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LEARNTECH PROJECT
ANNUAL REPORT FOR 1990-91
YEAR 1
September 1990 - September 1991

The LearnTech Project, funded through the Office of Education, Bureau for Research and Development, U.S. Agency for International Development, is administered by Education Development Center, Inc. (EDC) and brings together a strong international consortium of institutional expertise and experience.

EDC is assisted by the following institutions who provide specialized expertise and skills:

- Academy for Educational Development (AED) Washington, D.C.
- Applied Communication Technology (ACT) Menlo Park, CA
- Asociación de Promoción y Desarrollo Socioeconomico (AVANCE) Tegucigalpa, Honduras
- Centro de Investigación y Desarrollo de la Educación (CIDE) Santiago, Chile
- Centro Internacional de Estudios Superiores de Comunicación para América Latina (CIESPAL) Quito, Ecuador
- Commonwealth of Learning (COL) Vancouver, Canada
- Development Technologies, Inc. (DETEC) Washington, D.C.
- Electronic Learning Facilitators, Inc. (ELF) Bethesda, MD
- Friend Dialogues of North Carolina, Inc. (FDI) Shelby, NC
- Institute for International Research (IIR) Arlington, VA
- Interactive Image Technologies, Ltd. (IIT) Toronto, Canada
- Intercultural Communication, Inc. (ICI) Washington, D.C.
- Interlock Media Associates (IMA) Cambridge, MA
- International Extension College (IEC) London, England
- Real World Productions, Inc. (RWP) New York, NY

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EXECUTIVE SUMMARY

The LearnTech Project (Learning Technologies for Basic Education Project) was established by the A.I.D. Bureau for Science and Technology (now known as the Bureau for Research and Development), Office of Education, and is administered by Education Development Center, Inc. (EDC). The purpose of LearnTech is to promote the use of learning technologies to enhance basic education in the developing world. The project gives special emphasis to interactive radio instruction (IRI), a highly cost-effective use of technology that A.I.D. has invested in since 1973. The project also supports the use of other learning technologies from programmed text materials to video and computers. Also, LearnTech is to examine how technologies can best be used to increase access to schools, especially for girls. Finally, LearnTech seeks to internationalize financial support for learning technology projects. LearnTech is a four-year project that ends in September, 1994.

LearnTech made great progress during Year 1 to expand support for IRI. In Africa, the project developed proposals for Namibia, Ghana, Nigeria, Uganda, South Africa, Cape Verde, and Zimbabwe. In all those countries, except Cape Verde, there is interest in using IRI to strengthen the teaching of English. In Nigeria, there is also much interest in radio health; in Uganda, there is special interest in health, especially AIDS education, and radio-based teacher training, as well as English. Cape Verde is the site of a subregional project among the five Portuguese speaking countries in Africa. This project will begin in January, 1992, by adapting IRI mathematics and developing a new series, Portuguese as a second language. Pilot IRI projects are tentatively scheduled in 1992 for Zimbabwe, South Africa and Namibia.

In Latin America, LearnTech initiated a new IRI program in environmental education in Costa Rica. This timely new series will consist of two broadcasts per week for each of grades 4-6, and will emphasize school outreach activities in the local communities. Bolivia continued to develop IRI math lessons through grade 5, and completed plans to initiate a new radio health series in late 1991. In the Dominican Republic, the project also supported the expansion of the RADECO (Radio-Assisted Community Basic Education) math programs into the formal schools; conducted two research studies (one on the graduates of the RADECO centers and the other on the potential utility of the RADECO programs to increase school access in the capital of Santo Domingo); and funded a new teacher training video. In Venezuela, EDC and the Academy for Educational Development (AED) collaborated with the Ministry of

Education in Venezuela to pilot IRI math in early 1992. EDC received funds from the Mendoza Foundation in Venezuela for the technical assistance. LearnTech continued to support ongoing IRI programs in Belize and Honduras.

In Asia, LearnTech is supporting the development of a pilot IRI math series beginning with grade 2 in Nepal in 1992. LearnTech is also assisting the Ministry of Education in Indonesia to incorporate interactive radio techniques in teacher training programs.

In addition to IRI, LearnTech laid the groundwork for supporting other technologies such as computers, where the project will give special attention to how a single computer in a classroom or school can be used effectively. The project also outlined a study of the large primary school computer project in Costa Rica which would be conducted in collaboration with the Omar Dengo Foundation. The project also developed plans to continue the assessment of a major computer project in Grenada. In addition, LearnTech commissioned a state of the art paper on the use of video for teacher training. Finally, in the area of other technologies, the project continued to support the use of simple electronic learning devices to strengthen primary school math and reading in Belize.

LearnTech also gave high priority to developing support for IRI among other international donors. The project expanded contacts with the World Bank, UNICEF and UNESCO. The work in Cape Verde is a joint project with the UNESCO/Harare, Sub-regional Office for Southern Africa. This activity is a subregional effort among the five Portuguese speaking countries in Africa. The proposed activities in Nigeria will be a joint activity with UNICEF.

I. Introduction

This report begins with a summary of the objectives of LearnTech, reviews the approach of the project for Year 1, and describes its marketing strategy. The report then discusses the activities in support of IRI, giving special emphasis to the new ways in which IRI is being used. The report summarizes the efforts to gain international donor support for IRI, and then describes some problems with the acceptance of IRI and makes suggestions that would enhance its wide scale use. Finally, the report summarizes the activities with technologies other than IRI and closes with the priorities for 1992.

In addition, this report describes the initial efforts to develop activities using other technologies, especially computers and video. The report concludes with a discussion of priorities for Year 2.

The principal objectives of LearnTech are to:

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- introduce IRI into at least four new countries,
 - test the application of other technologies (either in conjunction with or independent of IRI),
 - test the impact of introducing a "complete package" of IRI programs in one country,
 - test the application of learning technologies to increase access to schooling, especially for girls, and
 - develop financial support from other international donors.
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To help carry out these objectives, EDC created an international consortium with extensive expertise in the effective use of learning technologies. One of LearnTech's first challenges was to establish a working relationship among the consortium members so that everyone felt involved and that the appropriate expertise could be identified and utilized as needed. The project has used personal communication, monthly reports, faxes and, for the most active consortium members, electronic mail to maintain this communication. In addition, early in the project LearnTech held an international teleconference in which almost all members of the consortium contributed to a discussion on some of the key issues and priorities of LearnTech.

A key component to developing support for IRI and other technologies is our marketing strategy, which is described in the following section.

II. Marketing LearnTech and IRI

Intercultural Communications, Inc. (ICI) has primary responsibility for developing the LearnTech marketing plan and for creating most of the promotional materials. The diffusion of LearnTech technologies is a specific marketing objective of the project. There are two main branches of the marketing strategy. One is "internationalization" efforts, which is strategy to promote IRI in more countries; the other is "nationalization" efforts, which occur within the countries that are using LearnTech services.

The international approach focuses on developing an understanding of LearnTech among USAID missions, other donors, and ministries of education. This approach aims at disseminating knowledge of the project's goals and its most important technologies. The distinguishing feature of this approach is that it is oriented to donor demand, rather than to a "hard sell" approach based on a commitment to specific technologies.

In support of this approach, ICI conducted both formal and informal surveys of priorities, plans, and country-level activities among donors such as USAID missions, UNICEF, the World Bank, and UNESCO. Based on their needs and priorities, the project then tailored its communication and activities. Some findings from this marketing research have considerably influenced LearnTech activities. For example, ICI found reservations on the part of many World Bank staff concerning the use of radio-based education. Further, it found that most UNICEF offices maintain a relatively narrow approach towards "basic education" that emphasizes informal channels rather than support for the formal school system.

LearnTech has responded to concerns within the World Bank with presentations that focus on specific issues such as sustainability. LearnTech has also offered UNICEF assistance in developing uses of radio and other technologies to strengthen health education, to improve access to schools for girls, and to develop basic "Facts for Life" for adults. This strategy has been successful both in terms of generating USAID "buy-ins" and in generating models for other donors on technology alternatives.

LearnTech also developed an international mailing list of over 3,000 individuals and institutions and sent them information on the project.

The nationalization component of the marketing plan is directed towards countries that are collaborating with LearnTech. The purpose of the national level strategy is to develop understanding and support of learning technologies within a country. The national level strategy utilizes international contacts, country visits, trials of instructional materials, and both international and national documentation. To assimilate and make available the collective learning of LearnTech, its predecessor projects in radio learning, and similar projects dealing with educational technologies, ICI developed a series of "Learning Alternatives" fact sheets. Some of these fact sheets have two parts. The first presents a specific technology within a context of general needs; the

second part includes information relevant to a specific country such as its infrastructure and training requirements.

The marketing plan calls for national-level efforts to be well documented in visual, audio, and written form. LearnTech will tailor this documentation for presentations in specific countries. Beyond this basic outline, the marketing plan provides a detailed, analytical breakdown of all potential project audiences, and goals for interaction with each. The plan goes beyond the present ability and resources of the project, but it clearly describes the many interrelated applications for improving learning technologies for basic education.

