

Tuned In To Student Success ***Assessing the Impact of Interactive Radio Instruction for the Hardest-to-Reach***

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A review of recent research was conducted to assemble evidence on the impact that Interactive Radio Instruction (IRI) may have on improving student learning outcomes. IRI is an instructional tool designed to deliver a family of active learning packages via radio broadcast using a dual-audience approach. IRI exposes students to regular, curriculum-based learning content while modeling effective learning activities and classroom organization techniques for teachers. As IRI continues to be called upon to improve teaching and learning in low-resource and hard-to-reach areas, a better understanding of the empirical data available is critical to guide the way forward. IRI has been implemented by Education Development Center, Inc. (EDC) in over 50 countries over the past 30 years. This paper is a review of existing student and teacher data collected by EDC's IRI projects. Effect sizes are used to summarize what is known about the effect of IRI on student learning gains in Grades K-4 for English, Mathematics, Science, Social Studies, and Local Language. In all, student test results from 13 projects, ranging from Nicaragua in 1977 through Indonesia in 2008, are reviewed, as are teacher observation outcomes from Mali and Madagascar.

Keywords: *Interactive Radio Instruction, Student Assessment, International*

I. Introduction

A. What is Interactive Radio Instruction?

Interactive Radio Instruction (IRI) is an instructional tool designed to deliver active learning by radio. Audio lessons are developed to guide the teacher or facilitator and students through activities, games, and exercises that teach carefully organized knowledge and skills. During short pauses built into the radio scripts, teachers and students participate in the radio program during the course of an academic year, often more than 100 times in daily half-hour lessons, reacting verbally and physically to questions and exercises posed by radio characters. Actual formats vary according to the subject and grade level being taught. Learners also participate in group-work, experiments, and other activities suggested by the program. In this way, IRI exposes learners to regular, curriculum-based content and models effective teaching and activities for teachers.¹

Based on the national curriculum and developed locally, IRI programs are designed to be part of a comprehensive, multichannel learning system. Multichannel learning is based on the belief that successful learning is more likely when more than one channel is used because people learn in various ways and through various means. The paths, or channels, that connect learners to knowledge and skills are numerous: teachers and facilitators, other learners, family and community members,

¹ The World Bank. (2005). Improving Educational Quality through Interactive Radio Instruction - A Toolkit for Policy Makers and Planners. The World Bank, Africa Region Human Development. Washington DC

educational materials, and media of all kinds. In addition to radio-delivered instruction, IRI enriches the learning environment by engaging resources already available (including, for example, teachers, local cultural artifacts such as songs, games and the environment, instructional materials in the classroom such as books and the blackboard, the expertise of local community members, and locally available materials (such as bottle tops and sticks) to create a blend of good teaching and learning practice.

IRI was first developed in the 1970s in Nicaragua by Stanford University, funded by the United States Agency for International Development (USAID). Evaluation data gathered between 1975 and 2000 demonstrated that IRI had improved learning outcomes in conventional classrooms when compared with control classrooms not using IRI (Tilson, et al, 1991; Leigh, 1995; Corrales, 1995; Bosch, 1997; Dock and Helwig, 1999). In addition, IRI was repeatedly found to narrow achievement gaps between boys and girls, as well as between urban and rural students (Tilson et al, 1991; Hartenberger et al, 1996; Bosch, 2001). Programs during this time period often had relatively well-funded evaluation components, often taught a single subject, and focused almost entirely on improving quality.

IRI projects of the last decade have focused more on addressing critical and urgent deficits in meeting Education For All (EFA) goals, and have had fewer resources to gather data about learning outcomes. This study focuses on results primarily achieved from 2000 to present and seeks to add to what has thus far been revealed about an important question: "What effect has IRI had on student learning when it has been applied in difficult environments and taken to national scale?" Pulling together student assessment results recently collected and published by various projects at Education Development Center, Inc. (EDC), the researchers have focused on the use of IRI in more taxing circumstances and the outcomes it achieved as well as children learning in conventional school settings.

Among the 37 records analyzed for this paper, average effect sizes ranged from -0.16 to +2.19 across a variety of subject areas, projects, and participant countries. This variation suggests that several factors affect the degree to which exposure to IRI can improve student achievement. The researchers believe these may include the availability of qualified local resources, the quality of project implementation and monitoring, and the extent to which students listen to and participate in IRI programs. While it is beyond the scope of this review to address these and other qualitative variables, they are suggested as areas for further research.

B. Methodology

The analysis to follow is based upon learning outcomes data as it was reported by EDC's projects. No raw data has been manipulated in the process of analysis. In an effort to build upon findings in prior studies, the researchers have, in some cases, included data from project reports preceding 2000. In all, this analysis covers data ranging from Nicaragua in 1977 through Indonesia in 2008. The following table provides a comprehensive list of the projects which provided the data for this study:

Table 1: Data Sources for Review of Research

Country	Project Duration	Subjects and Grades Assessed
El Salvador	2003-2005	Pre-Primary – Early Childhood Development
Haiti	2002-2008	Math and Reading, Grades 2-4
Honduras	2003-2005	Pre-Primary – Early Childhood Development
India	2002-ongoing	English, Grades 1-3; Math, Science, and Social Studies, Grades 4 and 5
Indonesia	2005–ongoing	Pre-Primary – Early Childhood Development
Nicaragua	1975-1978	Math, Grade 1
Madagascar	2006-2008	Teacher Observations – Grades 1 and 2
Mali	2004-2007	Teacher Observations – Grades 1 and 2
Papua New Guinea	1990	Science, Grade 4
Pakistan	2006, 2007	English Grades 1 and 2
Somalia	2005-2008	Reading, Grade 1
Sudan	2004-2009	English, Literacy, and Math, Grade 1
South Africa	1995	English, Grade 2
	2000 – 2004	English and Math, Grades 1 and 4
Zambia	2005 – 2009	Zambian Language, English, Math, Life Skills, Science, Social Studies, Grades 1 – 4

Throughout this analysis, reference is made to ‘records’. A record is a unique combination of a grade and year. For example, Pakistan provides three records to this study – grade 1 2006; grade 1 2007; grade 2 2007. In all, 15 projects supplied 37 records for analysis.

Criteria for Inclusion of Studies

The following criteria were applied to determine the final list of 15 projects that were considered in this study. For each study, more than one year of data was often available. In addition to data reported in previous studies (for Papua New Guinea, Nicaragua and South Africa), the researchers identified datasets that:

- had available a technical report that detailed results of IRI with some measure of student learning as an outcome variable; and

- included in the report results for a control group, including standard deviation, mean, and sample size (n). In instances where this data was not reported, efforts were made to obtain the data files containing the raw data. In all instances, except for Somalia, all data were obtained and verified.

Study Methodology

The researchers attempt to summarize recent data on the effectiveness of IRI on the learning outcomes of students in the hardest-to-reach areas. To this end, the data are summarized across subjects, grade levels, countries, over time, and by target groups.

