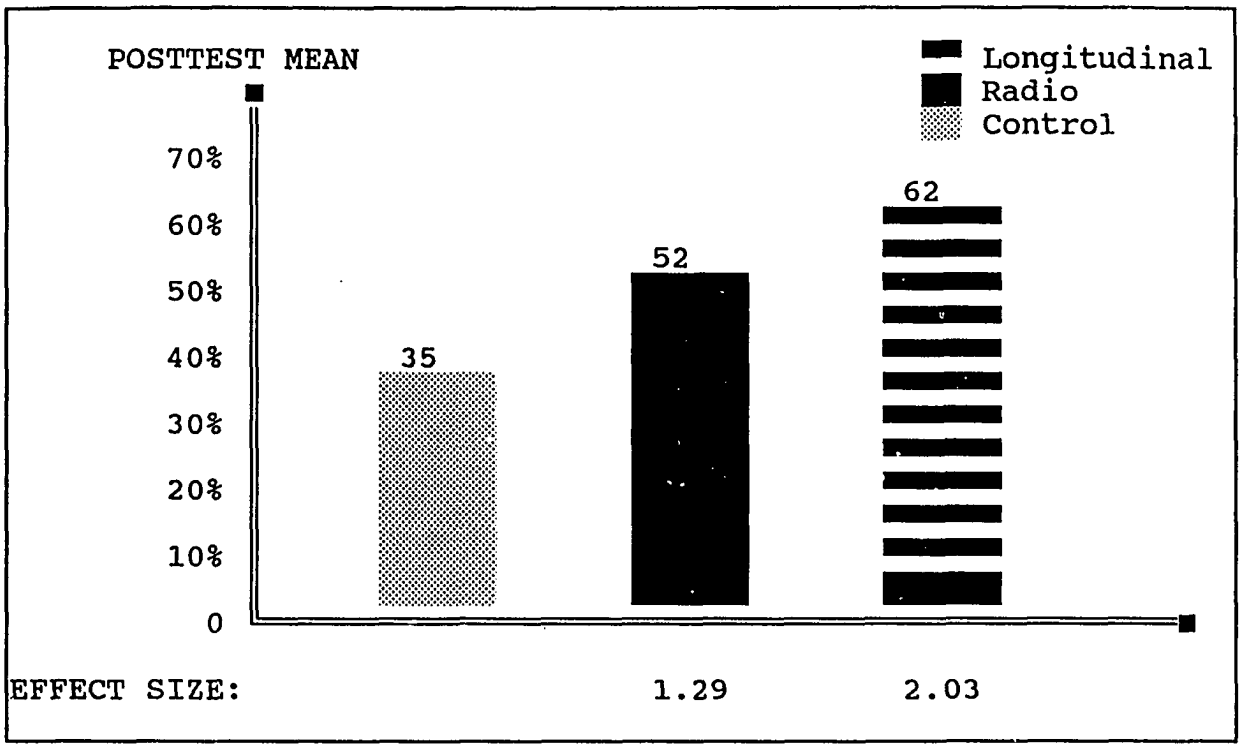

Figure 2 Comparison of Posttest Means for Control, Experimental, and Longitudinal Grade 3 Classrooms, Bolivia

school. A test was developed from the pool of items used in the second and third grade tests reported above. The test was designed to measure student mastery of objectives in the official Bolivian syllabus, not just the IRI curriculum. This test was administered about three-fourths of the way through the 1990 school year to 1,450 students in forty-eight second and third grade radio and control classes in Cochabamba.

By administering the same test to both grades, it was possible to assess the "normal" progression of learning over a year of both the experimental and control groups. In the control group, as expected, the children in Grade 3 scored significantly higher than the children in Grade 2. Overall, the scores were 22.5% correct for Grade 2 and 46.0% correct for Grade 3. The effect size was 1.7.

The scores from the radio classes were significantly higher for both Grade 2 and Grade 3 as shown in Table I. The effect size for both grades was .90, although there was considerable variation by location of school. There was almost no difference in suburban schools for Grade 3 (effect size = .03); the largest difference was for Grade 2 rural schools (effect size = 2.1).

Another way to look at the data is to recognize that a score of 35.0% for the Grade 2 radio lessons is about half way between the Grade 2 and Grade 3 scores (22.5% and 46.0%). That is, by

Table I % Correct by Grade and Experimental/Control Group, Bolivia

	Grade 2	Grade 3
Conventional Schools	22.5	45.0
Radio Schools	35.0	61.5
Effect Size	.90	.90

adding the radio lessons, the children learn about a half-year more as compared to children in conventional classes.

The radio costs can be divided between fixed and variable costs, that is, those costs that are fixed independently of the number of students and those costs that vary directly with the number of students. In Bolivia, the main fixed cost is the preparation of the math series. About $1.1 million was spent on developing 540 lessons resulting in a cost of about $2,100 per 30-minute lesson[6]. In addition, there were some start-up costs. Assuming a 15-year life-time for the lessons, the annualized cost (with a 7.5% interest or discount rate) is $140,000.

Variable costs can be divided between capital and recurrent costs. The major variable capital cost is for radios. Assuming a five-year life for the radios, the annualized cost is $.11 per student. The variable recurrent costs are estimated at $.70 per student per year. Thus, the total annual cost is:

Total cost = $140,000 (fixed cost) + $.81 * N (variable cost), where N equals the number of students.

Table II Cost for Radio Math by Number of Students, Bolivia

No. Students	Cost Per Student	Total Cost	Fixed Cost	Variable Cost
50,000	3.61	180,500	140,000	40,500
200,000	1.51	302,000	140,000	162,000
600,000 All Bolivia	1.04	626,000	140,000	486,000

[6] Lessons for grades 2-3 were adapted from the Nicaraguan series. The grade 4 lessons were also adapted from Nicaragua, but major changes were incorporated. The Bolivian team is developing a new series for grade 5.

The total cost and the cost per student will vary depending on the number of students. The impact of three levels of implementation for Bolivia is shown in Table II.

If N equals 50,000, the total variable cost is $40,500. Thus, this variable cost plus the fixed cost of $140,000 gives a total annual cost of approximately $180,500, or $3.61 per student. As the number of students using the program expands, the fixed cost per student decreases. If the project is expanded to include 200,000 children, the total cost per student drops to $1.51; with national implementation, the cost per student would drop to $1.04.

Most often cost-effectiveness is determined by the ratio of the <u>incremental gains in learning</u> to the <u>incremental costs</u>, with incremental gains in learning measured by effect size and incremental costs stated in terms of U.S. dollars per student per year. In Bolivia, using this definition of cost effectiveness, the cost-effectiveness ratio is determined by taking the effect size of .90 as a ratio to the incremental cost of $.81, resulting in a ratio of 1.10. As compared to the cost effectiveness of other interventions, the radio math programs seem to be a very attractive option.