III. New Partnerships to Internationalize IRI

LearnTech has sought to internationalize support for IRI in two ways. The first is through international organizations, especially those that have the potential to fund IRI activities. The second way has been through increased involvement of IRI specialists from developing nations.

As a part of the marketing strategy, LearnTech contacted 45 international organizations. Following a general mailing, 42 representatives of the World Bank were contacted. In addition, LearnTech gave a presentation to the Latin American division of the World Bank, generating much interest and a request for a similar presentation to the Asia division in January, 1992.

LearnTech also worked with UNICEF, collaborating with the New York office in the early stages of planning their conference on the "third channel" held in August. In addition, the project initiated contacts with both regional and country UNICEF offices. As a result, LearnTech was invited by the UNICEF Representative for Nigeria to assess the potential of IRI to support UNICEF's work there. The Project also held preliminary discussions with the Latin American UNICEF regional office on potential collaboration for IRI in El Salvador with the USAID SABE basic education project.

LearnTech collaborated with the UNESCO subregional office for southern Africa in Harare in establishing an IRI project among the Portuguese speaking countries of Africa, as explained on page 14. UNESCO and LearnTech collaborated in a two-week program in which two representatives from each of the five PALOP countries visited Lesotho to observe the IRI English program and then proceeded to Harare for a planning workshop. LearnTech and UNESCO will share the startup costs in early 1992. UNDP funds are expected to be available by mid-1992.

Venezuela - LearnTech provided the MOE with information and materials on IRI math. In addition, EDC and AED sent a joint mission to Venezuela funded by the Eugenio Mendoza Foundation in Caracas to plan an IRI math pilot project to begin in early 1992. Through a contract with EDC, the Mendoza Foundation paid for technical assistance

from EDC and AED to assist the MOE in preparing for the pilot IRI activity.

In addition to the foundation support in Venezuela, LearnTech is seeking funding from other foundations for the environmental education project in Costa Rica.

The first funding for IRI from a Latin American foundation came from the Eugenio Mendoza Foundation in Venezuela.

In the Dominican Republic, LearnTech helped RADECO prepare a proposal for a large grant from the European Community to greatly expand IRI. The proposal, if funded, would enable RADECO to greatly increase the number of communities with radio schools, and would also expand the use of IRI lessons in the formal school system.

In South Africa, the project is assisting OLSET, a NGO working in education, to develop a new national radio channel for education. An important component of this channel would be for IRI, but LearnTech has also suggested other types of programs for a more general audience that might be appropriate in the post-apartheid South Africa. The USAID mission there has been very supportive of this effort.

In Ecuador, LearnTech has involved consortium member CIESPAL (see page 8). CIESPAL has been particularly helpful in translating into Spanish the LearnTech brochure and the book Interactive Radio Instruction: Confronting Crisis in Education. The project continues to look for opportunities to involve two other international members of the consortium, the Commonwealth of Learning in Vancouver and the International Extension College in London.

LearnTech held discussions with the International Council on Distance Education (ICDE) based in Oslo and will consider a collaborative effort focusing on Africa for 1992.

In Asia, LearnTech held preliminary discussions with INNOTECH and the Asia Development Bank, both based in Manila. The Project plans to have follow-up discussions with both institutions in late 1991.

In addition to expanding contacts with international organizations, LearnTech is increasingly utilizing IRI experts from developing nations. The Project's new Deputy Director based at AED is Honduran and was formerly General Manager of AVANCE, the Honduran institution that developed the IRI mental arithmetic series. LearnTech has also drawn on the experiences of Third World consultants from the Dominican Republic and Costa Rica, and expects to utilize Latin American IRI specialists to support the new projects in Cape Verde and El Salvador.

The project is also giving special attention to capacity building. For example, LearnTech recommended that the new and rather complex project in Cape Verde be developed without any long-term American technical assistance. Instead, Mr. Anisio Matangala, distance education specialist from Mozambique, will be the Subregional Coordinator and Mr. Julio Correia of the Cape Verde Ministry of Education will be National Coordinator. To help prepare Mr. Matangala for this responsibility, LearnTech funded a two-month study tour to the IRI sites in Latin America including Bolivia, Costa Rica, the Dominican Republic, and Guatemala. In addition, he spent a few days at Florida State University to review evaluation strategies.

In summary, LearnTech made considerable progress during its first year in internationalizing IRI. The work in this area will continue to expand during the second year.

IV. IRI

This section describes activities to support IRI. The discussion is divided among three categories -- activities that support ongoing IRI projects; activities to expand the use of existing IRI programs in new countries; and the initiation of new IRI programs.

A. Support for Ongoing IRI Projects

An important responsibility for LearnTech is to support ongoing IRI activities. Some of the country activities are a continuation of projects begun under the Radio Learning Project, the predecessor project of LearnTech. Some of these countries continue with USAID funding, others receive little or no continued USAID funding and, in some countries, IRI has been funded by other sources. As with any other intervention to improve education, there is need for some continuing support for at least several years after major donor support terminates. The following section describes ongoing support by LearnTech within each region.

Latin America

Belize - Real World Productions, a LearnTech consortium member, carried out a consultancy to assist the MOE in developing plans for expanding IRI English in Belize. An expanded pilot IRI project will begin in early 1992.

Bolivia - With USAID mission buy-in funds, EDC continues to support the adaptation and development of new radio math programs, completing a series for grades 2-5. LearnTech also is supporting some of the planning activities for expanded work in radio health. The IRI math programs are being used by approximately 50,000 children.

Costa Rica - EDC continues to support the implementation in Costa Rica of the mental arithmetic IRI series originally developed in Honduras. About 25,000 children are

learning math by IRI. Other IRI activities in Costa Rica are described in the following sections.

Dominican Republic - AED is giving special attention to strengthening RADECO (Radio-Assisted Community Basic Education) program which developed the only IRI series designed to increase access to primary education by creating radio-listening centers in communities without primary schools. One of the new activities is the introduction of the radio math lessons into the formal school system. The positive findings of the summative evaluation are in line with the results of other IRI studies (see Appendix III). The radio math programs closed the urban-rural gap in achievement. LearnTech also funded two studies. One research activity studied the graduates of the RADECO centers (see Appendix I for a summary of the study). The other study was of the schooling situation in Santo Domingo to see if the RADECO programs might help alleviate the problem of access to schools in the poor barrios of the capital city (see Appendix II).

Ecuador - LearnTech continued its ties with CIESPAL in Quito. CIESPAL took primary responsibility for the translation into Spanish of the IRI book Interactive Radio Instruction: Confronting Crisis in Education. The project also held discussions on establishing a regional center on learning technologies at CIESPAL, but this has been postponed, in part, because of the USAID mission's decision not to proceed with a large-scale IRI project. AED is coordinating our work in Ecuador.

Instrucción por Radio Interactiva: Confrontando la crisis en la Educación Básica is now available.

Honduras - AED has maintained project contacts with the USAID mission, the MOE, and AVANCE (a LearnTech consortium member). Due to USAID's decision to cease funding AVANCE, plans were dropped to develop a new IRI language series in Honduras. In addition, the IRI mental arithmetic series was not broadcast until late in the school year. Last year about 200,000 children in grades 1-3 were learning math from the IRI lessons. The MOE and AVANCE have an agreement to continue implementing the IRI series.

LearnTech also received a buy-in from the mission to analyze the summative evaluation test results for the Grade 3 mental arithmetic series. Applied Communications Technologies (ACT) and Friend Dialogues of North Carolina (FDI), both LearnTech consortium members, will carry out the work. The report will be completed by the end of 1991.

Africa

Lesotho - The project held discussions with MOE officials about possible limited LearnTech support when the AED-administered USAID/BANFES project terminates at

the end of 1991. About 200,000 children in Standards (grades) 1-3 are learning English from radio in over 90% of the primary schools. The MOE expressed interest in collaborating on an evaluation of the IRI *English in Action* series in 1992.

Swaziland - Since the successful IRI English pilot project in Swaziland in 1990, EDC has maintained contact with the MOE and USAID mission about the Ministry's decision on whether to proceed with implementing the program. No decision has been made yet.

Asia

The Radio Science Project has been institutionalized in Papua New Guinea.

Papua New Guinea - With the completion in December, 1990, of the Radio Science Project, administered under a separate contract by EDC, LearnTech is maintaining contact with the Ministry of Education in PNG. The MOE is implementing the Grade 6 radio lessons on a national basis in 1991 and plans to implement the Grade 5 lessons in 1992, and the Grade 4 lessons in 1993.

Thailand - The MOE has been using IRI math nationally for over a decade, but in recent years, it has sharply reduced the number of hours it broadcasts these lessons.

B. New Initiatives Based on Existing IRI Materials

Latin America

Costa Rica - LearnTech is financing a pilot activity in which the language lessons from the RADECO project in the Dominican Republic are being tried out in remote rural schools in Costa Rica. These lessons, along with the IRI math series, are targeted to schools with multigrade classes. The Ministry of Education views IRI as a special resource to teachers who are in the most disadvantaged schools.

