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Basic Education Program

Summative Evaluation of Grade Three Interactive Radio English Instruction in Ethiopia

**USAID /AED/BESOII in Collaboration with Educational
Media Agency, Ministry of Education**

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1. Introduction

1.1. Background

Experimenting Interactive Radio English Instruction in Ethiopia started in 1999 as a project. The project was the result of the collaboration between the Educational Media Agency (EMA) and the Basic Education Overhaul Project (BESO I) /USAID. Initially the project focused on Grade One. This initiative drew its background from EMA's mission as stated in the First Education Sector Development Program of Ethiopia (ESDP-I). This program stated that EMA was expected to produce broadcast media programs for diverse audiences to "enrich the quality of education for those attending school and provide access to continuing education for those who are no longer enrolled". With particular reference to EMA's role in primary English education, the ESDP-I document noted that the main objective was to "improve the quality of English language instruction by producing high quality educational Interactive Radio Instruction programs to primary schools".

The introduction of IRI English radio programs was proposed in two stages. The first stage involved the production, distribution and piloting of programs on cassettes in 1999/2000 while the second stage was to move to radio in 2000-2001. For the pilot program in 1999/2000, the radio programs and teacher guides were produced and distributed to carefully selected 24 schools in eight regions. Of this number, 16 schools were "experimental schools" where the impact of IRI was studied. The remaining 8 schools using IRI lessons were visited on regular basis in order for EMA to obtain formative feedback for the purpose of improving the lessons. There was also a control group of 16 schools that did not receive the IRI lessons and relied on the traditional English language instruction in Grade one.

Findings from the impact evaluation showed impressive results that interactive radio English Instruction produced significant academic gains in comparison to traditional instruction. The following were the results reported from that study.

Table1. Effectiveness of Interactive Radio Instruction in Grade One in Ethiopia.

Status (group) of the school	Measurement		Academic Gain (Post test-Pre test)	Sig.
	Post- test	Pre-test		
Control (N=679)	66.08	56.32	9.75	.000
Experimental (N=787)	76.58	54.17	22.40	.000

Source: Nekatibeb,T.(2001).*The Effectiveness of Interactive Radio English Instruction Programs in Ethiopia. A Summative Evaluation Report. A.A. BESO/USAID.*

The collaboration between EMA and BESO I continued to carry over Interactive Radio English Instruction to Grade two in 2001/2002. The same number of regions and schools were involved in the program. Overall results indicate that the academic gains of students using IRI is much more than those following their lessons in traditional instruction. The following table presents findings from grade 2 IRI English impact evaluation.

Table.2. Effectiveness of Interactive Radio English Instruction in Grade Two in Ethiopia

Status (group) of the school	Measurement		Academic Gain (Post test-Pre test)	Sig.
	Post- test	Pre-test		
Control (N=609)	50.4	41.1	9.30	.000
Experimental (N=767)	55.9	41.9	12.00	.000

Source: AED/BESO II (2004). *The Effectiveness of Interactive Radio programs in Grade 2 in Ethiopia.*

From the above table, it is clear that the differences in academic gains between students using IRI and those in traditional instruction continue to persist in favour of IRI students. This study is in fact much more comprehensive than the first one since the measurement of student learning included all levels of skills in language instruction.

ESDP-I was completed in 2002/03 and now the implementation of ESDP- II (Education Sector Development Program-II) is underway. Likewise, the Basic Education Overhaul Project is in its second phase (now called Basic Education System Objective or BESO II) after having completed its first phase in Ethiopia. With these transitions also came a renewed commitment to supporting English education with Interactive Radio Instruction.

BESO II is designed in two phases. Phase I is the Base Period and it covered two years from 2002/03-2003/04. The strategic objective of BESO II in phase one was the improvement of quality and equity in Ethiopian Primary Education. In order to meet this goal, the following four Intermediate Results (IRs) were set.

Strengthening Quality of Professional Educational Personnel (IR1).

Improving the teaching-Learning Process (IR2).

Strengthening Educational Planning and Management (IR4).

Strengthening Community-Government Partnership in Education (IR3).

AED/BESO II is involved with the implementation of the first three Intermediate Results (IRs). The PMP (Performance Management Plan) of AED indicates that improving the teaching-learning process shall be attained by means of the following two Sub-Intermediate results.

- The use of relevant supplementary media and materials to support active learning by teachers.
- The integration of socially relevant topics (e.g. HIV/AIDs, Civics, and Environment) into the curriculum.

The use of Interactive Radio Instruction was a part of the first sub-IR under IR2. It is also one of the performance indicators at the IR2 level. The PMP puts this indicator as follows:

- IR2, Indicator 2. Improved achievement in English in Schools using Interactive Radio Instruction (IRI), relative to schools that do not utilize IRI.

In phase II or the option period, human capacity and social resiliency has become the key direction towards which USAID operates in Ethiopia. The goal is to establish a foundation for reducing famine, vulnerability, hunger and poverty. The following five strategic objectives (SOs) are envisaged to contribute to the attainment of this goal.

Strategic Objectives of USAID

SO13: Capacity to anticipate and manage through shocks increased.

SO14: Human capacity and social resiliency increased.

SO15: Capacity for good governance increased.

SO16: Market –led economic growth and resiliency increased.

SO17: Knowledge management coordinated and institutionalized.

From the above Strategic Objectives, education is subsumed under SO14- Human Capacity and Social Resiliency Increased. The following three Intermediate Results (IRs) constitute SO14:

- IR14.1: Use of high impact health, family planning, and nutrition services, products and practices increased.
- IR14.2: HIV/AIDS prevalence reduced and mitigation of the impact of HIV/AIDS.
- IR14.3: Use of quality primary education services enhanced.

The enhancement of the use of quality primary education services (IR 14.3.) comprises five Sub-intermediate results:

- IR14.3.1: Community participation in the management and delivery of primary education services strengthened.
- IR14.3.2: Planning, management, and monitoring and evaluation for delivery of primary education strengthened.
- IR14.3.3: Quality of primary education improved.
- IR14.3.4: Equitable primary education services strengthened.

In the option period comprising 3 years, the responsibilities of AED focus on two of the above Sub-Intermediate Results (Sub-IRs).

- IR14.3.2: Planning, management, and monitoring and evaluation for delivery of primary education strengthened.
- IR14.3.3: Quality of primary education improved.

AED's responsibility in Sub-Intermediate Results 14.3.2 covers two Sub-Sub-Intermediate Results:

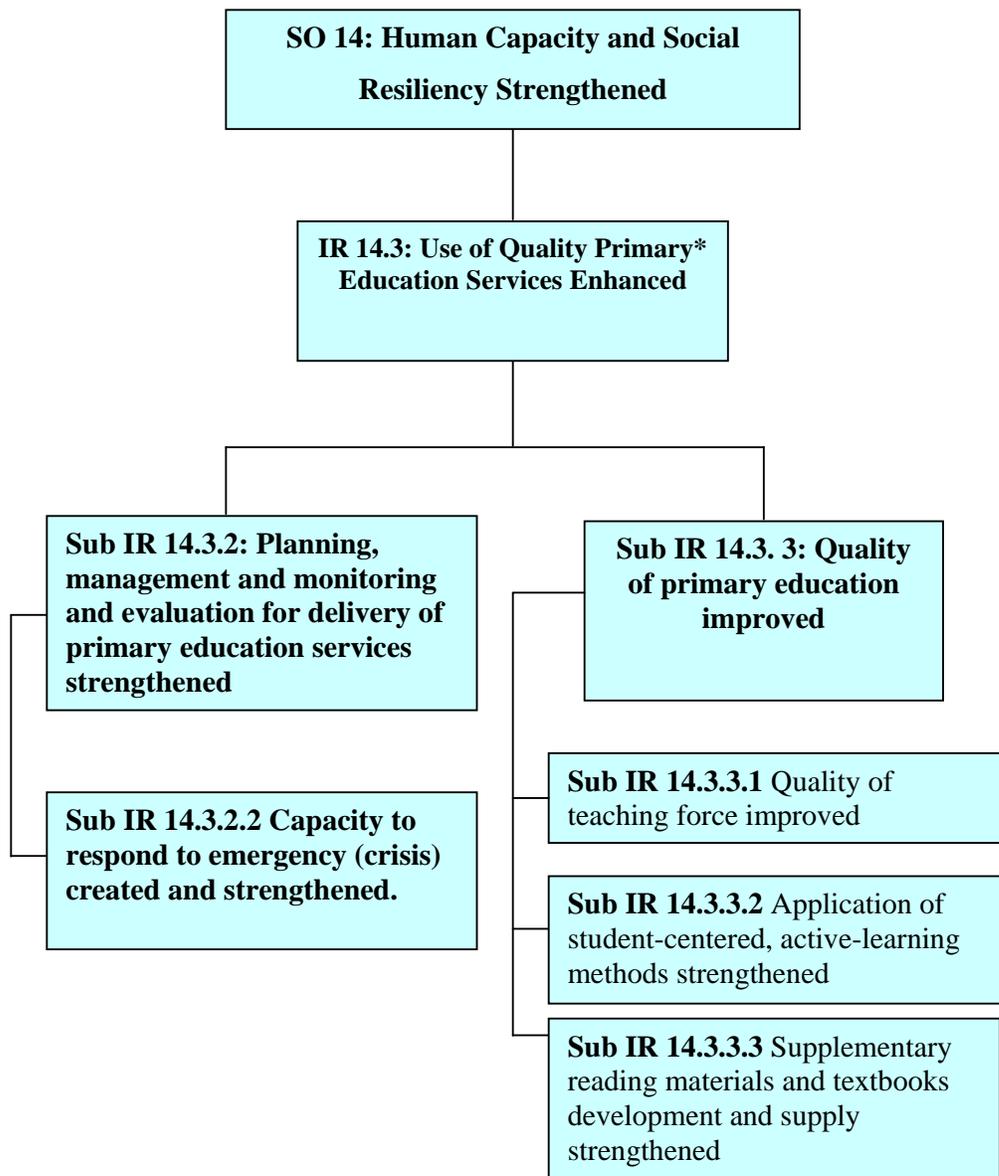
- Planning, management, and monitoring and evaluation capacity at all levels strengthened.
- Capacity to respond to emergency created and strengthened.

Although four Sub-Sub-Intermediate Results comprise Sub-Intermediate Result 14.3.3., AED implements only three of them:

- Quality of teaching force improved.
- Application of student centered, active-learning methods strengthened.
- Supplementary reading materials development and supply strengthened.

Like the base period, the use of Interactive Radio Instruction has been classified under the third sub-sub-intermediate results. The performance indicator also remained the same as indicated in the base period. The following chart shows the specific components of SO-14 and AED results framework.

Strategic Objective (SO) 14 – AED Results Framework



AED in collaboration with EMA focused on the production and distribution of English Interactive Radio Programs for Grade 3 in 2003/2004. These programs started to be broadcasted nationwide using EMA’s local radio stations in 2004/05. The methodological implication for learning the impact of IRI was that AED in collaboration with EMA does the baseline survey in April/May, 2004 since there will not be control schools. Furthermore, the impact assessment was to be conducted in April/May 2005, after one year of intervention. In both cases, the target population was Grade 3 students. Thus, this study was a comparative analysis of the baseline

results and the impact of learning with Grade 3 IRI over a period of one academic year following the introduction of IRI.

1.2. Objectives of the Study

The general goal of this study is to analyze the impact of Grade 3 English Interactive Radio Programs in Ethiopia. It compares a baseline data for Grade 3 Interactive Radio English Instruction with results after the implementation of the program Ethiopia. The specific objectives of the study are:

- To analyze the level of student learning in Grade 3 English by means of an achievement test.
- To analyze English learning skills at different levels, including listening, writing and reading skills in Grade 3.
- To analyze English learning skills by location (urban/rural,) gender and region in Grade 3.
- To create an electronic database for English instruction at Grade 3 for the purpose of later comparison with post-tests.

1.3. Significance of the Study

English is the principal international language in Ethiopia. It is the language of instruction beginning from secondary school, or even earlier in some regions. It is one of the subjects that determine whether or not a student qualifies for higher education. Providing quality learning in English, is therefore, vital to enable students to remain in formal schooling as well as in the world of work. IRI is one of the approaches to meet these ends. Studying the outcomes and effectiveness of this approach provides vital information to decision makers', parents and other stakeholders whether these programs should be continued and expanded or discontinued.

Onwards from 2004/2005, EMA has launched Grade 3 Interactive Radio Programs at the National Level. This means all schools will be covered by the program, and some results are expected from this nationwide broadcasting. In order to facilitate the determination of the effectiveness of these programs specific to Grade 3, a baseline

study was completed the previous year. The current comparison after the intervention is, thus, a step taken to analyze the academic gains of students as the results of Grade 3 IRI.

1.4. Limitations of the Study

Language skills can be assessed at listening, speaking, reading and writing levels, but this study does not include the assessment of speaking skills. However, this was essential because they are included in the curriculum. Nevertheless, appropriate instruments for measuring this skill are necessary preconditions for assessment.

The administration of the tests involved using a tape recorder. This has limitations on test administrators to solve some on-the-spot problems in terms of instructions and making corrections during the tests.

It is for the first time that an instrument that commonly measures Grade 3 English instruction was developed in Ethiopia. In order to relate the tests with the curriculum, an English curriculum expert in primary education was used. To ensure the reliability of the test, a pilot study was conducted. Despite this, however, the instrument requires refinement and improvement for future use.

Not all participants that took part in the baseline study were involved in the post intervention assessment. This was because in one of the regions (Benishangul Gumuz) it was found out interactive radio instruction was not broadcasted in schools. In other cases, however, maximum effort was made to minimize the number of dropouts from the study.

2. Conceptual Issues and Review of Literature

A thorough review of literature on the use of interactive radio instruction has been given in Grade 2 IRI summative Evaluation report. In that report, about eight issues were presented: emergence of Interactive Radio Instruction, Interactive Radio Instruction as a pedagogical tool, the effectiveness of IRI, IRI and hard-to-reach or out-of-school populations, the support of IRI to close equity gaps, the economics of IRI projects, cost-effectiveness of IRI when compared to other interventions, and Interactive Radio Instruction in Ethiopia. Interested readers can refer to that report, but in this technical report the focus is only on relevant concepts that would assist in understanding this current summative evaluation of Grade 3 English Interactive Radio Programs.

2.1. Interactive Radio Instruction

Interactive radio instruction has turned into an educational force since the mid-1970s (Anzalone, 1991; Bosch, 1997; Nekatibeb, 1998; Tilson, 1991; Suppes, et al., 1978). IRI is a methodology of instruction which turns a typical one-way radio technology into a tool for active learning inside and outside the classroom (Bosch, 1997). According to Anzalone (1991) these programs are interactive because the primary school children in classes that use the program call out responses to questions prompted by the pre-recorded radio instructors, who then give the answers according to carefully timed scripts. The process simulates live instruction, even though the broadcast radio signal is a one-way medium. The instructional principles include active and frequent pupil responses while the program is on air, immediate reinforcement, and distributed practice of one learning content. The lessons also have a segmented structure to ensure variety and, thus, to help maintain the active interest of the children. Many of the IRI services provide support materials. IRI programs are directed to situations and audiences where they could be used. There is an emphasis on audience research, participation, and field level formative evaluation to ensure that lessons are engaging, relevant, and that learners can achieve educational objectives (Dock and Helwig, 1999).

2.2. Effectiveness of Interactive Radio Instruction

The goals and results of Interactive Radio Instruction are known from well-documented evaluations in many countries. The goals include improving learning gains for students, educational access and equity in a cost-effective way. What does the literature say about the effectiveness of IRI in relation to these tasks?

Improving students' academic gains: With particular reference to *academic gains of students*, many studies have repeatedly demonstrated that students who learned with IRI consistently outperformed those who learned without it (See Bosch, 1997; Leigh and Cash, 1999, Lockheed and Hanusheck, 1988; Tilson, et al. 1991). For instance, Bosch (1997) summarized a comparison of mean test scores between experimental and control schools in Bolivia, Nicaragua, Thailand, Papua New Guinea, South Africa and Honduras. The results in each case indicate that learning gains for students using Interactive Radio Instruction are more than the gains for students in the control groups. It has also been demonstrated in most cases that students show progressively greater increases in achievement with increased exposure to the programs. For instance, Leigh (1995) reports that in South Africa students who received less than 33 'English in Action' lessons improved by 6.7%; students who received between 34 and 66 lessons improved by 13%; and students who received more than 66 programs improved by 24%. In Bolivia, Tilson et al. (1991) reported that the average score of second graders using 'Radio Maths' increased from 47% to 66%. Of these, the experimental students who had completed one year of the radio lessons did much better (52% correct) and those who completed two years of radio programs scored even higher.

