

SECTION 5 TECHNOLOGIES FOR TEACHER PROFESSIONAL DEVELOPMENT—RADIO

GUIDING QUESTIONS

- Which of our TPD needs or goals can be met through the use of radio broadcasts?
- To what extent does our country have access to the skills and facilities needed to produce programming in these media? How extensive and reliable is the relevant infrastructure?
- How are these technologies currently used in our schools and communities? How could these programs be improved or complemented by additional programs in TPD?
- What methods and what content are appropriate to meet our TPD objectives?

IN THIS SECTION

- Interactive Radio Instruction
- Sous le Fromager: Dual-audience Direct Instruction
- Educational impact of IRI
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SUMMARY

Radio is the most widely used communications technology in many of the poorest countries of the world. The cost of a radio receiver is low enough to be afforded by most communities and many individual families. Battery-operated and hand-cranked radios can operate without grid-based electrical power, and in school systems where skilled teachers are in short supply, radio can improve student learning while helping teachers gain skills and confidence. Radio is best used as a tool to guide whole-class participation and to provide teachers with hands-on experience in specific pedagogies.

Over the past three decades, education systems and donor agencies have advanced radio-based instruction beyond simple rote learning. Interactive Radio Instruction (IRI) comprises a body of techniques and content that has been shaped by research and by education policy to support active engagement of students and teachers. IRI has demonstrated positive impact on many EFA-related indicators, such as promotion, attendance, and dropout rates, and has been used to improve the quality of education for large numbers of students in the absence of qualified teachers. IRI has led to improved post-test performance by students and increased motivation on the part of teachers.

With high start-up costs and moderate recurring costs, radio projects are good candidates for donor support. But radio-based education can be disrupted by outside political and economic forces—such as re-allocation of specific radio frequencies—and by the need to fund broadcasts, replace radios and batteries in schools, and develop new course materials to avoid dissatisfaction on the part of teachers and students. In addition, radio tends to reinforce rote learning and linear, one-size-fits-all approaches.

INTERACTIVE RADIO INSTRUCTION

Since the mid-1970s, radio has helped teach basic skills to millions of students in developing countries. Typically, radio is deployed to improve the quality of education for large numbers of students when a school system faces a shortage of skilled teachers.

In some instances, such as the *Pas à Pas* series in Guinea, radio programming is developed specifically for teachers. In other instances, IRI programs—including the Guinean program *Sous le Fromager*—focus on student learning but also give teachers hands-on practice.

Radio for TPD is best used to enhance teachers' *basic* skills.

Interactive Radio Instruction (IRI) is a set of pedagogical practices that has been developed through over 30 years of fieldwork and research. IRI has evolved to include—at its best—group and pair work by students, guided inquiry, play-based learning, and other activities. Regular IRI broadcasts offer curriculum developers the opportunity to scaffold instruction across a series of episodes and to model activities—such as short experiments using locally available materials—that can be completed by teachers and students between broadcasts.

Some IRI programs, such as the Guinean program *Sous le Fromager*, help students learn while also giving teachers direct instruction on how to teach. This approach, focusing on the needs of both students and teachers, is known as “dual audience direct instruction.”

Educational Impact of IRI

IRI impact on student learning has been extensively evaluated. Programs in many countries have demonstrated improved post-test performance by students receiving radio instruction compared to control groups of students.⁷ Studies have also shown that IRI can have positive effects on Universal Primary Completion indicators such as promotion, attendance, dropout and grade-repetition rates.

As noted, IRI programs often target teacher development in conjunction with student learning—either formally or as an indirect objective. Anecdotal evidence of impact is strong, with teachers in many programs stating that IRI has increased their motivation, enabled them to overcome embarrassment at their lack of subject mastery, and changed their approaches to teaching and learning. However, quantitative evidence of change in teacher practice as a result of IRI has not been generated.

Cost for initial development of IRI programming is often high. Production costs may be augmented by costs for supporting printed materials, TPD, ongoing program management, and evaluation. Effective IRI also requires a commitment to advanced research and formative evaluation to ensure that programs are engaging and that they lead to enhanced learning.

Recurrent costs typically include airtime, batteries, radios or cassette players, and tapes for schools. Other common recurrent costs include print production, print distribution, and teacher development. (Some programs publish IRI classroom materials in newspapers to reduce printing costs.)

The financial appeal of the IRI model is based on dramatic reductions in the cost per student as programs increase their geographic coverage and as they are re-broadcast:

⁷ As an example of the gains reported, students receiving *English in Action* instruction through South Africa's Open Learning Systems Education Trust (OLSET) showed improvements in post-test scores that increased based on the number of lessons students had received: students receiving fewer than 33 lessons averaged 6.7 percent gains; students receiving between 34 and 66 lessons averaged 13 percent gains, and; students receiving more than 66 lessons averaged 24 percent gains. However, it is critical to note that basing overall educational strategies on the results of closed post-tests may not factor in bias in testing.