To address the varying nature of IRI across contexts, this study employs effect size comparisons as a common measure of student assessment results. Effect size is a term given to a set of indices that measure the magnitude of a treatment effect, without dependence on sample size. By using effect sizes, researchers since 1976 have been able to summarize results from studies to effectively compare findings in a specific area of research.²

In this study, effect sizes have been derived by comparing the results for IRI students (experimental) to those students who have not been exposed to IRI (control), and are derived from two types of results: those based on gain scores, and those based on post-only scores. Gain scores are computed by subtracting a pre-test measure (student achievement at the beginning of the treatment period) from the post-test measure (student achievement at the end of the treatment period). Where pre-test measures are not available, effect sizes are computed based on post-only scores.

Across both gain score and post-only comparisons, analyses by grade are based on an average of the effect sizes across countries. This assumes that subject content at grade level is relatively comparable on an international scale. Analyses by country illustrate effect sizes by grade level as well as by year of assessment, allowing for a fully detailed review of results.

Upon a review of the available data, the researchers selected several lenses through which to analyze and present the findings. The lenses, or perspectives, selected were based on a) the availability of data, b) some general assumptions about the types of questions stakeholders may ask regarding the impact of IRI, and c) the lenses through which IRI has historically been analyzed.

Based on the findings of earlier research, the underlying hypothesis was that learning outcomes for students would improve when learners were exposed to IRI, even in recent years where it is more often used as a means to reach learners in difficult circumstances.

Data Limitations

The researchers acknowledge limitations to this study that are either inherent in the data itself or in the IRI development and implementation process. The first data limitation of this study lies in the number of data points available in each study in a given year. For instance, some studies report both pre-test measures (before the beginning of IRI in the academic year) and post-test measures (immediately following the completion of the IRI programs), while others collect and report only

² The current practice of calculating effect size as a means to combine results from different studies was developed by Glass in 1976.

post-test measures. To address this, the researchers have reported these results separately, and have indicated the nature of the data available.

A second limitation is that different sets of variables are often available for analysis in each dataset. For instance, gender and urban/rural status were not consistently available from all 15 projects. For these analyses, only those project that provided the relevant variables were included.

A third limitation is the restricted amount of data available for analysis. This study is not intended to be a comprehensive record of all IRI activities at EDC or other agencies, but rather of those projects for which there is data of known reliability and is available. Where preliminary data has been included, it has been labeled as such. Furthermore, data was not available on supplementary programs that participants may have participated in.

Lastly, this report does not include data from non-EDC project, nor does it draw conclusions about their impact. Care must be taken when comparing educational activities that may have fundamental differences in their design. Experiences from other organizations are not included in this analysis because, without prior knowledge of the ways in which the methodology of developing radio programs differs at other organizations, the researchers cannot reasonably compare EDC's results from these (possibly) divergent efforts.

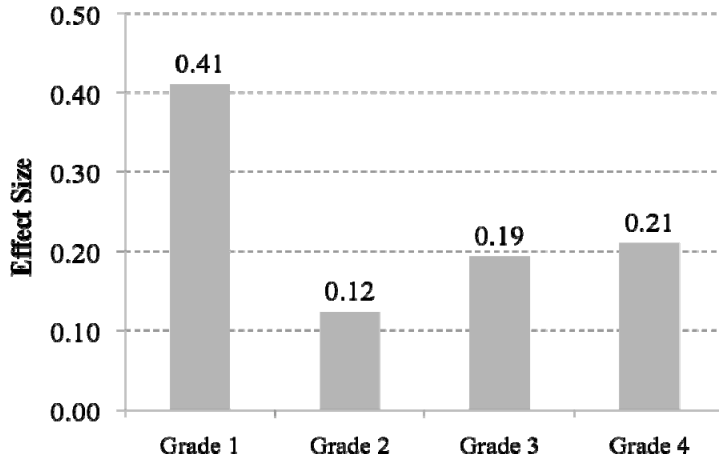
II. Key Findings

A. Learning Outcomes by Subject Area

As an instructional delivery mechanism, Interactive Radio Instruction has been used to bring teaching and learning material into classrooms in a wide variety of subject areas. The following analysis reviews student learning outcomes as an assessment of IRI's effectiveness in supporting the mastery of core subject content in the primary grades.

In mathematics, data have been analyzed from IRI projects implemented from 2003-2007 in four countries: Zambia, Sudan, Haiti, and India (see Figure 1). A summary review of these results illustrates an effect size of 0.41 in grade 1. This tells us that had the average control student participated in an IRI math program she would have been ranked at the 66th percentile of her class rather than at the 50th, representing a 16 percentile "boost" in rank attributable to the effectiveness of IRI instruction. Subsequent grade levels through grade 4 also demonstrate positive effects of IRI math programming.

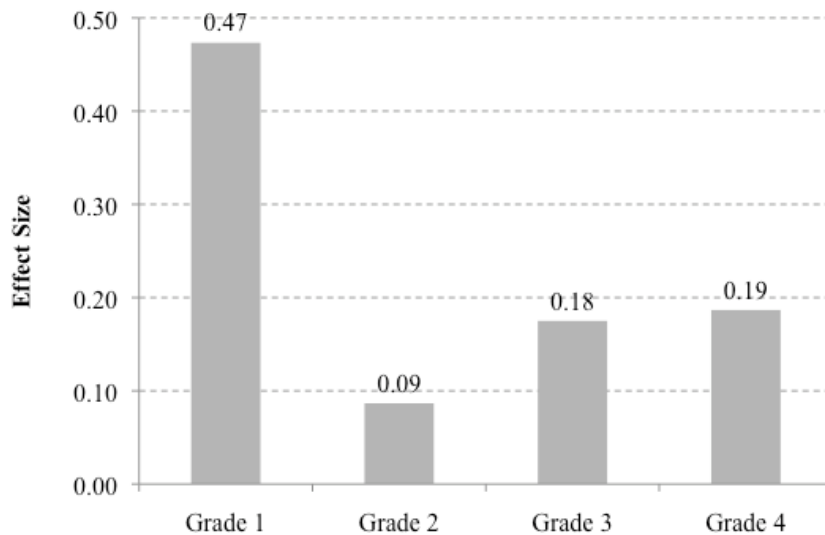
Figure 1: Mathematics Effect Sizes by Grade Level (Post-Test Only)



Note: Data for Mathematics includes student scores on tests administered by EDC and its partners in three countries—Zambia, Sudan, and Haiti—across different years spanning from 2003-2007. Grade 1 is based on two records (combination of countries and years), grades 2 and 3 on three records each, and grade 4 on four records. In cases where more than one record is available, the average effect size is reported.

