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Making Interactive Radio Instruction Even Better for Girls:

the data, the scripts, and the potential

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Foreword

The use of technology to deliver direct instruction has been one of the most compelling ideas in education development. In particular, interactive radio instruction offers a means of reaching large numbers of students with quality instruction at a relatively low per-student cost. It provides learning resources that are not available in the local community or classroom, and, in some countries, can help offset weak teacher preparation. It is the geographical reach plus the quality instruction that comes from the interactivity that distinguishes interactive radio instruction from other distacne education approaches. At the same time, there has been debate about the long-term impact of large-scale radio projects. Some argue that the pay-offs of instructional radio have been over-promised -- that more evidence of impact is needed if such initiatives are to be justified and sustained. This monograph responds to that challenge with important new information about the impact of interactive radio instruction.

In this monograph, Hartenberger and Bosch present new and compelling evidence of the positive impact of interactive radio instruction on student achievement, in general, and on girls' achievement, in particular. At a time of intense interest in instructional strategies that can help compensate for discrepancies in the educational experiences of boys and girls, their analysis of data from four countries demonstrates that interactive radio instruction, while benefiting both boys and girls, tends to have a ***disproportionate positive impact on girls' achievement***.

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IRI for Girls' Learning

There is growing recognition of the positive social benefits resulting from investment in the education of girls in developing countries. With this recognition is coming an exploration of strategies that will be effective in expanding and improving educational opportunities for girls. Innovative delivery options such as the use of radio offer a means for reaching a greater number of girls living in remote locations. However, learning strategies that also improve and provide tools to influence the long-term quality of instruction offered in schools and other learning environments are also needed so that radio education is not considered a lower quality alternative only applicable in dire situations. As the awareness and need to simultaneously enhance quality and access to education for girls grows, overcoming obstacles to girls' education and providing rich learning environments through the effective combination of technology and tools for learning has gained greater acceptance (Bosch, 1995).

One technology that holds much promise for extending and improving basic education for girls is *interactive radio instruction* (IRI). IRI is an educational methodology that has evolved from two decades of experience in more than a dozen developing countries. It differs significantly from other forms of radio instruction: (a) radio plays a primary rather than supplementary instructional role and (b) the degree to which lessons are designed to follow proven principles of learning, subjected to systematic formative evaluation, and developed to engage learners in active participatory learning. As a methodology, IRI offers a combination of delivery systems and pedagogical practices that incorporates interactive strategies, positive role models, hands-on experiential learning using local resources, and a strong role for the teacher or facilitator in the learning process.

What is IRI?

Interactive radio instruction was first developed in the 1970s by the Nicaraguan Radio Mathematics project. These radio math lessons were later adapted for use in Thailand. Since then, interactive radio instruction has been used to teach mathematics (Honduras, Dominican Republic, Bolivia, Costa Rica, and El Salvador), Spanish (Guatemala, Dominican Republic, El Salvador, and Honduras), English (Kenya, Lesotho, South Africa, Pakistan, and Bangladesh), science (Papua New Guinea), health (Bolivia), environmental studies (Costa Rica), teacher training (Dominican Republic), early childhood development (Bolivia and South Africa—now extending to Nepal), and adult basic education (Honduras). Also, Haiti is conducting a pilot study in using interactive radio to teach mathematics and reading.[1]

The first model of IRI developed by the Nicaraguan Radio Mathematics project promoted active learning through a conversation between the students and the radio teacher. The radio instructor would ask a question or set out a task for listeners to perform and leave pauses for learner responses and activities. As interest in the IRI methodology increased, the variety of IRI formats grew to include soap opera and adventure drama, drill and practice, teacher training through modeling and direct guidance, story and open-ended discussion, call-in and talk shows, and other educational formats.

These new interactive styles still relied on the principles of IRI that dictated that the students learn through actual participation, but the instructors also started to focus on motivating more independent thought and activity. The characters and situations created for these programs soon became more animated and creative, opening up the possibility for them to influence learners. Teachers and other facilitators were asked to take more direct roles in teaching and learning so that

they were more prepared to continue the interactive learning process later in the day. The possibilities to engage girls and influence the learning process also diversified dramatically. The newer programs could not only solicit direct participation from the listening audience, but also present stories and characters that would invite the listeners to think about their roles vis-a-vis gender, protecting the environment, teaching health information to other family members, caring for young children, as well as other topics.

In many ways, the explosion of styles and possibilities for IRI grew more quickly than could be evaluated. While the creators of the programs understood the ramifications of creating real characters and role models that would be used consistently in the teaching process, few evaluations concentrated on how aspects of the learning methodologies were playing out. While all programs were evaluated to ensure significant learning was taking place, they were reviewed less often to see if teachers were learning new methods of teaching or students were incorporating the underlying lessons presented from characters and the interactions they had on the air.

When we speak of IRI today, we include several styles of active learning with many different kinds of content or subject matter. The connection of the content to the learner is still an important part of the IRI methodology. Each set of programs must be catered to the audience and culture where the instruction is used. This ensures that the program objectives are built on previous knowledge, and characters and settings are familiar to the listeners so they maintain their relevancy and effect. This connection also allows the learner to go beyond what he or she knows and entertain new and interesting ideas.

While the methods to engage learners have diversified over the years, the main objective of IRI programs remains: to provide cost-effective quality instruction to disadvantaged learners. Numerous studies have been conducted to evaluate the effectiveness of IRI to improve learning. Taken together, these studies show that IRI has a positive and consistent effect on student achievement across a variety of subjects, school grades, countries, and learning environments.[2] This document attempts to go one step further and asks the questions: What about female learners? Are they learning as much as their male counterparts? What else are girls learning through this powerful medium? Can we improve upon the characters and story lines that are invented to teach lessons through IRI so that we also present positive role models and interactions that will better inspire participation and learning for female learners?

To answer these questions, this document takes a serious look at what IRI has accomplished for girl learners according to a retrospective analysis of the data on student achievement, reviews the potential of IRI to further contribute to girls' education, and provides a gender analysis of IRI scripts to help chart out how IRI scriptwriting can be improved to make it even better for female listeners.

The Data

Many IRI data sets are not easily accessible or are in formats that would make reanalysis of data unfeasible. Nevertheless, we were able to obtain from three countries where IRI is being used data that could be readily reanalyzed to examine gender differences. This includes Papua New Guinea (1990), where fourth-grade students were receiving IRI science lessons (for a discussion of this activity, see Olsson, 1994); South Africa (1994), where second-grade students were learning English through IRI (this experience is discussed in Leigh, 1995); and Honduras (1995), where adults were learning both Spanish and mathematics as part of an adult basic education program (discussed in Corrales, 1995). The third case provided an opportunity to look at gender differences with an older, out-of-school population.

The table below, Achievement in Interactive Radio Instruction, compares the performance of IRI students to control students disaggregated by gender. In two cases, pretest and posttest comparisons are made; in one case, we were able to obtain only posttest data. In South Africa, we see large differences in performance on the posttests between both boys and girls and their same-sex counterparts in control schools. Some of the difference might be explained by pretest scores which suggest that the IRI group may have been stronger at the beginning of the intervention. But, as shown by the means and effect sizes on the posttests, these differences became larger following the IRI instruction. In terms of effect sizes, girls did slightly better than boys when compared to same-sex counterparts in control schools. In Papua New Guinea, both boys and girls outperformed same-sex control students on posttests, but IRI girls (effect size of .46) appear to have benefited more than IRI boys (effect size of .27) when compared to same-sex control students. Such a difference in favor of female learners was also found in Honduras for both mathematics and Spanish.