Improving Access: The use of Interactive Radio for *improving the conditions of hard-to-reach or out-of-school population* has also been significant. For instance, Bosch (1997) refers to the RADECO project in the Dominican Republic that was created for children who had no schools. In this project, children who had just five hours of integrated instruction a week using IRI plus thirty minutes of follow-up activities were compared to students who were in Regular formal schools for more than twice the amount of time. Results indicated that first graders using the RADECO programs responded correctly 51% on post-tests versus 24% for the control group. Second

graders using IRI gave 10% more correct answers. Over all, even though RADECO students had enormous difficulties, it was found out that the use of IRI for an hour a day had comparable results in reading, writing and language for both grades.

Improving Equity in Education: One of the most promising outcomes of IRI has been its potential to close equity gaps between *rural and urban, and male and female students*. Concerning equity between urban and rural students, studies show that rural students gain more than their urban counter parts, who have greater access to materials and better trained teachers. That is, although children in IRI classes in both rural and urban schools outperform their counterparts in traditional classrooms, the IRI rural students gained more than the urban IRI students, thus, closing the usual performance gap between urban and rural students. Bosch (1997) summarizes data from Bolivia, South Africa, Thailand and other countries to argue that IRI addresses not only issues related to quality, but also urban/rural equity gaps. Hartenberger and Bosch (1996) have also looked into whether or not IRI closes gender gaps between male and female students in Papua New Guinea (Primary Science), Honduras (Maths and Spanish), and South Africa (English). They reported that girls were achieving about the same as boys in post-tests, but since the baseline scores of girls were lower, the total achievement for girls was greater.

Improving Educational Costs: IRI has also been *cost-effective*. According to a summary by Bosch (1997) most cost analyses of IRI programs project decreasing cost per student over time based on the fact that the relatively high cost of developing programs is increasingly offset as more and more learners use the programs. She refers, for instance, to Honduran Mathematics programs where it was discovered that the annual cost per student of using IRI Mathematics was US \$2.94 in the first year when development costs were included, but the incremental cost to continue the program fell to US \$1.01 per student per year thereafter. IRI has also been cost-effective when compared to other interventions. For instance, a cost analysis study conducted in South Africa suggests that when the cost of ‘English in Action’ IRI programs is compared with other English language programs, the cost per student of English in Action ranged from one third to one half of that for other options.

Teachers' Professional Development: Different case studies indicate that Interactive Radio Instruction offers promising professional development possibilities for teachers. Leigh and Cash (1999) refer to a study in Papua New Guinea where Radio Science teachers appreciated the opportunity to learn science along with their students. Similarly, in South Africa, teachers reported a range of new benefits and strategies they were being provided by *English in Action* programs for effective language teaching. These include new teaching styles, improved moral and confidence, vocabulary, listening skills, and problem solving skills as well as improved communication capacity. Leigh and Cash (1999) note that South Africa's English in Action Project developed a system of afternoon workshops called "Teacher Support Group Meetings" in order to maximize benefits for teachers. These provided periodic opportunities for IRI teachers from local schools to meet on a peer-to-peer basis, and discuss professional issues related to the effective use of IRI. An independent study showed that teachers appreciate these meetings, because they have found so much information to share by overcoming the effect of isolation.

Adult and very young learners: Some countries have used Interactive Radio Instruction for Basic Adult Education and Early Childhood Development Programs. Leigh and Cash (1999) refer to the Honduran Basic Education for All Radio classes and to the Bolivian Childhood Development Programs where high-level academic gains were observed. In Honduras, adults enrolled in Mathematics and Spanish Basic Education programs were tested and their scores were higher than control students. Using different indicators, an evaluation of the Bolivian Early Childhood Program found that IRI programs had a positive effect on overall child development – and not merely on education or cognition.

2.3. Interactive Radio Instruction in Ethiopia

As it has been already discussed in the previous section, Interactive Radio Instruction in English started as an experiment in Ethiopia in 1999. The project covered Grade One and Two English Instruction. Studies as to the effectiveness of these programs indicate that the academic gains of students who were using Interactive Radio Instruction were significantly more than those of students who were not using this technology (See Nekatibeb, 2001).

For Grade One, Nekatibeb (2001) reported that students who used IRI programs gained 22% as compared to 9% in control schools. A similar study in Grade 2 indicated that IRI using students gained 12% as compared to 9% with those that were not using the technology.

As a secondary objective these studies have analyzed the results of IRI in relation to location (urban/rural), gender (male/female), and age (appropriate age/overage) as well as classroom organization (linear/self-contained). With reference to student academic gains in relation to location, overall results indicated that rural students gained more from IRI than urban students. In Grade One; both urban and rural students scored almost similar results after the post-test, but this was irrespective of the advantages of urban students at pre-test. In Grade Two, the results were similar in that the academic gains of rural students were significantly greater than those of the urban students. Another interesting result was the findings in relation to gender. In Grade One, overall results indicated that female students gained more than male students, although that difference disappeared in Grade Two. With reference to age, students having appropriate age gained more from IRI programs than overage age students in Grades One and Two. When it comes to academic gains in relation to classroom organization, the study in Grade One showed that students in linear classrooms made more gains than students in the self-contained classrooms (See Nekatibeb, 2001). In Grade Two, however, these differences disappeared and students in both settings demonstrated similar academic gains.

3. Research Methodology

3.1. Design

This study is a baseline study which aims to determine the extent to which Grade 3 Interactive Radio Instruction Programs produce impact in relation to traditional instruction programs. Results were measured at two points in time in Grade 3. The first was before the IRI programs were nationally broadcasted to all Grade 3 students in 2003/2004. The second was after the programs were broadcasted at the end of the 2005 academic year to students in the same grade. The before-broadcast measurement served as a pre-test while the after-broadcast measurement was taken as a post-test. In this design, the before-broadcast Grade 3 students were used as control groups while the after-broadcast ones were used as experimental groups. The fact that Grade 3 IRI programs were nationally broadcasted implied that there were no control schools. Therefore the common procedure of basic experimental design used in several such studies has not been followed in this case. The treatment period was one academic year. This baseline study was conducted according to the following procedures.

First, a meeting was held between AED and EMA experts to plan how the study has to be conducted. Decisions were taken regarding the administrative structure of the study, major activities to be accomplished and the time table. With reference to the administration of the study, a committee comprising EMA experts and AED/BESO II was established to lead the activity on regular basis. The activities identified included test development and production, piloting test instruments, analysis and improvement of test instruments, selection and training of data collectors, data collection, data analysis and interpretation and reporting. The timetable was set to indicate when each activity was expected to be completed.

The second main activity was test development and production. After decisions were made concerning the levels at which English skills were to be measured, an English curriculum expert in primary education was recruited from ICDR to develop the test. The developed test items were changed to radio scripts by EMA experts. EMA provided a production studio, a producer and its technicians for audio materials. After

test-production was completed, the test-items were pilot tested in two primary schools (N=80 students) in Addis Ababa. EMA experts analyzed and the data from the pilot and improved the tests.

Third, decisions on sample settings and sample size were communicated to regions. Regions made the choice of schools and communicated this back to EMA/AED/BESO II team. Following this, data collectors were recruited, trained and sent to the field.

Fourth, data collection was completed as planned between June 8 and 15, 2004. This was followed by data organization, marking of tests, analysis of scores and reporting of results. The data were stored in a separate electronic directory for the purpose of comparison in the coming academic year.

The administration of data collection instruments for the post-test (after intervention) was carried out after check ups for item difficulty and discrimination power were conducted on the pre-test items. Grade 3 students in schools sampled for the pre-test in the previous year were included at this stage. After data were collected, a considerable time was given to data entry, cleaning, analysis and interpretation as well as report writing.