In local language literacy, analysis incorporates data from four countries: Zambia, Sudan, Somalia, and Haiti, spanning 2003-2007 (see Figure 2). Positive effect sizes observed in grades 1-4 evidence IRI’s stimulation of favorable learning outcomes in primary literacy instruction. Of particular note is the effect size calculated for grade 1, wherein the control learner, had she participated in IRI programming, would have been ranked at the 68th percentile at the time of post-test administration rather than at the 50th.

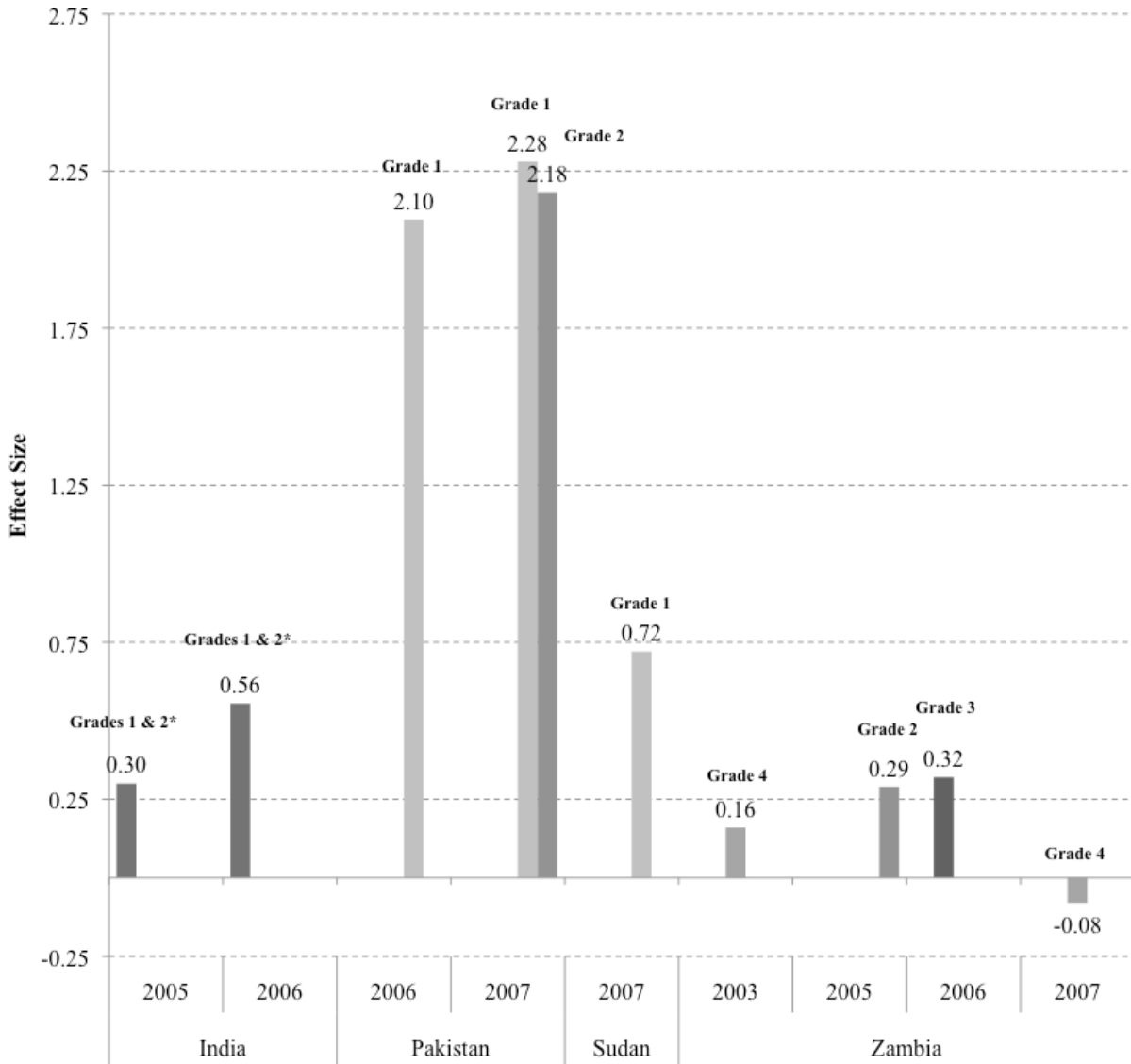
Figure 2: Local Language Literacy Effect Sizes by Grade (Post-Test Only)



Note: Data for Local Language Literacy includes student scores on tests administered by EDC and its partners in four countries—Zambia, Sudan, Somalia, and Haiti—across different years spanning from 2003-2007. Grades 1 and 2, and 4 are based on 3 records each (combination of countries and years), and grade 3 is based on 2 records. In cases where more than one record is available, the average effect size is reported.

In English, data collected from 2003-2007 show that IRI has almost always improved English language competency in the cases examined in Zambia, Sudan, Pakistan, and India (as shown in Figure 3 below). Across grades 1-4, students participating in IRI have been observed to outperform their control school counterparts. Notably, summary results by grade show that, in grade 1, had the average control student participated in IRI, she would have been ranked in the 96th percentile at the time of year-end testing rather than the 50th; the 46 percentile “boost” in rank at year-end is attributed to the effectiveness of IRI instruction. In grade 2, the average control student would have been ranked in the 89th percentile had he participated in IRI English programming.

Figure 3: English Effect Size by Country, Grade and Year (Post-Test Only)

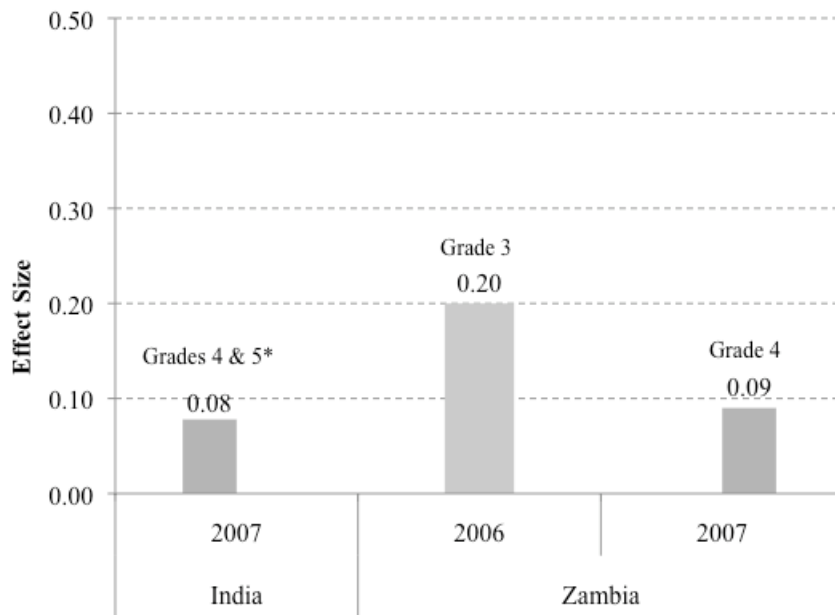


The rather impressive results in each grade 1 and grade 2 are primarily attributed to post-test scores obtained in Pakistan, as can be discerned from the figure below detailing English effect sizes by country. The magnitude of the impact IRI has had on English language instruction is evident, where 7 of the 11 records show moderate or large effect sizes. Strengths in grade 1 English IRI instruction

are reinforced by data from Sudan, which suggest that the average IRI student outranked 76% of her colleagues not participating in IRI. Effect sizes from India in grades 1 and 2 combined are moderate in 2005, and even stronger in 2006, again substantiating a strong pattern supporting the positive impacts of IRI in English language instruction.