Achievement in Interactive Radio Instruction:
Pre- and Posttest Scores and Effect Sizes for Males and Females

Country and Subject	Sex and Grade	Pretest			Posttest		
		Control: Mean Score SD N*	Experimental: Mean Score SD N	Effect size	Control: Mean Score SD N	Experimental: Mean Score SD N	Effect size
Papua New Guinea							
Science	Male Grade 4				44.5 14 2 347	48.4 15.8 292	0.27
	Female Grade 4				38 4 13 1 344	44 4 14 2 287	0 46
Honduras							
Math	Male Level 2 Adult	12 4 5 56 77	13 22 5.56 50	0 15	15.55 4.36 47	17 44 5 05 41	0 43
	Female Level 2 Adult	10.11 5.78 80	10.83 5.68 34	0.12	13 72 5.64 62	18.81 4 30 32	0 9
Spanish	Male Level 2 Adult	17 07 2 66 77	13 22 5 56 50	-1.45	17 63 2 78 47	18.00 2 91 41	0 13
	Female Level 2 Adult	16 53 4 43 80	17 03 3.01 34	0.11	17 87 3 16 62	19 59 3.06 32	0 54
South Africa							
English language	Male Grade 2	.69 .21 215	.76 23 289	0.32	.70 .18 215	.83 14 289	0 72
	Female Grade 2	.68 .19 184	75 25 293	0.36	.68 .17 184	.82 13 293	0 8

* SD= Standard Deviation, N= Number of students

Effect sizes are expressed in terms of standard deviation units and calculated by subtracting the mean of the control group from the mean of the experimental group then dividing by the standard deviation of the control group. They may be interpreted in several ways. One way is to consider that the effect size of one year's instruction at the elementary school level is +1. Therefore, if an effect size of .5 was achieved over two years, this would mean that pupils would learn in two years what comparison students achieved in three (Glass, McGaw and Smith, 1981).

The analysis above demonstrates the positive benefits IRI has on improving learning in both

females and males. This sample may not be representative of the population of IRI programs. But as we look at the experience of more females taking part in IRI in the future, it will be interesting to see whether the outcomes are consistent with the suggestion above that girls may benefit from IRI more than males when compared to same-sex learners not receiving IRI.

The Potential

We don't know exactly why IRI works so well to increase girls' achievement. However, we understand what constitutes a successful IRI program and how it involves and motivates students. This section outlines connections between some of the attributes of IRI and the obstacles and factors that are typically identified with improving girls' education.

Learner-centered materials development and relevance

IRI programs are created deliberately with a balance of creative and pedagogical inputs. Audience research is always conducted to determine what the audience knows and understands and the ways that people in similar communities learn. Then, formative evaluations are conducted continually as the programs are developed to find out whether the activities created actually work when aired. Audience research can range from working directly with the learners to see where their interests lie and what types of heroes and exercises are likely to engage them to ensuring that the whole audience actually has access to the radio and that content is relevant and appropriate. Formative evaluation always includes extensive observation to ensure that both girl and boy learners are participating adequately.

This aspect of the IRI methodology is different from most materials development. Rarely would you see observers in classrooms while individual lessons were being developed for a textbook. But during the development process of IRI programs, formative evaluation and observations are considered indispensable and the measurable objectives of each audio lesson are planned carefully in advance and distributed throughout the programs.

The rigid process of collecting data also allows programs to be learner-centered, rather than writer-centered. If the programs don't have the intended effect, they are changed. Because programs are audio, they can be changed easily without affecting the whole series. After this development process, programs can be used indefinitely (as long as learners respond to the same types of activities). We believe that this process ensures that the programs are interactive and the quality is high. In some countries such as Papua New Guinea and Bolivia, IRI programs developed 7 to 10 years ago are still being used on a national level.

Overcoming time and distance

Radio can reach learners who are unable to participate in education because of factors that are known to be associated with lower female enrollment and retention: great distances to school, dangers associated with boarding, and high opportunity costs. Rigid school schedules that conflict directly with competing familial or work responsibilities often prevent girls from getting an education. Because radio programs do not necessarily require that learners be in classrooms, education may be made to fit with unusual schedules or can be brought to distant learners. IRI has worked well with learners who have had difficult schedules, such as the children of agricultural workers in the Dominican Republic and working adults in Honduras.

Active and interactive learning

The interactive element to IRI may well be the most important aspect of the methodology for girls. In classrooms all over the world, girls are less likely to assert themselves or participate to the same degree as boys. This shyness may be attributed to less confidence in themselves as students, learned behaviors resulting from cultural preferences for girls who are demure and nonassertive, or learned behaviors of the teacher to reward boys or ask for their input more often.

IRI has great potential for improving the learning environment through simply increasing opportunities for active and interactive learning. For example, students using IRI may be invited to experiment with soil and measurements in science projects and receive guidance as they do so while the program is on the air. In other IRI programs, young children may be asked to participate in dramatic play to learn about health behaviors or to brainstorm about how to change them. Listeners quickly become active participants by solving problems orally, performing hands-on experiments, and interacting with the teacher and other classmates in discussions or physical activities. Both girls and boys are expected to participate. In some cases, IRI scripts have attempted to ensure female participation by specifically calling on the contributions of girls in the classroom while the programs were on the air.

A well-designed program can also demonstrate the value of girls' opinions and roles through radio characters created for the purpose of leading and demonstrating learning activities. In classrooms where students are rarely asked to play an active role, where boys are assumed to be more intelligent than girls, or where boys are simply favored, even an hour of interactive learning can be a big change.

Building on creativity and imagination

Also important for girls' education is the potential for IRI to draw upon learners' creativity and imagination. While conventional textbooks may restrict the imagination through set illustrations and a dependency on the level of training and skill of the teacher, IRI uses sound effects and oral descriptions so that listeners can comfortably enter places that they had not imagined before and visualize characters in personal ways. Activities, therefore, can range from familiar ones, such as counting fruit in a market, to new opportunities for experiencing things beyond the walls of the classroom, such as learning about an electrical plant or a health clinic.

The benefit is twofold. First, the lessons become more relevant and personal, a factor associated with girls' success in school. Second, because people identify with people like themselves, the characters can be imagined in culturally appropriate settings, and girls as well as boys can picture themselves at the center of activities.

The potential for IRI to use a learner's imagination also has major implications for girls' education. It means that during the process of learning, the listeners are envisioning girls and boys as problem solvers. Both boys and girls can learn through the experiences on the radio. In addition, most IRI programs deliberately never present radio characters to listeners visually, even in accompanying guides and posters. The rationale is simple. It is thought that as long as the characters remain voices, they can look like anyone the learners want them to and become relevant to students in different classes, communities, or households.

Role models and relevant scenarios

IRI offers great opportunities to provide new social messages and positive role models to girls. In many parts of the world, learners are rarely, if at all, presented with examples of educated or successful

women. IRI offers the possibility to invent positive female role models and to demonstrate positive interactions between characters that can effectively demonstrate to both genders that girls can participate and learn well.

The responsibility lies in the character and script development. A careful balance between creating positive role models for girls and developing believable, and therefore effective, characters is needed. If female characters or expectations stray too far from women in the community, they may be considered unrealistic and may not contribute to achieving the educational objective.

Looking at the effectiveness of IRI scripts to introduce positive role models and interactions between characters is a new venture and a major objective of this paper. If scriptwriters are not careful, there is a danger that negative stereotypes about girls and women may be reinforced. Later we take a critical look at the success of IRI to demonstrate positive interactions between males and females.