3.2. Sample Selection

Except for Afar and Gambella, 9 out of 11 regions were included in the sample for the pre-test (pre-intervention period). Afar was excluded because of the early closure of schools at the end of the academic year. Gambella was inaccessible for security reasons. From each of the big regions, i.e. Addis Ababa, SNNPR, Amhara and Oromia 3 schools were included. From the other 5 regions 2 schools each were selected as samples. Thus the total number of sample schools was 22 nationwide. The following table demonstrates the samples.

Table 3. Sample Schools and Students for the Baseline Survey.

Region	No. of Sample Schools	School Type		No. of Sample Students
		Urban	Rural	
Addis Ababa	3	3	-	120
SNNPR	3	1	2	144
Amhara	3	1	2	121
Oromia	3	1	2	130
Harari	2	1	1	82
Dire Dawa	2	1	1	80
Tigray	2	1	1	92
Somali	2	1	1	82
Total	22	11	11	851

The total number of students included in the sample was 851. In each school, sample students were selected randomly, although the sample size was determined at 40 by quota sampling. During field work, modifications were made to raise this size and the results can be observed in Table 3 above. By taking into consideration the limited capacity for managing and collecting data from a larger size, and the limited time for data collection, it was decided to limit the numbers to this reasonable size. Table 1 above also shows that the schools were stratified into urban and rural. In larger regions, more rural schools than urban ones were included to reflect the distribution of schools in the regions and the nation in general.

In the post-test, the number of schools from which data were collected was 20. The final sample is demonstrated in Table 4 show.

Table 4. Final Sample of Schools and Students for Grade 3 IRI Summative Evaluation

Region	No. of Sample Schools	School type		No. of Sample Students
		Urban	Rural	
Addis Ababa	3	3	-	120
SNNPR	3	1	2	144
Amhara	3	1	2	121
Oromia	3	1	2	130
Harari	2	1	1	82
Dire Dawa	2	1	1	80
Tigray	2	1	1	92
Somali	2	1	1	82
Total	20	10	10	850

Table 4 above indicates that the summative evaluation of Grade 3 IRI was carried out in 8 regions out of the possible 11 regions. The proportion was 72.7% and this was a good size for making generalizations. The total number of schools included was 20 nationwide and the total number of students was 850. Both urban and rural schools were included in equal proportions as indicated in the table above.

Instruments of Data Collection

The main instrument of data collection was an achievement test. The test had three parts. Part one comprises a listening comprehension test. This test was presented in pictures and students were asked to listen to a tape recorder and for each item identify the correct picture from the given alternatives.

The second part of the test instrument was a reading comprehension test. Items comprised written sentences with four alternative answers each. Students listen to the readings from the tape recorder and choose the correct answer.

The third part of this instrument was intended to measure students' writing skills. It comprised tape recorded sentences or phrases that were required to be written in spaces provided in the test instruments. Students were required to listen to radio presentations and identify the correct words and write them.

These test-items were developed from written draft forms into pictures by a professional artist. It was only after they were pre-tested and corrected that they were administered. In the post-test, items were checked for difficulty and discrimination power before they were administered. The same procedures as during the pre-tests were followed in conducting the post-tests.

Training of Data Collectors and Collection of Data

Data collectors were selected and trained by EMA in collaboration with AED/BESO II. The main criterion for selection was experience in working with educational radio programs. Most had experience in working with previous IRI programs or with supplementary radio programs. Their training comprised of introduction of test items, administration of classroom tests, use of tape recorders to conduct the tests, and sampling students for the tests. Since regions were provided with prior information about the test, and supported the activity by providing assistants, tests were carried out as planned during pre-tests and post-tests. EMA filed the data and provided space and facilities for analysis of the collected data.

Data Management and Analysis

Separate files were created for encoding both the baseline and post-test data. Later these files were merged for the purpose of comparison. In both cases, however, before encoding was started, the marking of correct answers for the measurement of writing skills was completed. Data analysis was conducted using SPSS computer program. Data were summarized using percentages, means, and t-test. Percentages were used to see the responses of students in each item. The mean was used to find out the average results of students in schools and regions. The t-test was used to check if there were significant differences between the obtained means.

4. Presentation of Findings and Analysis of Data

4.1. Grade 3 Student Baseline Achievement Results in English

The current baseline survey in Grade 3 English comprised the measurement of listening, reading and writing skills. It was believed that capturing these skills gives a relatively complete picture of students' level of learning in English. Overall, results indicate that students achieved 51.79 mean percentage points in Grade 3 English traditional instruction. The following table summarizes the results.

Table 5. Total Students' Achievement Results by Level of Skills in Grade 3.

Level of English Language skills	Achievement	
	Mean Scores (N=851)	Std. Deviation
Listening	74.79	14.28
Reading	80.80	21.86
Writing	23.84	20.09
Total	51.75	16.03

Table 5 above indicates that students had learning difficulties in the writing skills. This is indicated in that the mean scores for the writing skill were far below the national average for English student achievement in Grade 3. Reading skill was fairly high among students in Grade 3. This might be due to the textbooks available to them. Teachers also spend a considerable amount of time asking students to read their textbooks particularly in the classroom. Similarly, student achievement in listening was moderately high. The fact that overall results stood at 51.8% shows the need for exerting a lot of efforts to improve English instruction in Grade 3. Particularly much emphasis is needed to improve writing skills.

4.2. Grade 3 Student Post-test (after-intervention) Achievement Results in English

The post-test result of Grade 3 students in Interactive Radio English was 58.74% on average. Table 6 below shows these results in relation to different language skills as well as the overall summary.

Table 6. Student Achievement Results by Level of Skills in Grade 3 Interactive Radio Instruction.

Level of English Language Skills	Achievement	
	Mean Scores (N=791)	Std. Deviation
Listening	78.50	15.45
Reading	83.10	21.81
Writing	53.10	25.27
Total	58.74	18.66

The above table indicates that students have done well in reading comprehension with an achievement of 83.10%. The same is true for listening comprehension in which students attained 78.50%. Interactive radio effects were least for writing skills and it amounted to 53.10 %. Overall, the after-intervention mean score result was 58.74%, and this was more than the 50% minimum points expected by the Education and Training Policy of the country in any subject.

4.3. Students' Academic Gains as the Results of Interactive Radio Instruction

Results from this analysis indicate that students made extremely significant academic gains after interactive radio instruction was utilized.

Table 7. Students' Academic Gains as the Results of Interactive Radio Instruction

Language Skills	Measurement	N	Mean	Std. Dev.	Std. Error	Sig. (2-tailed)
Listening	Pre-test	851	74.79	14.28	.4896	
	Post-test	791	78.50	15.45	.5495	
Mean Diff.			3.71		.7338	.000
Reading	Pre-test	851	80.80	21.86	.7496	
	Post-test	791	83.10	21.81	.7757	
Mean Diff.			2.29		.10788	.034
Writing	Pre-test	851	23.84	20.09	.6888	
	Post-test	791	35.10	25.27	.8986	
Mean Diff.			11.26		1.1229	.000
Sum	Pre-test	851	51.75	16.03	.5496	
	Post-test	791	58.74	18.66	.6638	
Sum Mean Diff.			6.99		.8425	.000

From Table 7 above what is clear is that the total academic gain of students who used IRI was 6.99 % over those who did not use IRI. This finding is consistent with many IRI programs in other countries. What is also interesting is the contribution of IRI to the writing skill. In the pre-test, writing skill was extremely poor when students were under traditional instruction. After IRI has been introduced a gain of 11% was attained. Although this result is good news for IRI, the overall situation of children in the writing skill in Grade 3 has remained extremely very low. Given that these pupils were in this system for 2 years before this stage means that a lot remains to be done in developing the writing skills of children. On the other hand, reading skills were highest among children in Grade 3. May be this can be due to the textbook culture existing in schools. Pupils can be engaged in this activity in the classroom as well as outside the classroom very easily. Although, listening skill were reasonably high, they were not as high as the reading skills. One can see pronunciations used by the classroom teacher greatly differing from that of IRI teacher as a contributing force to this difference. If student results at pre-test and post-test were generally related to the minimum academic standards expected by the nation at 50%, it is possible to say that students were almost within this range of expectations. In fact, these results also show that a lot remains to be done to improve learning English in Grade 3.