SOUS LE FROMAGER: DUAL-AUDIENCE DIRECT INSTRUCTION

The Guinean project *Sous le Fromager*—funded by USAID and administered by Education Development Center (EDC) and the *Institut National de Recherche et Action Pédagogique* (INRAP)—was a cornerstone in the Fundamental Quality in Education Level (FQEL) project (1998-2005). *Sous le Fromager* directs teachers to lead the class through specific actions that require students to respond verbally or physically.

The program, broadcast over the course of 122 weeks, reached 25,000 classrooms—60 to 70 percent of the total primary school audience in Guinea. In addition to actual programming, teachers receive instructional materials and detailed teacher guides to assist them in preparing for and carrying out activities. Teacher guides used text and drawings to help teachers know what to do before, during and after a radio broadcast.

Sous le Fromager was originally created as a tool to improve student learning in French, math, and science. However, the popular radio program evolved into an effective tool for TPD. The project has reported that teachers increased their use of active-learning instructional methods and improved their subject knowledge. Engaging teachers as “co-learners” alongside students, and at the same time influencing teachers’ classroom practices, *Sous le Fromager* is an excellent example of dual-audience direct-instruction TPD.

- *Mental Arithmetic: The Numbers Family*, a program launched in Honduras in 1986, reported Year One costs per student of US\$2.94, based on 200,000 students and the inclusion of production costs and materials-development costs.
- Costs per student for *Mental Arithmetic* fell sharply in subsequent years to US\$1.01.

Recurrent costs per student tend to remain stable over the life of an IRI program.

For IRI projects with TPD as their primary focus, however, reductions in per-unit costs will be more limited, based on smaller target populations. For TPD and other small-audience projects, developers should consider reusing or adapting proven TPD-focused IRI materials from other countries if they are available, to avoid materials development costs.

Questions for Further Discussion

The Guinean program *Sous le Fromager* achieves impact among teachers as well as students, even though it was primarily designed to improve the quality of student learning. The Guinean TPD program, *Pas à Pas*, focuses on teachers exclusively, and is much less successful.

- *Sous le Fromager* unintentionally resulted in improved practices among teachers. In designing a complementary TPD program to consolidate the teachers’ gains from *Sous le Fromager*, what would be the program objectives?
- In the case of TPD radio programming such as *Pas à Pas*, in which teachers are addressed directly, how could it be structured differently to make it more effective?

Strategic Considerations

Among the factors to be considered in relation to IRI are three that affect sustainability:

- **Recurrent costs**
Broad estimates by World Bank researchers have determined that recurrent costs of small-scale IRI

PAS À PAS: TOP-DOWN RADIO-BASED TPD

Pas à Pas is a weekly radio broadcast designed to help primary teachers increase their *knowledge of good instruction and assessment*. Unlike *Sous le Fromager*, which is entertaining, multimodal, and an example of IRI, the *Pas à Pas* program is more didactic and less interactive. *Pas à Pas* is not an example of IRI.

The 30-minute program offers a simulated teaching episode after which the “teacher” is interviewed about his/her use of instructional strategies, formative assessment, etc. Compared to *Sous le Fromager*, *Pas à Pas* listenership is low—30 percent—in part because it is broadcast on Thursday afternoons, when teachers are out of school for professional development activities, but which, in many Guinean communities, is market time.

programs average 17 percent of total per-student spending in countries such as Ethiopia, Chad, Mali, and Lesotho.⁸ Total per-student spending may include teacher salaries, facilities maintenance, textbooks, and other items included in school operating costs. Seventeen percent of total per-student expenditures, then, may represent all funds available for educational improvement.

■ **Limited listening time**

The use of IRI is generally limited to brief periods during the school day (or outside the school day for teachers). Teachers and school-based resources—whether local materials, textbooks, library books, or computers and CDs—may remain the primary means of student learning throughout the school day.

■ **Challenges to large-scale projects**

With high production costs and relatively low recurrent costs, IRI lends itself to donor funding. But often IRI production is completed through a university or NGO, or under international contract. Ministry personnel may not build capacity to produce IRI, and may have little motivation to allocate funds necessary to continue broadcasting. For these reasons, IRI is often piloted successfully but not taken to scale.

To achieve IRI programming which is successful, sustainable, and taken to scale, development and implementation of IRI planning should be coordinated with other critical components of educational improvement, including teacher development and curriculum change.

New Radio and Audio Tools

To ensure that IRI reaches students in geographically remote areas, lessons can be recorded on cassette tape and provided to schools. Recorded lessons also give schools and teachers the ability to schedule and replay lessons conveniently.

Many other technologies are emerging with the potential to increase the impact of IRI. These include:

■ **Hand-cranked radios**

Radios with hand-cranked generators and rechargeable batteries extend the reach of radio broadcasting to areas without electrical power. The Freeplay Foundation has developed the Lifeline Radio, combining both solar and wind-up power generation; thousands have been distributed throughout Africa as a result of private and foundation contributions.

