

Intervention on the Interactive Radio English Instruction and its impact on grade three students' listening comprehension

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Abstract

In the educational curriculum of Ethiopia (particularly in primary levels education) Interactive Radio English Instruction (IREI) has been practiced for about a decade for dual purposes including facilitating children's English learning and teachers' professional development. However, research indicates that most teachers did not utilize IREI programs as they have been planned (Ebabu, 20070). The main intent of this study is to investigate the effects of the intervention on the IREI and its impact on the listening comprehension achievement of grade three students in Bahir Dar, Ethiopia. To generate the appropriate data, quasi-experimental research design was employed. Four governmental primary schools (two experimental groups and two comparison groups) who were teaching English with the help of IREI were selected. A total of 167 pupils were given a pre and post listening comprehension test. Participants' results were analyzed using paired sample t-test and independent sample t-test, significance was determined at $p < .05$. The findings of the study indicate that pupils in the experimental group showed an increase in their mean scores following the intervention. Also when compared to the control group, students of the experimental group scored higher mean score in the post-test. The intervention was also noted favor both boys and girls equally. A major implication of this study is that greater emphasis on proper IREI utilization and its integration with Non Interactive Radio English Instruction (NIREI) will promote pupil listening comprehension achievements.

Keywords: Interactive Radio Instruction, Interactive Radio English Instruction Listening comprehension, achievement

Introduction

It has been common to support education with technology and researchers such as Simpson and Park (2013) studied the effects of technology supported classrooms on student achievement and engagement. They found that students who learned English with the help of technology integrated student-centered instruction tended to score significantly higher than their counterparts who did not.

The invention of radio technology changed the way that individual communicate and exchange information, and it was used as a means of educational broadcasting. According to Sowmya (2016, p.28), "the first educational radio was started in the year 1930 in Britain" but its primary focus was on access. Ethiopia introduced radio into Ethiopian education in 1969, but it was the weekly supplemental English radio program, Interactive Radio Instruction, that made its entry to Ethiopia's education among Grade one students as a pilot study in 1999/2000 (MOE, 2004).

Following the coming of radio to Ethiopian education, several research studies have been conducted with regard to instructional radio in Ethiopia. For example, Dagne (2002) has researched the utilization of grade eight English language radio broadcasts in the second cycle primary schools of Awi Zone. Lemma (2014) also studied assessment of instructional radio broadcast related to civics and ethical education broadcast to primary schools of Addis Ababa.

In addition, Ademe (2003) examined the extent of incorporation of media utilization training in teacher training institutions' syllabi of Ethiopia. Endris (1987) also investigated content and effectiveness of instructional radio programs of the teaching of English in Ethiopian elementary schools. Furthermore, Nekatibeb (1998) explored media utilization and school improvement of educational radio support programs in Ethiopia.

The Interactive Radio Instruction (IRI) strategy was originally introduced in the Radio Mathematics program in Nicaragua in 1974 (Moulton, 1994) and primarily focused on educational quality. It is an "instructional tool designed to deliver active learning by radio, and it has improved both educational quality and teaching practices in classrooms" (Ho & Thukral, 2009, p. 3). It is also highlighted that "IRI is an interactive teaching and learning methodology that promotes quality learning in diverse environments including those with shortages of qualified teachers, school infrastructure, and learning materials" (USAID, 2006, p.7). IRI is termed interactive because of the dialogue it creates among the radio teacher and children, radio teacher and classroom teacher, classroom teacher and children, radio character and children. Since the inception of IRI, various countries, in particular developing countries have adapted and developed IRI programs for a variety of subjects, audiences, and learning environments.

According to Shaba (2009) IRI teaching method has been employed successfully in Kenya, South Africa, Australia, Papua New Guinea, Nicaragua and Indonesia. Similarly, Hortenberger and Bosch (1996) observed that IRI has the utility in raising girls' education by facilitating educational quality and access for girls, particularly hard to reach places where access is poor. Tilson et al. (1991) further witnessed that IRI is important because of the enormous demand in developing countries for improved quality of instruction and for increasing access to schools.

According to Bosch (1997, p.3)

IRI is the use of interactive lessons delivered through either radio broadcast or audiocassette where an 'audio' teacher directs the lessons while classroom teachers serve as facilitators. IRI has been used in developing countries worldwide to improve the quality of education across a range of school subjects and to serve as a form of teacher development. Multiple studies of IRI consistently have shown high learning gains, decreased equity gaps, and cost-effectiveness.