El Salvador - LearnTech received a buy-in from the USAID mission to assist the MOE in structural reorganization to improve the preparation of new curriculum materials. The new USAID basic education project SABE, being administered by AED, is likely to include an IRI component. LearnTech has offered to collaborate with SABE on any such effort and has planned to support a pilot radio math activity in 1992. The SABE project and LearnTech have been in touch with UNICEF regarding possible collaboration.

Africa

Ghana - LearnTech representatives held discussions in Ghana with USAID and Ministry of Education officials during September, 1991. There is support within the mission to involve LearnTech in strengthening schools broadcasting, especially in English, through their basic education program PREP. There is also interest within the Ghanaian Broadcasting Corporation, but the MOE prefers to postpone any activities with radio until coverage of the national radio network improves.

Namibia - EDC carried out a mission to Namibia to prepare a proposal on the potential application of IRI to assist the MOE in switching from Afrikaans to English as the official medium of instruction starting in the upper primary grades. An adaptation of the IRI English

IRI could help Namibia implement the new policy that English shall be the nation's official language.

series would provide excellent support for teachers in the lower primary grades to help implement this transition. The MOE has expressed interest in the proposal. LearnTech has offered to fund a modest pilot project. International Extension College (IEC), a LearnTech consortium member, is working with the MOE through a contract with the British Overseas Development Agency to create a weekly 30-minute English language instructional program targeted to teachers and other adults.

South Africa - With encouragement from the USAID mission, EDC has collaborated with a NGO called OLSET (Open Learning Systems Education Trust) on developing a proposal for using radio to strengthen basic education in South Africa. A one-day seminar for over 100 representatives from NGOs, international and local donors, Ministry of Education officials, and personnel from the South African Broadcasting Corporation, is planned for early November. IEC, with funds outside of LearnTech, is also involved in developing plans for instructional radio in South Africa.

Zimbabwe - EDC and AED have collaborated in developing support for IRI within Zimbabwe. LearnTech co-sponsored, with the MOE, a planning workshop on IRI and then financed a study tour of four MOE officials to Lesotho to observe the *English in Action* series being broadcast there. The Audio-Visual Services division subsequently

Zimbabwe may begin a new IRI English project in 1992.

developed a proposal on using IRI English. The MOE has decided to begin an IRI project in 1992 with support from LearnTech; the MOE has also requested funding from the World Bank to cover the costs of implementing the program. Given the relatively

advanced level of human resources and infrastructure in Zimbabwe, the MOE can adapt and rerecord the IRI English series with only modest assistance from LearnTech. LearnTech also held discussions with officials at the University of Zimbabwe, Faculty of Education, regarding the possible establishment of a regional center there on learning technologies.

Asia

Nepal - A new IRI math pilot for grades 2 and 3 began with the funding shared between the USAID mission and LearnTech. Grade 2 lessons will be introduced in 1992 and grade 3 in 1993. This activity is being administered by AED.

Nepal is expanding its radio education activities from teacher training to direct instruction to children in math.

C. New Directions for IRI

IRI began with the Nicaraguan Radio Mathematics Project in the mid-1970s. In the following years it expanded to English as a second language in Kenya, to science in Papua New Guinea, and to reading and writing in Spanish as part of the Dominican Republic RADECO project. The vitality and flexibility of IRI is shown by the expansion of IRI into new subject areas during the last few years.

Eastern Europe and the Teaching of English

With the momentous changes taking place in Eastern Europe, there is an enormous demand for learning English. In Poland, for example, there are some 20,000 teachers of Russian, many of whom are now quickly trying to learn English to help meet the enormous new demand for English language instruction. The IRI English language series could be a great help to teachers striving to teach English, especially for the thousands of teachers whose English competence is not strong. EDC, outside of LearnTech funding, has held discussions with Polish Radio and the key MOE advisor on language instruction. There is a great deal of interest in the possibility of adapting the IRI series for Poland. There would be ample free air time. EDC will seek funding outside of A.I.D.

Environmental Education - In Costa Rica, LearnTech is initiating an exciting new environmental education IRI series for the upper primary grades in collaboration with CENADI (National Center for Teaching), of the Ministry of Public Education. The first

lessons for Grade 4 have been tried out and received an enthusiastic response in the classrooms. This project builds on the extensive experience and commitment in Costa Rica in caring for its environment. Given the increased attention world wide to environmental issues, it is both timely and appropriate to develop an IRI series in this area. The IRI environmental education series will build on the experience of the Radio Science Project where IRI lessons sought to incorporate a more open-ended, inquiry approach and the more extensive use of hands-on materials during the radio lessons.

The environmental education series in Costa Rica will promote interaction between the schools and their communities. Of the two weekly radio lessons for each grade, one will be targeted to adults as well as children. In addition, the radio programs and teacher's guides will suggest activities for children in the communities.

The programs will emphasize two areas. First, they will focus on the concept of an ecosystem as a scientific and philosophical concept. The programs will stress the interrelationships of different parts of the earth and the ways in which problems in one area have an impact in other areas. Second, the programs will give attention to environmental problems and potential solutions to those problems, and will promote community action projects. These programs will be for adults as well as school children in grades 4-6.

EDC is providing one long-term technical advisor to assist the MOE in adapting their new environmental education curriculum to radio lessons. Interlock Media, a LearnTech consortium member, is also assisting with training in radio production, and AED will have an ongoing supportive role as well. The project is seeking additional funds from sources both in and out of Costa Rica. More funds will be needed if this project is to development its potential fully.

Health - At the end of Year 1, LearnTech received a buy-in from USAID/Bolivia for over four million dollars to develop a new radio health series for the upper primary grades and to implement on a wider scale the radio math programs. This new work is based on a successful IRI health pilot project carried out in 1989. The pilot series consisted of ten programs for children in grades 4-5 on diarrheal diseases covering topics such as symptoms and causes of diarrhea, preventative measures, and how to mix ORT solutions. The content of the lessons was determined from anthropological research in the target communities to assess knowledge, attitudes and practices relating to diarrhea.

The project will be a collaborative effort among the MOE, Ministry of Health, two local NGOs, and LearnTech. It will develop and test a series of approximately ten instructional modules on the following topics -- cholera, diarrhea (revision of the pilot series), nutrition, Chagas disease, accident prevention, personal hygiene, household and

environmental sanitation, vaccinations, respiratory infections, traditional medicines, and personal decision making (alcohol, drugs, tobacco, sex).

The new radio health programs in Bolivia will help to fill a gap in health promotion campaigns which have targeted adults and have focused on child survival. IRI programs will be designed to affect knowledge, attitudes, and behaviors of school-age children who, not only have control over some aspects of their own health, but are also care givers to younger siblings.

In Nigeria, at the invitation of UNICEF, LearnTech conducted a mission to examine the potential of introducing IRI. The EDC/ICI team visited two of the northern states, Kaduna and Bauchi, where there was considerable interest in IRI. UNICEF is interested in using IRI for health education in the primary schools and for adult centers for women.

The USAID mission, which only works in health, is willing to consider how radio for primary schools might support their objectives. UNICEF will sponsor a study-tour to IRI sites. LearnTech and UNICEF are planning a workshop in Nigeria in early 1992.

If IRI is introduced in Nigeria, it will build on decades of experience with schools broadcasting there, and will focus on health education with support from UNICEF.

Uganda would like to use radio to support teacher training, English for the primary schools, and health education with a special emphasis on AIDS.

In Uganda, LearnTech, with the participation of EDC, AED and Real World Productions, assisted the MOE in preparing a proposal for the use of radio in three areas: health education, especially about AIDS; teacher training; and English for primary children. The proposal is in the top category of priorities for the MOE's five-year investment plan for basic education. The MOE and potential

donors are considering this proposal, among others, for possible funding. LearnTech is ready to support a pilot activity.

The IRI initiatives in health and environmental education add two important dimensions to IRI. The first is a shift from using IRI in core basic education subjects such as mathematics and language, to more specialized areas in which teachers may have had little or no training. Thus, IRI may be used increasingly to help teachers introduce new important areas into the curriculum and, thus, help to minimize the need for expensive teacher training.

Second, both the environmental education and health projects are the first attempts to link the schools with their communities. Thus, their objectives are not just an increase in knowledge, but a change in both attitudes and behaviors of children and members of the community. Half of the environmental education radio programs will be targeted to adults as well as children, and the radio programs and teacher's guides will include suggestions for community-related activities. For example, in one program children are encouraged, with cooperation from parents, to become "water detectives." They investigate and talk to their parents and teachers about ways in which water is being wasted and contaminated in the community.

The radio health series will encourage communication between children and their families on health issues; in addition, the teacher's guides will support outreach programs into the communities. Schools will be given fully-stocked first-aid kits and teachers will be trained in the treatment of minor injuries. Schools will also become important community resources in educating community members about the use of basic health interventions such as oral rehydration salts or iodine, and in distributing the same within the community.