The Cost Effectiveness Study by Fryer and Jamison, however, went beyond this usual analysis. They incorporated an additional cost-effectiveness analysis by measuring the ratio of the <u>total</u> learning gains to the <u>total</u> costs.

Given the positive impact of the radio lessons on mathematics achievement, the <u>cost</u> to attain a <u>specified level</u> of math achievement through radio classes may be reduced, <u>if</u> the cost of the radio lessons is not too high. The cost of the radio classes must include the costs of teachers, administration, schools, etc., plus the incremental cost of the radio lessons. The total annual cost per primary school student in Bolivia is $64.00. In Bolivia, mathematics is taught for six periods; thus, the pro-rated cost for math is $15.60. The radio-math classes take only five, rather than six, periods per week. Thus, the pro-rated cost to support the conventional component of the system is lower, $13.00. But to get the total cost of the radio classes, one must add the incremental cost of the radio system.

As stated earlier, the effect size of one year of traditional study is 1.7. With a cost per student of $15.60, the cost-effectiveness measure is .11. The additional effect size from adding the radio lessons is .90, making a <u>total effect size</u> of 2.60. With a total cost of $14.51 based on 200,000 students, the cost-effectiveness ratio or efficiency is .18 for the IRI lessons. Thus, the cost-effectiveness of the IRI math classes is 64% higher than traditional math classes (based on the comparison between .11 efficiency for traditional math classes and .18 for radio classes). This figure would increase to 73% if the radio programs were

implemented to all 600,000 students nationally. Therefore, the efficiency arguments for implementing IRI on a large scale are very strong.

IRI Health Lessons

Based on the success of the math lessons, USAID/Bolivia and Fe y Alegria decided to develop a new pilot series on health. This series of ten lessons was broadcast to Grades 4 and 5 in 1989 and was designed to reduce child mortality rates by focusing on diarrheal diseases. Since the audience (10-13 year olds) includes those who are often primary caretakers for infants, it is hoped that the lessons will have an impact on the very high infant death rates in Bolivia.

A health and nutrition oriented educational program presented special challenges because diet and eating habits are influenced by sociocultural beliefs and attitudes. Knowledge and respect for such beliefs and the ability to integrate them into acceptable health messages required sensitivity from program developers. To meet the needs of teaching a health curriculum in Bolivia, extensive field research was done in the areas of health and nutrition before program plans were developed. To ensure the design of an appropriate health curriculum for primary schools, ethnographic research was carried out in the following areas: cultural beliefs and perceptions of health issues, family health practices, attitudes towards written and audio materials, children's roles in health and nutrition, and traditional stories and legends related to health and nutrition. This information was incorporated into the IRI lessons. Activities and practices that children have control over (such as washing their hands) were emphasized in the curriculum.

Complementary IRI program materials included take-home exercises designed to involve family participation, and teachers guides to provide teachers with hands-on activities to strengthen children's understanding of health concepts. Short in-service training sessions prepared teachers to manage the radio classes and to carry out post-broadcast activities with children.

"Diarrhea Prevention and Oral Rehydration" was selected as the subject of the test module because of its fit with ongoing child survival activities. Although infant mortality has decreased from 169/1000 in 1976 to 96/1000 in 1989, it remains the highest in South America. Despite massive efforts during the 1980s to promote child survival themes among the adult population, diarrheal disease (with resulting dehydration) is the leading cause of death among children under the age of five; and the National Institute of Diet and Nutrition estimates that one in two Bolivian children suffers from some degree of malnutrition.

Although children living in marginal-urban settlements are frequently victims of Bolivia's health crises, health education is not included in the official urban curriculum. Therefore, the Radio Health intervention used a modular format consisting of ten 25-minute lessons related to a common theme that could be taught once a week during science class, physical education, or home economics. The project also adapted the IRI methodology for slightly older students by emphasizing individual rather than group responses, incorporating role-play activities into the lessons, and using stories as dramatic illustrations of important messages.

The field evaluation of Radio Health assessed the effectiveness of IRI in teaching health concepts and behaviors to upper primary grade students. In addition to a formative evaluation, a summative evaluation measured the impact of the instructional intervention; focus group interviews were employed to gain insight into parental acceptance of the Radio Health programs. The results of the summative evaluation showed improvement in students' understanding between the pretest and the posttest, Table III.

Table III Summary of Average Test Scores by Grade

	4th GRADE		5TH GRADE	
	N	% CORRECT	N	% CORRECT
Pretest	224	51%	214	57%
Posttest	211	70%	199	76%

In particular, there were five areas in which we were able to note highly significant gains ($p<.001$) in student knowledge over the course of the pilot. These include:

(a) Knowing the amount of liquid that an infant or child with diarrhea should drink (pretest=22%, posttest=89%)

(b) Understanding the correlation between bottle feeding and frequent diarrhea (pretest=43%, posttest=72%)

(c) Recognizing one or more symptoms of dehydration in a drawing of a baby (pretest=12%, posttest=80%)

(d) Identifying one or more ways in which older children can help younger children with diarrhea (pretest=40%, posttest=80%)

(e) Describing how to mix homemade ORT correctly (pretest=1%, posttest=46%)

Costa Rica

In mid-1988, Costa Rica's National Center for Teaching (CENADI) introduced IRI mental arithmetic lessons to twenty Costa Rican first-grade classrooms. These pilot tests, first developed and used in Honduras, were introduced to raise the quality of math education, especially in remote multi-grade classrooms. It is of particular interest that Costa Rica decided to use the original Honduran tapes with only minor changes. After the successful conclusion of the first-grade pilot, math lessons were broadcast to first-grade classes in about 600 schools during 1989, and were used in 1,000 schools in 1990. The grade 2 lessons were used in twenty schools in 1989, and in 500 schools in 1990.

An evaluation study of IRI lessons in Costa Rica found that the radio programs helped reduce the large rural-urban educational gap in the country. See Figure 3. Promotion of urban-rural equity through radio education has been consistently found to occur in other countries where IRI programs are in place.

Under a grant from RLP, CENADI developed a radio-based teacher training series to help teachers with math education. A teacher training conference was held in Costa Rica in 1989 to plan a series of lessons to train teachers in math instruction as well as in the use of IRI lessons. CENADI produced twenty half-hour radio lessons for teachers. The first nine lessons were designed to motivate and train teachers in the use of IRI math lessons in the classroom. The remaining lessons, accompanied by a booklet, were designed to help first-grade teachers with several mathematics topics, including areas not fully covered by the children's radio programs and topics that teachers find difficult to teach. These lessons were based on the results of several studies by CENADI on student achievement, teachers' knowledge of mathematics, their diagnosis of student errors, and what teachers find most difficult to teach. The series of lessons will be tried out and evaluated in 1991.

CENADI also began plans to use radio to teach English and environmental studies. In 1990 the Ministry of Education obtained the first twenty radio English lessons adapted by AVANCE from the IRI Radio Language Arts Project series developed in Kenya. They plan to test out the lessons in 1991. Finally, they wrote a proposal to develop an IRI environmental education course for children in the upper primary grades.

