

EDC Radio Learning Project



IN CONSORTIUM WITH
ACADEMY FOR EDUCATIONAL DEVELOPMENT
AND FRIEND DIALOGUES OF NORTH CAROLINA, INC.

*RLP
gen'l
report*

Interactive Radio Instruction: Confronting Crisis in Basic Education

*PN-ARH 389
0461*

Joan Larcom and Molly Teas

I. Introduction

Interactive radio instruction (IRI) is an approach to basic education that is helping over 600,000 primary school age children learn more math, language, science, health, and reading and writing. A new use of an old medium, IRI has proven to be particularly appropriate for countries where poorly equipped schools are staffed by insufficiently trained and overworked teachers. This sturdy technology has been introduced to fourteen countries and, in every instance, radio classes using IRI have outshone their respective control groups. Interactive radio instruction has produced notable achievement gains wherever it has been tested.

The IRI approach is not only effective but also portable: lessons developed in certain countries for math and English as a second language have been rather swiftly modified and re-recorded to suit the curricula and cultures of other countries. This adaptability has saved time and costs for the adopting country.

EDUCATION DEVELOPMENT CENTER, INC.
55 CHAPEL STREET
NEWTON, MASSACHUSETTS 02160, USA
TELEPHONE 617 969-7100
FAX: 617 552-6405/TELEX: 922476 EDC NEW

1

Growth of Interactive Radio

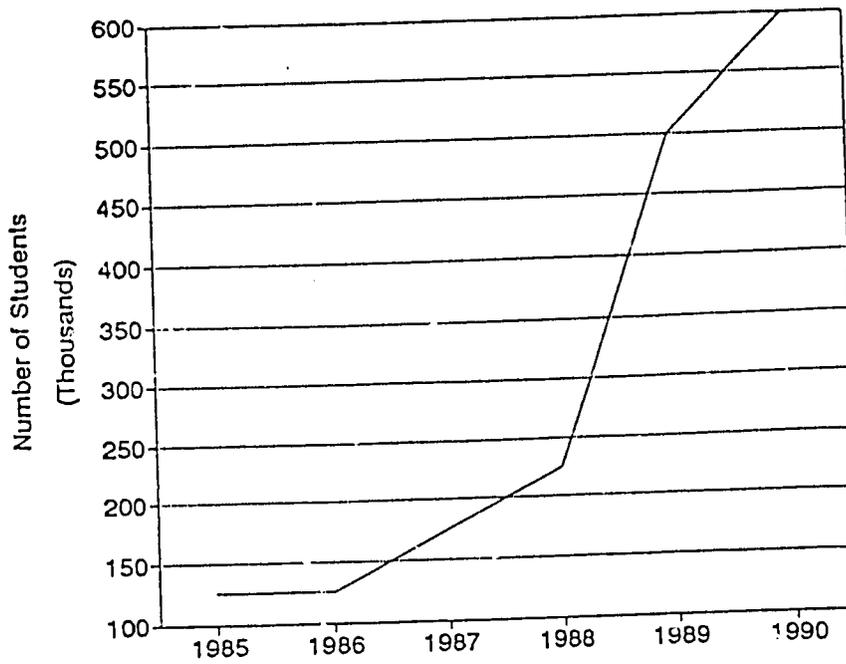


Figure 1

There has been a dramatic increase since 1985 in the numbers of students learning by IRI (See Figure 1.) At that time, the U.S. Agency for International Development (A.I.D.) established the Radio Learning Project (RLP) to oversee the dissemination and implementation of interactive radio throughout the developing world. The RLP is administered by the Education Development Center of Newton, Massachusetts, in consortium with the Academy for Educational Development in Washington, D.C. and Friend Dialogues of Shelby, North Carolina.

II. What is Interactive Radio Instruction

IRI methodology seems, on the surface, simple: children are asked to respond to directions or questions from the radio every 10-20 seconds. Yet behind this apparently uncomplicated teaching technique lie fifteen years of painstaking course development and experience in Africa, Latin America and Asia.

A visitor to a classroom during an interactive radio lesson

would probably conclude that the IRI approach can be easily replicated. The radio asks students to speak, read, do exercises and use simple materials. During the 20 to 30 minute radio lesson broadcast, children generally respond to the radio teacher's questions enthusiastically.

