Improving Educational Quality through Interactive Radio Instruction

A Toolkit for Policy Makers and Planners
March 2005
Human Development Sector
Africa Region
The World Bank


The Bank thanks the Norwegian Trust Fund for Distance Education in Africa and the Irish Education Trust Fund for Africa for providing the financial resources to develop this brochure.

The views expressed in this brochure are those of the original authors and do not reflect the opinions of the World Bank or any of its affiliated organizations

Cover and Interior Design by the Word Express Inc.
Interactive radio instruction (IRI) has emerged as an important option for improving educational quality in primary school classrooms in developing countries around the world. Studies of the IRI experience in more than two dozen countries during the past 25 years have shown that the use of IRI has led to significant and consistent improvements in school achievement and has helped overcome equity gaps between urban and rural children and between boys and girls. Studies also demonstrate IRI’s value as an effective mechanism to introduce new pedagogy and curriculum. Since the mid-1990s, IRI has been increasingly used as a tool for teacher training and development.

This brochure presents an overview of the toolkit *Improving Educational Quality Through Interactive Radio Instruction: A Toolkit for Policymakers*. The toolkit is intended for African policymakers and education planners who may be considering the use of IRI in their education systems. The brochure is intended to quickly acquaint the reader with the characteristics of IRI, and with salient issues relating to the development and implementation of IRI programs. It also includes the foreword and the table of contents from the main toolkit. The full document provides more a comprehensive discussion of each of the issues addressed in the overview. In addition to this booklet, the toolkit comes with a companion CD-ROM containing an electronic copy of the toolkit and audio and video clips that demonstrate the use of IRI in typical learning environments in different African countries.

The toolkit, *Improving Educational Quality through Interactive Radio Instruction*, is part of the ongoing effort by the World Bank’s Africa Region to deepen understanding of how distance education as well as information communication technologies (ICTs) can support education in Africa. The toolkit builds on the region’s strategy paper “Enhancing Learning Opportunities in Africa” (Murphy et al. 2002), which reviews past experience with distance education in Africa and reaffirms its strong potential, with judicious integration of ICTs.

The authors note that since IRI’s introduction nearly 30 years ago, studies indicate its effectiveness in improving educational quality as well as retention rates at the primary school level. Studies also demonstrate IRI’s value as an effective mechanism to introduce new pedagogy and curriculum. Cost-effectiveness is offered as another of IRI’s primary benefits. In the section on “Cost”, the authors cite findings on the cost-effectiveness of IRI in improving the quality of primary school instruction, compared with that of alternative investments, such as providing additional textbooks or teacher training.

These findings make IRI a potentially powerful tool for African governments as they seek to meet the challenge of EFA by improving educational quality and undertaking in-service teacher upgrading. Nonetheless, the introduction of innovative technologies and pedagogies must always be based on a critical assessment of experiences and options. The toolkit offers a compilation and analysis of recent experience of IRI in Africa and elsewhere. It explains the IRI concept. It guides the reader through the process of determining when IRI might be appropriate in a given context, and it describes the steps in setting up an IRI program. The authors emphasize the critical factors for success, including appropriate policy frameworks as well as planning for the necessary investment and sustainability.

It is hoped that the toolkit will lead to greater appreciation of IRI’s potential and that it will make a useful and enriching contribution to the work of policy-makers and educators in Africa.

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What Is Interactive Radio Instruction

- Interactive radio instruction (IRI) is a distance education system that combines radio broadcasts with active learning to improve educational quality and teaching practices. IRI has been in use for more than 25 years and has demonstrated that it can be effective on a large scale at low cost.

- IRI programs require teachers and students to react verbally and physically to questions and exercises posed by radio characters and to participate in group work, experiments, and other activities suggested by the radio program. IRI builds on local resources and knowledge.

- IRI has been used to teach nearly all basic primary subjects and audiences of all ages, as well as hard-to-reach and out-of-school populations.

- There is consistent and significant evidence that IRI can increase learning across subject matter, age, gender, and rural or urban location. Students show progressively greater learning with time.

- In Guinea, South Africa, and some Latin American countries, IRI programs have demonstrated that they can enlarge their audiences, sometimes reaching a million or more students.