FIGURE 3 Evaluation Study of IRI Lessons

School Sample

	Number of Schools		Number of Students	
Type of School	Radio	Control	Radio	Control
One-Teacher (PP2)	6	8	42	44
Three-Teacher (D1)	8	8	97	116
Large (DT)	8	8	204	211
Total	22	24	343	371

The posttest consists of 25 items, covering the entire first-grade math curriculum (not only the topics taught by radio). The test was designed and field-tested in 1988. It was administered with oral instructions for every item, and resembles in format other mathematics tests given by the various radio projects.

The basic results of the test are shown below.

Test Results

	Radio		Control	
Type of School	Mean % Correct	Standard Deviation	Mean % Correct	Standard Deviation
One-Teacher	58.9 (a)	25.2	41.5	27.3
Three-Teacher	63.8 (b)	23.5	53.1	23.8
Large	73.0 (c)	18.5	73.1	19.7
All	68.7 (d)	21.5	63.1	25.0

Notes:
(a) T-test showed that the difference between radio and control mean test score is significant at $p < .003$.
Effect size = .63.
(b) Difference between radio and control is significant at $p < .001$.
Effect size = .44.
(c) Difference not significant at $p < .05$.
Effect size = -.01.
(d) Difference is significant at $p < .002$.
Effect size = .22.

The RLP sponsored two CENADI delegates to visit the Dominican Republic to observe and learn more about the RADECO project. The Costa Rican Ministry of Education is particularly interested in RADECO's language component for use in rural, multi-grade schools.

Ecuador

The RLP conducted a very successful IRI math pilot project in 1988. Subsequently, the USAID mission developed plans for a large-scale IRI project, but in late 1990, the mission decided not to proceed with this project because of changing mission priorities.

Honduras

IRI Math

In April, 1987, RLP began to provide technical assistance to AVANCE, La Asociacion de Promocion y Desarrollo Socioeconomico (the Association for Socioeconomic Growth and Development), a Honduran private sector organization which was funded by USAID/Honduras to develop a new IRI mathematics series focusing on mental computation skills.

In early 1988, AVANCE introduced a mental arithmetic series to 70,000 first-grade children in six of the country's eighteen districts. By 1990 about 200,000 children in grades 1-3 were learning from the IRI programs. Friend Dialogues of North Carolina Inc. designed the curriculum and, using the new computer program EXPERT they developed, created an outline for each daily lesson for grades 1-3. The scripts were written and produced by the AVANCE team with assistance from long- and short-term specialists provided by the RLP, principally through AED.

Summative evaluations have been completed for Grades 1 and 2. The analysis of the data for Grade 3 will be complete in 1991, under a Delivery Order from USAID/Honduras to the LearnTech Project. The achievement data reported here is from the work of Jamesine Friend, et.al[7].

The evaluation of the radio series was complicated and made more interesting by the simultaneous introduction of new textbooks. Thus, the evaluation design sought to measure the discrete benefits of the two interventions as well as the combined impact of the new textbooks and radio lessons. The three groups are identified as follows:

Group A: Children with traditional instruction

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[7] Friend, J., Beach, K., Kozlow, S., Gamero, G., and Galda, K. *The Impact of Honduras Mental Arithmetic Radio Programs on Student Achievement in Grades 1 & 2*. Shelby, N.C.: Friend Dialogues, 1990.

Group B: Children with new textbooks
Group C: Children with new textbooks and IRI

A combined lapped-year and matched group experimental design was used. In a lapped-year design the same classes are used for both the control and experimental classes in subsequent years. That is, in the first year the children receive conventional instruction and are administered a posttest at the end of the year. In the next year, a new group of children enter those classes; they are the experimental group and are given the IRI lessons as part of their math instruction. These children are administered the same posttest. The advantage of a lapped-year design is that the same communities, schools and, in most cases, the same teachers, are used for both the control and experimental classes, thus, controlling for a large number of variables.

Group A was tested in 1987 before either the textbooks or radio lessons were introduced. Group C consists of the same classes, but tested one year later with a new group of children who received both the textbooks and the radio lessons. These are the two groups of the lapped-year design. The matched group is Group B from another part of the country. These classes are matched with the classes in Groups A and C. The children in Group B received the textbooks, but since the schools were not in the reception area of the radio transmitters, they did not have the radio math lessons. Based on a comparison of test results, it is believed that Groups A and B are essentially equal.

The results of the summative evaluations for Grades 1 and 2 are shown in Figure 4.

As with other studies that have measured the impact of introducing textbooks, this evaluation shows that the new textbooks markedly increased achievement scores in Grade 1 (from 34.3% correct of Group A to 43.7% of Group B with an effect size of .43). The addition of the radio lessons to the new textbooks brought the score up to 51.9% (Group C) with an effect size of .80 when compared to the traditional classes. In other words, the addition of the radio lessons doubled the impact of just adding textbooks.

The results of the second grade evaluation show more explicitly the strong impact of the radio lessons. For reasons that are not entirely clear, the textbook only group (Group B) actually shows a slight <u>decline</u> in achievement score as compared to the traditional classes (Group A). Apparently the Grade 2 textbooks arrived about half way through the year, and there were no teacher's guides nor special teacher training as was provided to the Grade 1 teachers. Whatever the reason, the new textbooks did not have a positive impact on achievement scores. Thus, the key scores are from the two groups of the lapped design (Groups A and C). The score of Group A was 52.0% correct; that of Group C was 63.5%. The effect size is .61. Since the textbooks had no effect,