But an observer should not be deceived by the apparent simplicity of IRI. Jamesine Friend, a consultant to practically every IRI project, has commented on the delusive appearance of the technique:

[i]t is very easy to imitate the sound of interactive radio...which is really basically programmed instruction. You say a little bit and you expect a response from the students. ...You have a rapid-fire exchange of questions and answers and little quick activities for kids to do. There's a change of topic every two or three minutes, and you can imitate that. But that's only part of the picture. If you don't have the whole sequence of instruction designed correctly, if you haven't thought about every detail, if you're not there collecting information about whether it works or not, you're going to end up with a product that sounds like interactive radio, and doesn't teach any better than an average teacher could teach. And if you're not teaching any better than an average teacher, you have no business being on the air."¹

Behind the uncomplicated facade, IRI is supported by an invisible scaffolding that has contributed to the significant achievement gains among students; this is constructed from several important principles that are rigorously observed:

- . active participation by students
- . immediate reinforcement of correct answers
- . systematic instructional design
- . careful distribution of new and review topics in each lesson
- . fast-paced lessons with varied activities
- . formative evaluation

¹ Agency for International Development, Interactive Radio Instruction: Confronting Crisis in Basic Education, 1990, page 46.

Formative evaluation, in particular, is an invaluable contributor to IRI lesson quality. To provide feedback to enhance the preparation of future lessons, formative evaluation identifies student difficulties in early lessons that can be resolved by later lesson segments focused on the problem topics.

II. Interactive Radio Instruction Projects in the Asia Pacific Region

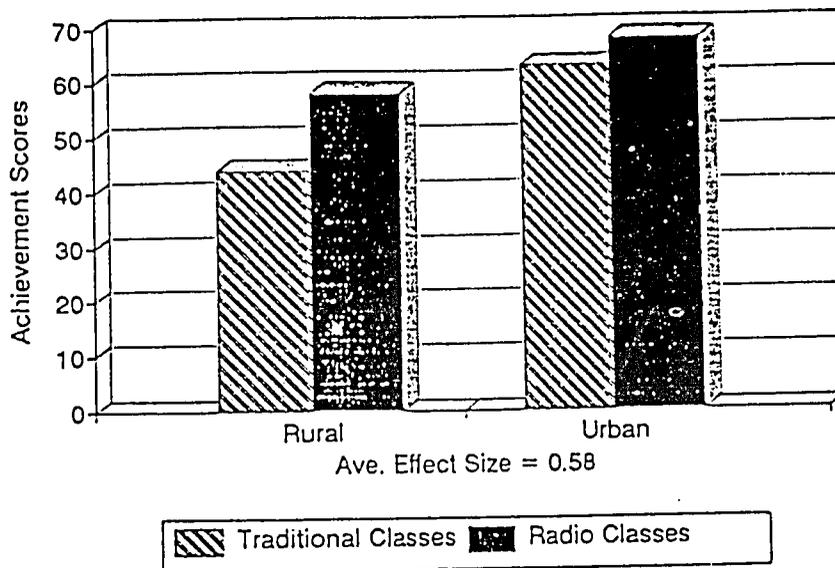
Three interactive radio instruction courses have been used in Asia and the Pacific. This is the region where the oldest and newest IRI programs have been developed or adapted. In Thailand, Thai Radio Math has been on the air continuously since 1980. Science, the latest core subject to be taught through IRI, is being developed by the Radio Science Project for upper primary school students in Papua New Guinea. In Nepal, the first comprehensive IRI teacher training lessons were introduced. Although limited teacher training has always been a component of IRI projects, the RLP has recently prepared a series of programs that improve teachers' pedagogy as well as their knowledge of the basic subjects they teach.

A. Thai Radio Math

Thai children have been working with interactive radio math since 1980. The lessons, which were adapted from Radio Mathematics in Nicaragua, were developed with the help of World Bank funding. The catalyst for this adaptation was the Ministry of Education's discovery that children in the remote northeastern part of Thailand were achieving far less in math than urban Thai children. The goal

of the project was to narrow the gap between these urban and rural children and the project was certainly successful in that endeavor (See Figure 2).

Thailand Radio Mathematics Grade 2



¹ Figure 2

Children who listened to Radio Thai Math lessons showed significant gains in comparison with their control groups. The most striking gains, however, were seen in the remote northeastern region:

"[S]tudents in the Thai Northeast, who were most disadvantaged, gained more than students in the Central Plain [Bangkok vicinity] or students in the original radio classes in Nicaragua. The adapted lessons were most successful in the isolated, underserved region where the need for them was greatest."²

² Agency for International Development, Interactive Radio Instruction: Confronting Crisis in Basic Education, 1990, page 18.

Another major finding during the project was the ability of Thai scriptwriters and staff to complete most of the adaptation of the Nicaraguan scripts without expatriate technical assistance. Grades 2 through 4 were adapted to Thai school curricula and schedules. Expatriate assistance was only needed during the first cycle of adaptation (the second grade lessons and the first few weeks of the third grade lessons). The bulk of the work was done by Thai staff, working independently.