In social studies, the introduction of subject content using IRI is a recent development. Analyses draw upon a limited data set including student assessment results from India and Zambia in 2006 and 2007. Student learning outcomes in both countries show slight advantages for IRI learners in grade 4 programming as well as in grade 4 and 5 combination programming. Grade 3 results from Zambia are stronger and suggest that had the average control learner participated in the IRI social studies series, she would have been ranked at the 58th percentile rather than at the 50th. More data is certainly required to confirm early patterns observed in these results. However, the evidence in this review suggests, albeit inconclusively, that IRI is effective in this area.

Figure 4: Social Studies Effect Size by Grade, Country and Year (Post-Test Only)



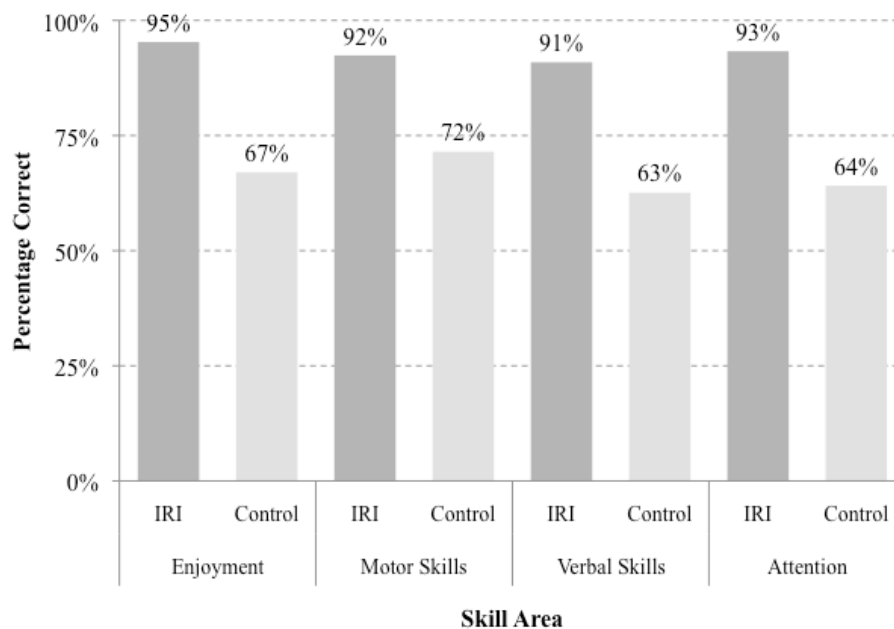
B. Student Learning Outcomes in Early Childhood Education

In addition to delivering primary-level classroom content, IRI has also been applied at earlier stages of cognitive and social development as a tool to support early childhood development and education. In the cases examined below, IRI has proven to be an effective pre-primary intervention in terms of early childhood development. Results have shown to be positive in both urban and rural environments, as well as in alternative learning centers lacking trained teachers.

Results from tests that are administered to younger learners (generally between the ages of four and six years old) are usually summarized by levels of development rather than by a “percentage correct.” Since effect sizes cannot be calculated on this type of metric, the data below should not be directly compared across countries in an absolute sense. What the data does show is that the trend of change in the development of young learners suggests that IRI can be influential in the lives of such very young children.

In Bolivia, assessments measured learner levels of verbal communication, physical activity, positive affects and engagement, and skill levels in performing designated tasks. Caregivers in classrooms using IRI were consistently more positive in their reviews of children's attention levels, skills, and general enjoyment of learning activities than caregivers in control classrooms. Complementing these observations, student assessment results show IRI learners had outperformed their control counterparts in each subcategory by an average margin of 27 percentage points (see Figure 5). These achievements are considerable, particularly given that target beneficiaries represented large, often remote audiences, and that caregivers required training materials and program tools not reliant on high-level reading skills or face-to-face instruction.

Figure 5: Comparison of Early Childhood Education Post-test Results (Bolivia)



In El Salvador, assessment results were drastically lower for IRI learners than for control learners at the time of pre-test evaluation. However, by post-test administration, the percentage of IRI learners categorized as “Needs Improvement” dropped by 23 points, while control schools saw a reduction of 5 percentage points. After only a few months of program participation, the percentage of IRI learners evaluated as “Excellent” jumped from 34% to 82% while control schools saw a rise in the percentage of students in this category from 67% to 80%.

In Honduras, the Juego y Aprendo project established 53 early childhood IRI centers with the objective of increasing access to pre-primary education. It was not expected that, following 12 months of intervention, the project's alternative IRI centers--staffed with volunteer educators--would match student achievement levels attained by the control group comprised of existing, formal pre-schools. Despite this, post-test scores for IRI and control group learners were not seen to be significantly different. This was true for centers in both urban and rural regions.

In Indonesia, although assessment results favored control learners over IRI learners at the time of pre-test, the percentage of IRI kindergartners meeting “average” and “above average” criteria were seen to be equal to or greater than students from control kindergartens in every subcategory at post-test examination. Of note, this meant an increase in the percentage of IRI students meeting or

exceeding school readiness requirements in each Language and Cognitive Development categories by 21 points from pre- to post-test where control kindergartners increased by 13.