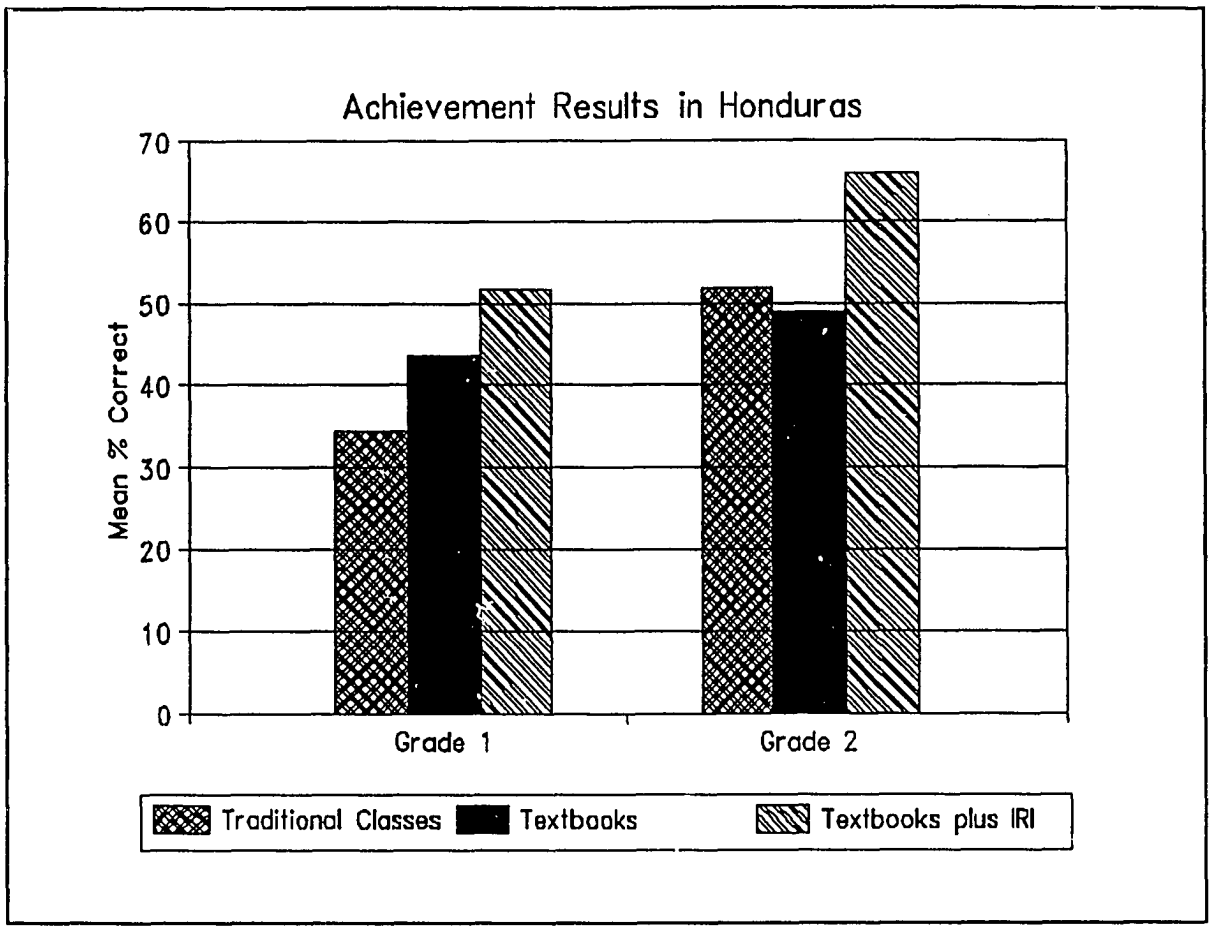

Figure 4 Achievement Results for Grades 1-2 in Honduras, Bolivia

one can attribute the total gain of Group C to the radio lessons.

Table IV Distribution of Total Investment Costs, Honduras

	Dollars ,000	Lempiras ,000
Development	1,982	3,964
Implementation	1,265	2,966
TOTAL	3,447	6,930

SOURCE: AVANCE, Academy for Educational Development, Education Development Center, Inc., and Friend Dialogues, Inc.

The total investment in this project from inception in 1987 through 1990 amounts to 6,930,952 Lempiras or US $3,465,476 using an exchange rate of US $1 = 2 Lempiras. Eighty-nine percent of the costs were provided by the USAID/-Honduras mission; 11% came from contributions from businesses in Honduras. These costs can be divided between expenses for developing the instructional materials and

implementing the lessons in the schools. Table IV shows the breakdown between these categories.

The recurrent costs based on 1990 prices with 200,000 students are presented in Table V.[8]

Table V Allocation of Costs, Honduras

	MOE or AVANCE	BUSINESS COMMUNITY	PARENTS/ TEACHERS
Administrative Overhead	16,754		
Salaries and Benefits	37,503		
Travel - Domestic	6,443		
Radios & Print Materials			
Radios	5,128		5,128
Radio Repair			1,469
Batteries			18,052
Teacher's Guides			4,259
Notebooks		7,194	7,194
Posters		515	
Carrying Bag		115	
Supervisors' Commission	1,469		
Transmission		78,824	
Distribution	676		
Teacher Training	7,101		
Other Direct Costs	5,083		
Total	$80,157	$86,647	$36,103
Cost Per Student 200,000 students	$0.40	$0.43	$0.18

[8] The costs in dollars are based on an exchange rate of US $1 = 3.4 Lempiras. Note that this is a different rate than that used for the development costs presented above. The reason for the change is that during all but the last few months of the development phase of this project, the exchange rate was approximately 2 Lempiras per dollar. Beginning in January, 1990, the Lempira began to be devalued, reaching 5.5 Lempiras per US dollar by mid-September when these data were collected. Thus, the impact of the devaluation on local costs of imported goods had not been fully realized when these data were collected. Therefore, the development costs of the project are stated in terms of the predominant existing exchange rate at that time of US $1 = 2 Lempiras. The recurrent costs, however, are stated using 3.4 Lempiras per dollar. The 3.4 rate is calculated using a combination of two rates; the rate of 5.5 Lempiras per dollar is applied to costs not tied to imported goods, and a rate of 2 Lempiras is applied to items that are imported and, thus, must be paid in dollars.

The annual recurrent cost is $1.01 per student. The largest single item is for radio transmission; other large items include the radios (amortized over five years) and the batteries. In addition, the cost for student notebooks is high.

An important consideration is the allocation of the costs among different constituencies or institutions. The costs can be allocated among three major groups: the Ministry of Education or AVANCE, the business sector, and the local community of parents and teachers. See Table V for a breakdown of these allocations. Of the $1.01 total recurrent cost, either AVANCE or the Ministry of Education will need to pick up $.40. Private businesses will assume $.43 per student. Of this cost, 94% is donated radio transmission time; the remaining amount is for printing half of the student notebooks, the plastic posters and the plastic carrying bags for the instructional materials. About 18% of the costs are to be met by parents or teachers. The breakdown of costs between parents and teachers depends on the circumstances in each school. These local community costs are for the radios, the repair of radios, batteries, teacher's guides, and about half the cost for the student notebooks.

The projected recurrent cost per student can be compared to the per student recurrent government expenditure. The latest figure in 1988 is 285 Lempiras per primary school student; assuming a growth of 15% to 1991, the total government expenditure per primary school student would be 328 Lempiras or US$96 (based on a US $1 = 3.4 Lempiras). The add-on cost to the Ministry of Education (e.g. $.40) to maintain La Familia de los Números would be only 0.4% of the annual per student recurrent government expenditure for primary education. If the total recurrent cost is considered (e.g. $1.01), the add-on cost is 1% of the government expenditure per primary school student.

Cost effectiveness is the ratio of the incremental gain in student achievement, stated in terms of effect size, to the incremental cost (e.g. recurrent cost) of the educational inputs.

The effectiveness measure for *La Familia de los Números* is difficult to calculate precisely because the radio lessons were introduced along with new textbooks which, in turn, were introduced with some teacher training (in Grade 1). In Grade 1, the effect size for the total package was .80, with the impact of IRI alone yielding an effect size of .37. In the second grade, the impact of the total package was .61. But in contrast to the first grade, the addition of textbooks alone had no impact at all.