4.4. Comparison of Academic Gains from IRI Grades 1, 2 and 3

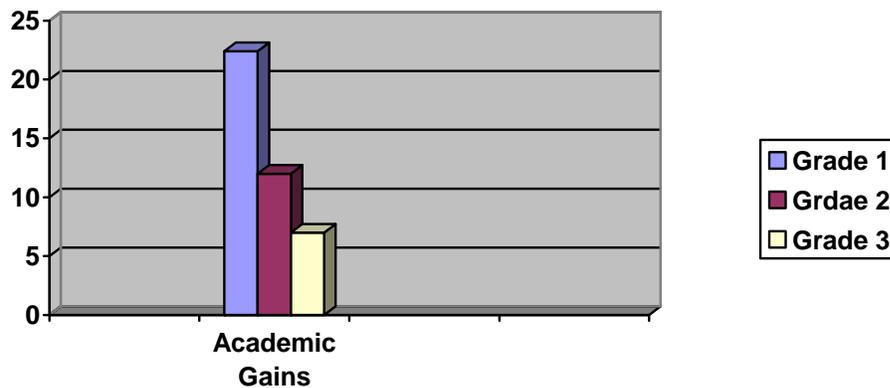
From the table below two types of comparisons can be made. The first and obvious comparison is the academic gains between experimental and control groups. In Grade 1 Experimental schools had an advantage of about 12 % points over control schools.

Table 8. Comparisons of Academic Gains from Grades One, Two and Three English IRI in Ethiopia

Grades	Status (group) of the School	Measurement		Academic Gain (Post test-Pre test)
		Post- test	Pre-test	
1	Control (N=679)	66.08	56.32	9.75
	Experimental (N=787)	76.58	54.17	22.40
2	Control (N=609)	50.4	41.1	9.30
	Experimental (N=767)	55.9	41.9	12.00
3	Control (N=931)		51.75	
	Experimental (N=791)	58.74		6.99

In Grade 2 this advantage was 2.7% percent while in Grade 3 it was 6.99%. This shows that IRI instruction has been effective in all three grades in comparison to traditional instruction. The second comparison is among the academic gains of schools that used IRI. The following figure is a more elaborate demonstration.

Figure 1. Comparison of Mean Gains in Grades 1, 2, and 3 English IRI



Obviously the contribution of IRI was the highest in Grade 1 and from there it showed a decreasing trend. In Grade 1, experimental schools gained 22 % whereas in Grade 2 the gain was 12%. In Grade 3 academic gains went down to 6.99%. The findings show that the more students were exposed to IRI the less became their academic gains.

4.5. Comparison of Pre-test and Post-test Student Achievement in Grade 3 Interactive Radio Instruction by Sex

Table 9 below shows that male students gained significantly better after the introduction of Grade 3 IRI. The total advantage of students after learning through the IRI amounted to 5.95% in comparison to learning through traditional instruction. A 2-tailed t-test for equality of means indicated that the academic gain was higher and statistically significant at 0.05 level of significance ($t=5.213$; $df= 869$).

Table 9. Comparison of Pre-test and Post-test Students' Achievements for Males

Language Skills	Measurement	N	Mean	Std. Dev.	Std. Error	Sig. (2-tailed)
Listening	Pre-test	430	75.89	13.35	.6440	
	Post-test	441	79.53	15.05	.7170	
Mean Diff.			3.63		.9652	.000
Reading	Pre-test	430	83.89	20.84	1.0052	
	Post-test	441	85.26	20.20	.9621	
Mean diff.			1.36		1.4233	.325
Writing	Pre-test	430	27.39	21.25	.10251	
	Post-test	441	37.03	25.21	.12007	
Mean Diff.			9.64		1.4233	.000
Total	Pre-test	430	54.54	15.85	.7648	
	Post-test	441	60.49	17.80	.8476	
Mean Diff.			5.95		1.1431	.000

The above table also shows male students demonstrated the highest gains in the writing skill with 9.64% points. In listening, the improvement was 3.63% whereas in reading it was 1.36%. Male students were already at a higher level (83.89%) in reading skills before the introduction of IRI but IRI further accelerated their learning by improving their performance to 85.26%. Although a significant change has been observed in male students' writing skills after IRI, it is generally clear that male students required more improvement to meet at least the 50% minimum standard in the Ethiopian Training and Education Policy.

Table 10 below shows the academic gains of female students before and after the introduction of Grade 3 Interactive Radio Instruction in English. Overall, results show that female students gained 7.60 % after the introduction of IRI in Grade 3 English instruction. In comparison to the overall achievement of males showed in Table 8 above, the overall gains of girls exceeded that of boys.

Table 10. Comparison of Pre-test and Post-test Student Achievements for Females

Language Skills	Measurement	N	Mean	Std. Dev.	Std. Error	Sig. (2-tailed)
Listening	Pre-test	293	73.10	14.94	.8732	
	Post-test	297	77.95	15.80	.9169	
Mean Diff.			4.62		1.2667	.000
Reading	Pre-test	293	78.68	22.92	1.3392	
	Post-test	297	81.79	22.51	1.3065	
Mean Diff.			3.11		1.8707	.096
Writing	Pre-test	293	21.96	18.81	1.09927	
	Post-test	297	33.57	25.10	1.4570	
Mean Diff.			11.60		1.8286	.000
Total	Pre-test	293	49.91	16.17	.94517	
	Post-test	297	57.52	19.15	1.1112	
Mean Diff.			7.60		1.4158	.000

What the above table also shows is the fact that female students were generally at a higher level in listening comprehension before the introduction of IRI since their scores were 73%. After IRI has been introduced, achievement in this skill further improved to 77.95%. Like male students, female students also demonstrated the highest level of academic improvement in writing skill with 11.60%. Generally, however, academic achievements were by far very weak in the writing skill among Grade 3 female students.

A comparative demonstration in Table 10 below shows that the overall academic gains of female students was 7.61 % whereas those of male students was 7.82%. Obviously IRI English instruction was effective for teaching English among both sexes, and the slightly higher effectiveness observed among male students was not statistically significant. Given the fact that female students in traditional primary instruction generally scored less than male students, IRI seems to be a promising solution to improved learning for female students. Overall, it should be clear that males still have better learning scores than females both before and after interactive radio instruction.

Table 11. Comparison of Pre-test and Post-test Students' Achievements for Females and Males

Language Skills	Measurement	Mean Scores		Mean diff.
		Males	Females	
Listening	Pre-test	75.89 (N=430)	73.33 (N=293)	2.56
	Post-test	79.53 (N=441)	77.95 (N=297)	1.58
Reading	Pre-test	83.89 (N=430)	78.68 (N=293)	5.21
	Post-test	85.26 (N=441)	81.79 (N=297)	3.47
Writing	Pre-test	27.39 (N=467)	21.96 (N=293)	5.43
	Post-test	37.03 (N=441)	33.57 (N=297)	3.46
Total	Pre-test	52.67	49.91	2.76
	Post-test	60.49	57.52	2.97
Mean diff.		7.82	7.61	0.21

From the above table, it is clear that in all language skills male students scored better than female students both in the pre-tests and post-tests. It is also clear that when male and female academic gains are considered both at pre-test and post-test male academic gains were higher. As it has been explained above, an interesting finding is the fact that academic gains from IRI were almost similar between the sexes although males generally demonstrated higher performance.

With particular reference to academic gains by sex, a comparison among previous studies in Grades 1, 2 and 3 for both sexes shows a decreasing trend over the three years considered. The next diagram and table show these trends in general and in specific terms respectively. This finding can be explained in many ways, but one can be familiarity. That is the more students get to know the programs, the more stable and the less excited they could be with the programs to demonstrate less achievement. It is also possible that the intensity of implementing a small project and nationwide program might vary. With a project in Grade One, there was a possibility of more implementation and use of IRI whereas the capacity to implement and use Grade 3 IRI programs was very far from being the same. Under these circumstances, it is not surprising that a decreasing trend in outcomes was observed.