Second Languages - AED, under the BEST basic education project in **Guatemala**, is designing a new IRI series for the lower primary grades to help teach Spanish as second language to Indian children. The radio programs will be part of a bilingual approach to language development. AED plans to begin testing these lessons in early 1992. Once the programs are developed, LearnTech will help to make them available to other countries where Spanish as a second language is an important subject. BEST collaborated with LearnTech by hosting an African educator on a LearnTech study tour who is scheduled to be the new subregional director of the IRI project in Cape Verde.

As mentioned earlier, EDC and AED have been working with UNESCO/Harare on a new IRI regional project among the Portuguese speaking countries in Africa. The project is scheduled to begin in **Cape Verde** in early 1992. In addition to adapting the radio math series to Portuguese for the upper primary grades, the project will develop a new Portuguese as a second language series for the first two years of primary school. The Portuguese as a second language programs will give special attention to developing basic concepts of numeracy and of elementary mathematical operations. Both the math and Portuguese series will include content on important development topics such as health, agriculture, and the environment.

To support the subregional dimension of this project, the staff in Cape Verde will have representatives from at least three of the PALOP (African Countries with Portuguese as an official language) countries. In further preparation for this activity, LearnTech sponsored a two-month study tour to the Latin American IRI sites for a Mozambiquan distance education specialist who will be the subregional coordinator of the project in Cape Verde. Finally, LearnTech participated in a two-week planning mission to Cape Verde in September, 1991 in preparation for the project.

Popular Legal Education - LearnTech provided technical assistance in Costa Rica for a new radio series on popular legal education. These lessons are designed to complement projects by A.I.D. and other donors to strengthen democratic institutions in Latin America. The series will consist of approximately thirty 15-minute radio programs that emphasize the rights and duties of citizens, with special emphasis on women and children. The programs will be targeted to a general audience. Radio Netherlands is producing the programs in San Jose under a contract with ILANUD (the UN regional organization for justice in Latin America). An accompanying booklet is being produced at CENADI.

Teacher Training - The first radio programs for teachers in support of IRI were in Papua New Guinea. There, each night before the radio science broadcast to the children, there would be a ten-minute radio program to help prepare the teachers. In Honduras (for mathematics) and Lesotho (for English) there have also been a few broadcasts to help orient teachers to IRI. But in Costa Rica, LearnTech helped to develop the first comprehensive radio series -- twenty-nine half-hour lessons directed to lower primary school teachers. The first nine lessons focus on how to use IRI in their classrooms -- what is IRI, what is the role of the teacher, etc.

The new teacher training series in Costa Rica reflects the desire of LearnTech to incorporate more teacher training so that, not only will children learn more from the IRI programs, but teachers will gain competence as well.

The last twenty lessons of the series go beyond IRI; they are designed to help improve the capabilities of teachers. The content was determined from research on the math knowledge of both teachers and children; in addition, teachers were interviewed about areas of math teaching they found difficult. They were also shown math problems with typical errors that children make and asked how they would teach to correct the problem.

The lessons try to bring together two elements that are uncommon for radio-based teacher training programs. First, the content was derived from careful research. Second, the scripts were written and produced based on the principles of interactive radio that have been so successful for children. For example, the lessons try to actively engage the teachers. Although the teachers are not asked to respond orally, there are questions, followed by pauses, that ask the teacher to think about a particular issue, problem or solution. Or, they may be asked to write down some of their ideas.

These radio lessons should strengthen the competence and confidence of the teachers. The series of twenty-nine lessons was completed in 1991 and an evaluation of their effectiveness is scheduled for 1992.

In the Dominican Republic, AED is working with RADECO to develop a technology-based approach for orienting teachers to IRI. The approach will include both television and radio. In 1991, LearnTech financed a new teacher training video tape. RADECO plans to use this video on television, and then follow up with the series of twenty-nine radio teacher training lessons from Costa Rica. There are also plans to orient school supervisors, who may or may not provide some training for teachers. During 1992, LearnTech will closely monitor the impact of this approach on teacher orientation.

RADECO will be the first project to try training teachers on how to use IRI principally through technologies using both television and radio.

In November, 1991, LearnTech will conduct a workshop with the MOE in Indonesia on using radio to help train teachers in remote locations. Indonesia is embarking on a massive upgrading program for its primary school teachers; one objective of the upgrading program is to introduce a new curriculum that is more child centered and incorporates more active learning. To reach the more remote teachers, the MOE has begun to develop radio-based teacher training lessons; but the MOE believes that their radio lessons could be improved by incorporating a more active learning mode and would like to draw on the IRI methodology.

D. Access to Education

Malaŵi - The USAID mission has contacted LearnTech about participating in a study to help address the problem of low access to primary schools, especially for girls, by using radio along the lines of the RADECO model. The study is scheduled to be carried out in mid-1992 under the basic education project GABLE, which will begin in early 1992.

V. Problems and Opportunities for IRI

In spite of over fifteen years of research and development on IRI, and at least a half dozen years of active promotion, IRI has not become as widely accepted and utilized as one would hope. Granted, there has been a large increase in the use of IRI in recent years, bringing the number of learners up to about 600,000. Nevertheless, IRI has yet to reach its potential impact on improving basic education. The following text summarizes some of the constraints and presents some possible solutions.

Constraints

1. Instructional radio is not seen as one of the major interventions to improve basic education. It remains an afterthought following textbooks and

Possible Solutions

1. Part of the acceptance of IRI will come simply as a result of experience in more countries. IRI should not be seen as an alternative to textbooks or teacher

teacher training. IRI also suffers from the poor reputation of traditional schools broadcasting.

2. IRI is often thought of as a solution for just one, or possibly, two subject areas. Thus, many decision makers are reluctant to consider IRI with all of its implications for infrastructure to improve teaching in only one or two content areas.

3. Although many educators recognize that IRI can have a dramatic impact on student learning, IRI has not been linked with efforts to upgrade the qualifications of teachers. As long as IRI is perceived as bypassing efforts to improve the capabilities of teachers, many educators will turn to other solutions.

4. The IRI language and math programs are so demanding in terms of broadcast time, that many countries find it difficult to provide so much air time. Just the math or English series alone for three grades requires 1 1/2 hours of broadcast time each day (and double this time if a country has two shifts). This makes it difficult to add IRI programs in more subject areas in an effort to be more comprehensive.

training, but as an important complement. Thus, LearnTech must continue to try to get IRI considered at the beginning of a reform effort so that an appropriate balance of texts, teacher training, and IRI can be planned for. LearnTech should also look for opportunities to develop an integrated radio-textbook-teacher training approach to curriculum reform.

2. Now that there is experience using IRI in so many subject areas, there is need to promote IRI as a more comprehensive solution. Not only can it help teachers in the basic core areas of math and language, but it can be used to support some of the new special subjects in which teachers may not have had training e.g., environmental education, health, and popular legal education.

3. Part of LearnTech's comprehensive approach is to give more attention to improving the competence of teachers. The most significant effort to date is the radio series for teachers of mathematics in Costa Rica. In addition, LearnTech may need to stress the importance of teacher's guides as important training materials.

4. One option is to obtain a separate educational broadcasting channel. Where constraints remain, there may be need to reduce the broadcast schedule; for example, the English or math series may need to be cut back to three 20-minute lessons per week.

5. The cost of batteries is still a problem in many countries.

5. LearnTech will continue its efforts to find adequate solar powered radios and solar powered rechargeable battery systems. The Radio Learning Project carried out research on solar powered rechargeable battery systems in Honduras, and LearnTech is continuing research in this area in Belize. The Institute for International Research under the LearnTech Project held a one-day seminar in August, 1991, with assistance from the Sandia National Laboratory on types of simple batteries (cost as a function of energy requirements) and solar power options for radios and cassette players.

VI. Technologies Other than IRI

The following summarizes LearnTech activities under the alternative technologies component of the project during FY 91.

LearnTech/Educational Technologies Studies and Applications Project (LTP) Interface

EDC and IIR (Institute for International Research) merged the final year of LTP with LearnTech. The merging of the two projects proceeded smoothly without any operational, bureaucratic, or budgetary confusion.

LearnTech Net

During the first quarter of the year, LearnTech put into operation an integrated e-mail system and electronic bulletin board. After experimentation, users felt that the system was not sufficiently user friendly and that the bulletin board was not likely to get much use. The project then linked up with EDC's e-mail system. This has worked well, although the e-mail has been used extensively only by the few most active members of the consortium.

Appropriate Educational Technology Strategy Statement

IIR developed a strategy statement for the alternative technologies component of LearnTech. (See Appendix III). LearnTech decided to change the name of this component from Alternative Technologies to Appropriate Educational Technology.

IIR prepared a one page, desktop published flyer for LearnTech on Appropriate Educational Technology. This included an in-house translation into Spanish and French.