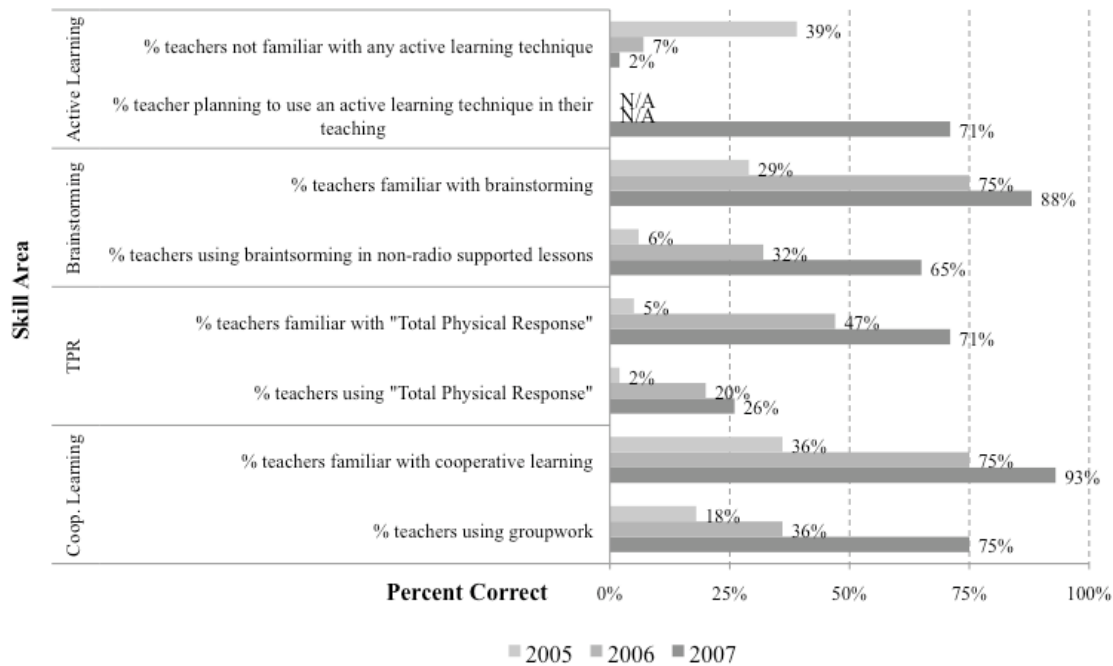
C. IRI and Teacher Professional Development

Though in most contexts IRI has followed a dual-audience approach, involving direct instruction to students while modeling teaching strategies and classroom organization techniques for teachers, it has also been used specifically for teacher professional development. In Mali and Madagascar, assessments were administered to measure changes in teachers’ instructional behavior and understanding of pedagogical techniques introduced by IRI programming. IRI-trained teachers were surveyed regularly during the life of each project, providing some longitudinal analyses data, although no control comparison data is available. A summary of the findings is presented below and illustrates that teachers, too, stand to benefit from IRI.

In Mali, teacher training was introduced via IRI as a delivery mechanism built to overcome long distances, reaching educators at the school and classroom level. Radio-based in-service training complemented school-based “communities of learning” and face-to-face trainings developed by the Ministry of Education.

Results from teacher observations indicate real improvements in instructional practice over the course of the project (see Figure 6). Each evaluation shows steady gains in teachers’ familiarity with, and use of, all key techniques emphasized by the program. Increases in teachers’ facility with brainstorming are particularly notable, with the percentage of participant teachers familiar with, and the percentage using brainstorming during non-IRI lessons escalating 59 percentage points from 2005 to 2007. Also of note is the percentage of teachers familiar with cooperative learning (93% in 2007 up from 36% in 2005), and the percentage of teachers observed using group work during non-IRI lessons (75% in 2007 up from 18% in 2005).

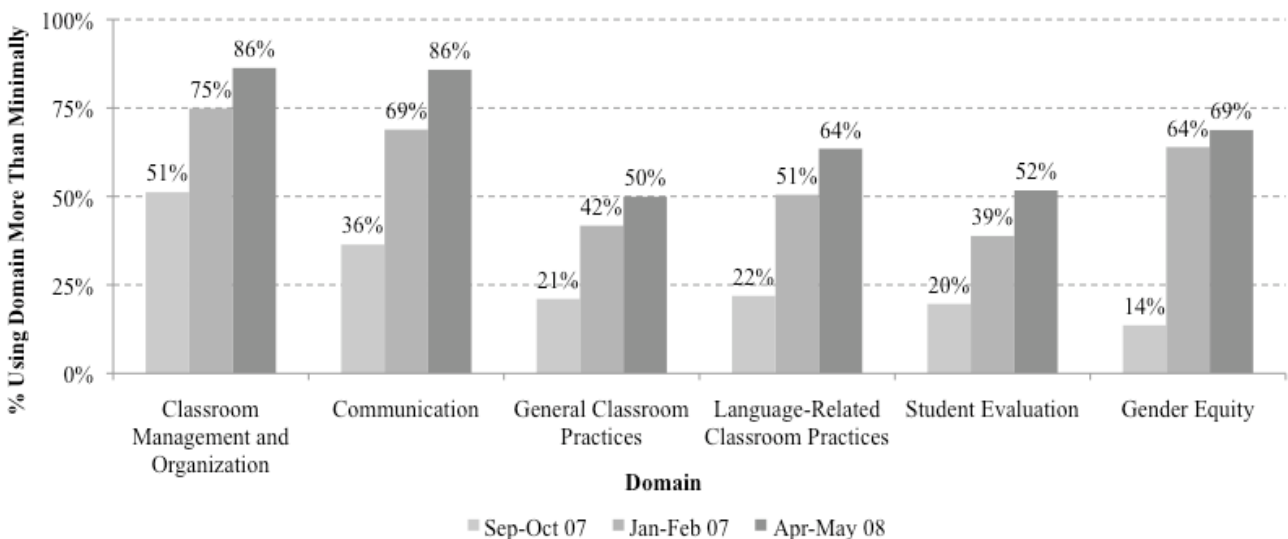
Figure 6: Percentage of Teachers Familiar With or Adopting IRI Instructional Methods (Mali)



In Madagascar, in-class IRI training took on a similar form in which radio teachers would model the different games, songs, and student-centered learning activities to their classroom counterparts, aimed at improving teaching in mathematics, French and Malagasy. Pauses in the radio programs allowed participating teachers time to try new activities with their students while listening to the program. The primary objective of both programs was to improve the quality of classroom instruction with an emphasis on active learning and student-centered methodologies.

For both grades 1 and 2 teachers in Madagascar, steady improvements are observed from baseline testing to final evaluation. Grade 1 observation results (shown in Figure 7) illustrate that teachers improved by a minimum of 31 percentage points in each of the six key areas evaluated, with a marked improvement by 51 percentage points in the area of gender equity (64% of observed teachers in 2008 used gender equitable practices more than minimally, up from 13% in 2007). Grade 2 teachers improved in all six areas by at least 29 percentage points, where again, the most dramatic gains appeared in the area of gender equity (69% of observed teachers in 2008 used gender equitable practices more than minimally, up from 14% in 2007).