Figure 2. Comparison of Grades 1, 2 and 3 Academic Gains among Male and Female Students from English IRI

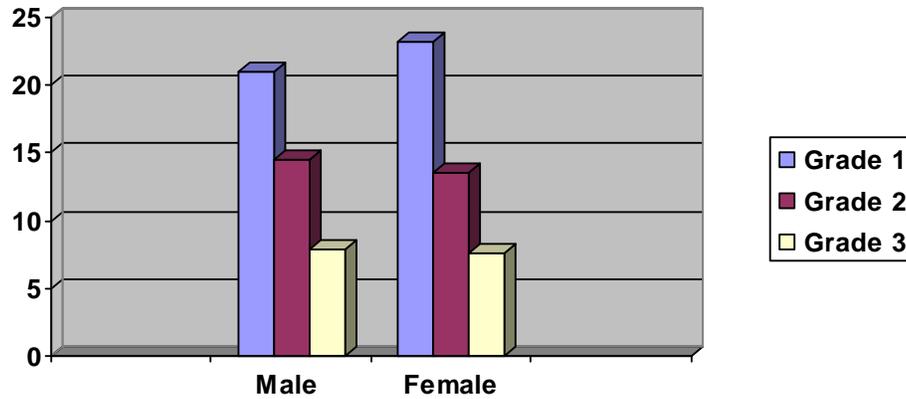


Figure 2 above and Table 12 below indicate that female academic gains were 23.24% in Grade 1, and this went down to 13.48% in Grade 2 and 7.61% in Grade 3.

Table 12. Comparisons of Grades 1, 2 and 3 Academic Gains by Sex

School Type	Grade 1 Academic Gains		Grade 2 Academic Gains		Grade 3 Academic Gains	
	Male	Female	Male	Female	Male	Female
Control	10.27	8.60	9.15	9.53		
Experimental	20.99	23.24	14.48	13.48	7.82	7.61

The illustrations above also indicate that the academic gains of male students went down from 20.99% in Grade 1 to 14.48% in Grade 2 and 7.82% in Grade 3. What is also visible is the fact that female students are benefiting insignificantly less than male students except for Grade 1. In Grade 1, the difference between males and females was just 2.25% point in favor of females. Given the circumstances of low academic achievement of female students in traditional instruction as whole, the introduction of IRI was undoubtedly useful.

4.6. Comparison of Pre-test and Post-test Student Achievement in Grade 3 Interactive Radio Instruction by Location

The introduction of IRI in English teaching is associated with overall academic gains of 7.76% for urban students. Table 13 below also indicates that urban students had gains in all types of learning skills from Grade 3 English IRI.

Table 13. Comparison of Pre-test/Baseline/ and Post-test Academic Gains of Urban Students.

Language Skills	Measurement	N	Mean	Std. Dev.	Std. Error	Sig. (2-tailed)
Listening	Pre-test	423	77.08	11.73	.57069	
	Post-test	378	83.10	14.54	.74801	
Mean Diff.			6.02		.92975	.000
Reading	Pre-test	423	83.40	19.41	.94381	
	Post-test	378	84.79	22.93	1.17943	
Mean Diff.			1.39		1.49661	.352
Writing	Pre-test	423	26.57	20.56	.9999	
	Post-test	378	38.68	25.02	1.28719	
Mean Diff.			12.11		1.6123	.000
Total	Pre-test	473	54.33	14.88	.72353	
	Post-test	378	62.09	18.46	.94992	
Mean Diff.			7.76		1.17989	.000

The highest contribution of IRI was in the writing skill with an increment of 12.11%. This gain has been overshadowed by the low level of student proficiency in the writing skill both before and after the introduction of IRI. Reading was the highest learning skill both in IRI and in traditional instruction. However, IRI has also been considerably effective in enhancing the listening skill among urban students.

In rural schools, Table 14 below shows that the academic gains were 7.20% in favor of IRI students. However, it should be noticed that the overall achievement of rural students was less than the achievement of students in urban schools.

Table 14. Comparison of Pre-test/baseline/ and Post-test Student Achievements of Rural Students.

Language skills	Measurement	N	Mean	Std. Dev.	Std. Error	Sig. (2-tailed)
Listening	Pre-test	428	72.52	16.11	.77874	
	Post-test	413	74.30	15.07	.74190	
Mean Diff.			2.55		1.06222	.016
Reading	Pre-test	428	78.23	23.79	1.15032	
	Post-test	413	81.54	20.65	1.01622	
Mean Diff.			3.31		1.53877	.032
Writing	Pre-test	428	21.15	19.26	1.53877	
	Post-test	413	31.84	25.08	1.23449	
Mean Diff.			10.69		1.5381	.000
Total	Pre-test		49.20	16.72	1.2098	
	Post-test		55.67	18.34	.90266	
Mean Diff.			6.47			.000

The above table shows that learning gains were the highest in the writing skill (10.69%). Before the IRI was introduced, student, achievement in the skill was 21.15% whereas this rose to 31.84% after the introduction of IRI. Again proficiency in the skill was less than proficiency in the other two skills. Reading skill was also at a higher standard in the rural schools.

A comparative analysis in Table 15 below shows that the overall academic gains of students after IRI has been introduced in Grade 3 English instruction in urban schools was 7.76% while it was 6.47% for rural schools. In other words, urban schools gained marginally better than rural schools from Grade 3 IRI. What is more important from this analysis is the fact that IRI has been a great support to the substantially rising education quality both in urban and rural schools.

Table 15. Comparison of Pre-test and Post-test Achievements for Urban and Rural Grade 3 Students.

Language Skills	Measurement	Mean Scores		Mean Diff.
		Urban	Rural	
Listening	Pre-test	77.08(N=423)	72.52 (N=428)	4.56
	Post-test	83.10 (N=378)	74.30 (N=413)	8.80
Reading	Pre-test	83.40 (N=423)	78.23(N=428)	5.17
	Post-test	84.79 (N=378)	81.54 (N=413)	3.00
Writing	Pre-test	26.57 (N=423)	21.15(N=428)	5.42
	Post-test	38.68(N=378)	31.84 (N=413)	5.19
Total	Pre-test	54.33	49.20	5.13
	Post-test	62.09	55.67	6.42
Mean Diff.		7.76	6.47	1.29

The above table also shows that in the listening comprehension, urban and rural students had fewer differences in the reading skill (4.56%). After IRI was introduced, urban students doubled their differences when compared to rural students (8.80%). In both urban and rural schools, however, the introduction of IRI has brought advantages in the listening skill over traditional instruction.

The difference between urban and rural schools before IRI was introduced in Grade 3 English instruction in the reading skill has shrunk considerably. In pre-test, urban students had an advantage of 5.17% and in the post-test the mean difference went down to 3.00%. This is in addition to the advantage that IRI has brought in raising school quality by raising student performance. This trend is also observable in the writing skill where mean differences between urban and rural schools went down from 5.42% in the pre-test to 5.19% in the post-test.

Figure 3 and Table 16 below are interesting comparisons of the trend of effectiveness of IRI using mean academic gains from IRI. The comparison covers students' academic gains in Grade 1, 2 and 3 over 3 years. Figure 3 indicates that in both urban and rural schools, academic gains were decreasing from Grade 1 through Grade 2 to Grade 3.

Figure 3. Comparison of Grades 1, 2 and 3 Academic Gains among Urban and Rural Students from English IRI

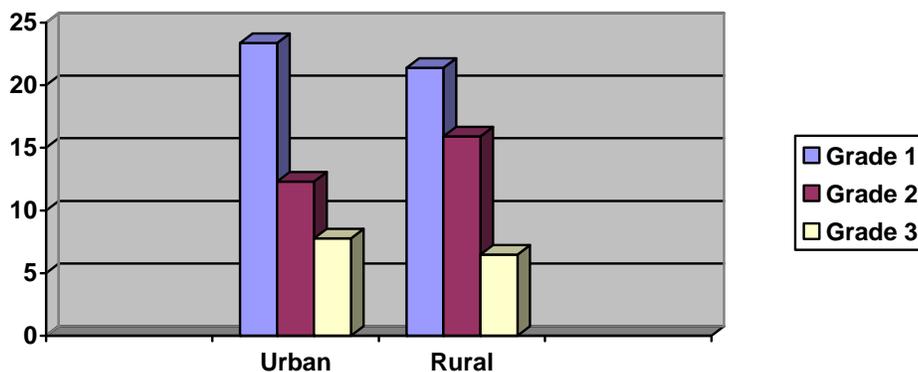


Table 16 below shows that the academic gains of urban students went down from 23.37% in Grade one to 12.30% in Grade two and 8.78% in Grade 3. In rural schools the tendency is still similar in that academic gains in English IRI dwindled from 21.39% in Grade one to 15.92% in Grade 2 and 7.70% in Grade 3.