LearnTech and Computers

EDC hosted a two-day meeting during May to examine how LearnTech would explore educational applications of computers in developing countries. The meeting brought together many members of the consortium.

There seemed to be a consensus that computers were most likely to find widespread application at the post-primary level -- secondary schools, teacher training, and technical/vocational education. For primary schools, electronic learning aids and calculators need to be explored further. One area of particular interest was to find ways to assist schools in situations where they may have only one or a few microcomputers. The participants also thought it was important to learn from the few major projects such as Costa Rica where there is a significant attempt to introduce computers into the school system. The group also thought that the software Electronic Workbench created by consortium member Interactive Image Technologies had considerable potential for technically or vocationally oriented courses at the secondary or higher levels.

CIES Conference

Steve Anzalone prepared and presented a paper entitled "Computers for Basic Education in Developing Countries: Will the First Wave Find the Third Channel?" at the Comparative and International Education Society's 1991 Conference. LearnTech also made possible a presentation by Clotilde Fonseca, Executive Director of the Omar Dengo Foundation in Costa Rica, on their educational computing program. Finally, Tom Tilson gave a presentation on the cost effectiveness of IRI based on recent studies in Bolivia, Honduras and Lesotho.

"Third Channel"

Several LearnTech staff attended the meeting held at UNICEF to look at the possibility of forming an Inter-Agency Technical Advisory Group on "Third Channel" Approaches to Basic Education. Anzalone's presentation was on developing countries' use of computers for basic education. Clotilde Fonseca presented Costa Rica's experience with computers for elementary schools. Tom Tilson and Gary Gleason made a presentation on IRI.

Belize

IIR and AED coordinated plans for continued activities in Belize.

Multigrade Teaching Study. A new project to study the particular problems of multigrade teaching was developed. The first workshop was conducted in May 1991; a team in Belize developed instruments for investigating multigrade teaching practices in schools. IIR will lead another workshop in late 1991 to revise the instruments and get the investigation under way.

Speak & Math Study. The Belize Lab arranged testing of the new model of Speak & Math with students in upper grades at the Caye Caulker primary school. This study began during the Fall semester of 1991. The study is to be an informal look at the appropriateness of the new learning aid in the classroom and to look at the feasibility of inexpensive solar recharging devices.

Speak & Read Study. The Curriculum Development Unit (CDU) of Belize expressed an interest in having a second look at the Speak & Read learning aid, which had received a brief and inconclusive try-out during the pilot of IRI English lessons in Belize. The study was conducted entirely by the CDU with some assistance from Peace Corps Volunteers; LearnTech supplied the learning aids. The study was conducted over a four and a half month period in three schools. The children were Spanish-speaking refugee children.

Although it would be difficult to isolate the effects of the Speak & Read from other English learning that may have been occurring at school or in the community, the CDU concluded that "Clearly from the results of the post-test the Speak and Read program could be very effective in providing ESL learners the necessary skills required for effective learning of a new language – English, as well as some readiness skills as beginning readers."

Costa Rica

IIR took the initiative to develop a collaborative research project with the Omar Dengo Foundation in Costa Rica on their primary school computing systems. The concept paper "Study of National-Scale Implementation of Educational Computing in a Developing Country" describes the study that would (a) assist the Omar Dengo Foundation in collecting systematic information for program planning and management; and developing its capacity to analyze this information and make use of it for future activities in Costa Rica and elsewhere; and (b) to gather and disseminate information that will be useful for other developing countries contemplating wide-scale implementation into their educational systems. The proposed study would focus on implementation issues rather than on assessing LOGO outcomes.

Grenada

The evaluation of computer-assisted instruction (CAI) in Grenada that began under LTP is continuing under LearnTech. IIR provided the Crochu Primary School

with a new uninterruptible power supply that is connected to the computer so that in late 1991 the CAI program could continue.

The students in Crochu were tested in May 1991. These results will provide a baseline to interpret next year's performance after the resumption of CAI. It was hypothesized that in the absence of CAI, student performance in school subjects would fall. This, in fact, was noticeable on the performance of Crochu students on this year's Common Entrance Examination. Last year, 53 out of 64 students passed this examination. This year, 35 out of 64 passed.

An article on the Grenada CAI experience, "Can CAI Developed in the U.S. Work in a Developing Country?" by James M. Royer, Barbara Greene, and Stephen Anzalone, has been accepted for publication by the Journal of Educational Computing Research.

Renewable Energy Seminar

One area of concern for LearnTech is to find ways to make use of renewable energy sources, to make educational technology more accessible and affordable, and to promote environmentally-sensitive practices.

A seminar on photovoltaics was held at IIR during July for LearnTech staff and others. The presentation was given by Sandia National Laboratory and the Oak Ridge Associated Universities. Presenters introduced the principles of using solar energy and provided examples relevant for LearnTech. The presenters also provided an analysis of the costs and benefits of using different types of batteries. The groundwork was laid for future collaboration between LearnTech and the Oak Ridge consortium.

USCEFA Conference

LearnTech assisted the U.S. Coalition for Education for All (USCEFA) in organizing their fall conference "Learning for All: Bridging Domestic and International Education," especially the component entitled "Mobilizing Media in Support of Education." The plenary session on media and six panels were organized. Anzalone wrote the Conference's issues paper on media.

LearnTech will play a significant role in the Conference including support for the following presenters -- Clotilde Fonseca, LearnTech collaborator from Costa Rica; Reidar Roll from the International Council for Distance Education; Tom Tilson; Carleton Corrales; and Steve Anzalone (IIR).

During the course of the conference, LearnTech will meet with Roll to begin action on LearnTech/ICDE joint activities and with Alan Hill of Apple Computers to discuss possible areas of collaboration.

Video-Assisted Teacher Training

One appropriate technology that has been targeted for a pilot study is the use of video as a means for developing teaching skills. This activity would test an approach that applies some of the principles of learning used so successfully with interactive radio.

Dean Nielsen drafted a background paper on the use of video for teacher training. The paper will be completed in late 1991.

IIR staff met with the Media Services Unit of the Fairfax County Public Schools to explore collaboration in producing a demonstration tape that would illustrate an approach to video-assisted teacher training that could be tested in a developing country. A concept paper will be written based on these discussions.

The "GIFT"

One of LearnTech's operating tenets is that developing countries should be able to utilize technologies, not only to gradually progress in education, but to "leap forward" if cost and national capacities allow. A second tenet is that LearnTech, while concentrating on the transference of new learning technologies to the developing world, also attempts to identify areas of learning and instruction where developing countries themselves have much to offer.

One area of basic education that has been identified by the project as having potentially strong NORTH - SOUTH linkage is that of knowledge and skills on family relations. Indeed, in developing countries, the family is perhaps the strongest element of what UNICEF is calling the "third channel" for basic education. In addition to being a powerful channel for learning basic skill educational skills, in many cases families in developing countries have strong and highly relevant traditional practices in areas such as child rearing, care of children of working parents, care of the elderly, and essential work related skills.

New technologies such as the 8mm hi-band camcorder, multimedia computer equipment and software, now offer low-cost yet powerful means of gathering, organizing, and displaying information on the ways families around the world contribute to the basic education of children and young adults.

In anticipation of the International Year of the Family (1994), Dr. Gary Gleason of ICI drafted a proposal to create a multi-country, interactive computer-based project on basic education with and by families from each of the participant countries. This proposal is entitled: "Global Interaction on Family Themes," or "The GIFT."

VII. LearnTech Priorities for Year 2

LearnTech will continue to give top priority to the expansion of IRI during Year 2. The project expects that there will be a shift from marketing and promotion to actual project activities. In addition to the continued support for activities in Bolivia, Costa Rica, Belize, Honduras, the Dominican Republic, Lesotho and Nepal, new startup activities are anticipated. Possible countries in which new activities may commence include Zimbabwe (English with World Bank support), Cape Verde (math and Portuguese as a second language with UNESCO support), South Africa (English), Namibia (English), Nigeria (health with UNICEF support), Uganda (teacher training, AIDS, English), and El Salvador (math with USAID support). In addition, there may be an opportunity outside of LearnTech to support the new IRI pilot project in Venezuela. LearnTech also hopes to conduct a feasibility study in Malawi on using IRI (the RADECO model) for improving access to schooling, especially for girls.

LearnTech will continue to give top priority to involving other organizations in support of IRI. The project will work, in particular, with the World Bank, UNICEF and UNESCO.

Year 2 will also represent for LearnTech an increasing emphasis in technologies other than IRI. Some of the activities for 1992 in appropriate technologies include the following.

1. A background paper and concept paper on video-assisted teacher training will be written. A demo will be produced and discussions will be held about testing the approach in a developing country, perhaps, Indonesia.
2. During FY 92, LearnTech will write a report on recent experiences in developing countries with educational television (ETV) for basic education. There is a renewed interest in ETV, and knowledge of recent experience is not readily available.
3. A study will be done on two options of school use of solar energy to support interactive radio/learning aids. This could take place in Belize or another country now using interactive radio.
4. LearnTech is planning to collaborate with the Omar Dengo Foundation (Costa Rica) on a study of implementation of educational computing on a national scale.
5. An update on CAI instruction in Grenada will be prepared in late summer of 1992.
6. Work will get underway on the "lone or sparse micro scenario." That is, how can a single computer in a school or a classroom be used effectively to improve education? A study team will be drawn from within the consortium. Belize would be an ideal place to begin this investigation.