Changing teaching practice

Finally, IRI programs can serve as teacher training tools, either directly or indirectly. They can change teachers' abilities to perform their jobs. In South Africa, teacher training in English skills is considered a primary goal of the IRI program *English in Action,* for example. In early childhood development programs in Bolivia, the adult caregivers are taught directly how to manage programs, use natural resources in the environment for learning activities, and plan future activities to support children's development.

Teacher training also occurs indirectly when teaching is modeled on the air. For science and health programs, teachers are guided through the process and asked to play lead roles. The characters on the radio programs demonstrate both girls and boys performing activities well. This is likely to have an influence on the teacher or facilitator as he or she then watches the students in the classroom. In Bolivia, one teacher brought the point home when she stated that the IRI program was her teacher.

Finally, in some literature, female teachers are associated with better achievement for girl students. It is possible that by diversifying the role and characteristics of teachers on the air, negative effects of teacher bias may be neutralized.

The Scripts

One place to look for an explanation of why IRI programs seem to be so beneficial for girls is in the instructional materials themselves, the IRI scripts. Although there are many factors involved in implementing good educational projects, the design and wording of the script can determine the success or failure of an IRI program. An IRI script is the result of a team effort on the part of audience researchers, educators, content specialists, writers, and producers. Before the first script is ever written, extensive planning is needed to define curriculum objectives and sequence, develop interesting characters and a believable story line that will allow for the introduction of educational content, and ensure that the programs meet the needs of the target audience.

IRI scripts are the visual representation of what the audience will hear. An interactive radio script looks much like the script for a play where each character's lines are written. The lines are often numbered so that radio actors can easily find their place. An IRI script also includes sound effects and music, often set apart from the dialogue in capital letters and denoted by the letters FX, as well as timed pauses for student response marked by the abbreviation PSR.

Looking at a script allows us to see how the children are asked to participate actively in the learning and what kinds of role models the children are presented. An analysis of the scripts gives us a limited understanding of how the interactivity in IRI works—we can see if the structure of the IRI lessons themselves give boys and girls equal opportunities to interact—but we cannot see how it plays out in the classroom. The best way to judge whether girls and boys are equally active in the lessons is through classroom observation. The script analysis is best suited to analyzing the learning that occurs through the radio characters, and this is the emphasis of our script analysis.

The radio characters are an important element of learning in IRI. Most IRI programs have narrators and radio characters who participate in the action. The narrator usually talks directly to the listeners and responds as if he or she could hear them. Often this character is an authority figure and a source of knowledge, sometimes a teacher but often someone who is not related to the school environment. Narrators usually have the double role of participants in the action and omniscient storytellers. The other radio characters are children or adults.

Previous research suggests that the female characters in IRI lessons do influence girls' perception of the educational content. People relate to stories of people like themselves, and girls pay particular attention to female role models. In a formative evaluation of an IRI program with Costa Rican fifth graders, the children were asked to draw pictures and tell about their favorite radio characters. Girls almost exclusively chose the main female narrator, while boys talked about the male characters (Vargas, 1994). These results coincide with studies showing that girls and boys remember content associated with their own sex better than content associated with the opposite sex. Studies with young children show that they also imitate and associate facts better when they are related to their own gender (Levy and Fivush, 1993).

Moreover, it is important that gender-related content also coincides with children's notions of gender-appropriateness. Material that is not considered gender-appropriate is less likely to be remembered and may actually be distorted in memory in order to conform to gender stereotypes. In one study where children were asked to pick the correct next action in a sequence, they were much more likely to pick the action that was gender-consistent instead of temporally consistent with the sequence (Boston and Levy, 1991). For example, if children had been given a series of pictures showing a family eating dinner and then shown a picture of a man washing dishes or a woman reading, they would have been more likely to pick the second as the correct next action. This especially held true for the younger children.

Does this mean that effective female characters should conform to gender stereotypes? We believe that they should not, because portraying females who respond to strict gender stereotypes may create an obstacle for girls' learning, especially for subjects, skills, and behaviors that are stereotypically associated with males. There is some evidence that gender bias contributes to lower achievement for girls in science and math. In a study of sex differences in spatial/cognitive tasks, there was a large sex difference in mental image rotation when instructions emphasized the use of the skill involved in stereotypically male occupations (Sharps, Price, and Williams, 1994). Female stereotyped occupations resulted in a small, nonsignificant difference. Sharps, Price, and Williams suggest that differences in achievement may be explained by sociocultural mediated expectations; girls have less motivation to perform well in what is perceived as gender-inappropriate behavior.

Similarly, Rasanen (1991) argues that Finnish girls have a poorer command of physical concepts than boys because they have less previous knowledge and experience upon which to base new concepts as well as less self-confidence about their ability to solve physics problems. She points to studies showing that boys have more experiences connected to physics outside of school than girls, and that physics is associated with a masculine lifestyle. These social factors influence achievement.

Boys scored higher than girls on physics problems that required scientific explanations where previous knowledge was important, but girls scored as well or better than boys on problems where background knowledge was provided in the test situation.

These studies suggest that gender stereotyping in educational materials perpetuates existing inequities in achievement. It may also have other negative social effects that are not as easy to quantify as achievement on standardized tests. For example, women may be at an economic disadvantage if they are discouraged from choosing higher paying, "masculine" technical careers. In a study where school counselors listened to girls talk about their career aspirations, those who chose "masculine" careers were perceived as needing counseling while those who were interested in "feminine" careers were making appropriate choices (Bornstein, 1982). While it is clear that social expectations concerning gender do affect learning, it is difficult to determine the extent of short- and long-term negative consequences of gender stereotyping. Much research remains to be done to determine how gender stereotypes affect learning in different cultural contexts and educational settings, including interactive radio instruction.

Still, current research points to the motivation to learn as one factor that is clearly influenced by gender expectations. Girls often do not feel capable or do not want to learn skills they perceive as inappropriate for their gender. In the face of this obstacle to learning, educators have two options: (1) to disassociate gender from the content being taught or (2) to change notions of gender-appropriate skills and attitudes. The first option involves removing unnecessary gender bias from educational materials and using gender-neutral examples. For instance, physical concepts can be taught using the context of the playground, a non-gender-specific environment, rather than the context of a construction site, a traditionally male domain. The second option is to change traditional gender associations by presenting role models. For example, a science series can create a believable female character who is curious, logical, and likes to experiment. We know that girls relate to female characters and a positive role model has the potential to change girls' expectations of appropriate behavior. In this example, girls are being encouraged to see themselves as scientists. (Boys are also being assisted in seeing girls as scientists.) A positive image of women in the lessons is one way of making IRI responsive to girls' learning needs.

Results of the Script Analysis

We randomly selected for an informal review 25 scripts from five different programs and looked at how IRI has treated gender issues, particularly the potential to present positive role models. In analyzing the scripts, we looked at five broad areas: (a) the frequency of appearance, names, and voices of characters by gender; (b) psychological traits by gender; (c) images of work/employment and family life; (d) how the process of learning was developed; and (e) gender-biased language.

1. Overall, there was a strong presence of women.

Women were featured in all of the IRI scripts reviewed as teachers, narrators, and other characters. Male characters still outnumbered females by an average of 1.3 to 1. However, the main characters in the IRI series were fairly evenly distributed across gender; the stronger male presence in three of the six series is due to more males in lesser roles. The four series that featured a character who narrated the action or structured the lesson and took part in the story used female narrators. The other two series did not have narrators, but used standard male and female characters to structure the lesson.