Table 16 Comparisons of Grades 1, 2 and 3 Academic Gains by Location.

School Type	Grade 1 Academic Gains		Grade 2 Academic Gains		Grade 3 Academic Gains	
	Urban	Rural	Urban	Rural	Urban	Rural
Control	10.38	8.81	8.30	10.87		
Experimental	23.37	21.39	12.30	15.92	7.76	6.47

What is visible from Table 16 is the fact that IRI is still contributing to the improvement of school quality or students achievement in both rural and urban schools. Given that IRI can be used with low cost, and that rural schools require more support for the improvement of students achievement, it is thus justifiable to use IRI for at least Grades ranging from 1-3.

4.7. Grade 3 IRI English Language Skills by Region

Pupils' baseline total performance in the listening skill was the highest in Amhara and Addis Ababa regions. Students in the SNNPR demonstrated the lowest academic performance in this skill. What makes Amhara and Addis Ababa similar is that the language of instruction for these children is Amharic. In the SNNPR, there are about 45 languages out of which only 13 are used as a medium of instruction. It is likely that learning in the mother tongue might accelerate the understanding of a second or foreign language. Students in Beneshangul Gumuz, Hararii and Tigray scored below the national average in listening comprehension. In Beneshangul and Harari; situations are not very far from SNNPR, but Tigray's case requires further investigation. Following is a table showing the performance of regions in relation to different language skills in Grade 3 English in Ethiopia.

Table 17 Baseline Results of Grade 3 English Learning Skills by Region.

Region	Mean Achievement Scores			Sum
	Listening	Reading	Writing	
Amhara (N=121)	81.98 (Std.d =14.10)	78.40 (Std.d =23.60)	24.94 (Std.d=22.95)	53.51 (Std.d=18.35)
Oromia (N=130)	77.12 (Std.d =10.02)	93.28 (Std.d =10.18)	26.97 (Std.d=14.94)	57.09 (Std.d=9.90)
SNNPR (N=144)	62.12 (Std.d =13.13)	72.73 (Std.d=22.79)	15.22 (Std.d=15.06)	42.22 (Std.d=13.62)
Hararii (N=82)	70.40 (Std.d =13.29)	84.55 (Std.d=19.28)	22.99 (19.92)	51.17 (14.00)
Dire Dawa (N=80)	79.00 (Std.d =13.83)	84.16 (Std.d=20.79)	24.68 (Std.d=19.00)	54.11 (Std.d=15.13)
Tigray (N=92)	70.57 (Std.d =15.28)	63.91 (Std.d=28.20)	13.35 (Std.d=14.58)	41.22 (Std.d=16.00)
Addis Ababa (N=120)	81.00 (Std.d=9.21)	85.72 (Std.d=17.52)	33.60 (Std.d=24.02)	59.33 (Std.d=15.97)
Somali (N=82)	78.61 (Std.d=11.41)	83.49 (Std.d=14.48)	29.92 (Std.d=20.37)	56.37 (Std.d=13.51)
Total (N=851)	74.79 (Std.d=14.28)	80.80 ((Std.d=21.86)	23.84 (Std.d=20.09)	51.75 (Std.d=16.03)

From the above table, students reading skill seems very high in Oromia, Hararii, Dire Dawa, Addis Ababa and Somali regions. In these regions one or two languages are used as a medium of instruction. Below the national average are the scores of students in SNNPR, Tigray and Beneshangul Gumuz. Except in Tigray, where further investigation is required, the language condition is far from settled in the other two regions that scored below average.

The performance of all regions in the writing skill was poor. Regions that performed below the national average were Benshangul Gumuz, Tigray, Hararii and SNNPR. Addis Ababa and Somali regions had a relatively better performance level in comparison to other regions.

In general, Addis Ababa, Oromia and Dire Dawa were those with the best performance while Tigray, Beneshangul Gumuz and SNNPR had the poorest performance. The one most important area in which poor achievement was observed in all regions was the writing skill. The overall status of Grade 3 students in English before the introduction of IRI in the country, however, was an average with 51.75%.

Table 18 below is a comparison of the baseline student achievement results in Grade 3 English instruction with the achievement of students after IRI has been introduced in Grade 3 English instruction in each region. The highest achievement (68.79%) was observed in Addis Ababa and the lowest (49.29%) was in SNNPR.

Table 18. Post-IRI Intervention Results of Grade 3 Students in English.

Region	Mean Achievement Scores			Sum
	Listening	Reading	Writing	
Amhara (N=122)	82.34 (Std.d =13.24)	85.51 (Std.d =18.65)	40.01 (Std.d=28.52)	62.73 (Std.d=18.66)
Oromia (N=130)	73.94 (Std.d =14.12)	81.16 (Std.d =18.84)	29.28 (Std.d=27.60)	54.25 (Std.d=18.92)
SNNPR (N=90)	65.33 (Std.d =14.48)	78.00 (Std.d=22.26)	25.31 (Std.d=14.69)	49.29 (Std.d=13.70)
Hararii (N=82)	77.15 (Std.d =16.92)	85.12 (Std.d=20.23)	31.31 (23.68)	57.08 (18.29)
Dire Dawa (N=83)	79.00 (Std.d =13.00)	84.94 (Std.d=20.32)	27.58 (Std.d=19.99)	55.72 (Std.d=15.18)
Tigray (N=81)	76.37 (Std.d =14.79)	69.38 (Std.d=31.75)	29.54 (Std.d=25.98)	51.95 (Std.d=22.22)
Addis Ababa (N=128)	90.15 (Std.d=13.27)	91.45 (Std.d=16.66)	45.20 (Std.d=22.44)	68.79 (Std.d=14.67)
Somali (N=82)	78.66 (Std.d=11.85)	83.76 (Std.d=21.01)	45.04 (Std.d=25.67)	63.75 (Std.d=18.71)
Total (N=1722)	76.30 (Std.d=15.05)	81.09 ((Std.d=22.55)	28.61 (Std.d=23.35)	54.52 (Std.d=17.84)

In all regions, students scored less than the national standards in writing comprehension. Addis Ababa, Somali and Amhara were the best achievers whereas

SNNPR was the poorest. Reading was high among Grade 3 students in general. In this respect, Tigray and SNNPR showed a relatively lesser achievement among the regions. In the listening comprehension, Addis Ababa and Amhara showed exceptionally high standards. Overall, listening was also at a high standard next to reading, but the SNNPR was still lagging behind the other regions.

Below in Table 19 it can be seen that the overall academic gains (pre-test and post test student achievements are compared) amount to 6.88% in favor of students who were taught through IRI. In all sample regions post-test results were higher than pre-test results except in Oromia.

Table 19. Comparison of Pre and Post-test Grade 3 English IRI Student Academic Gains by Region

Region	Student Achievement		Academic Gains (post-test/pre test)
	Pre-test	Post-test	
Amhara	53.51	62.73	9.22
Oromia	57.09	54.25	2.84
SNNPR	42.22	49.29	7.07
Hararii	51.08	57.08	6.00
Dire Dawa	54.11	57.27	3.16
Tigray	41.22	51.95	10.73
Addis Ababa	59.33	68.79	9.46
Somali	56.37	63.75	7.38
Total	51.86	58.74	6.88

The impact of IRI was the highest in Tigray, Addis Ababa and Amhara. In Tigray academic gains were the highest not because achievements were the highest, but it was due to the fact that pre-test scores were very low. In Addis Ababa, both pre-test and post-test achievements were the highest and this reflects that the level of Grade 3 students in English instruction was high. Oromia was the only region where IRI has not performed as well as traditional instruction. This is in fact a very important issue since Oromia is the biggest region in the country. In the previous studies of Grades 1 and 2, this region has shown significant positive academic gains from IRI. To the best, one explanation for such development can be implementation. Ensuring that the IRI programs reach students is a very important step in this respect.

5. Summary, Conclusions and Recommendations

5.1. Summary

The general purpose of this study was to determine the effectiveness of Grade 3 Interactive Radio English Instruction in Ethiopia. The main focus was the improvement of students' academic achievement as a result of using the technology of IRI. This program was a continuation of the efforts of the Educational Media Agency (EMA) to cover lower primary education with IRI English instruction in collaboration with AED/BESO II /USAID. Previously summative evaluations have been conducted in Grades 1 and 2, and this brings consecutive evaluations in parity with the grades covered with IRI.