- There is evidence that the benefits of IRI can be sustained over the long term and can be adapted for other countries.

- Incentives for investing in IRI include its cost-effectiveness compared with other technologies and the willingness of donors and lenders to assist with up-front development costs.
How Does IRI Differ from Other Learning Systems?

Many distance learning efforts are primarily intended to increase access to education. IRI programs have as their main goal the improvement of educational quality within existing structures. Programs are designed to engage a specific audience through the use of entertaining characters and activities and an active learning pedagogy. The use of radio broadcast increases the ability of IRI programs to reach a large audience of students without dramatically increasing the cost, and so IRI is able to improve educational quality on a large scale.

What Does the Word “Interactive” Actually Mean for a Radio Broadcast?

Because radio is a one-way broadcast medium, IRI programs are not truly interactive in the sense of two-way communication. Short pauses provided throughout the lessons allow teachers and learners to stop and react to questions and exercises through verbal and physical responses to radio characters, group work, experiments, and other physical and intellectual activities while the program is on the air.

How Do Teachers Fit In?

IRI programs differ in the specific ways that teachers or facilitators are involved in the instructional process during broadcast and the degree to which they use IRI as a teacher-training tool. No IRI series has been designed to replace the teacher. Instead, the design of IRI requires the involvement of a teacher or advanced mentor to guide interaction. Most often, the programs aim to build the teacher’s skills and enable the teacher to play a more active role in a student-centered and interactive teaching and learning process.
Since the mid-1990s, IRI programs have emerged as specific teacher-training tools. The United Nations Children’s Fund (UNICEF), developed the “dual audience” IRI approach to help teachers learn active teaching methods for primary mathematics and English. Teachers were given explicit directions about why certain types of activities could improve learning and how they might adapt them when IRI was not on the air. Since 1998, Guinea’s IRI programs for French and mathematics instruction have incorporated a reflective teacher-training series that helps teachers assimilate student-centered instructional practices into their own teaching styles.
Post-Test Data on Achievement of Students in Selected IRI Projects

Sources: Tilson et al. (1991); Corrales (1995); Leigh (1995).

Mathematics Scores in IRI Centers and Public Schools, Zambia, 2002

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Feasibility of IRI

- **Educational goals.** The feasibility of an IRI program depends on how well the program addresses the specific goals of national educational reforms or educational development plans. Most IRI programs are intended to improve instruction in primary schools, and their focus is on student achievement. IRI’s dual audience approach helps train teachers in active pedagogy and in standardizing instructional quality.

- **Audience.** Successful IRI programs identify audience needs, abilities, and interests through research and formative evaluation—that is, early testing of materials as they are used. One-size-fits-all distance education such as IRI has generally worked best with younger audiences. Informal learning on the part of unintended shadow audiences such as parents and out-of-school youths can add to the returns on IRI investments.

- **Content.** IRI has proved versatile in teaching most academic primary school subjects; it has not been as successful with subjects requiring a strong visual demonstration component or face-to-face guidance. IRI could, however, assist in hands-on subjects such as science and life skills, including health practices. IRI produces the best results when designed as a single subject taught in a daily, year-long program, and this is its most common form. Although most IRI programs have been developed for the early primary school years, the method can work for later primary school grades. Adaptation of existing IRI programs for other audiences can simplify development and save money and time, but a number of constraints have to be overcome. No research has determined how much of the school curriculum can be handled by IRI or for how long a period students can be effectively engaged.

- **Program development.** Specific personnel are needed to handle program design and management, curriculum design, scriptwriting and support materials, radio production, research and evaluation, and marketing. Successful IRI programs are led by an institution with authority, technical competence, and a commitment to nurturing effective alliances with stakeholders. Important planning decisions include level of external technical assistance, capacity building, the most
cost-effective delivery approach for the program, and the scope and duration of pilot projects. Adequate training should be provided early in the process to ensure quality in design, production, and delivery.

- **Cost and finance.** Because of economies of scale, IRI offers a relatively low-cost means of improving educational quality in primary schools. It is important, however, to plan for and contain recurrent costs—of broadcasting, radios and batteries, print materials, and teacher training and support—and to be realistic about the long-term implications of these costs for governmental and nongovernmental funding. IRI programs cover recurrent costs through such means as taxes, funds already budgeted, cost-sharing, fees for service, and marketing of products such as calendars.