Number of Male and Female Characters per Script (Speaking Parts)												
	1		2		3		4		5			
	M	F	M	F	M	F	M	F	M	F	Total M	Total F
Series 1	3	3	4	5	5	4	7	4	7	4	26	20
Series 2	1	2	1	2	1	2	1	2	1	2	5	10
Series 3	1	1	1	2	1	1	2	2	2	2	7	8
Series 4	6	4	7	4	7	4	6	4			26	16
Series 5	5	2	3	3	4	1	6	5	8	3	26	14
Series 6	2	2									2	2
Totals	18	14	16	16	18	12	22	17	18	11	**92**	**70**

or 1 31 to 1

Women also had a voice in the IRI lessons, literally and figuratively. Because IRI relies on aural perceptions, the presence of women can only be detected when they speak, are spoken to, or are mentioned in the dialogue. While males spoke slightly more times than females (a ratio of 1.08 to 1), females were twice as likely to interact with the listening audience by asking them questions or giving instructions. This is linked to the pervasiveness of female narrator figures who are often the ones who directly address the audience. We also looked at whether there was a pattern in the number of times males and females were interrupted as they were speaking, either by another character or by some event. We found no trend. The one area in which scripts did show a bias toward men was in the number of times male and female characters were mentioned by name (a ratio of 1.61 to 1). Some series were more susceptible to this bias than others. Using proper names for characters is important because it establishes them as real individuals, rather than nameless voices or in relation to a function like "George's father," or "the woman who sells shoes."

Number of Times Characters Are Mentioned by Name per Script												
	1		2		3		4		5		Total M	Total F
	M	F	M	F	M	F	M	F	M	F		
Series 1	48	29	9	10	52	7	30	2	46	5	185	53
Series 2	16	39	22	22	34	24	10	27	8	30	90	142
Series 3	15	27	11	12	9	8	67	63	30	13	132	123
Series 4	77	26	44	12	15	22	32	25			168	85
Series 5	33	19	23	8	42	10	43	29	53	18	194	84
Series 6	35	12									35	12
Totals	224	152	109	64	152	71	182	146	137	66	**804**	**499**

2. In some cases, lessons did not distinguish between male and female listeners, and in others, female listeners were explicitly encouraged to participate.

Most series (four out of six) did not differentiate between male and female listeners. They used gender-neutral terms to refer to listeners, either as "children" or "students." Using gender-neutral terminology to address listeners is preferable if classroom observation reveals that boys and girls are participating equally in the IRI programs.

However, if girls tend to participate in class less than boys, then differentiating between girls and boys is an option. Two programs did divide the class into groups based on gender by asking teachers to call alternately on boys and girls, or by asking boys then girls to respond to a question as a group. This is a workable way to ensure that teachers who might normally only call on boys also include girls in the radio-led activities and normally timid girls participate in the classroom. Gender differentiation can also be used to focus on girls during specific activities; for example, one program emphasized leadership skills in both sexes by specifically asking the teacher to choose a girl leader, then a boy leader.

In some languages, it may be preferable to use the feminine and masculine form of a word to address listeners (while not necessarily asking them to respond separately). In Spanish plural male nouns denote both males and mixed groups ("niños" means both "children" and "boys"). So "niños" might refer to all the children, or just the boys. Using the female "niñas" is a way to specifically include girls when the radio characters speak to listeners. Only one of four Spanish-language series used both feminine and masculine forms to address listeners.

3. The range of women's jobs was quite limited.

Most women's occupations revolved around caretaking—playground monitor, nurse, midwife, maid, childminder, or mother. The tasks they did in their jobs included making tea, cooking, cleaning, feeding babies, and preparing medicines. Two characters did not fit the caretaker mold: one narrator who predicted the future and a female city mayor. On the other hand, men's occupations were quite varied. They worked at electrical power plants, on banana plantations, and on farms. They were carpenters, bus drivers, magicians, accountants, engineers, fishermen, merchants, landowners, priests, kings, guards, government workers, sailors, policemen, traditional healers, and lawyers. Men built things like kites, boats, dams, or buildings. Adult men rarely cared for children except to admonish them, or in some instances they participated in feeding children. In one series, a man did interact with the characters in a caring manner but never acted as a caretaker per se. He brought information from outside and never participated in the children's games or daily care. Sometimes younger boys also took care of babies or older men.

The range of career options that boys and girls are exposed to through IRI programs depends upon the sociocultural context and learning objectives of the series. It may not be appropriate to mix gender-specific jobs if this interferes with cultural expectations and thereby disturbs the learning process. In these cases, scriptwriters would do better to opt for gender neutrality by striking unnecessary references to occupations. However, series that aim to promote nontraditional career options for girls or shared workloads for girls and boys should certainly include a wider range of jobs that are not gender specific.

4. There were behaviors and attitudes important for interactive learning that were not equally represented in female and male characters.

We were particularly interested in analyzing how characters acquired knowledge and whether they displayed characteristics like leadership, curiosity, and adventurousness. These are important qualities for students to apply to interactive learning that may not be encouraged in traditional rote-style classrooms. Although the skills often cultivated in rote learning—listening, remembering, and repeating the correct answer—are not unimportant, interactive learning demands more of the student. Interactive learning encourages independent problem solvers willing to experiment with different solutions and use knowledge from many sources. It is especially important that programs encourage both females and males to perceive active learning behavior as gender-appropriate.

Sources of knowledge

Both males and females were portrayed as knowledgeable and often gained information from an adult "teacher" figure. Boys and girls in all of the programs were equally likely to supply the correct answer to a question. Three of the series had male and female characters who used magic or non-Western sources of knowledge. This was one way that the series incorporated traditional knowledge that might have been discredited or ignored in other educational materials.

However, in some programs there was a gender bias evident in certain types of reasoning or sources of knowledge:

Using analytical reasoning. Out of four programs where characters are depicted using analytical reasoning, three tended to show men using analytical reasoning more than women. For example, at the description of a terrible tornado, a girl exclaimed "how horrible" while a boy noted how interesting it would have been to take photographs of the destruction. In another case, a father judged the lawyer's trustworthiness based on what the lawyer said about his motives while the mother was suspicious of the lawyer because he had small, deep-set eyes and a thin mustache. However, one series presented a positive role model for logical/scientific thinking in women through a character who reached conclusions through deduction and was looked to for answers to puzzling clues.

Asking listeners for information. Women commonly used the technique of asking listeners to help the radio characters in a given task in order to make listening students feel like an integral part of the action. Adult men communicated directly with the audience less than women, but when they did they never asked the audience for help.

Using technology or special objects. The three adventure series featured special objects (magic books, medallions, CB radios, and cameras) wielded almost exclusively by men. Sometimes women openly disdained technology, like an older woman who called the CB radio "that blasted contraption."

Qualities Displayed by Female Characters per Series			
	Leadership	Curiosity	Adventurousness
Series 1	Y	Y	N/A
Series 2	N	Y	N
Series 3	N	Y	N/A
Series 4	Y	Y	N/A
Series 5	N	Y	N
Series 6	N	Y	N

Y = yes
N = no
N/A = not applicable

Leadership

In two thirds of the programs, men tended to display leadership qualities; in the other third, leadership qualities were displayed equally by males and females. Examples of men taking leadership roles include speaking for the group at large and addressing strangers, initiating actions and distributing tasks to others, closing discussions, and making final decisions. In these series, females often had secondary roles in the action, helping men carry out tasks. Women were often described as "companions," "guides," and "helpers." They did suggest a course of action to the group and participate in decision making, but usually did not make the final decision.

The other two series had both male and female characters in leadership roles. For example, a curious little girl always had ideas that led to activities or lessons and made things happen within the story line. Both male and female characters in these programs took an active role in structuring the lesson by leading students into the next activity.