Bosch (1997) also reminds us that IRI has been utilized in schools to improve the quality of education by decreasing equity gaps between girls and boys, rural and urban, and by promoting higher learning gains. When compared to television, radio has a

lack of visual presentation [which] is one of the strengths of IRI – its absence encourages cognitive abstraction of concepts and their internalization. Thus, IRI is much more interactive than most television programs, and it is compatible with the constructivist learning theories (World Bank, 1999, p.60).

With regard to this, Burns (2001, p. 279) also asserted that "learner-centered or child centered instruction is the offspring of constructivist learning theory." In this theory, learners are considered as active participants or autonomous learners who can construct knowledge for themselves. In this regard, Noel (2000, p. 185) referring to social constructivists said that "learners need to be actively engaged if they are to learn effectively; these students needed an opportunity to do more than merely listen." Englehart (2009, p. 715), also underscored that "providing for student autonomy in the classroom enhances an enduring motivation to take an active part in learning." Scholars such as Noel (2000, p. 186) believed

The implications of the language and learning theories were explored not only through discussion of the assigned readings and through films of real classrooms, but also through student-centred activities in which students had an opportunity to learn by doing. Through role play, by practicing specific teaching strategies, and by experiencing the language arts activities themselves, these [Bachelor of Education] students demonstrated their growth in their understanding of current theories. These activities were then examined from the points of view of the students and teachers, as well as from the theoretical perspective

In summary, IRI in general and Interactive Radio English Instruction (IREI) in particular challenge the learning model of the teacher as transmitter and the student as receiver. It emerges from the knowledge that

learning is best achieved when it is interactive, relevant, well-designed and based on the learner's previous knowledge and interests. IRI involves a combination of a highly structured design and evaluation methodology, pedagogical principles based on active learning, and the

use of entertainment and communication strategies consistent with the culture, subject matter, and age of the learners that are targeted. (Bosch, 1997, p. 2).

Burns (2006) also showed the four ways of communications taking place in IRI. She said that IRI is an instructional approach that uses one-way radio to reach dual audiences as follows:

- Radio teacher—in-class teacher
- Radio teacher— students
- In-class teacher—students
- Students—students

Burns (2006) further added that the radio teacher delivers content and orally directs teachers to apply more interactive instructional approaches within the classroom. Both the content and activities of the radio program are based on the national curriculum and use a series of structured learning episode in which students are prompted to sing songs, do individual and group work, answer questions, and perform certain learning tasks. The approach is interactive because the radio teacher speaks to students and students respond to radio sounds quickly.

Taking into consideration the benefits of IRI in general and IREI in particular for teachers and learners, the Ministry of Education of Ethiopia has been broadcasting educational radio programs for about a decade. However, since its 1999 pilot in Ethiopia, the preliminary study indicates that teachers of English in grades one to four were not adequately implementing IREI. So pupils and teachers were unable to benefit from the advantages that IREI provides unless teachers were prepared to implement IREI properly. This requires the need for intervention on the proper implementation of IREI. The researcher designed a 10 hours training for teachers who were teaching English at grade three level with the help of the radio on how it can be implemented. Thus, the study seeks to examine the impact of the intervention on grade three pupils' listening comprehension.

Objective of the study

The general objective of the study was to investigate the effects of the intervention on grade three students' listening comprehension achievement. Specifically, the research was designed to

1. Compare the academic mean scores of students in the experimental group before and after the intervention;
2. Compare the academic mean scores of students in the experimental group and comparison group before and after the intervention; and
3. Investigate the academic mean score of male and female students taught by teachers who and did not take the intervention.

Methods

This study uses a quasi-experimental design to examine students' placement, as such assignments to the experimental and control groups were not random. Students were taken as a sample in their normal classroom situations (in their natural setting) as assigned by the schools. The dependent variable, student mean score, was measured during pre-test and post-test. At pre-test both comparison group and experimental group were given a listening comprehension test. Study participants were grade three students whose teachers were selected purposively as they were teaching English. Two groups were selected for as the experimental groups, while two additional groups were selected as comparison groups.

The test was developed and based on grade three English Curriculum and recorded on a tape recorder. Four months after initially testing students, the same test was again given to the same students in each group. In experimental groups, students were taught by teachers who received the intervention after the pre-test. The intervention incorporated improving teachers' classroom instructional practices (Interactive pedagogy) through implementing IREI properly and adopting its interactive instructional techniques when they are teaching without radio. Teachers who were in the comparison or control

group did not receive the researcher's intervention, but taught English language using the same IREI method to the grade three students.