Therefore, the effectiveness measure to be used for the cost-effectiveness analysis is the average of the effect sizes for the two grades (.37 and .61) or .49. This represents the incremental learning as a result of the radio programs.

Table VI Recurrent Costs, Honduras

		Dollars	Lempiras
AVANCE Administrative Charge		16,750	56,963
Salaries and Benefits		37,503	127,510
Travel - Domestic		6,443	21,905
Radios & Print Materials		50,524	171,781
Radios	10,256		
Radio Repair	1,469		
Batteries	18,052		
Teacher's Guides	4,259		
Workbooks	14,388		
Posters	515		
Carrying Bag	115		
Supervisor Commission	1,469		
Transmission		78,824	268,000
Distribution		676	2,299
Teacher Training		7,101	24,144
Other Direct Costs		5,083	17,282
Total		$202,907	689,883
Cost Per Student 200,000 students		$1.01	3.45

The per student recurrent cost for the radio programs is $1.01. Therefore, the cost-effectiveness ratio is .49.

IRI English

In 1988, AVANCE adapted the Grade 1 lessons from the Kenya Radio Language Arts Program (RLAP) for use in bilingual primary schools. AVANCE developed these lessons as a generic ESL series which can be used throughout Latin America. These lessons have been successfully tested in Belize.

Social Marketing

Honduras was the first site to apply social marketing to interactive radio within a country. AVANCE created a social marketing team to conduct research on the most effective way of implementing the interactive radio project. The team developed a strategy for implementing the project on a national basis. The marketing research also gave guidance on specific details such as whether to sell the radio to parent organizations or directly to the teachers. (They decided to sell the radios to the teachers.) The team also came up with two "kits" of materials needed to

implement the radio lessons in the classroom, and a system for distributing and selling these kits to the teachers.

THE CARIBBEAN

Belize

In 1989, the Ministry of Education tested first-grade English language instruction tapes first developed in Kenya and modified in Honduras. A pilot project for the *Let's Learn English* programs was conducted from September to December in six classes (170 students) with a control group of six classes (177 students). As part of this project, RLP experimented with the use of "Speak and Read" electronic learning aids. The objective of the experiment was to see if children could benefit from using these devices, and to see if there might be a particular advantage from using them in combination with the radio English lessons. Preliminary results from a small sample were encouraging. The Institute for International Research (IIR) under the Educational Technologies: Studies and Applications Project collaborated with RLP on this project.

Dominican Republic

In 1981, RADECO (Radio Assisted Basic Community Education Project) began to develop IRI lessons in math, reading, writing and social and natural science for communities where there are no primary schools. These "radio schools" are for children in grades one through four. In RADECO communities, parents provide simple buildings where children meet each day in the late afternoon to listen to hour-long education broadcasts. Lessons are monitored by a local auxiliary who is responsible for the radio and the distribution of printed materials to the listeners. Since 1986, RADECO has been institutionalized as a department of radio education within the Secretariat of Education (SEEBAC).

With funding support from RLP, the RADECO project held a two-day seminar to inform 75 educational leaders from the Dominican Republic about its activities and enlist their help with the planning of future RADECO programs. RLP also sent three representatives. Seminar participants included top level officials and educators from SEEBAC (the Ministry of Education), RADECO staff, and representatives of national and international donor agencies. Representatives at the conference gained an understanding of the RADECO program and viewed it positively. SEEBAC officials supported RADECO and advocated an immediate expansion of the program.

RLP support laid the groundwork for a pilot project beginning in late 1990 in which the RADECO math programs were tested in the formal school system in Santo Domingo.

AFRICA

Lesotho

On occasion, RLP collaborated with A.I.D.'s Basic and Non-Formal Education Systems (BANFES) Project as they successfully

Table VII Development Costs, Lesotho

Personnel			
Host Country			96,201
Technical Assistance			447,931
Furniture and Equipment			33,319
Operational Costs			98,023
Summative Evaluation			45,624
@	0%	Discount Rate	721,098
@	7.5%	Discount Rate	1,225,367

introduced IRI English classes in Lesotho. The *English in Action* series is adapted from the Kenyan Radio Language Arts Project. Over 95% of Lesotho's schools are currently using the English in Action series.

RLP, with assistance from the BANFES staff, conducted a cost study of the IRI English series. The development costs for adapting the 525 lessons for Standards 1-3 are presented in Table VII. The total expenditure was $721,098. The full development cost with a 7.5% discount rate was $1,225,367.

Once the total development costs have been determined, it is necessary to average this amount over the useful life of the radio lessons. Assuming a 15-year life for the lessons, the average annual development cost is $48,073, or $81,691 including a 7.5% discount rate.

The incremental recurrent cost for adding IRI to the schools in Lesotho is composed of both fixed and variable costs. The variable costs depend on the number of students; there are approximately 200,000 children in grades 1-3 in Lesotho.

The total annual fixed and variable costs are shown in Table VIII.

The fixed costs account for 25% of the total incremental costs; 87% of the fixed cost is for transmitting the lessons. Of the variable costs, the replacement of batteries is the most significant component (40%); the student workbooks account for 28%

(these are depreciated over three years) and the radios account for 25% (depreciated over five years).

Given the high cost of batteries, an estimate was made on how much this component might be reduced if Ni-cad rechargeable batteries were used and the recharging was provided by a solar panel. Such an arrangement would reduce the total battery cost by one-half, and the total incremental cost by 15%.

Table VIII Total Fixed and Variable Costs

TOTAL INCREMENTAL COSTS: STANDARDS 1-3	COST	PERCENT
FIXED COSTS		
Radio Transmission	41,490	87%
Administration	6,100	13%
Subtotal	47,590	
VARIABLE COSTS		
Radio Receivers	34,603	25%
Radio Maintenance	2,625	2%
Batteries	55,997	40%
Teachers Guides	4,943	4%
Student workbooks	39,127	28%
Teacher Training	1,481	1%
Delivery of materials	1,842	1%
Subtotal	140,618	
TOTAL INCREMENTAL COST	188,208	

As shown in Table IX, the incremental cost per student is $.94. This represents 1.7% of the total expenditures per primary school pupil. The total cost per primary school student is $55., of which the Ministry of Education budget covers $24; the remainder is provided by churches or local communities.

Although the incremental cost per student is $0.94, the Ministry of Education does not pay this amount. The costs are allocated among the Ministry of Education, the Ministry of Information and Broadcasting, and the parents (with the teachers picking up some of the costs in some schools). The allocation of costs is shown in Table IX.

The Ministry of Information and Broadcasting finances Radio Lesotho, which broadcasts the *English in Action* series without charge. Although Table IX shows that the cost to the Ministry of Information and Broadcasting for transmitting the lessons on Radio Lesotho is $37,500, in reality the budget of the Ministry will be affected little as the *English in Action* radio programs simply replace other programs.