Curiosity

This characteristic was visible in both sexes in all the programs reviewed. Characters showed interest in the events or activities in the programs, asked questions, and tried to find out answers.

Adventurousness

Half of the series used story lines in which the radio characters became involved in an adventure. These series tended to endow the male characters with the quality of adventurousness. Only males used certain adventure/war vocabulary. Men were described as "warriors" in a "battle." They spoke of traitors, cowards, honor, punishments, pirates, missions, or enemies. Women did not. When confronted with the prospect of an adventure (sneaking on to a pirate ship or taking a trip to an unknown place), males tended to react enthusiastically while females did not. The male adventurousness was slightly irresponsible or ill-considered. Males tended not to think of negative consequences, and often overrode female concerns about safety or practicality. Women of all ages freely admitted to being afraid of lightning, dark spaces, and the unknown future, while men were convinced to carry out tasks in order to avoid being perceived as cowardly. Only three male characters showed fear—a young boy, a bookish boy, and an evil lawyer.

Mischievousness

A mischievous character appeared in five out of six of the programs, either as a boy or an animal. This boy (or animal) is irresponsible, foolish, and often gets into trouble because he disobeys or is too inquisitive. The mischievous boy precipitates action. For example, one boy's curiosity and playing with a medallion led to the discovery of a secret means of communicating with the children in the classroom. Sometimes this type of character unwittingly causes the plot to unfold, as in the case of a boy taken hostage by an evil lawyer who accused him of "meddling," or a boy whose bicycle broke down in front of a teacher's house.

The mischievous boy is not only a catalyst for plot developments, but he is often the excuse for educational messages. The mischievous boy at times does not understand or gets things wrong. In correcting the boy, the lesson of the day is presented. In one case, a mischievous parrot tries to fly out of a closed window. This leads to teaching the concept of open and closed. In another, a boy's imaginative anxiety dream about a baby with a fever leads to a lesson on immunization.

None of the programs reviewed featured a mischievous girl, although curious girls abounded. The difference between curious and mischievous is important, though. Mischievous boys have the freedom to say and do stupid things, to be wrong, to be bad. Responsible boys and girls, curious or otherwise, are unfailingly good. Their constant goodness is at best laudable but unattainable to the average listening student, and at worst, downright boring.

The mischievous boy becomes the de facto hero of the series, even if that was not the intent of the scriptwriters. He is the key to the plot and the lesson, therefore his role is paramount. He is not perfect, so he is more likeable and real. The narrator of one series began by trying to establish a girl as the main character. The narrator explained that this was a story about a girl "like you," "about your age," and the girl's family. But by the end of the same script, the girl was completely overshadowed by her mischievous brother. When an effort is made to include female role models in educational materials, the girls are usually ideal "good" girls. And the good girl is always going to be less important to the plot, less involved in the lesson, and less interesting than the mischievous boy. Because mischief is the sole domain of males, females are often relegated to secondary roles.

Good role models don't have to be perennial good girls. Experimenting with mischievous girls would open up a world of possibilities for scriptwriters.

Sample Scripts: An Exercise in Gender Analysis

This section presents three sample scripts as an exercise in gender analysis. They are based on actual programs, but have been changed for the purposes of this exercise. The script analysis guidelines were used for the review of IRI scripts presented in this document. Each type of script is different and, therefore, subject to different gender biases. Following each sample script analysis is a discussion of how it might be changed in order to make it more appropriate for girls.

Script Analysis
A Guide for Gender Messages in Interactive Radio Scripts

1. Frequency of appearance, names, and voices of characters by gender
How many characters are men? How many are women? When do they appear in the story? How often do characters speak? Are they interrupted? How many times are their proper names used? Are diminutive names used?

2. Psychological traits by gender
What do the characters do and say? Who takes the initiative? Who distributes tasks? Who makes final decisions? Who agrees/disagrees? How do they influence others? Who wields objects or tools?

3. Images of work/employment and family life
What occupations do men and women have? What economic and political roles do they have? What roles do they play in the family and community?

4. Process of learning
Where do characters get their information? How do male and female characters participate in the learning process? Who talks to listeners? What are classroom teachers asked to do? How do the listening students participate in the learning process?

5. Gender-biased language
What pronouns are used? How often is he used versus she? What words do the characters use? Is there a certain vocabulary that only one gender uses? Do characters use different, gender-biased words to describe the same concept?

Script 1-Dialogue and Activities

A dialogue, or conversation between two or more people, is often used to introduce concepts and lead into activities. Let us look at gender in the dialogue of this sample science script featuring two teachers, Mr. Tore and Mrs. Poro, and two students, Mary and Peter.

1. MRS. PORO: Hello, Mr. Tore. I think Peter and Mary enjoyed our last lesson on electricity.

2. MR. TORE: Yes, they did. Now the children know how to use a flashlight battery and a wire to make a simple circuit.

3. MRS. PORO: I heard Peter and Mary asking each other what electricity is and that makes it work.

4. MR. TORE: Mary and Peter are asking important questions about electricity. We cannot see electricity unless we see lightning or an electric spark. But we can see how electricity makes many things work. We'll find this out in today's lesson.

5. FX: RADIO MUSIC PLAYING (:06)

6. MARY: I like singing and listening to music.

7. PETER: Me, too. Let's sing!

8. FX: CHILDREN SINGING SOFTLY WITH RADIO (:04)

9. MR. TORE: Sorry to stop your fun, children. Look! I bought a new flashlight today. But I forgot to buy batteries. Peter, may I try my flashlight with the batteries from your radio?

10. PETER: Okay, let me put them in for you.

11. FX: BATTERIES BEING REMOVED FROM RADIO AND PUT IN FLASHLIGHT

12. MR. TORE: Look what happens when I turn the switch on.

13. PETER: It works, Mr. Tore, it works! The flashlight lights.

14. MARY: (Annoyed) Peter, turn on the radio. I want to sing.

15. PETER: Okay, I'll turn it on.

16. FX: RADIO BUTTON PRESSED

17. PETER: Hey, why isn't the radio working?

18. MR. TORE: Children, what does Peter's radio need to work?

19. PSR (:02)

20. MRS. PORO: Batteries. Peter's radio needs batteries to work just like the flashlight needs batteries to light.

[This leads to a review of electricity and simple circuits.]

21. MR. TORE: Peter, you seem to be very busy. What are you doing?

22. PETER: I'm making a kite to fly this afternoon.

23. MR. TORE: Peter, it is not safe to fly a kite in our schoolyard.

24. PETER: Why not, Mr. Tore?

25. MR. TORE: Look at those power lines up there. It is not safe flying your kite near those lines. So never, ever go near those lines.

[This leads to an exercise about safety in an accompanying workbook.]

26. MR. TORE: Children, we have learned some ways that we should be careful when using electricity. You can make safety posters with your teacher after the broadcast.

27. FX: MUSIC BRIDGE

28. PETER: Mary, we must tell Mrs. Poro and Mr. Tore about our visit to the power station.

29. MARY: That's a good idea. It was very exciting to see all the machines the men were working on. I had never seen such big machines.

30. PETER: Come on, let's go.

[This leads to a discussion and an exercise in the workbook concerning the uses of electricity.]

31. PETER: Mrs. Poro, sometimes my friends and I pile stones and sticks across a stream to make a little pond. Would that be a dam?

32. MRS. PORO: Yes, Peter. You made a small dam. You were holding back the water just like the picture in Box Six on page 45 of your workbook.

33. PETER: Could I make electricity with my small dam?

34. MRS. PORO: (laughing) No, Peter. It takes very big machinery and a large dam to make electricity. You could make a wheel that would turn in the water like a turbine.