7. The multigrade teaching study in Belize will lead to the development of a model for enhancing and enriching multigrade classes.

8. Consultation will begin with ICDE (International Council on Distance Education) on the use of appropriate educational technology as part of new models for basic education at a distance.

9. LearnTech will explore the potential of developing a project based on the GIFT as described above. The project would look for corporate and foundation support for this effort.

VIII. Summary

In conclusion, the LearnTech Project made considerable progress during 1991 in generating interest in IRI. Most gratifying has been the growing support in Africa where several new activities are scheduled for 1992. In addition, there has been an increase in activities in Latin America and Asia as well.

There has also been an increase in support of IRI from donors including collaboration with UNESCO in Cape Verde, UNICEF in Nigeria, and the World Bank in Zimbabwe.

Finally, LearnTech made progress in developing activities with other technologies. In subsequent years, LearnTech will give increasing attention to technologies such as video for teacher training, computers to support primary and secondary education, and small electronic learning devices.

APPENDIX I

LIFE AFTER RADECO: A LOOK AT THE GRADUATES OF THE RADECO SCHOOLS IN THE DOMINICAN REPUBLIC

by Michael R. Hall

After eight years of transmission, three graduating classes, and hundreds of children participating--and learning--in interactive radio basic education classes, RADECO (the community based radio education program begun in the Dominican Republic in 1982 with funding from the United States Agency for International Development) initiated a statistically meaningful study of the RADECO graduates in the spring of 1991. The results of the study are significant not only from an historical standpoint, but also from their application to the potential influence and magnitude of interactive radio instruction in the future of Dominican education.

The analytical study, which uses a random sample of 97 RADECO graduates from a total population of 1,100, established a 92 percent level of confidence. In order to obtain a random sample, every eleventh name was chosen from the list of graduates. If a student could not be found--as was the case seven times--the student listed immediately before the eleventh graduate was selected.

The results of the Graduate Study support RADECO's contention that interactive radio instruction in the Dominican Republic, in addition to its merits of quality education and potential cost-effectiveness, is a consequential methodology that can help to solve the woes facing the future of the Dominican educational system. Thus, although some of the results of the Graduate study

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come as no great surprise to those familiar with the RADECO program, the findings give strength to the contention that interactive radio instruction is a viable tool for grassroots community development.

In an effort to analyze the effect of the RADECO program on the three groups of students who have successfully completed the first basic cycle of the primary level (eg. the first four years), the RADECO staff initiated investigative studies in early 1991 to ascertain the impact of RADECO on the graduates. Following months of investigative work and careful statistical analysis, the RADECO staff concluded its study of the 1,100 graduates from the graduating classes of 1986, 1988, and 1990.

As the final phase of evaluating the RADECO students, it was deemed necessary to examine the graduates' participation in productive activities, such as continuing their education, working, and other socially responsible activities in the community. Also of interest was the correlation between the expectations of the graduates and the realities.

Because of formative and summative evaluations conducted throughout the history of the RADECO program, RADECO understood that its use of interactive radio to teach literary skills to children who live in remote areas provided the children with an education equal to that obtained in the formal school system. The proven success of the curriculum content of the RADECO program, along with the success of the RADECO graduates--most of whom remain as productive elements in their community--as demonstrated in the



Graduate Study, makes interactive radio instruction a viable alternative for the future.

After their graduation, the children are certified to enter the fifth grade in the formal school system. Just how many of RADECO's graduates continued their education after RADECO? Did they remain in the general vicinity of their community, or did they emigrate to more urban areas? Were they prepared to enter the formal school system? If so, what were their recollections of their RADECO experiences? Basically, what happened to the graduates after graduation?

The general objective of the Graduate Study was to observe the characteristics of the RADECO graduates in relation to continued studies, to productive and social activities in the community, and to perceived expectations of the graduates themselves in order to more fully understand the importance and efficiency of interactive radio education in the lives of children with limited access to the formal school system.

RADECO attempted to determine the types of activities that RADECO graduates are engaged in. The socio-economic role of the RADECO graduates in their communities is best illustrated by examining the work and study habits of the children. Over 90 percent of the graduates are continuing their education or currently employed (see Chart 1). For the majority of these children, RADECO was their only alternative for obtaining literacy.

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CHART 1: ACTIVITIES OF RADECO GRADUATES IN 1991

ACTIVITY	FREQUENCY	PERCENT	ACCUMULATED PERCENT
SCHOOL	31	32	32
WORK	28	29	61
SCHOOL/WORK	31	32	93
NONE	6	6	99
OTHER	1	1	100
TOTAL	97	100	100

RADECO examined the degree of migration of students away from RADECO communities after graduation. Eighty-seven percent of the graduates in the sample population continue to live in the vicinity of the community where they received their education from RADECO. This is bound to have a positive effect on community development. RADECO has helped to teach them the value of their community. By providing basic education, RADECO has help stem the flow of people emigrating from the rural areas.

RADECO also investigated the scholastic year that the RADECO graduates entered the IRI system. Although 58 percent of the graduates entered RADECO without any prior schooling, 42 percent of the graduates entered the program at various points in their primary education. Most of the children who entered RADECO after they began their formal school education did so because of logistic and economic reasons (see Chart 2). This exemplifies the point that there is no problem in incorporating students into the IRI system once the four year cycle has begun.

CHART 2: ACADEMIC LEVEL OF STUDENTS ENTERING RADECO			
GRADE	FREQUENCY	PERCENT	ACCUMULATED PERCENT
NONE	58	60	60
FIRST	22	23	83
SECOND	12	12	95
THIRD	4	4	99
FOURTH	1	1	100

Fifty-one percent of the graduates in the sample were female. The minor difference between the participation according to sex exemplifies the importance of the role played by women in the RADECO program. Since RADECO students are able to achieve the equivalent of the official first grade curriculum in one hour a day, interactive radio education facilitates the participation of females in the program.

RADECO has played an important socio-economic role in the communities. Most graduates are working and/or studying. Sixty-two percent of the graduates dedicate themselves to working in agriculture, commerce, and domestic service (see Chart 3). The majority of these graduates (thirty-two percent) work in agriculture, which is not surprising considering the rural setting of the majority of the RADECO schools. The majority of the graduates that do not work (thirty-five percent) are solely engaged in continuing their education.

CHART 3: TYPE OF WORK PERFORMED BY RADECO GRADUATES			
CHARACTERISTIC	FREQUENCY	PERCENT	ACCUMULATED PERCENT
AGRICULTURE	32	33	33
DOMESTIC	14	14	47
COMMERCIAL	5	5	52
OTHER	8	8	60
NONE	38	40	100

After determining the number of graduates that continued their education after RADECO, it was shown the sixty-two percent of the graduates are currently pursuing further education (see Chart 4). One of the big problems affecting the children in the formal school system is the high drop-out rate and the high rate of children repeating the first grade. RADECO has never encountered this problem. The children are active participants in their education. RADECO has provided quality education to children in the Southwest of the Dominican Republic who would have been otherwise without access to formal schools.

CHART 4: SCHOLASTIC GRADE OF GRADUATES IN 1991			
GRADE	FREQUENCY	PERCENT	ACCUMULATED PERCENT
FIFTH	23	24	24
SIXTH	14	14	38
SEVENTH	13	14	52
EIGHTH	7	7	59
NINETH	0	0	59
TENTH	5	5	64
NONE	35	36	100

In order to avoid problems in the possible expansion of RADECO in the Dominican Republic, it was deemed necessary to determine the difficulties that the graduates encountered while studying with RADECO. Although the overwhelming majority (77 percent) of the graduates encountered no difficulties while studying with RADECO, fifteen percent of the graduates were inhibited in their studies by excessive illness or work outside of the class.

The overwhelming majority of the students have very fond memories of their years studying with RADECO. Interactive radio education is fun! For seventy percent of the graduates, their

fondest memory was the day that they received their graduation certificates.

Following testing for reading, writing, and mathematics skills to determiné the academic levels achieved by the RADECO graduates, the high scores achieved by the graduates attest to the eminent quality of the interactive radio lessons developed by RADECO.

Although specialists of educational alternatives in the developing nations constrained by limited economic resources continue to place increased emphasis on the quantitative objectives of alternative education programs, the RADECO program in the Dominican Republic proves that it is possible to attain quality education that can be a cost-effective educational alternative (provided the program can be expanded to include greater numbers of children). Given the positive results of the Graduate Study, and the effect of the RADECO program on the graduates, RADECO should be encouraged--and supported--to gradually expand to national coverage.