To gather data, the researcher had developed a listening comprehension test derived from the grade three English syllabuses in consultation with experts and primary level among English as a Foreign Language teachers. A test of 50 items was used for data collection. However, giving 50 items at a time for grade three students was problematic, so the test was given to pupils over different days by taking into consideration pupils' ages and maturation level.

Regarding reliability of the test, test-retest reliability measure was calculated by taking the pre-test and post-test results of students in the comparison group. Thus, test-retest reliability measure showed a modest correlation between the pre-test and post-test results of participants in the control groups, Pearson's $r(69) = .58$ (Cohen's $d = 0.87$), $p < .001$. This showed that the instrument was reliable. Had the number of study participants in the comparison group increased, r could have increased. Significance was determined at $p < .05$.

Regarding the validity of the test, content validity of the test were checked by teachers of grade three and surface validity of the test was also checked by three experts. Two of them were Teaching English as a second language and PhD holders from Bahir Dar University, while the other was a teacher with many years of experience as radio English programs producer for primary grade levels in the Ministry of Education in Ethiopia. In addition, paired sample t-test and independent sample t-test were used to analyze the data.

The experiment was conducted on grade three students in the city of Bahir Dar. Two government funded schools for the experimental group and another two government funded schools for comparison group were purposely selected. The total number of participants was 189, but those students who missed at least one test (22 students) were excluded from the analysis.

Table 1: *Groups within the experiment*

Experimental Group	Comparison Group
Male (49)	Male (35)
Female (49)	Female (34)
Grade 3 students	Grade 3 students
Learn English with radio support	Learn English with radio support
Taught by teachers who received the experimental	Taught by teachers who didn't receive the experimental
Pupils take listening comprehension test	Pupils take listening comprehension test

The experiment comprised of experimental group ($n=98$) and comparison group ($n=69$) (see Table 1). The focus of the intervention was on enabling participant teachers to implement IREI in classrooms adequately and integrate it with NIREI which in turn will improve teachers' classroom instructional practices and students' listening comprehension scores. Finally, both groups of students were given similar listening comprehension tests to compare their mean scores with their pre-test mean scores.

Findings and Discussions

Pupils' mean difference in control groups

The status of pupils' learning was measured during pre-test and post-test which compared groups and calculated to enable the researcher to compare with the status of students in the control group and summarized in Table 2. It depicts that the mean score of students from the control groups for the post-test was very similar and implies that study participants in the control groups have had similar learning outcome level during pre-test and post-test.

Table 2: *Students' test results of the comparison group*

	Mean Scores	Standard deviation	Mean difference	df	t-value	Sig (2-tailed)
Pre-test	24.0435	5.07136	-0.71014	68	1.314	0.193
Post-test	24.7536	4.75396				

Students' mean difference in experimental groups

Similarly, results in the experimental groups indicate that the academic improvement is significant when compared to students' pre-test as outlined in Table 3. It indicates that the mean score of students' listening comprehension in the post-test was a mean difference of 8.612 and Partial Eta Squared=.77. From this finding, it is inferred that the intervention had an impact on students' learning of English in the experimental group. This finding is in harmony with the findings outlined in the World Bank (2005) in that students' learning gain is better when they learn with the help of IRI.

Table 3: *Students' Test Results of the Experimental Group*

	Mean Scores	Standard deviation	Mean difference	df	t-value	Sig (2-tailed)
Pre-test	22.9184	5.03324	-8.61224	97	17.832	0.000
Post-test	31.5306	4.01852				

Students' academic performance between experimental and control groups

The table below indicates the results of the experimental and control groups. It depicts that when the post-test mean score of the experimental group and the comparison group is compared to each other, there is a mean gain of 6.78 points in the experimental group. However, there is a gain of 1.13 point advantage of comparison group over experimental groups at the pre-tests, which is to be anticipated prior to the implementation of the intervention among teachers in the experimental groups.

It indicates that there was no statistically significant difference between comparison and experimental groups during the pre-test and there was a significant statistical difference between comparison groups and experimental groups during the post-test with a Partial Eta Squared=.3. The finding indicates that students in the experimental group showed better performances in listening tests as compared to their counterparts of students in the comparison groups following the onset of the intervention. This finding is similar to the findings of other studies (USAID, 2009) in that one of the major activities of IRI for children is to improve students' achievement other than access to education.

Table 4: *Students' results between control and experimental groups*

	treatment	Num	Mean	Std. Dev.	Mean diff.	df	t-value	Sig (2-tailed)
Pre-test	Experimental	98	22.9184	5.03324	-1.1251	165	-1.418	.158
	Control	69	24.0435	5.07136				
Post-test	Experimental	98	31.5306	4.01852	6.7770	165	9.944	.000*
	Control	69	24.7536	4.75396				

*p<0.05

Students' mean difference by sex in control group

One of the current foci regarding children schooling is whether or not education narrows the gap between boys and girls. The following table shows the results from control groups. As can be seen in table 5, grade three students' mean score of boys and girls in the comparison group is similar.