35. PETER: How would I do that?

36. MRS. PORO: You would have to find a place where the river runs fast. You could make a wheel out of bamboo or palm leaves and make it turn on a

stick. It wouldn't be easy, but you could do it.

37. PETER: I think I'll try it. I like building dams. I'll see if I can make a wheel with a bamboo stick and palm leaves. I'll tell you how it comes out.

38. FX: MUSIC BRIDGE (:05)

39. MARY: Mr. Tore, I didn't know electricity could do so many things. Electricity is very important to us.

40. MR. TORE: You are right, Mary. We know there are many ways to make electricity. And many ways to use it.

41. MRS. PORO: Peter, I want you to remember that electricity can be very dangerous to us if we are not careful.

42. PETER: Yes, Mary made a safety poster. I will make one, too.

43. MRS. PORO: Good, Peter. Children, after the broadcast, you should make some safety posters about electricity for your classroom, too. This will remind you to use electricity safely.

44. MR. TORE: Have fun making your safety posters. Good-bye now.

Analysis

1. Frequency of appearance, names, and voices of characters by gender. Although there are an equal number of male and female characters, females don't play as large a role in the lesson as males (primarily because Mary doesn't have a large role). Males speak twice as often as females and their names are spoken twice as often.

2. Psychological traits by gender. From this short selection, we get a strong impression of Peter as a curious, active boy. He makes kites, dams up streams, and is going to try making a little turbine. The teachers remind him twice to be careful. We don't find Mary initiating any activity or doing anything on her own. It is Peter who suggests that they sing along to the radio, and Mary agrees because she likes to sing. Peter suggests they tell about their trip to the power station, and Mary agrees. Mary makes a safety poster but doesn't take any actions that might carry safety risks.

3. Images of work/employment and family life. Both men and women are teachers. Men work at the power plant.

4. Process of learning. Males and females are perceived as knowledgeable. Both Mary and Peter are praised for giving right answers and for asking good questions. Both Mrs. Poro and Mr. Tore ask questions and provide responses. However, Peter is the only character who is shown doing physical activities and wanting to experiment.

5. Gender-biased language. There was no gender-biased language.

Discussion

The portrayal of girls in series designed to teach science is particularly important, since it is a subject area in which girls may not feel as comfortable or competent as boys. The curiosity and hands-on experimentation that students must develop for scientific inquiry are often associated with boys. In this script the boy is shown doing activities and having adventures, and the girl is not. A special effort must be made to encourage girls. Some suggestions include:

Create settings where girls use science. Peter talks about a normal, everyday situation in which he uses science—playing with his friends at the river. Find a comparable situation where Mary might normally use science. Try not to make these settings stereotypical, like having Mary in the kitchen while Peter is out playing at the river. Find examples where both boys and girls participate. In this script, Mary could be flying the kite in the schoolyard.

Present role models of girls who do hands-on experimentation. Have Mary propose ideas and take actions. For example, she could be the one to discover how electricity runs the radio and the flashlight. It is important to show that Mary has a positive, confident attitude toward science by having her actively involved in doing science.

Make safety an issue for both genders. Safety is an important topic to broach when teaching about electricity. But only Peter is warned about safety (presumably because Mary doesn't do anything to warrant a warning). It leaves the listener wondering why Mary made a safety poster. Because she always obeys her elders? Because she is afraid?

Avoid invoking gender unnecessarily. There is no need to emphasize the fact that men work at the power plant. By the same token, it may be inappropriate to replace "men" with "men and women." Instead, the reference to gender could be omitted completely by replacing the word "men" with "workers," "technicians," or a specific job title.

Script 2- Drill and Activity

Some radio programs integrate interactivity using a drill in which students are asked to respond to questions in a quick succession. This technique works well for practicing skills that have already been introduced or where recall is important. This script also includes an activity in which the children are asked to take some action in response to the radio lesson. The following example is from a beginning English lesson with two female characters, Linda and Fatima, and two male characters, Sipho and Abu.

1. STANDARD OPENING—VOICE-OVER CENTERED

2. LINDA: Good morning, teacher.

3. PSR - 3

4. SIPHO: Good morning, children.

5. PSR - 3

6. LINDA: Look, Sipho! Here comes Fatima and Abu. Children, say good morning to Fatima and Abu.

7. PSR - 5

8. MUSIC INTRO TO "GOOD MORNING" SONG

9. LINDA: Everybody, let's sing!

10. LINDA AND SIPHO: (SINGING)

GOOD MORNING, GOOD MORNING, HOW ARE YOU?
GOOD MORNING, GOOD MORNING, HOW DO YOU DO?
GOOD MORNING, GOOD MORNING, HOW ARE YOU?
GOOD MORNING, GOOD MORNING, HOW DO YOU DO?

11. SIPHO: Again.

12. FATIMA AND ABU: (SINGING)

GOOD MORNING, GOOD MORNING, HOW ARE YOU?
GOOD MORNING, GOOD MORNING, HOW DO YOU DO?
GOOD MORNING, GOOD MORNING, HOW ARE YOU?
GOOD MORNING, GOOD MORNING, HOW DO YOU DO?

13. MUSIC—CLEAN FINISH TO ABOVE

14. CAST: Good morning!!!

15. BRIDGE—CYMBALS

16. SIPHO: Linda, listen to these sounds.

17. FX: TRAIN

18. LINDA: Train!

19. SIPHO: Train is right.

20. FX: BELL

21. LINDA: Bell!

22. SIPHO: Bell is right. Now, children, listen! Name the sound.

23. FX: COW—5 SECS (EACH OF THE FOLLOWING SOUNDS—APPROX 5 SECS)

24. PSR - 2

25. LINDA: Cow is right.

26. FX: GOAT

27. PSR - 2

28. LINDA: Goat is right.

29. FX: BUS

30. PSR - 2

31. LINDA: Bus is right.

32. MUSIC—KEYBOARD INTRO TO ANIMAL SONG

33. LINDA: Children, let's sing!

34. SIPHO: (SINGING)

LISTEN TO THE CAT SAY MEEEEEOOOOOOW.
LISTEN TO THE COW SAY MOOOOOMOOOOOO.
LISTEN TO THE SHEEP SAY BAAAABAAAAA.
LISTEN TO THE COCK SAY COCKLEDOODLEDOOOOOOO.

35. MUSIC—CLEAN FINISH TO ABOVE

36. FATIMA: Abu, please sit down.

37. FX: SIT-DOWN WHISTLE

38. ABU: Am I sitting, Fatima?

39. FATIMA: Yes, you are.

40. ABU: Am I standing?

41. FATIMA: No, you're not.

42. ABU: Am I clapping?

43. FATIMA: No, you're not. (PAUSE)

44. ABU: Fatima, clap your hands.

45. FX: CLAPPING—HOLD UNDER—END WITH LINE 16

46. FATIMA: Am I clapping?

47. ABU: Yes, you are. Children, say "Yes, you are."

48. PSR - 4 (CLAPPING CONTINUES)

49. FATIMA: Am I snapping my fingers?

50. ABU: No, you're not. Children, say "No you're not."

51. PSR - 4 (CLAPPING ENDS)

52. MUSIC—KEYBOARD INTRO TO "HAPPY SONG"

53. ABU: Girls sing!

54. ABU: (SINGING)

lalalalalalalala CLAP YOUR HANDS
lalalalalalalala CLAP YOUR HANDS
lalalalalalalala lalalalalalalala
lalalalalalalala CLAP YOUR HANDS

55. FATIMA: Boys sing! (SINGING)

lalalalalalalala SNAP YOUR FINGERS
lalalalalalalala SNAP YOUR FINGERS
lalalalalalalala lalalalalalalala
lalalalalalalala SNAP YOUR FINGERS

56. FATIMA AND ABU: Everyone sing! (SINGING)

lalalalalalalala STAMP YOUR FEET
lalalalalalalala STAMP YOUR FEET
lalalalalalalala lalalalalalalala
lalalalalalalala STAMP YOUR FEET

57. MUSIC ABOVE ENDS

58. SIPHO: Children, sit down.

59. FX: SIT-DOWN WHISTLE

60. LINDA: Sipho, stand up.

61. FX: STAND UP WHISTLE

62. FATIMA: Standing.

63.LINDA: Sipho is standing. Children, say "Sipho is standing."