The overall success of Thai Radio Math demonstrated that well-designed IRI could retain their educational effectiveness when re-tailored for use in countries quite different from the one for which they were originally developed.³

B. The Radio Science Project

A new use of IRI, to teach science to upper primary school children, is being explored by the Radio Science Project in Papua New Guinea (PNG). Funded by the United States Agency for International Development and implemented by Education Development Center, the Project aims to address two of the most important issues in PNG today: quality and efficiency. At a time when the standards of education are perceived to be declining, the Project aims to develop a method for providing systematic, high quality instruction in primary science -- a subject for which many teachers consider themselves to be inadequately prepared. The Project also seeks to improve the capabilities of classroom teachers to teach

³ Jamesine Friend, Klaus Galda, and Barbara Searle, "From Nicaragua to Thailand: Adapting Interactive Radio Instruction," Development Communication Report Winter 1986.

science.

The radio programs are based on the official community school curriculum in science and also include aspects of health, agriculture and community life. The lessons teach the core science curriculum; they are not designed as supplementary material. The radio science lessons for Grade 4 were first broadcast in 1988, Grade 5 in 1989 and Grade 6 is being broadcast in 1990.

Papua New Guinea was selected as a host country for the project because of the government's interest in the use of radio to deliver science instruction to large numbers of children and teachers throughout the country. Even though science is a required subject in the community (rural) school curriculum, many teachers do not teach it due to a lack of materials and/or lack of training.

The science programs are broadcast to community schools twice weekly for thirty weeks. Currently, more than 9,000 students are participating in Radio Science lessons throughout the country. The lessons are twenty minutes in length during which the classroom teacher participates in a supportive role. Scripts for the lessons are written specifically for the children in PNG, using Papua New Guinean writers, actors, sound effects and examples. After the radio portion of the lesson, the teacher conducts specific, complementary, post-broadcast activities as outlined in teachers' guides. Both broadcast and post-broadcast portions of the lessons are supplemented by worksheets and simple science materials; the materials are designed to complement and extend the radio lessons.

The major challenge of the Radio Science Project has been to

develop a hands-on approach to science teaching using radio as a medium of instruction. While the PNG science curriculum encourages the hands-on approach, in actuality few teachers were employing the approach in their classrooms before the radio lessons. How could the radio encourage students and teachers to freely explore materials and invent hypothesis and experiments?

The Radio Science Project is addressing the challenge in several ways. First, children are involved in science activities both during and after the broadcast. Teachers play a supportive role during the broadcast and the lead role for the post-broadcast activities. Formative evaluations have indicated that the post-broadcast period is often the most effective time for involving children in activities. Supplementary written materials for teachers provide suggestions for these post-broadcast activities. Second, through careful scriptwriting, the process of learning science is emphasized rather than the simple memorization of facts. For example, a typical broadcast may describe two students trying out an experiment, making mistakes and discoveries together. Careful scriptwriting is also the key that enables students to carry out activities during broadcasts. Third, rigorous formative evaluation plays a critical role in ensuring that the science lessons are clear, well timed, and interesting for both students and teachers. Trained observers evaluate each new lesson using these and other criteria and their comments are used to revise future lessons.

The most recent summative evaluation of Grade Four science

materials shows that the radio is an effective tool for the teaching of science to primary school children in PNG. The evaluation shows a mean test score for the experimental group (28 community schools were included in the sample) of 46.5 percent as compared to 41.5 percent for the control group. The effect size of .36 which is well above the average effect size of educational interventions. Some of the other conclusions cited in the evaluation report include the following:

- o The gender gap was narrowed in the experimental group. The difference between boys and girls was higher in the control group than in the experimental group.
- o Programs were effective at all age ranges.
- o The radio programs were effective in both the biological and physical sciences, but slightly more effective in the physical sciences.
- o The experimental group scored higher than the control group in all types of schools: government Catholic, and Evangelical.
- o The radio programs were effective across a wide range of schools: rural, remote rural and urban.
- o Teachers express a high degree of enthusiasm towards the program.

Teacher training is another component of the Radio Science Project in Papua New Guinea. This work is a response to teachers' needs for ongoing, accessible and quality training in science. Programs have been developed to help teachers improve their knowledge of science content and their pedagogical skills, while increasing their motivation.

The teacher training programs target teachers who use the Radio Science Program lessons. There are three major components of the program: face-to-face training, weekly radio broadcasts, and

cassette-based lessons. Face-to-face training sessions are held for all new Radio Science Program teachers. They last for a half-day and orient the teachers to the principles of IRI and answer questions on how to use the radio and the post-broadcast materials effectively. During the orientation, the teachers simulate Radio Science classes using taped lessons and then discuss their reactions and questions with the trainer.

The second component is a ten-minute broadcast twice a week to the teachers. Each radio program reviews the upcoming children's science lesson and reminds the teachers what materials they will need for any activities, both during and after the broadcasts.