- **Planning for institutionalization and sustainability.** Plans to integrate IRI into existing institutions vary according to the degree of decentralization in the ministries of education and communication and in other agencies involved in IRI broadcasts. Planners should consider a role for government agencies, colleges of education and other tertiary institutions, and NGOs with an interest or institutional investment in an IRI program. Planning for the sustainability of the program should be considered at the outset of the project. Sustainability depends on the educational benefits documented, the affordability of recurrent costs, successful institutionalization, and strong leadership in adapting the program and in troubleshooting. Creating appropriate policy frameworks is essential to ensuring sustainability, as are cooperation among relevant agencies, the annual commitment of adequate budgetary funds, and mainstreaming within existing educational structures, particularly within the teacher education system.
Understanding the Costs of IRI

The use of IRI to improve primary school quality will not lead to a reduction in the unit costs of educating a student. Unlike distance education systems that are designed to increase access, applications that use technology to improve the quality of conventional educational programs usually result in increased per-student costs for providing education at a given level. The reason is that applications take place in regular schools and involve no reductions in teaching time. The use of IRI is nevertheless efficient from an economic point of view to the extent that it offers a less costly means of achieving the same results as other quality-improving tools or that it provides better quality at the same price as other tools. In many countries, the costs of using IRI are roughly equivalent to the cost of a textbook.

The underlying factors that determine the costs of developing an IRI program can be summarized as follows:

- High fixed costs are generally required to develop an IRI program. These costs are usually absorbed through a grant or loan.
- IRI benefits from economies of scale, but the benefits accrue mostly to investment in program development rather than to payment of recurrent costs.
- Annual per-student costs for IRI are substantially lower than those for other technologies.
- The annual recurrent costs for delivering IRI are between $2 and $3 per pupil.

Pros and Cons of Wind-up Radios

The main advantage of using wind-up radios is the reduction of recurrent costs that are borne by either ministries of education or communities. The quality of locally available batteries can often be so poor that their use becomes prohibitively expensive due to the frequent need for replacement. The main recurrent cost specific to wind-up radios is for repairs if the wind-up lever breaks. This cost will likely decrease with time as teachers become more accustomed to the mechanism and learn to avoid damaging the radios when winding. Local entrepreneurs will often respond to the demand for radio repair, and as expertise increases, repair costs will decline. It is important to note that non wind-up radios also need repairs, especially in dusty climates.
The Effect of IRI Programs on Urban-Rural Equity Gaps

Sources: Bosch (1997)
Designing IRI

• **Project development** entails a number of steps, including (a) determining the profile of the learners—linguistic levels, existing knowledge, interests, local games, local tensions, and role models—and identifying the overarching educational objectives; (b) creating a design document to guide program development and map the learning process of students and teachers; (c) initiating scriptwriting to bring life to the educational activities through radio characters and settings; and (d) conducting *formative evaluation* to determine whether individual IRI programs, and the entire IRI series, are achieving the desired learning goals.

• **Production** comprises activities that turn learning objectives into scripts and audio programs. This includes reproduction of CDs or tapes for distribution; and possibly adaptations for different regions of the country. Revisions of programs through formative evaluation involve as much as 50–75 percent more in production costs, although digital editing may reduce this cost. Options for delivery include radio broadcast, CDs, audiocassette tapes, or a combination of these methods. Production of some print materials helps support lessons and training but does not need to be extensive.

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**Developing of an IRI Program**

- **Preparation of design document**
- **Scriptwriting**
- **Formative evaluation**
- **Production**
- **Delivery/broadcast**

**Audience research**
A key factor in the success of IRI learning systems has been the active learning pedagogy that is used in the design of an IRI series and is incorporated into every script. This is what sets IRI apart from other distance education strategies that use radio broadcasts, audio CDs, or audio tapes.