Table 5: *Students' Test Results by Sex in Comparison Group*

	Sex	Num.	Mean Scores	St. Dev.	Mean Dif.	df	t-value	Sig. (2-tailed)
Pre-test	Male	34	22.9118	4.68633	-1.67347	67	-1.863	0.067
	Female	35	25.1429	5.25325				
Post-test	Male	34	24.2059	4.53792	-0.9388	67	-0.943	0.349
	Female	35	25.2857	4.96204				

Students' mean difference by sex in experimental group

It is also possible to examine whether the intervention has effects on students' achievement by sex. It is indicated in table 6 that there is no statistically significant differences between boys' and girls' achievement in the experimental group during the post-test ($t(96) = -1.158$; $P > 0.05$). From this, one can infer that the intervention equally favours both boys and girls. However, USAId (2009) report indicated that IRI benefited girls better than boys. In addition, the finding is similar to Ho and Thukral's (2009) research finding in that the English mean scores for boys and girls show similar trend due to the support of the radio.

Table 6: *Students' Test Results by Sex in Experimental Group*

	Sex	Num.	Mean	Std. Dev.	Mean diff.	df	t-value	Sig. (2-tailed)
Pre-test	Male	49	22.0816	4.72068	-1.6735	96	-1.661	.100
	Female	49	23.7551	5.24218				
Post-test	Male	49	31.0612	3.44848	-.93878	96	-1.158	.250
	Female	49	32.0000	4.50463				

Pupils' pre-test Mean Scores between Comparison and Experimental Groups by Sex

Table 7 indicates that boys' pre-test mean score between comparison and experimental groups was not statistically significant difference ($t(81) = -.790$; $P > .05$). From this, it is possible to infer that boys and girls seem to have similar level in their pre-test achievement.

Table 7: Pupils' Pre-test Mean Score between Comparison and Experimental Groups by Sex

	Sex	Treatment	Num.	Mean	Std. Dev.	df	t-value	Sig. (2-tailed)
Pre-test	Male	Experimental	49	22.0816	4.72068	81	-.790	.432
		Control	34	22.9118	4.68633			
Pre-test	Female	Experimental	49	23.7551	5.24218	82	-1.195	.235
		Control	35	25.1429	5.25325			

Pupils' Post-test Mean Scores between Comparison and Experimental Groups by Sex

Table 8 indicates that the intervention has brought change for both boys and girls and this finding is similar to the findings of, for example, UNESCO in that IRI is used to narrow the gap between boys and girls. Generally, changes in teachers' classroom practices due to the proper implementation of IREI in fact tailored with NIREI affected their students' listening comprehension achievement. As can be indicated in the previous findings, both boys and girls in the experimental group are found to benefit from the intervention their teachers received as compared to their counterparts in the comparison group. In other words, the overall achievement of students is attributed to changes in teachers' classroom practices as a result of the intervention

Table 8: Students' Post-test Results between Comparison and Experimental Groups by Sex

	Sex	Treatment	Num.	Mean	Std. Dev.	df	t-value	Sig. (2-tailed)
Post-test	Male	Experimental	49	31.0612	3.44848	81	7.817	.000
		Control	34	24.2059	4.53792			
Post-test	Female	Experimental	49	32.0000	4.50463	82	6.455	.000
		Control	35	25.2857	4.96204			

Conclusion

The experiment has been conducted on limited number of schools-two experimental and two comparison schools. Consequently, the findings cannot be generalized. To be generalizable, the experiment should be conducted on large scales. The study has demonstrated that proper implementation of IREI by teachers as a result of the intervention has been found more effective in improving student listening comprehension achievement. Research participants of grade three students in Bahir Dar city (both in the comparison group and experimental group) were found to have similar status before the onset of the intervention. However, following the intervention pupils in the experimental group gained higher mean score in their listening comprehension achievement while those in the comparison group remain the same; students' mean score of the experimental group after the intervention was found to be higher compared to their pre-test scores. In addition, the intervention favors both boys and girls almost equally. For IREI to be implemented appropriately and to help students' English language learning effective, teachers should be given 'how to implement' IREI training. In addition, it is recommended that the Amhara Regional State Education Bureau should prepare experience sharing forums and workshops concerning IREI utilization for primary school teachers who are teaching English language with the help of radio.

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