The third component of the program, just being tried out, is an audio-cassette-based series that focuses on science content and methodology. The cassette tapes are twelve minutes in length, but are designed to be used interactively, with the listeners turning off the tape player at appropriate times to perform activities and discuss them. The aim of the audio-cassettes is to teach science content and pedagogy in an interesting way by incorporating interviews about science concepts, by using a variety of sound effects, and by including a number of "hands-on" activities.

The most appropriate science programming and supporting teacher training strategy will differ according to varying needs and contextual conditions of particular countries. The Radio Science Program in Papua New Guinea, however, can serve as a valuable model for other countries working to improve the quality and efficiency of science instruction in their schools.

C. The Radio Education Teacher Training Project in Nepal

In 1978 this project began using radio to upgrade the skills of unqualified teachers. The first subject to be broadcast was English. In preparing these lessons, project staff incorporated the interactive radio methodology for teaching language, developed by the Radio Language Arts Project in Kenya (RLAP). The Kenyan project taught ESL successfully to primary school children in grades 1-4. Its lessons have recently been adapted for national implementation in Lesotho and for pilot projects in Belize and Swaziland. In Nepal, the RLAP lessons were adapted to a different target audience, that of teachers learning alone in their homes, so interactive radio instruction segments were interspersed with other techniques suited to this different situation.

This first phase of teacher training concluded when Nepal passed a law prohibiting the employment of unqualified teachers. Since 1984, the project has been broadcasting to qualified teachers a course covering all 7 primary subjects and designed to upgrade teaching skills.

The Ministry of Education in Nepal is currently exploring the feasibility of direct broadcasts to school children. A small pilot project teaching math to second grade students was conducted last April. Plans are now being made to arrange for a more extensive pilot project. It has been proposed that programs from the Nicaraguan Radio Math project be adapted and implemented in grades one to three.

IV. The Cost of Interactive Radio

Interactive radio is affordable. The costs for preparing lessons can be tailored to available funds in each country by adjusting the level of adaptation. Ongoing annual costs typically add about \$.50 per student to the education budget. IRI may actually reduce the cost per primary school graduate by improving the efficiency of education.

Experience has shown that the programs can also provide basic education in communities without schools for about half the cost of traditional schools, after initial development costs are met.

V. Conclusion

There are a number other successful IRI projects, implemented outside the Asia/Pacific region, and two of these merit brief mention in closing: RLP health classes in Bolivia and RADECO schools in the Dominican Republic.

Radio Health lessons have been broadcast to fourth and fifth graders in Bolivia to teach them about prevention and treatment of infant diarrhea. In this country, which has a very high infant death rate from diarrhea, it is hoped that elementary school children, who are often primary caretakers for younger siblings, will be able to contribute positively to a reduction in the alarming infant mortality statistics.

In the Dominican Republic, the RADECO project has moved IRI out of the classroom to reach children in communities where there are no schools. The RADECO "radio" schools take place in simply constructed buildings, provided by parents. In each community,

lessons are monitored by a radioauxiliary who is a literate member of the community. Daily radio lessons, broadcast for an hour in the late afternoon, are teaching the core subjects, math, reading and writing, some natural and social science, to children in grades 1-4. When they have finished with four years of radio school, RADECO children are able to enter fifth grade classes in conventional classrooms without apparent difficulty. RADECO is meeting the educational needs of these children at about half the cost of traditional schools.

Both of these projects, as well as the ESL course mentioned earlier, could be of great value to some nations in the Asia/Pacific region. The Radio Learning Project has high hopes that the number of students benefiting from all our projects will continue to increase (See Figure 3 for list of present projects).

Interactive Radio Programs Around the World

Program Start	Country	Math	ESL	Spanish	Science	Teacher Training	Health
1974	Nicaragua	N					
1980	Thailand	A					
1980	Kenya		N				
1980	Nepal	A				N	
1981	Dominican Republic	A		N			
1986	Papua New Guinea				N	N	
1987	Honduras	N	A	N			
1987	Bolivia	A/N					N
1987	Lesotho	A					
1988	Costa Rica	A				N	
1988	Ecuador	A					
1989	Belize		A				
1990	Swaziland		A				
1990	Guatemala	A		N			

KEY: N = New Curriculum Model Developed
A = Adopted Curriculum Model Used

Figure 3

During the coming decade, literacy and basic education will be of particular concern. The problems confronting those who are attempting to increase the quality, access and equity in basic education are great, and there is no single solution. During the past fifteen years, interactive radio instruction has proven to be an intervention that is highly effective. It stands ready and experienced to contribute its advantages, either independently or in tandem with other educational improvements, to the goal of world literacy and universal basic education.