The study used a baseline research design that is compatible with the absence of a control group. The baseline data was measured in June 2004, in sample schools. The post-intervention measurement was conducted in June, 2005 after one year in the same grade. The measurement of English learning skills included listening, reading and writing. Additional information concerning students' gender, school location and region was also acquired. The main instrument of data collection was an English comprehension test initially developed by an English curriculum expert. For the baseline, samples were selected from 9 regional states and 22 schools. The sample size was 931 Grade 3 pupils from both urban and rural schools nationwide. During the post-intervention measurement, the number of regions included in the sample was only 8 and the total number of schools was reduced to 19, and that of students came down to 851. It was reported from EMA that the Benishangul Gumuz state has not implemented Grade 3 English Interactive Radio Instruction.

Main Findings of the study

The overall baseline students' achievement results in Grade 3 English were higher than the minimum standard envisaged in the Education and Training Policy by 1.75%. That is the mean scores for the baseline was 51.75%. This shows that there was a huge demand for improving English instruction using whatever input that could

contribute to that goal. After the introduction of IRI, the mean student academic results rose to 58.74% and the mean difference was 6.99%.

Within this frame, the baseline study showed that students achieved lowest in the writing skill with a mean score of 23.84%. Reading and listening comprehension results were fairly high from the outset with 80.80% and 74.79% respectively. After the introduction of IRI students did well in reading comprehension with an achievement of 83.10%. The same is true for listening comprehension in which students attained 78.50%. Interactive radio results were least for the writing skill (53.10 %).

A comparison of the academic gains of students from Grades 1, 2 and 3 indicate that the more students advanced in their grades the less were the gains from IRI English instruction. In Grade 1, the academic gains of students in experimental schools were 22.40% whereas in Grade 2 this went down to 12.00%. In Grade 3, academic gains further shrank to 6.99%.

Analysis of results for male students showed that the introduction of IRI improved their achievement by 5.95% when compared with traditional instruction. The highest gains for the writing skill were 9.64%. Because of the high level of students' performance in reading and writing from the very beginning, academic gains in these skills were generally high after the introduction of IRI. However, male students still need more to improve their writing skill in English.

Female students' overall academic gains were 7.60%. Like that of males, female's reading comprehension was still the highest with 81.79%, and listening was 77.95%. Academic gains in the writing skill were the highest with 11.60% for females. The level of achievement in the writing skill was less than those in the other skills, but the reasons for high gains were due to the very low level from which the intervention began.

Overall, IRI has been effective among both sexes of students. When male and female academic gains are considered both in pre-test and post-test, male academic gains were slightly but insignificantly higher in Grade 3.

When students' academic gains are considered overtime, findings illustrated that the academic gains of male students went down from 20.99% in Grade 1 to 14.48% in Grade 2 and 7.82% in Grade 3. Similarly, the academic gains of females went down from 23.24% in Grade 1 to 13.48% in Grade 2 and 7.61% in Grade 3. This means in both sexes the gain shows a downward trend.

When compared to traditional instruction, the introduction of IRI in English teaching showed overall academic gains of 7.76% for urban students. In rural schools, the academic gains were 7.20% in favor of IRI students. However, it was noticed that the overall achievement of rural students was less than that of students in urban schools.

A comparison of Grade 1, 2, and 3 results showed that the academic gains of urban students went down from 23.37% in Grade 1 to 12.30% in Grade 2 and 8.78% in Grade 3. In rural schools the tendency was still similar in that academic gains in English IRI dwindled from 21.39% in Grade 1 to 15.92% in Grade 2 and 7.70% in Grade 3.

When the pre-test and post test student achievements are compared, the overall academic gains in the regions amount to 6.88% in favor of students who took English lessons through IRI. In all sample regions post-test results were higher than pre-test results except in Oromia. The impact of IRI was the highest in Tigray, Addis Ababa and Amhara. In Tigray academic gains were the highest not because achievements were the highest, but it was due to the fact that pre-test scores were very low. In Addis Ababa, both pre-test and post-test achievements were the highest and this reflects that the level of Grade 3 students in English instruction was high. Oromia was the only region where IRI has not performed as well as traditional instruction.

5.2. Conclusions

This study shows that the performance of students in traditional instruction in Grade 3 was just an average. However, the introduction of IRI has enhanced the level of students' learning by a significantly higher margin. It means that IRI has been effective in meeting its original plans and that it is desirable for improving school quality in Ethiopia.

On the other hand, there is a year to year decreasing trend in the advantages that students get from IRI. This can partly be attributed to the inadequate capacity to implement the innovation in terms of broadcasting, teachers' use of IRI in the classroom, availability of radio sets, supervisions and so on. Thus, it is clear that attention has to be given to this area.

The main challenge in learning English in Grade 3 was writing. Listening and reading comprehension came in that order of difficulty. Since the main mission of interactive radio is to improve such learning difficulties, it is obvious that the writing skill must be the center for program development and implementation.

Interactive English Radio Instruction in Grade 3 was effective among both male and female students in Ethiopia. Although the overall achievement standards of male students were still higher than those of females, the gains of students from the innovation were similar among both sexes. This implies that IRI has been instrumental both for the improvement of quality and equity in the country.

Pupils' performance in both urban and rural schools has been enhanced by IRI. There is no question that this is good news. Given the disadvantages of rural and remote students, the potential of this technology requires to be exploited to its fullest capacity. There was a tendency among urban and rural students in Grade 3 to gain less than students in the preceding grade. In this sense, the implementation arena needs to be strongly revisited.

Regions also gained positively from Grade 3 interactive English radio instruction. This means that they need to attach importance to the programs. They can support the

innovation through allocation of adequate air time, supervision, training of teachers etc. Where inadequate performance of IRI has been observed in Oromia, there is a need to work harder with IRI in Grade 3.

5.3. Recommendations

In line with the basic findings of the current study concerning the improvement of student learning as the result of the use of Interactive Radio Instruction in Grade 3 English, and the relationships of student academic gains to gender, school location and regional location, the following recommendations are made.

5.3.1. Interactive Radio English Instruction in Grade 3 has been effective in improving students' academic performance in the nation. Thus, this innovation has to be used for instructional purposes in all schools for teaching Grade 3 English. At the same time the innovation needs to be used to its fullest potential since the overall performance standard of students remained within an average range after the innovation has been introduced.

5.3.2. The greatest challenge to pupil's performance in Grade 3 English instruction is writing. It is astonishing that students have high standards in reading and listening, but not in writing. This implies that Interactive Radio Instruction has to concentrate on the improvement of the writing skill, although it is well known that radio is an audio medium.

5.3.3. Grade 3 female and male students in urban and rural areas have gained significantly from Interactive Radio Instruction. However, the general level of performance for females and rural students is still behind males and urban students respectively. Since the effectiveness of the innovation is clear, there must be an emphasis to use radio lessons as much as possible along this line, and build extra support for females and rural students to maximize radio support.

5.3.4. All regions gained from the use of Interactive Radio Instruction in Ethiopia. The only region that has not been benefiting was Oromia. Since Oromia is the largest state in Ethiopia, there is no question that a lot needs to be done. This includes

dedication to broadcasting, training of teachers, provision of radio sets and strict supervision. The level of students' performance in regions significantly differs from each other.

5.3.5. Some regions are not using IRI for English instruction. This is definitely a point that must be given attention by all the concerned bodies, because students will lose quite many advantages they deserve. Otherwise, in the long run, it may contribute to the inequality of educational opportunities among the nation's students. Thus, there is a need to pay attention to IRI in these regions.

5.3.6 In some regions, the level of academic performance is very low, although the level of their gains is very high. The fact that academic gains are high shows that Interactive Radio Instruction has been effective. However, the low level of performance shows the need to use radio to improve the general standards of learning in some regions more than in others.

5.3.7. A decreasing tendency in academic gains has been observed from Grade 1 to Grade 2 and then to Grade 3. Maximum gains from IRI in Grade 1 was attained under conditions of strict use of radio, training of teachers, formative evaluation and supervisions as well as the availability of radio sets. In fact these conditions started to dwindle from Grade 1 to 2 and then to 3 with the expansion of the interactive radio system to the whole nation. It is clear that maximum benefits could be expected only if the above conditions are met.

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