The parents, perhaps with some participation by teachers, buy the radios (at a subsidized price) and the batteries; they also pay for the repair of the radios. On average, they provide $0.33 per student or a total of $66,263 per year.

The remaining expenditures must be covered by the Ministry of Education. On the average each year (in 1990, U.S. dollars), the

Ministry must budget $.42 per student, or a total of $188,208, to the radio English lessons. This represents 1.8% of the budget for primary education. In the first years, the amount will be less than this as the radios, teacher's guides, and student workbooks are new and will not need to be replaced immediately.

Table IX Allocation of Costs for *English in Action*, Standards 1-3, Lesotho

ENGLISH IN ACTION
STANDARDS 1 - 3

Allocation of Incremental Costs

	Total Costs	Ministry Education	Ministry Inform.	Parents Teachers
Workbooks	$39,127	$39,127		
Teacher training	$1,481	$1,481		
Teacher's guides	$4,943	$4,943		
Radio receivers	$34,603	$24,847		$9,756
Maintenance of radios	$2,115			$510
Power, battery	$55,997			$55,997
Radio transmission	$37,500		$37,500	
Duplication of worn tape	$3,990	$3,990		
Administrative & clerical	$3,600	$3,600		
Administrative overhead	$2,000	$2,000		
Administrative travel	$500	$500		
Delivery of materials	$1,842	$1,842		
Total Program Cost	$188,208	$84,445	$37,500	$66,263
Cost Per Student	$0.94	$0.42	$0.19	$0.33
200,873 students				

Swaziland

The RLP conducted a successful radio English pilot project from November 1989 to May, 1990. The Ministry of Education is presently considering whether to proceed to the next implementation phase - a full year trial of the grade 1 lessons.

The objectives of the pilot project was to:

1) test the first 40 English in Action interactive radio programs in 20 test schools.

2) analyze the state of medium wave broadcasting in Swaziland and the possibility of using it for educational broadcasting.

3) provide evaluation information to USAID and the Swaziland Ministry of Education to allow them to make

an informed decision as to whether a full year of the English in Action radio curriculum should be introduced for Grade 1.

The National Curriculum Center (NCC) English curriculum staff assessed the degree to which the radio curriculum conformed to the current Grade 1 curriculum. In vocabulary and in sequence and types of structures and functions, the fit was found to be close.

The 40 radio scripts, as produced in Lesotho, were read by three members of the English curriculum staff to determine what vocabulary, personal names, situations or sounds had to be changed to fit Swaziland's particular culture and environment. As both Southern African countries share so much in culture and geography, little had to be changed. Among the necessary changes, however, were all personal names. The 40 scripts were then revised in accordance with the judgements of the NCC team.

The NCC team selected 20 pilot schools, five in each region. Some schools were urban, semi-urban, and rural.

A skilled evaluator in each regional office was identified. Their duties included daily observation and evaluation of the radio classes, early remediation of problems with the radio classes (such as loss of radios, or other materials), weekly reporting to the NCC, and generally keeping open the lines of communication from the field to the central office.

During November, the team made a survey on the quality of radio reception at all the schools. Areas of good and fair reception were mapped.

A studio at the Swaziland Broadcasting Service was renovated specifically for the production; recording began in mid December and continued through early March.

The twenty headmasters and headmistresses that would be involved in the program were given a day of orientation. Their support was considered vital to the success of the test. The Radio Learning evaluators were also present.

A few weeks later, the teachers who would be using the *English in Action* series received one and a half days of training. There were 36 teachers, plus 4 evaluators, and some headmasters.

On February 20, the first program went on the air. The programs ran for 40 consecutive school days at 10:00am every day.

A technical analysis of the transmission equipment was conducted and the results were submitted to SBS, USAID, and the MOE. A plan for maintenance of the medium wave system was drawn up and submitted to SBS and USAID.

The evaluation data collected included 165 daily observation reports, 131 teacher reports, 4 final reports from evaluators, 12 final reports from the regional inspectors, and 3 final reports from the Regional Education Officers.

The results of the evaluation support the recommendation that the complete *English in Action* curriculum be introduced without delay.

Among the most important findings of the evaluation:

- 31 of 35 teachers (88.6%) said reception was better than adequate. Four (4) (11.4%) said it was adequate. None said it was less than adequate.

- Over 90% of the teachers felt their students were ahead of where they would have been in English if they hadn't had instruction by radio.

- All 4 program evaluators, all the regional inspectors (12), and Regional Education Officers (3) that were consulted would like to see a full 3-year English in Action radio curriculum in their schools.

KEY RECOMMENDATION:

The English in Action interactive radio curriculum should be introduced into all of Swaziland's primary schools.

EXTERNAL EVALUATION OF RLP

A 1989 project review by an independent consultant identified four strategies that would best secure widespread acceptance of IRI. They are (a) promoting adoption of IRI programs, (b) internationalizing RLP, (c) preliminary site development activities and (d) insuring long-term sustainability. The review, entitled "The Radio Learning Project: The Current Status - Options for the Future," was commissioned by A.I.D., with funding from the RLP and conducted by James Terry.

A. **Promoting Adoption of IRI Programs** - Throughout its tenure, the RLP continued to gather support from users of IRI programs (teachers, students, parents) and made greater efforts to contact and win approval from gatekeepers, those who decide whether RLP programs will be implemented in a given country. Attention was also given to the development of critical support among ministries of education, donor agencies, IQC (Indefinite Quantities Contract) holders, and educational consultants.

The RLP staff have concluded that personal contact with decision makers is the most effective means for inspiring decision-maker interest in IRI programs. Although promotional materials

offer important support, site visits by project staff, local workshops, and international conferences have generally been the catalysts for new IRI programs.

The above strategy proved especially useful to RLP's introduction of IRI to educators in Africa. A visit to Uganda and Zimbabwe by an official of the RLP, followed by workshops, a regional conference, and site visits by Ugandan educators to Lesotho and Swaziland, led to strong commitment to the IRI methodology by educators in the two countries. Uganda officially requested assistance from the RLP in beginning a pilot English and teacher training IRI activity in 1991, and Zimbabwe is seriously considering beginning a pilot project in English.

The RLP also achieved much success in introducing IRI through personal contact with decision makers in other African countries. These included Cameroon, Ghana, Guinea, Liberia, Mali, and Namibia.

B. **Internationalizing RLP** - As donors leave more decision-making power under the control of host country officials, RLP has given more attention to host country institutions and decision-makers. In 1989 the project sought to increase the involvement of non-American specialists with IRI activities. In the Latin American region, RLP already had the assistance of AVANCE consultants, who were able to help both Costa Rica and Belize with the implementation and evaluation of IRI pilot projects. During 1989 RLP hired an African educational consultant to visit countries in sub-Saharan Africa and meet with educational decision makers, radio officials and donor agencies to plan for IRI activities. An experienced Kenyan IRI practitioner was recruited to help coordinate the Ugandan workshop in November, 1989.