The benefits of interactive radio education are obvious. RADECO can provide low cost, high quality education to the children in the Dominican Republic. RADECO's brand of interactive education--carried to the national level--seems to be the logical breakthrough to the dilemmas currently plaguing the educational system in the Dominican Republic.

Santo Domingo, Dominican Republic
August 1991

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APPENDIX II

STUDY TO DETERMINE PROBLEMS OF ACCESS TO SCHOOLS IN MARGINAL BARRIOS OF SANTO DOMINGO DOMINICAN REPUBLIC

1. Introduction

Radio-Assisted Community Basic Education (RADECO) in the Dominican Republic has been successful in the rural areas of the country where there are no formal schools. Using one hour radio lessons as the main means of education for grades 1-4, these "schools" are able to provide education at the same level as regular schools. The RADECO mathematics series had also been successfully tested in the formal public schools in the city of Santo Domingo to support the classroom teachers.

Santo Domingo, the capital of the Dominican Republic, is undergoing fast urbanization from rural migration to the city. This movement has created marginal areas around Santo Domingo, "barrios marginales," with almost non-existent urban services, poverty, and a lack of schools. Several private, non-profit organizations, as well as some church affiliated or non-government organizations (NGOs) have taken on some of these services.

2. Objective

This study carried out a survey of community related organizations working in the marginal barrios in educational services and the possible use of interactive radio instruction (RADECO) as a way to improve the quality of learning.

3. Methodology

Forty-two organizations were selected for the study because they reported educational activities among their scope of action. Twenty-five organizations provide some adult, non-formal education. The remaining seventeen organizations provide educational services within the formal schooling. The number of marginal barrios participating in the study were 68 and the number of school age children (6 to 14 years old) was 18,655.

A questionnaire was prepared and personnel from RADECO were trained to use it as an interview guide.

4. The Results

Of the 42 organizations included in the survey, only those with formal schools are interested in the RADECO approach. These schools have a possible target school population of 10,099 students.

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All of these schools are supported by private or religious organizations. They have good administrative structure, but work under severely deprived conditions in terms of instructional materials, teacher incentives, and the poor socioeconomic background of the students. These schools felt that interactive radio instruction (RADECO) would be a useful support in the classroom.

APPENDIX III

RADIO MATH IN THE FORMAL SCHOOLS OF THE DOMINICAN REPUBLIC

Introduction

The Radio Assisted Community Basic Education (RADECO) Project has been providing alternative primary level education in Barahona, Dominican Republic since 1981. One hour lessons are broadcasted daily to a target population of school age children. There are no formal schools in most of this area; therefore, RADECO "schools" provide the only primary education. RADECO lessons cover grades 1-4 of primary school and teach mathematics, reading and writing in Spanish, plus some social studies and science.

Several comparative studies have shown that the academic achievement of students in RADECO centers is equal or better than that of students in the formal schools. Now, with severe budget constraints and increasing problems in the quality of education in the public schools of the Dominican Republic, the Ministry of Education decided to test the effectiveness of the RADECO interactive radio math lessons in improving student learning in the regular schools of Santo Domingo.

Experimental Design

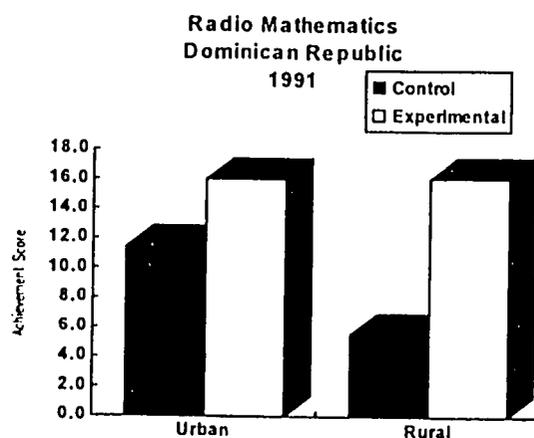
A classical design of experimental and control groups was utilized. Each group consisted of twenty randomly selected first-grade classrooms. Both groups were similar in terms of the number of students, sex, urban-rural ratio, and the age range of the children. A total of 947 students participated in the study -- 54 percent were in the experimental group.

The experimental treatment included 125 radio mathematic lessons, written student materials, and supervisory visits. There were no pretests. At the end of the lessons, a posttest was administered to both groups. The instrument was a written test with 20 mathematics items.

The Results

The mean achievement score for the experimental group was 16.1, almost double the score of the control group of 8.8. This is a very significant difference.

The results of the evaluation broken down by urban-rural schools are summarized in the graph to the right. The radio mathematics program had a strong impact in both the urban and rural schools, but especially in the rural schools. The score in the rural schools increased from 5.6 to 16.1; the urban group increased from 11.5 to 16.0. Note that the achievement score in the rural schools with the radio lessons was *at the same*



level as that of the traditional urban schools. Thus, the radio had a major impact on closing the urban-rural learning gap.

This information is summarized from "Informe Estudio Comparativo de los Resultados de la Prueba Matemática, Etapa Experimental, Santo Domingo, República Dominicana, 12 de Diciembre de 1991" by José Cárleton Corrales.

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LEARNTECH PROJECT
STRATEGY FOR ALTERNATIVE TECHNOLOGIES

INTRODUCTION

The following is a statement of the strategy that the LearnTech Project will follow for implementing the alternative technologies component of the project. We take alternative technologies to mean various combinations of methods and materials used to enhance the effectiveness of instruction provided by teachers or in reaching students where there are no teachers. Interactive radio has been demonstrated to be a powerful alternative technology for delivering instruction in developing countries. For the present discussion, however, and as a means of organizing project activities, we take the alternative technologies component to consist of all those technologies that could be used in combination with, or independent of, interactive radio.

GOAL AND FOCUS

Our goal is to contribute -- as part of the international effort to ensure education for all -- to improving access to, and the quality of, basic education in developing countries.

We regard basic education as an indispensable prerequisite for persons acquiring (a) the knowledge, attitudes, and skills to participate effectively in productive, sustainable, and environmentally responsible economic and social development and (b) an understanding of their rights and responsibilities as citizens in a world that is increasingly being drawn to visions of democratic freedom and global cooperation.

We take basic education to include primary school and junior secondary education and out-of-school education for youth and adults, especially those designed for groups not having access to conventional instruction or whose basic skills must be improved in work-related educational programs. We take basic education to include programs for training teachers as providers of basic education.

STRATEGY IN A NUTSHELL

Our strategy is founded on the belief that the use of alternative technologies should become an important option in educational plans designed to meet the goals of education for all. Our strategy grows out of our judgment that there is a greater willingness among international educational policymakers and planners to consider the possibilities offered by educational technology than there was five years ago. But it is also our judgment that the efficacy of different options still requires demonstration and that such demonstrations must be communicated effectively and widely.

Our strategy reflects our understanding that the options for using alternative technology in education in developing countries must fit the wide range of instructional conditions encountered throughout the population of developing countries and the widely varying amounts of resources that countries have to devote to solving educational problems. It is our belief that our efforts must be directed toward identifying options suitable across the spectrum of conditions and possibilities encountered in the developing world...and that the use of educational technology be conceived in a way to further, rather than detract from, the opportunities for education for all. It is our observation that testing simple delivery systems along with more complex ones not only adds to the range of options but provides credibility to the whole notion of exploring alternative technologies.

Our strategy reflects our judgment that mobilization of resources, advocacy, and transfer and institutionalization of capacity developed must accompany exploration and demonstration. Partnerships must be formed -- at home and abroad -- to broaden the base of support for the use of alternative technologies in education and to sustain and advance that effort at the conclusion of the project.

Our purpose is to demonstrate the efficacy of alternative technologies and to develop the means for alternative technologies to come into wider use in educational plans in developing countries. We intend to accomplish that by a strategy of collecting, producing, and disseminating information, providing technical services, and building partnerships. We will accomplish our purpose by building credibility, which will come through the quality of the products and services we provide.

PURPOSE

Our purpose is to (a) demonstrate that the use of alternative technologies can produce a significant impact on learning and access to basic education and (b) develop an awareness, willingness, and the technical means necessary for alternative technologies to come into wider use in educational plans in developing countries.

ACTIVITIES

To accomplish our purpose, we plan four principal strands of activity. They are as follows:

- Activity Strand 1: Packaging and Communicating the State-of-the-Art
- Activity Strand 2: Exploring New Options
- Activity Strand 3: Providing Technical Assistance
- Activity Strand 4: Developing Partnerships

Activity Strand 1: Packaging and Communicating the State-of-the-Art

OBJECTIVES

LearnTech will become a complete and up-to-date information provider with respect to (a) the evolving state-of-the-art of those technological possibilities that appear to be promising for developing countries and (b) the unfolding experience with alternative technologies that developing countries undertake on their own and that are likely to be of interest to other countries. We will seek to put this information into packages that are understandable, useful, and widely disseminated.