■ **Digital audio**

The ability to record in digital files enables sounds to be recorded on many different devices, and to be easily stored, edited, and distributed. Digital audio files can be downloaded via the Internet (through podcasts) or shared via email.

■ **Audio compression (MP3, etc.)**

Audio compression technologies strip inaudible frequencies out of digital audio files to create files of much smaller size. Compression renders audio files more suitable for delivery over the Internet—via audio streaming—or, via Multimedia Message Service (MMS), to mobile telephones.

■ **Digital radio**

Digital radio, or Digital Audio Broadcasting (DAB), has the potential to increase access to radio signals, lower airtime costs, and expand the services that radio provides. Digital radio signals may carry any binary-encoded data, which means that digital radios can transmit multimedia information via download to computers.

Consider Using Radio to Support TPD When...

Minimum capacity and infrastructure requirements for other technologies cannot be met.

⁸ The lower-income countries with IRI programs had a mean per-capita GNP of US\$390 in 1993. The calculation of 17 percent of total per-student spending is based on small-scale IRI programs of less than 100,000 students per year. Average recurrent costs were estimated to be 6 percent of total per-student spending.

Problems to be addressed include:

- Lack of qualified teachers means that classes are conducted by para-teachers, volunteers or others
- Teachers lack basic skills in the language of instruction, math, or other subjects
- Teachers lack knowledge of instructional practices
- Students are failing to gain basic skills

TPD objectives include:

- Developing teachers' (and students') basic skills and knowledge of core subjects
- Improving teachers' abilities to manage whole-class instruction
- Increasing teachers' use of simple interactive pedagogies such as questioning strategies
- Increasing teachers' motivation, confidence, and/or enthusiasm for teaching

WEB RESOURCES

- *Interactive Radio Instruction: Impact, Sustainability, and Future Directions*
Edited by Alan Dock and John Helwig, this 1999 publication, part of the World Bank's Education and Technology series, contains seven reports, including detailed analysis of costs of IRI programs and case studies from six countries in Africa.
<http://www-wds.worldbank.org>
(use Advanced Search by author "Dock")
- *Interactive Radio Instruction: Twenty-three Years of Improving Educational Quality*
A 1997 analysis by Andrea Bosch of Education Development Center, this study outlines the strengths of IRI in relation to the challenges of infrastructure and educational quality that confront developing countries, with information about South Africa's OLSET project.
<http://www-wds.worldbank.org>
(use Advanced Search by author "Bosch")

RADIO IN TPD AT A GLANCE

Roles in TPD & education	Strengths	Limitations	Cost profile	Other considerations
<ul style="list-style-type: none"> Addresses shortages of trained teachers Provides instruction to hard-to-reach, displaced, or home-bound populations Provides basic-skills instruction—math, health, language-of-instruction (English, French, etc.) Promotes teacher development primarily via demonstration, guided and hands-on classroom management, and building subject knowledge Can lead to improvements in basic skills 	<ul style="list-style-type: none"> Proven curricula in basic math, language arts, health, Early Childhood Care and Development (ECCD) May be implemented with or without textbooks and other resources Potential to reach large student populations Lack of literacy skills not a barrier Addresses equity and access issues (gender, ethnic, rural) Can combine hands-on development of teacher skills with student learning Audio learning may support visualization and conceptbuilding by learners Enables instructional continuity across grades and subjects Durable, survives extreme environments and long-term use with minimal care Moderate infrastructure requirements Low technical-support requirements 	<ul style="list-style-type: none"> Value of content may degrade over time—long-running programs must evolve with schools and education systems Broadcast airwaves are subject to political and economic events Tendency to reinforce rote learning models—interactivity and attention to needs of individual learners are limited Fixed broadcast schedule Linear, one-size-fits-all approach Risk of student and teacher dissatisfaction—including boredom, especially when lessons are broadcast daily Hardware-replacement programs are necessary: Radios and batteries may be borrowed indefinitely or stolen 	<ul style="list-style-type: none"> High to moderate content-development costs Startup includes cost of radios, cassette players, tapes, batteries, as well as development of materials Per-student recurrent costs of large-scale programs are very low Funding may combine contributions from ministries of communication, broadcast authorities, private radio networks, parents' groups, and others Low recurrent cost has not ensured sustainability Advance research and 	<ul style="list-style-type: none"> Formative evaluation are essential for success Impact is increased by teacher development, printed materials, school site visits and other means May incorporate songs, use of real-world objectives (e.g., pebbles or beans as math manipulatives), in-class experiments, pair and group work and other active learning elements Limited quantitative evidence of impact on teacher development Can be used in combination with other technologies, such as video or "podcasting"—teachers may adopt radio-delivered classroom practices when they see examples on video