C. **Preliminary Site Development Activities** - As part of project development work, the RLP prepared a database on each prospective country. Another important preparatory activity undertaken was the identification of institutions responsible for distance education and local advocates with decision-making ability. Individuals identified by the World Bank, A.I.D., ministries and schools broadcasting programs, were sent promotional information. RLP also made efforts to seek alternative sources for funding, equipment, and broadcast time for each potential IRI country.

D. **Insuring Long-term Sustainability** - To ensure that pilot projects were implemented on a long-term basis, RLP paid special attention to professional and political support from the beginning of each country's IRI activity. The project was particularly attentive to the placement of each project within the bureaucracy, the involvement and support of key decision makers, and the incorporation of recurrent project costs in government budgets.

LESSONS LEARNED

IRI is a Cost-Effective Intervention

Studies on the impact of IRI on student learning under the RLP continued to demonstrate the power of IRI to improve learning. The consistent strong, positive impact on student learning has continued across all IRI projects.

In addition to further documenting the impact of IRI on student achievement, the RLP has extended the earlier cost studies on IRI with research in 1990 in Bolivia, Honduras and Lesotho. Cost-effectiveness studies were carried out in Bolivia and Honduras. The results continue to support the findings of Lockheed and Hanushek[9], that IRI may be a more cost effective intervention than either textbooks or teacher training.

More Than Achievement Gains is Necessary

For all its success in demonstrated effectiveness, IRI still has not caught on across the developing world as one might have anticipated. Although some 600,000 children in about ten countries are learning from IRI, given the cost-effectiveness of this intervention, one might expect an even larger number of countries to have started IRI programs. There are at least three factors that constrain wide-scale acceptance of IRI. The first is proven long-term sustainability. The skeptics say "Yes, I know that IRI is effective in experimental settings, but where has it been sustained over a long period of time?" IRI is still too new to have a long track record, but in <u>every</u> instance where an IRI project has proceeded past a pilot phase, it is still being maintained. In Thailand, IRI lessons have been broadcast since 1978. As more projects mature, the sustainability concern should subside.

A second factor is that IRI programs do represent an add-on cost to a Ministry of Education budget, but so does the addition of new textbooks and more teacher training. In fact, all three interventions require ongoing financial support if they are to be sustained. Textbooks need to be replaced every few years; teachers need continual professional development; and IRI programs require an annual budget. The question is not which <u>one</u> intervention a Ministry should choose, but what is the optimal combination of interventions. For example, by delivering textbooks to every two children instead of every child, enough money can be saved to also include IRI lessons, and the resulting impact will be much more significant than textbooks alone. It should also be noted that given the marked increase in achievement, there should be at least

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[9] Lockheed, M.E. and Hanushek, E. "Improving Educational Efficiency in Developing Countries: What Do We Know?" in <u>Compare</u>, Vol 18, No.1 (1988).

a modest increase in promotion rates. If this occurs, then the added cost of IRI can be more than offset by an improvement in the efficiency of the school system.

The third factor relates to support for teachers. Many Ministry of Education officials express interest in the power of IRI to improve student learning, but they are also interested in programs that strengthen the capacity of their teachers. In the future, IRI projects should make a greater effort to develop complementary programs that provide training for teachers as well as for teaching children directly. The new radio-based teacher training series being developed in Costa Rica is a good example.

Generic Programs are Still Elusive

"Generic" programs that can be used with little or no adaptation in many countries have not been developed. Yet, as the seminar on generic programming held in Honduras in September, 1989, showed, there is considerable interest in generic programming among IRI enthusiasts. However, the realities in each country dictate that local acceptance of IRI programs depends on programs that are modified to reflect local culture. Thus, Bolivia modifies the math scripts developed in Nicaragua; Lesotho modifies the English language scripts from Kenya, and Swaziland makes their own changes to the scripts produced in neighboring Lesotho. Developing local ownership of the materials is key to gaining acceptance of the IRI lessons in most countries. This phenomenon can also be seen in textbook development, especially at the primary school level, where local centers for writing and producing textbooks are becoming commonplace.

There are a couple of notable exceptions to this trend. Both Costa Rica and Belize have decided to use IRI programs developed in other countries without requiring the lessons to be rerecorded. In general, just the beginning and ends of the lessons have been changed, plus about 5% of the lesson segments. Costa Rica is implementing the mental arithmetic series developed in Honduras, and Belize is using the IRI English lessons recorded in Honduras.

Both countries would like to make more changes, perhaps even rerecording all the lessons, but they don't have the resources. Thus, although they recognize that the lessons may not be ideal for their respective countries, they believe that their schools are better served by broadcasting the unadapted IRI lessons, rather than not having them at all.

The cost implications for options ranging from developing a new IRI series (Honduras) to just using the tapes from another country (Costa Rica) are shown in Table X. The table shows that to the extent that one country is willing to use materials developed in another country, there can be considerable cost savings.

Table X Costs for Degree of Adaptation of IRI Materials

Country	Type of Adaptation	Cost for Three Grades
Honduras	New Series	$1,900,000
Bolivia	Partially New Series	$1,300,000
Lesotho	Adaption and rerecording	$721,000
Costa Rica	Use existing tapes	$175,000

Successful Marketing Components

The RLP implemented a wide-reaching marketing plan including the production of audio and video tapes, brochure, newsletters, presentation at conferences, papers for publication, etc. Primary and secondary target audiences were identified and an appropriate strategy developed to reach those audiences. This section comments on the apparent success of some of these components.

The most important aspects of the marketing plan for developing interest in an IRI activity seemed to be those elements that most quickly developed into personal contacts. Brochures and newsletters were important first steps, but the key seemed to be developing and fostering communication with individuals decision makers or "gatekeepers," those individuals who have control over whether a new idea gets an appropriate hearing. Sometimes these people were identified from an unsolicited inquiry; other times contacts were made through conferences or workshops; in other circumstances, we took the initiative to contact influential individuals who we thought might be interested.

The key individuals could either be donor officials (e.g. A.I.D. officers in Bolivia and Honduras) or local Ministry officials (e.g. Costa Rica, Belize and Ecuador). In general, the marketing strategy gave increasing attention to developing support among local officials. This strategy is in line with a move by donor officials to provide more "program" funds that give local officials greater responsibility about how donor funds are to be used.

Timing is another critical factor. Donor-funded projects have a long lead time and it is important to influence the decision makers at the right time. Often funding activities begin with sector studies that focus on the macro-elements of the education system. At this stage there is relatively little interest in

detailed activities such as IRI. Yet, the shift from macro-analysis to specific projects can proceed quickly. When problems such as a shortage of instructional materials or a dearth of qualified teachers arise, possible solutions come to mind quickly. It is important to provide information about IRI to the right people at the right time. Ideally, interest in IRI should be generated well in advance of the sector studies; there must then be continued follow-up as the funding process proceeds.