DISCUSSION

We hope to collect and communicate information to all those interested in education in developing countries. This includes government decisionmakers, educational planners, development assistance professionals, academics and researchers, business people, and students. This activity will disseminate information to further the purposes of scholarly exchange of knowledge, project planning, and public information. We will draw upon and refine information already produced, including material from the Radio Learning and Educational Technology Studies and Applications Projects. We will tap domestic sources of materials when appropriate and package them for use by developing countries when necessary.

CRITERIA FOR SUCCESS

- we cast the net widely but carefully; we use time judiciously in exploring emerging technological possibilities; we do not waste time on applications unlikely to be appropriate for basic education in developing countries;
- we are successful in identifying and tracking important applications in developing countries;
- we avoid reinventing the wheel by making use of already existing materials that discuss the state-of-the-art; we make use of existing dissemination channels;
- we produce information packages that are attractive and understandable by a non-technical audience and are disseminated widely.

OUTCOMES

TARGETS STATUS

1. Information Products

- technology briefs
- background papers
- journal articles
- conference presentations
- case studies (effects and costs)
- The Digest (updating and expanding)

2. Dissemination Channels

- operation of LearnTechNet, which will include an electronic bulletin board for the general public to access all documents produced by the project
- publications (including DCR and leading journals)
- conferences
- direct mail
- visits to key decisionmakers and gatekeepers
- other channels mentioned in project's marketing plan

Activity Strand 2: Exploring New Options

OBJECTIVES

LearnTech will not just follow the state-of-the-art, it will help create it. We will accomplish the following:

- be able to recommend alternative technologies capable of offering significant improvements in educational quality and access suitable for the widely varying circumstances of developing countries;
- understand the costs associated with using various alternatives and be able to recommend ways to contain costs through such things as using renewable energy;
- be able to depict the various options and present the evidence for their effectiveness in valid, understandable, and useful ways.

DISCUSSION

Applications of alternative technologies that are effective and affordable for developing countries will not always occur naturally -- they will have to be created and fostered. By the end of the project, we aim at being in a position to make recommendations, based upon firm evidence, about which alternative technologies are most likely to make a strong impact on learning or access, what constraints must be overcome to use them effectively, and what they are likely to cost. These will include options appropriate across the spectrum of developing countries, from the poorest to the richest. Options to be explored will include those that use simple and relatively inexpensive delivery systems and those that include more sophisticated ones. Options will include technologies that can be used in

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combination with interactive radio and those independent of it. Options will include feasible ways of using renewable power sources to operate hardware, both as a worthy end itself and as a means toward containing costs.

We will be undertaking pilot studies of alternative technologies in collaboration with colleagues in developing countries. We intend to take a fresh look at what should go into a pilot study with a view to establishing guidelines for gathering evidence that will be comparable, well-targeted, and compelling for policymakers and planners. We will decide in consultation with S&T/ED how the experience from the pilot studies should be collated and presented, whether in a book or in a series of individual articles and videotapes.

We will also explore different contexts under which alternative technologies might be considered and introduced. This will include looking at alternative technologies within the context of interactive radio instruction, distance education, and multigrade teaching.

We hope during the course of the project to undertake three pilot studies of the use of computers in education and one study of the use of videodiscs for teacher education. We will look for funds outside the project or through buy-ins for this purpose. We will also fund smaller case studies of computer-based education with LDC collaborating institutions.

CRITERIA FOR SUCCESS

- we identify for exploration options that are appropriate for developing countries and that include options for the poorest group of these countries -- our efforts are directed at improving opportunities for education for all;
- we explore a sufficiently wide range of delivery systems, from the relatively simple and inexpensive to use, to the more complex;
- we design and conduct pilot studies that will provide information that will lead, in due course, to making a recommendation about the likely efficacy and costs of different alternatives;
- we remain true to our focus on basic education and at the time address the various avenues basic education is delivered (directly within primary school and junior secondary classrooms, in classrooms but through the intermediary of improved teacher practices, and in basic skills programs offered outside the classroom).

OUTCOMES

TARGETS STATUS

1. Pilot Studies - Core Contract

Ten

Direct Instruction - Primary School

- Electronic learning aids (combined with IRI) (3)
- Programmed posters (combined with IRI) (1)

Improved Teaching Practice - Primary

- Videocassettes for Teacher Training (1)

• Primary Science Teachers Audiocassettes	(1)
• Expert Guide for Teachers	(1)
<u>Basic Skills - Outside Classroom</u>	
• Computer-Assisted Technology Education	(1)
<u>Technology in Varied Contexts</u>	
• Technology in Multigrade Teaching	(1)
• Interactive Radio and Escuela Nueva	(1)
2. Other Pilot Studies	Five
• Continuation of Grenada Primary School CAI study	(1)
• Other computer education studies	(3)
• Videodiscs for teacher education	(1)
3. Cost Studies	
• Multitechnology cost recovery study	One
4. Guidelines for Conducting Pilot Studies	One

Activity Strand 3: Providing Technical Assistance

OBJECTIVES

LearnTech will respond to requests from host countries, USAID Missions, and others for assistance in designing, testing, and evaluating initiatives involving the use of alternative technologies. We will send technical assistance teams or arrange visits to the that will allow host country colleagues to be in touch with the best possible expertise and latest applications in the area of instructional technology.

DISCUSSION

Under the requirements contract and, in exceptional cases, under the core contract, LearnTech will provide technical assistance to help plan activities that will be developed and funded outside of the project. The extent to which such requests are received will be an indicator of both the growing interest in the new technologies and how successful we are in generating demand for these services. We would like to be able to respond to at least six requests for technical assistance tasks.

CRITERIA FOR SUCCESS

- we receive at least six requests for technical assistance during the course of the project;
- we adopt a proactive approach to creating demand for these services;
- we are able to identify persons or applications to be visited that are the most suitable for the contemplated activity;
- we provide high quality assistance.

OUTCOMES

TARGETS STATUS

1. Demand Generation

- | | |
|---|---|
| <ul style="list-style-type: none"> • services to be provided become part of the ongoing marketing portfolio and activities of LearnTech; • USAID Missions, host countries, and others are contacted and visited to make them aware of our services. | <p>Planned 1991</p> <p>Beginning 1991</p> |
|---|---|

2. Requests Received and Services Delivered

- | | |
|--|---------------------|
| <ul style="list-style-type: none"> • Requests for technical assistance are received; • Services are delivered; • Continuing relationships are established with institutions receiving the technical assistance. | <p>At least six</p> |
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Activity Strand 4: Developing Partnerships

OBJECTIVES

LearnTech will forge effective partnerships for pursuing project objectives and conducting project activities. This will occur in three ways:

- building partnerships with national and regional organizations in developing countries with a view toward building a common perspective on the use of alternative technologies and to improving capacity in developing countries to conduct pilot research studies and to design and support local projects using alternative technologies;
- forming partnerships with organizations, educational institutions, and businesses in the United States and other countries with a view to sharing ideas, exchanging information, and cooperating in joint ventures;
- facilitating direct contacts between developing countries and sources of expertise in the United States and other countries.

DISCUSSION

For both strategic reasons and to get the most from available resources, LearnTech will attempt to work closely with organizations at home and abroad. We will form partnerships with two organizations that will serve as "gateways" to regional activity. This will include an organization in Asia and another in the Latin America and the Caribbean region -- two areas poised for wider use of alternative technology in educational systems. This will involve organizations capable of exercising leadership within the region -- possibly the Regional Center for Educational Innovation and Technology (INNOTECH) or the Asian Centre of Educational Innovation for Development (ASCEID) in Asia and the Omar Dengo Foundation in Latin America. Moreover, we will continue activities at the Belize Education Lab, which has provided a favorable setting for conducting pilot research. Building what we hope will be an "off shore" capacity to promote and support the use of alternative technologies will be done in tandem with similar activities for dissemination of interactive radio.

CRITERIA FOR SUCCESS

- we establish relationships with institutions overseas that result in developing a shared perspective on the use of alternative technologies and lead to meaningful participation in project activities;
- we define and assist in building the kind of "off shore" capacity for exploring, supporting, and promoting alternative technologies that leads to increased interest in the use of alternative technologies in the regions concerned and in making use of the services of our partner institutions;
- we reach out widely to the educational technology networks in the U.S. and other countries and define areas of joint endeavor;
- we mobilize resources outside the project for exploring the use of alternative technologies in developing countries.

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OUTCOMES

TARGETS STATUS

LDC Organizations

- Establishing cooperative relationships with regional gateway organizations; defining and implementing workplans for building capacity within the institutions;
- Identifying, planning, and conducting case studies or pilot studies in cooperation with the regional institutions;
- Continuing the operations of the Belize Education Lab, especially for low-cost, quick turnaround studies.

One in AsiaPlanned 1991
One in LAC regionPlanned 1991

At least onePlanned 1992
each region

Three studies Underway 1991
per year

Domestic Organizations

- Continuing to network with U.S. businesses and other organizations involved in educational technology;
- Conducting joint ventures with the U.S. private sector in overseas activities.

Two