Figure 7: Percentage of Grade 1 Teacher Using Domain of IRI Practices More Than Minimally (Madagascar)



D. Student Learning Outcomes for Marginalized Populations

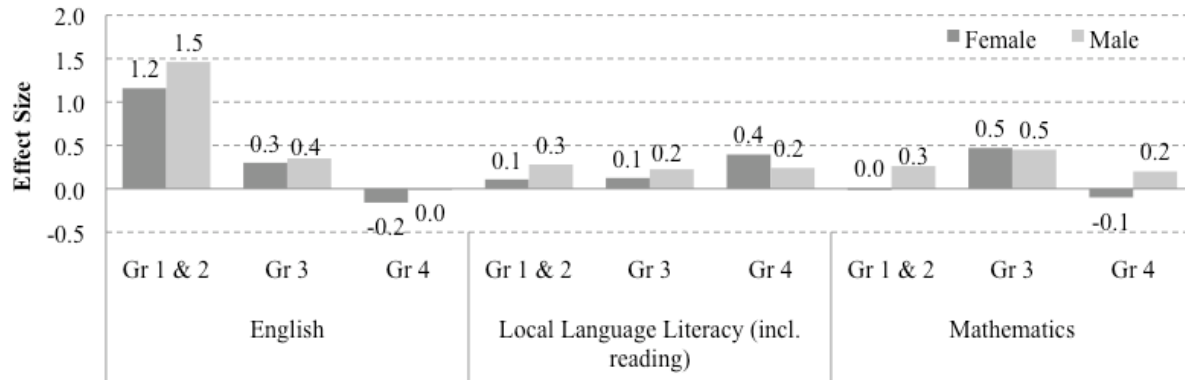
The concern for marginalized learners is not new, nor are the efforts to bring quality, scalable education to them. As a result of the ubiquitous reach of radio, IRI has been looked upon as a means to reach marginalized children, and more so in recent years. This section highlights what is known of the impact of IRI on the learning outcomes of four key marginalized groups: girls, orphans and vulnerable children, learners in fragile states, and those in rural areas. While all IRI projects include some combination of one or more of these marginalized groups, limited data is available that looks at the learning outcomes for these students specifically. The following analyses are based on projects that provided the relevant demographic information.

Girls and Boys

The researchers were interested to see if IRI had a differential effect on boys and girls and whether current data upheld earlier findings of IRI as a mechanism for narrowing gender-based achievement

gaps (Hartenberger and Bosch, 1996). Recent findings by subject or grade level appear mixed, but overall, reveal a slight gap between boys’ and girls’ achievement (see Figure 8). While IRI boys enjoyed a larger boost over non-IRI boys than IRI girls did over non-IRI girls, the difference between IRI boys’ and IRI girls’ performance, on average, appears small. English results by country show that mean scores for females mirror the general trend of mean scores for males--when boys did better, so too did girls. In local language literacy (which includes both reading and writing), the data show more variability in achievement compared to English.

Figure 8: Gender Effect Size Comparison by Subject and Grade (Post-Test Only)

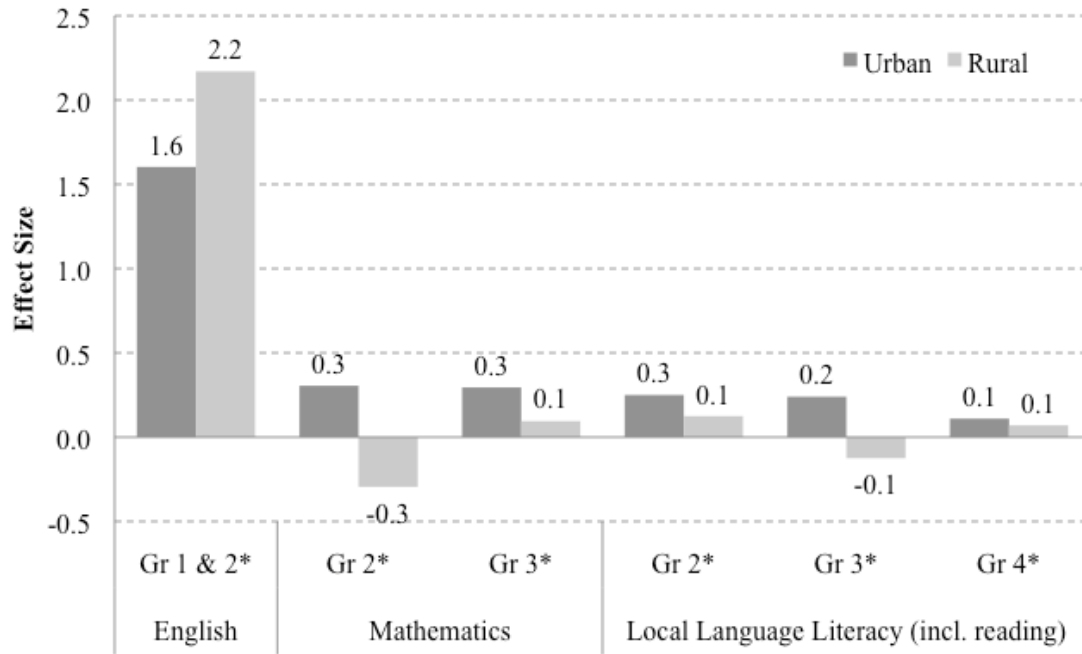


Rural and Urban Students

Another group of students that tends to have poor access to quality education are those in rural areas (see Figure 9). Common obstacles facing rural schools in developing countries, such as remote school locations, poorly trained teachers, and high teacher turnover rates, have adversely affected learning outcomes for rural students compared to their urban peers. In response to this discrepancy in achievement, EDC has seen a steady growth in the number of projects that target this population in recent years.

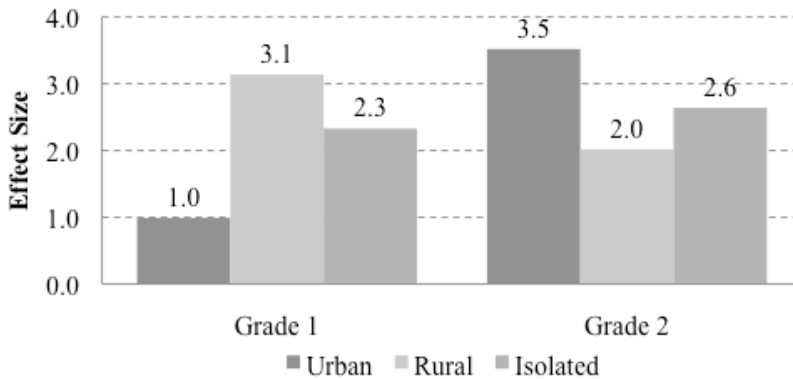
Analyses of student assessment results reveal that rural IRI students enjoy approximately the same boost in achievement over their non-IRI peers as do urban IRI learners. Results show that learners in rural areas continue to benefit from IRI programming despite the fact that the distinction between ‘rural’ and ‘urban’ is messy, at best, and more so today than a decade ago. With an increased interest in IRI in recent years as a means to reach remote learners, the kinds of learners that comprise the dataset for rural learners are more varied than ever, and yet results remain promising. The data for English in grades 1 and 2 provide the most promising evidence that IRI is bridging the rural-urban achievement gap. Here, the mean English score for rural IRI students in grades 1 and 2 is at the 100th percentile of rural non-IRI English students. By comparison, the mean English score for urban IRI students in English (in the same countries, grades and years) is at the 94th percentile of urban non-IRI students.