Conferences or workshops on radio education in general or IRI in particular, seem to be good vehicles for generating interest in IRI. The *African Conference on Radio Education* was particularly helpful in that regard. As a result of that conference, there are educators in several African countries who are knowledgeable about and interested in IRI. These contacts will provide a good basis for the marketing activities under the LearnTech Project.

Social Marketing is Still Underutilized

The RLP inaugurated the use of social marketing techniques to promote the use of IRI. In Honduras, AVANCE established a social marketing team that developed and implemented a plan for national implementation of the IRI lessons. The team activities had several components including (a) a system for distributing (and paying for) instructional materials and radios, (b) a plan for encouraging teachers to use IRI (IRI was to be used by teachers on a voluntary basis), (c) a plan for developing a market for secondary products such as T-shirts, and (d) a scheme for training the teachers. Although the marketing division was eventually scaled back, most of the initial ideas generated by the team were implemented.

The experience in Honduras demonstrated that a social marketing approach could be effectively applied within the context of a national project. The lessons from this experience need to be applied to other countries. In addition, there needs to be further exploration of using social marketing techniques to promote IRI internationally.

Growing Interest in Less Traditional Subjects

There is growing interest in using IRI to teach subjects that are <u>not</u> part of the core curriculum. There has been considerable interest in the new IRI health and environmental education programs to be developed under the LearnTech Project. Health and environmental education are being recognized increasingly as appropriate and important subjects to teach. Yet relatively few countries have good instructional materials in these areas; in addition, few teachers are qualified to teach these subjects. Thus, IRI can help to quickly fill the need to provide good quality instruction in these areas.

Successful Projects Can Be Based in Government or Private Institutions

One of the key lessons learned concerns collaboration with and full inclusion of existing host institutions in all phases of project design and development. These institutions can be government or private. The best testimony to the value of collaboration can be seen in RLP's relationship with AVANCE in Honduras (private), Fe y Alegria in Bolivia (private), CENADI in Costa Rica (government), SEEBEC in the Dominican Republic (government), the Ministry of Education in Swaziland (government), and the Ministry of Education in Papua New Guinea (government).

Although IRI programs can be initiated and developed with private institutions, long-term sustainability still seems to depend on government support. In Bolivia, for example, Fe y Alegria is not interested in supporting wide-scale implementation of the IRI series, so the project is turning to the Ministry of Education for the support required for national implementation. In Honduras, USAID support for AVANCE beyond 1990 is not assured; thus, the Ministry of Education will be required to take a more active role if the IRI series is to continue in Honduras.

Developing Local Capacity

The IRI project in Bolivia demonstrates the ability to build local capacity to produce new programs. The Bolivia project was designed only to adapt the Nicaraguan radio math series for use in Bolivia. This required modifying the scripts slightly to account for differences in the curriculum and to adapt the lessons to the Bolivian culture. The modified scripts would then be rerecorded, teachers trained, and the lessons implemented.

However, the capacity of the Bolivian team has grown considerably beyond the ability to just adapt existing lessons. In mathematics, they made substantial changes to the Nicaraguan Grade 4 lessons and, then, based on their own evaluation, decided to make substantial changes again. The team has now gone on to design and implement a totally new Grade 5 math curriculum. In addition, the Bolivians struck out in a new direction by developing and testing successfully a series of ten IRI health education lessons. These lessons will provide the basis for a more expanded health series to begin in late 1991.

Costa Rica is also breaking new ground by producing a series of twenty-nine teacher training lessons. These lessons are being designed, written and produced with only limited technical assistance from the RLP (and the LearnTech Project beginning in late 1990). These lessons will be evaluated in 1991.

Still Limited Appeal for Using IRI to Improving Access

In spite of the success of the RADECO project in providing access to primary school education in communities where there are no formal schools, there has been little interest in other countries in using IRI to improve access. Some countries in Africa, for example, still have fewer than half their school-age population in school, yet it has been difficult to encourage educational leaders to think of any option besides building more schools and training more teachers. In large part, this may be because there is no history of alternative, radio-based schools for young children. While distance education programs are common for adults, there is little experience with this approach for young people.

If IRI is to help meet the need of providing increased access to schooling, a more focused marketing approach will be needed. In addition to potentially meeting the needs of isolated rural communities for more primary schooling, IRI has the potential of meeting the needs in two other areas. The first is in the rapidly growing urban areas where population growth is outpacing the capacity to provide primary schooling. The LearnTech Project plans to conduct a study in 1991 of such a need in Santo Domingo, the capital of the Dominican Republic. The second area of need is for the junior secondary level. As universal primary education becomes more commonplace, the unmet demand for schooling is likely to shift to the junior secondary and secondary levels in many countries. IRI-type programs could help provide good quality instruction for young adults in communities centers where traditional schools are not yet available.

Support from Other Donors is Slowly Developing

IRI is associated with A.I.D., it principal sponsor. RLP has made efforts to encourage support among other donor agencies including the World Bank, UNICEF, and UNESCO. Although each organization has expressed interest in IRI, and the World Bank even proposed funding a large IRI project in Malaŵi (but the Malaŵians decided they did not want IRI), there has not yet been financial support for an IRI project from other donors. Nevertheless, part of the groundwork has been laid for future support of other donors under the LearnTech Project. More focused attention is needed to develop support from these and other donor institutions.

SUMMARY OF RLP'S 5-YEAR EXPERIENCE

During the five-year period of the RLP, there has been a significant increase in interest in IRI. The response in Latin America was especially gratifying. The adaptability and viability of the IRI methodology has been demonstrated by the project's Latin American experience. Costa Rica and Belize were able to use programs developed in other countries with only minor changes;

the work in Bolivia evolved from simple adaptation of the Nicaraguan math lessons for Grades 2 and 3, to significant changes to the Grade 4 lessons and, finally, to developing a new program for Grade 5. The RLP was also able to facilitate the development of new IRI programs including mental arithmetic in Honduras and a health series in Bolivia. The RLP also developed a radio-based teacher training program series in Costa Rica to instruct teachers not only in IRI methodology's use in classrooms but also in improved techniques for teaching mathematics.

The RLP's promotional efforts in Africa generated much interest in IRI among educators, especially after the *African Conference on Educational Radio* in Harare, Zimbabwe. A number of countries have expressed serious commitment to establishing IRI programs as a result of discussions during and following the Harare conference. Thus, the groundwork is laid for a major expansion of IRI activities in Africa in 1991 and beyond.

IRI is increasingly being recognized as a cost-effective intervention for improving basic education in developing countries. When the RLP began in 1985, only about 175,000 children were learning from IRI, mostly in Thailand. Since then, many pilot and full-scale projects have been developed; many others are in the active planning stage. Approximately 600,00 children are benefiting from IRI in Africa, Latin America and Asia. IRI is on the verge of having a major impact on the education of young children in the Third World.