64. PSR - 4

65. LINDA: Again.

66. PSR - 3

67. SIPHO: Teacher, please tell the children in native tongue to listen to Abu and speak at the same time as Fatima.

68. PSR - 6

69. ABU: Sitting.

70. FATIMA: Sipho is sitting.

71. ABU: Sipho is sitting. Again.

72. FATIMA: Sipho is sitting.

73. ABU: Listening.

74. FATIMA: Sipho is listening.

Analysis

1. Frequency of appearance, names, and voices of characters by gender. This lesson has an equal number of male and female characters. There is no imbalance in the number of times male and female characters' names are mentioned and each seems to have an equal opportunity to speak. These are important things to look for in a script because they establish the relative importance of each character.

2. Psychological traits by gender. It is difficult to determine particular personality traits for each character from this selection, although the characters may develop over the course of several lessons. Note that both boys and girls take leadership roles in moving from activity to activity and in telling each other what to do. (There does seem to be some gender bias in the way boys and girls get each other to do things—see number 5.)

3. Images of work/employment and family life. There are no mentions of occupations in this script.

4. Process of learning. The male and female characters take turns in the role of "teacher"—asking

questions and giving positive reinforcement. Although all the characters speak to the children, only Linda addresses the teacher. At one point, the classroom students are divided by gender and only the boys or girls respond.

5. Gender-biased language. Only girls use the word "please" (twice) and get others to do things by using "let's."

Discussion

There is no obvious gender bias in this script; however, there are subtle messages about gender being given in the interaction between characters and the listening audience. Look carefully for patterns in the behaviors that the characters exhibit, as well as what and how they get the listening audience to respond. Remember that it is difficult to define patterns from looking at just one script. To determine the weight of gender biases you must see if and how they are present in a large number of scripts in the series. Here are a few things to watch out for:

Make sure there is a good pedagogical reason for dividing the class into boys and girls. Research has shown that most young boys and girls prefer to interact with their same sex. Dividing the class by gender may simply reinforce this tendency. However, asking girls to respond separately may be appropriate if observation of your target audience has shown that girls do *not* respond to questions asked of both boys and girls.

Try not to have only girls interact with adult characters or teachers. This script shows only Linda speaking to the teacher. This is a potential problem if it continues over many scripts. It puts Linda on par with the teacher, while the other characters interact as peers with the children. It may reinforce the idea that females should interact in the adult arena, taking on adult roles and responsibilities, while males should have more of an opportunity to play.

Try not to reinforce stereotypes in the way characters get people to do things or change behavior. In this script, the boys simply tell others what to do and the girls say *please* and *let's* when getting others to take some action. Try rewarding boys for these same behaviors.

Script 3- Soap Opera

Now let us try using the guiding questions to analyze a fictional script that uses drama. A drama is a story acted out by the radio characters; it centers around a conflict and how the characters resolve it. In this script, there are four male and two female characters.

1. FX: **NIGHT SOUNDS. CHILDREN MURMURING IN BACKGROUND.**

2. ARTHUR: We'd better start, even without the book and without Oliver. It's already late and I haven't finished my homework.

3. SAM: No, Arthur. Let's wait for Oliver. He's bringing the book.

4. SANDRA: I agree with Sam. This is serious business. We aren't kidding. We can't start without the book and Oliver because . . .

5. OLIVER: Hey, lower the ladder! Hurry up!

6. ALL: Shhh!

7. ARTHUR: (Whispering) Quiet! First give the secret password so that we know you are a member of the club.

8. OLIVER: Bat tongues, monkey brains, witches, and more, I am Oliver Jones so open the door!

9. FX: CREAKING LADDER.

10. SAM: Okay, now that we're all here at the treehouse and we have the secret book we can take the club oath.

11. OLIVER: All right, everyone raise your right hand and repeat after me—We swear to be members of the secret club.

12. ALL: We swear to be members of the secret club.

13. OLIVER: We promise to fight to save the forest, which is home to the animals and to our secret club.

14. ALL: We promise to fight to save the forest, which is home to the animals and to our secret club.

15. OLIVER: We agree never to tell anyone about our secret club, and to follow the club leader.

16. ALL: We agree never to tell anyone about our secret club, and to follow the club leader.

17. SANDRA: And if someone doesn't agree with the leader, he can ask for a vote.

18. ALL: (Ad lib) Yes, that's right. Good point.

19. FX: HOLLOW THUMPING (AS IF IN A BOX)

20. SAM: What's that sound?

21. SANDRA: It's coming from the trunk! But Sam, I thought only you had the keys to the trunk!

22. SAM: I gave them to Oliver so he could put the book away! Here, help me open the trunk, Sandra.

23. ARTHUR: It's your brother, Oliver!

24. OLIVER: Kevin?! What are you doing here! Did you steal the key, you little twerp?

25. KEVIN: I just borrowed it. I want to be a member of the club, too. I took the oath while I was in the trunk.

26. ARTHUR: We don't let first-grade babies in! This is a fifth-grade club.

27. OLIVER: Yeah, you'd better get out of here or I'll . . .

28. SANDRA: Calm down, Oliver. Besides, he already heard the secret.

29. KEVIN: Yeah, if you kick me out I'll tell everyone.

30. ALL: (Ad lib) What? You'd better not! He's going to squeal!

31. SAM: Quiet everyone. I think it's best to let Kevin join the club. Or we can vote, if you want.

32. SANDRA: I think Kevin should stay, too.

33. OLIVER: Well, I don't. And if you tell anyone, Kevin, you're in trouble! No one can be a traitor to the club.

34. ARTHUR: Oliver, I think it's best if Kevin stays because he'll probably blab our secret to everyone.

35. FX: TRANSITION MUSIC. CATHERINE'S THEME.

36. CATH: Hello, children. I see that you are all listening carefully to the story. Isn't that Kevin a prankster! One day, he even . . . But wait! I haven't even introduced myself yet. I'm Catherine. And I have a special gift. I can tell the future. And another important thing I can do is change into anything—a bird, a deer, even a rainbow! Shall I tell you what happens next? No, we'd better keep listening. I'll talk to you again soon!

37. FX: CHILDREN PLAYING. RECESS.

38. SANDRA: (Upset) Sam, I checked it out and it's true! The city government is going to build a parking lot where our little forest is! My father saw the plans. His company is going to build the gate around the lot. They're going to cut down all the trees!

39. SAM: They're cutting down the trees!

40. OLIVER: Hi, Sandra. Hi Sam. Hey, what's wrong?

41. SAM: The city is going to build a parking lot over our forest. And they're the only trees left in the neighborhood.

42. OLIVER: Then it is true. But look what I found in the secret book.

43. FX: PAGES RUSTLING.

44. OLIVER: These drawings of a treehouse . . . just like ours. And this clue—a door with a quarter moon on it. I wonder what that means?