Figure 9: Urban vs. Rural Effect Size Comparison by Grade (Pre-Post Gain Scores)



In Pakistan, results for English grades 1 and 2 rural and urban students were further disaggregated into urban, rural and isolated schools (data are based on pre- and post-test student scores) (see Figure 10). Isolated schools were rural schools that were classified as difficult to reach because of the challenging terrain. As a result of their location, students in these schools tended to be even more isolated than those in rural schools, resulting in poorer access to technology, quality teachers, and the routine support functions provided by the central education offices to each school (these supportive measures could reasonably reach the urban and rural schools). The results for student achievement scores in isolated IRI classrooms (shown here) are impressive in an absolute sense (in both grades, isolated learners’ post-test effect sizes are significant and large), as well as in a relative sense (in both grades, isolated learners show learning gains that are between their rural and urban peers).

Figure 10: Urban, Rural & Isolated School Effect Size Comparison by Grade (Pre-Post Gain Scores)

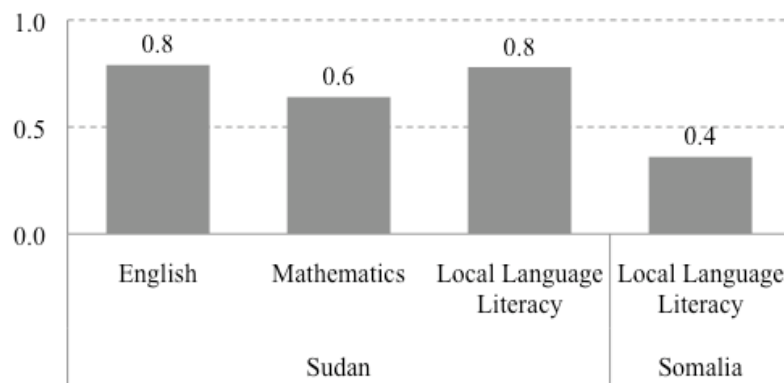


Students in Fragile States

While the quantity of available data is limited to experiences in Sudan and Somalia, student assessment results reviewed for IRI learners in fragile states are nonetheless encouraging. Those students who participated in IRI classes had a distinct advantage over their non-IRI peers, and this advantage was consistent across subjects. The greatest advantage was observed in English, where the average IRI student was seen to achieve a mean score that was 29 percentage points higher than that of her control school peers (effect size 0.8 in Sudan), followed by mathematics (effect size 0.6 in Sudan) and local language literacy (average effect size of 0.6 across both Somalia and Sudan).

These data present medium (0.3 to 0.5) to large (≥ 0.6) effect sizes for students in Sudan and Somalia. To put this in perspective, Sudanese and Somali students participating in IRI classes are benefiting from a 16-29% advantage over their peers in non-IRI classrooms. In light of the multitude of factors that children in these conditions are faced with (including hunger, poverty, lack of access to health care, water, and proper sanitation), it is quite probable that the impact that IRI can have on their learning is understated in these data. While the available results are extremely encouraging, additional data is needed to make more broad conclusions regarding the impact of IRI on student achievement in fragile states.

Figure 11: Fragile States Effect Size Comparison by Subject (Pre-Post Gain Scores)



Orphans and Vulnerable Children (OVCs)

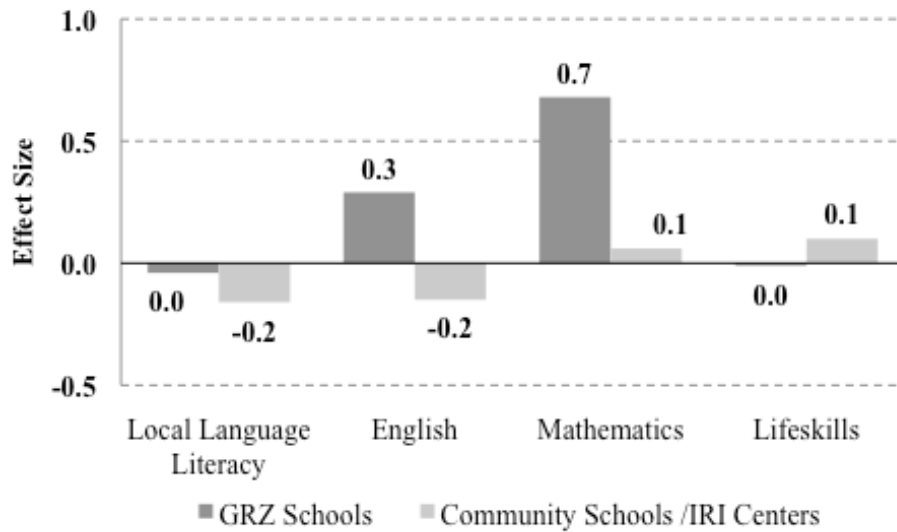
UNICEF (2008) defines Orphans and Vulnerable Children (OVCs) as those children who have been separated from their parents due to a variety of reasons, and as a result, suffer from poorer overall well-being and development. Since 2000, IRI has been used to reach both in- and out-of-school orphans in Zambia. Orphans have largely been exposed to IRI either during their attendance in community schools or IRI centers. Community schools are those schools established and maintained by local communities and offering IRI programming in addition to other instruction, while IRI centers offer solely Interactive Radio Instruction. For the purposes of this report, results from community schools and IRI centers are used as a proxy for results for OVCs. This is consistent with project data evidencing larger percentages of orphans attending IRI centers and community schools in comparison to the population enrolled in formal primary schools.

Data from 2006 for grade 2 students show a small advantage for learners participating in IRI community schools and IRI centers in mathematics and lifeskills over their non-IRI peers, although

the impact of IRI in local language literacy and English is not as encouraging. In mathematics, the advantage enjoyed by IRI students in community schools and IRI centers is small when compared to the advantage IRI students in formal schools enjoyed. Conversely, in lifeskills instruction, IRI students in community schools and IRI centers demonstrate a mean that is at the 54th percentile of non-IRI students in community schools (effect size of 0.1).

When comparing the effect sizes for students in formal schools to those for students in community schools and IRI centers, there are distinct differences between these two populations that must be kept in mind. For example, students in community schools and IRI centers differ significantly from their peers in formal schools – economically, socially, and in terms of the resources available to them in school. As such, a direct comparison and conclusion cannot be made from the data available regarding the differential impact of IRI on the two populations. Instead, the data available provide some initial indication of the potential impact of IRI on OVCs. While more data is required for more conclusive evidence, additional variables, such as the quality of teacher training in formal schools versus that in community schools and IRI centers, would also be necessary.