The Nicaragua IRI Math series created in the 1970s by Stanford University developed the original parameters for the pedagogical principles that became IRI. Over time, some of the strategies changed as innovative methods were tested and different subject matters and audiences were targeted. Yet a number of consistent pedagogical principles define IRI and are present in IRI series:

- **Active learning pedagogy.** Students take an active role in the learning process by doing something—answering, measuring, singing, working in groups, counting, practicing, and so on.
- **Structured learning.** IRI programs structure the learning process so that teachers and students know what to do. This method serves to guide activities and to ensure that the overall curriculum is addressed.
- **Recognition of existing knowledge.** The IRI series builds on the existing knowledge of local audiences. Where a great disparity in knowledge is found among potential listeners, the IRI series begins by laying down a foundation of knowledge that can be drawn on in future lessons. In many programs, teachers are instructed to use the extended pauses to make connections between local knowledge and what is being discussed in the lesson.
- **Distributed learning.** In the context of IRI methodology, this term describes a curriculum design that spreads the acquisition of new knowledge across several lessons so that students can learn gradually and practice new skills. Students are not expected to master new skills on the first try.
- **Diversified educational activities.** Throughout the programs, students are invited to participate in varied learning activities—individual work, group work, experiments, communicative approaches to languages, word problems in math, and so on. This reduces reliance on rote learning methods and diversifies the learning experience.
- **Engaging characters, stories, and exercises.** IRI uses local activities, stories, and games to capture students’ interest and motivate them to participate.
- **Reinforcement.** The lessons that are taught are reinforced through repetition and positive feedback.
- **Defined role of the teacher.** Although IRI series differ in the degree to which the program is a teacher-training tool, all IRI programs build in specific and active roles for the teacher or facilitator so that he or she takes the leadership role in the teaching and learning process.
- **Formative evaluation.** Individual IRI programs and the entire series are evaluated on an ongoing basis throughout the life cycle of the program to determine whether students are actively participating and are mastering skills. If shortcomings are found, additional attention is given to the specific skill in subsequent lessons.
Designing IRI

- **Marketing** is an essential aspect of IRI programs. Possibilities include radio spots, promotion of songs and content featured in the IRI program, development of ancillary materials that support community involvement, and games and competition among schools to motivate students and build program visibility.

- **Summative evaluation**, usually conducted by an external agency, measures the ability of the IRI program to reach its goals and often has a strong qualitative component.

### Designing for Sustainability

Once the design document takes shape, it is useful to review how well it will contribute to sustainability. Will the program be able to make the transition from an experimental phase supported by technical assistance to a stage in which the IRI program is simply part of the regular education program? To what extent can this transition be enhanced by planning for it in the development phase?

### Issues to Consider

**Production**

- Will the production use a digital or analog studio? (It is often more economical to include a digital studio in the budget than to pay for the added costs of revising programs through analog editing.)

- Will the budget pay by program or by series?

- If CDs or tapes are used as one means of delivery, is reproduction of CDs and audiocassettes included in the design document?

- If local adaptations are required, do the budget and project plan reflect these costs?
Designing IRI

Delivery Broadcast

- What broadcast capacity exists? What does it cost? What is its quality?
- Is there a government policy on educational broadcasting?
- Are there inexpensive options, free channels, or blocks of time for educational or social programs?
- How prevalent are radios themselves across the country?
- How will the recurrent costs of broadcasting and batteries be covered?

Scriptwriting

IRI programs should evolve in response to the need for new content, improvements in student achievement and better understanding of specific unmet needs. Scriptwriting capabilities will be required for program revisions in the ongoing phase.
Designing IRI

Marketing

Thought needs to be given to how best to attract potential audience members and foster effective participation. Marketing can make use of radio spots, promotion of the songs and content featured in the programs, development of ancillary materials that support community involvement, and games and competition among schools to motivate students and build program visibility.

Factors for Success

- Political will
- Adequate financial provision (investment and recurrent costs)
- High relevance to education policy and identified educational needs and priorities
- Enabling policy & regulatory frameworks (educational radio policy)
- Teacher training and support (including in teacher training)
- Institutional capacity building (mainstreaming in education system)
- Rigorous quality control in development
- Monitoring and formative/summative evaluation
- Availability of local champions and advocates
- Strong and active community participation and responsiveness to needs emerging from the local context
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