45. SAM: Sandra, why don't you investigate?

46. FX: CHILDREN PLAYING. RECESS.

47. KEVIN: Look at all of them over there with that stupid book. They think that just because I'm little, I won't understand. Well, I don't care about their dumb club anyway.

48. CATH/JONES: What are you grumbling about, Kevin? You don't look too happy.

49. KEVIN: Oh, nothing, Mrs. Jones. Well, actually I can't tell you. It's a secret.

50. JONES: Mmm. Well I've been a playground monitor at this school for a very long time. I've known lots of children with secrets and I know you can't tell me yours. But maybe I can help you and the other club members.

51. KEVIN: How did you know about our secret club?

52. JONES: All I can tell you is that behind that classroom there is an old storeroom. It has been here for a long time, even before they built the school. There you will find the answers to many questions.

53. KEVIN: Over there? Wow. Thanks, Mrs. Jones. Mrs. Jones? She's gone!

Analysis

1. Frequency of appearance, names, and voices of characters by gender. Male characters outnumber female characters 2 to 1 (Catherine and Mrs. Jones are the same character). Men speak three times more often than women. A female character is interrupted, no male characters are interrupted. Within the first three lines, listeners are introduced to three out of four of the male characters. Even though Sandra speaks, listeners do not know her name until line 22. In fact, women's names are only mentioned 6 times while men's names are mentioned 19 times, more than 3 times as often.

2. Psychological traits by gender. Some characters do exhibit characteristics stereotypical of their genders. For example, Kevin is the mischievous boy who causes problems or otherwise acts as a catalyst for events that move the plot along. The listeners know that this is typical behavior because Catherine calls him a prankster. Kevin hides in the trunk, wants to join the older kids' club, and is led to the storehouse. Sam is obviously the club leader. He makes final decisions and leads discussions. Sandra is serious and analytical. She reasons that it is better to let Kevin stay, and she is the one who will decipher the meaning of the picture in the secret book. This is an attempt to

assign Sandra nontraditional female characteristics. Unfortunately, it is somewhat undermined by her lack of initiative and autonomy. She is the peacemaker who strives for harmony and calm. Sandra never disagrees with anyone (in contrast to the boys) and seconds the boys' opinions twice. She calls for Oliver to calm down and stresses the importance of consensus through voting.

Female characters tend to be passive or have secondary roles in the action, while male characters initiate actions and carry them through. Oliver leads the oath taking and Kevin hides in the trunk. However, Sam tells Sandra to help open the trunk and to investigate the cryptic writing (she does not volunteer for the job). Catherine acts as a helper to the children. She intervenes in the action through Mrs. Jones by guiding and suggesting actions to the Econauts. Also note that men wield the objects (the book and key) in the adventure.

3. Images of work/employment and family life. In this script, Sandra's father owns or works for a construction company, a traditional male occupation. Mrs. Jones is a playground monitor.

4. Process of learning. In this script, both boys and girls are knowledgeable. However, boys are seen actively seeking knowledge (Oliver gets his information from books) while girls either have innate knowledge (Catherine has a gift of "knowing") or look to adults (Sandra finds out from her father).

5. Gender-biased language. A gender neutral term *anyone* is subsequently referred to as *he*. Notice the boys use "adventure" vocabulary (Arthur mentions the secret password which Oliver repeats, Oliver warns Kevin of being a traitor) while the girls use legal vocabulary (Sandra mentions voting).

Discussion

Of the three scripts we have reviewed here, this is the richest in characterization. The story line is compelling because the characters are very real. This format involves the audience in the story at an emotional level and has the potential to affect attitude and behavior changes. At the same time, this format is the one most subject to gender bias. Scriptwriters must walk a fine line between creating characters who are believable, and say and do realistic things, and characters who simply reinforce gender stereotypes.

Here are some suggestions for changing the sample script so that the characters still seem like real people, and unnecessary gender bias is removed.

Including more female characters. The club seems like mostly a boys' club with a token girl. On the other hand, one strong female character may be worth more than four females who do not have meaningful roles in the action. This might become a central issue in the story, that Sandra is entering into new territory by being a female in a traditionally boys' club.

Addressing the issue of interruption. If characters are interrupted, it should not only or always be the girls. Or a female character who is interrupted might say, "Hey, stop interrupting me while I'm talking."

Mentioning female characters by name. This gives female characters an individual identity and shows listeners that both boys and girls are valued as people.

Spreading traditional male or female characteristics across gender. For example, Sandra could be

the one to begin and end discussions, suggest ideas, take actions; or both boys and girls could be shown using technology or adventure props like the secret book. A girl might always get in trouble, and a boy could be the peacemaker. In assigning nontraditional characteristics to boys or girls, one must be careful not to create an unrealistic character. If it is unrealistic to have a little girl with the freedom to roam about without adult supervision, then the scriptwriter might create a situation in which an older sibling in the club is charged with looking after the little girl. A female might be the public voice of the group, the one who speaks for them. Again, be aware of cultural context. This may not be an appropriate educational device if it is dangerous for young girls to speak to strangers.

Assigning nontraditional occupations across gender, or removing unnecessary references to gender-specific occupations. Boys/men could be portrayed in child care roles. For example, Sandra's mother could work for the construction company. If that seems unrealistic or inappropriate, then the reference to Sandra's father could be cut altogether. Sandra could find out about the city plans by researching at the library or city hall.

Conclusions

Interactive radio instruction has a role to play in improving girls' education. The data show that when girls participate in IRI programs, learning gains are achieved. Furthermore, IRI may be benefiting girls more than boys as the improvement in achievement from pretest to posttest is often greater for girls. IRI also addresses many of the factors commonly identified with the obstacles to female participation, including distance to schools, lack of role models, and irrelevant curriculums. Altogether, the potential for using IRI to contribute to improving educational quality and access for girls is promising.

We have attempted to take an honest look at IRI scripts so that future programs can be crafted with girls in mind and will take advantage of the opportunities that IRI has to offer. The script analyses reveal that the interactions and characteristics of the radio personalities can be developed so that they provide positive role models and break traditional biases, if the scriptwriters and program designers are careful.

In sum, it is possible to use IRI both to increase learning and broaden the spectrum of what girls and boys think is possible and acceptable for girls. But to date, the methodologies for designing effective female role models and gender sensitive activities and curricula have not been well-defined. Until now, scriptwriters as well as most curriculum designers for other media have had little support in defining adequate role models and gender-sensitive activities. Some have gone through their own intuitive processes to help ensure that girls are invited to participate and that they can relate to the action in the dramas and educational materials have turned out well. Others have not been as lucky.

Quality control in an approach like IRI is intrinsic to the methodology. It is time that the processes to use IRI most effectively for girls are further defined so that audience research, scriptwriting, and formative evaluation can exploit the full potential for IRI to support girls' education. The evidence suggests that we are well on our way, and that with added attention to gender issues, IRI can be made even better for girls.

References

[1] These experiences are described in the AID-funded LearnTech case study series 1-9 published from 1994-1996 available through Education Development Center and other publications, such as:

Agency for International Development, *Interactive Radio Instruction: Confronting Crisis in Basic Education.* Washington, D.C., n.d.

Agency for International Development, *Radio-Assisted Community Basic Education (RADECO).* Pittsburgh, PA: Dusquesne University Press, 1988.

[2] There are many other factors that influence girls' access to education, achievement, and overall development. For a discussion of gender differences in learning and recommendations for creating appropriate educational materials, see "Gender, Culture and Learning" by Eileen Kane, ABEL 2, 1996.

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