Figure 12: Conventional vs. Non-Conventional Schools Effect Size Comparison by Subject (Post-Test Only)



III. Summary and Overall Conclusions

In this study, the researchers set out to review recent EDC experiences with Interactive Radio Instruction and its impact on student learning outcomes, especially when applied in difficult circumstances. Based on previous analyses, the hypothesis was that learning outcomes for students would improve when learners were exposed to IRI. The researchers found this supposition to be tenable, albeit in some specific grade levels and specific subjects more than in others. As discussed in the preceding sections, at times the lack of sufficient data prohibited the researchers from reaching broad conclusions regarding the impact of IRI on student learning outcomes. This was the case for some subjects, for upper primary grades, and for some marginalized populations. At other times, the data provides a collage of convincing evidence. This was seen in the analysis for early grades and in English and mathematics, and for specific marginalized populations .

It is recognized that the effect sizes presented in this study are smaller in comparison to those cited in earlier IRI literature. While explanations for such differences are left to speculation, one of these may be that local resources and expertise available to both develop and evaluate high-quality IRI programming varies significantly between countries, and may have even more variability when developed in difficult contexts. Another possibility for these smaller effect sizes may be the degrees to which IRI projects have been implemented. More so than ever, IRI is being applied at national scales, posing a significant challenge for assessments attempting to capture impacts in student learning within whole countries and finite project timelines.

Additional factors should be taken into account in the evaluation of program effectiveness, such as the quality of project implementation and the extent to which students and teachers regularly listen to programming. Overall, however, the present library of data do uphold earlier findings and suggest that learners continue to benefit from exposure to IRI programming, including those in hard-to-reach areas.

References

- Anzalone, S. *Using Instructional Hardware for Primary Education in Developing Countries: A Review of the Literature*. Institute for International Research, Prepared for Harvard University Project - BRIDGES. Washington DC: USAID, 1987.
- Bosch, Andrea. *Interactive Radio Instruction: Twenty-Three Years of Improving Education Quality*. Education and Technology Notes, Vol. 1, No. 1, World Bank, Washington DC, 1997.
- Bosch, Andrea & Crespo, Cecilia. *Jugando en el Pidi: Active Learning, Early Child Development and Interactive Radio Instruction – Supporting Caregivers, Parents and Young Children*. LearnTech Case Study Series, No. 4. Washington DC, 1995.
- Cohen, J. *Statistical power analysis for the behavioral sciences (2nd ed.)*. Hillsdale, NJ: Erlbaum, 1988.
- Dirir, Mohammed. *Somalia IRI Report*. Education Development Center, Inc., 2005.
- Early Childhood and Family Education Activity (EDIFAM). *Proyecto IRI en El Salvador: Una Propuesta Aplicada a la Educacion Inicial y Parvularia*, 2005.
- Education Development Center, Inc. *Southern Sudan Interactive Radio Instruction (SSIRI) – Grade 1 Evaluation*, 2008.
- Education Development Center, Inc. *Etude D’Evaluation du Programme de Formation Interactive Des Enseignants Par la Radio (FIER)*, 2008.
- Evans, Norma & Pier, Daniel. *Interactive Radio Usage and Its Impact on Grades 1 and 2 Teachers and Students – Midterm Study of the Appui Technique aux Educateurs et Communautés (ATEC) Program, Madagascar*. Education Development Center, Inc., 2008.
- Glaser, R. *Instructional technology and the measurement of learning outcomes*. American Psychologist, 1963. Issue 18, P 510-522.
- Hartenberger, L. & Bosch, A. *Making Interactive Radio Instruction Even Better for Girls: the Data, the Scripts and the Potential*. ABEL 2, USAID Award # HNE-5832-C-00-4075-00, 1996.
- Ho, Jennifer & Mitchell, Jonathan. *Impact, Results and Progress: DBE 2 Monitoring and Evaluation Report FY2008*. Education Development Center, Inc., 2008.
- Leigh, Stuart. *Changing Times in South Africa: Remodeling Interactive Learning*. LearnTech Case Study Series #8, USAID, Washington DC, 1995.
- Letshabo, Kathleen. *Learning at Taonga Market – Evaluation of Interactive Radio Instruction. Grades 1, 2, and 3*. Education Development Center, Inc., Multiple reports 2000 - 2007.
- Letshabo, Kathleen. *Somali Interactive Radio Instruction Program (SIRP) –Grade 1 Evaluation 2006/2007*. Education Development Center, Inc., 2007.
- OECD. *State Building in Fragile States*. (accessed August 2008).
http://www.oecd.org/document/53/0,3343,en_2649_33693550_38692341_1_1_1_1,00.html
 2008.
- Rothstein, Richard. *Class and Schools*. Economic Policy Institute, 2004.

- Royer, James. *EDA/Edikasyon a Distans pou Ayiti Project – Final Report*. Education Development Center, Inc., 2003
- Royer, James. *Literacy Enhancement Assistance Program Student Assessment Report*. Education Development Center, Inc., 2003.
- Royer, James. *EDA/Edikasyon a Distans pou Ayiti Project – Final Report for the 2003-2004 Project*. Education Development Center, Inc., 2004.
- Royer, James. *Dot-EDU India State-wise Student Assessment Reports. Chhattisgarh, Jharkhand, Karnataka, Madhya Pradesh*. Education Development Center, Inc., Multiple reports 2004-2007.
- Royer, James. *Pakistan Education Sector Reform Assessment Program – IRI Student Assessment Report*. Education Development Center, Inc., Multiple reports 2004-2006.
- Sanchez, Yvette & Evans, Judith. *Dot-EDU Honduras Interactive Radio Instruction for Kindergarten Pilot – Summative Evaluation*. Education Development Center, Inc. 2005.
- Snow, C., Burns, S., & Griffin, P. *Preventing Reading Difficulties in Young Children*. National Academy Press, Washington, DC, 1998.
- Tilson, T., Jamison, D.T., Fryer, M., Godoy-Kain, P., Imhoof, M. *The Cost Effectiveness of Interactive Radio Instruction for Improving Primary School Instruction in Honduras, Bolivia and Lesotho*. Paper presented at the CIES Annual Conference in Pittsburgh, Pennsylvania, on March 15, 1991.
- UNESCO. *Primary Education: Access and Equity – Girls*. (accessed September 3, 2008)
http://portal.unesco.org/education/en/ev.php-URL_ID=30870&URL_DO=DO_TOPIC&URL_SECTION=201.html
- World Bank. *Improving Educational Quality through Interactive Radio Instruction - A Toolkit for Policy Makers and Planners*, Washington, DC, 2005.
- World Bank. *Fragile and Conflict Affected Countries*. (accessed August 2008)
<http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/STRATEGIES/EXTLICUS/0,,menuPK:511784~pagePK:64171540~piPK:64171528~theSitePK:511778,00.html>. 2008.
- Zambia Education Broadcasting Services. *Interactive Radio Instruction Evaluation Report, Grade 1*. Education Development Center, Inc., 2001.