

USING RADIO TO DELIVER INSTRUCTION: UP NISMED'S TITSER'S ISKUL ON THE AIR PROGRAM

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Introduction

Teaching science and mathematics which are highly-visual subjects just by making learners listen? UP NISMED explored using radio as an alternative mode of delivering instruction when it piloted a radio program in the year 2001. The initiative proved encouraging and the project continued as a radio course in 2002, 2003, and 2005.

Radio is undeniably a powerful and influential tool in disseminating fresh news and moving people to action. Our history attests to the crucial role the radio played when national interests and people's rights were at stake. Among farmers and fisherfolk, battery-operated radios are basic equipment in the households. They bring their portable radios to their resting nooks and boats, not only to listen to news about the weather and agri-based programs, but also to actively participate in issues and concerns aired over the community radios.

In highly developed countries, distance education via radio is used to reach learners with varying needs. In our country, which consists of about 7 100 islands where 21% of our people have no electricity (NSO, 2002), the flexible features of the radio can be exploited to deliver instruction for the formal and nonformal forms of education.

With the existing programs on addressing the learning needs of the marginalized learners (ILO, n.d.) and the ongoing discussions on policy reforms in basic education (DepEd, 2005), UP NISMED's efforts to use radio to teach science and mathematics at the basic level are valuable inputs for these national programs in education.

The Radio Courses

How did the Institute go into radio? The Institute's staff of about a hundred working collaboratively to do curriculum development, teacher training, and research *vis à vis* the 456 325 teachers (DepEd, 2006) was a clear indication for a need to explore other modes of delivering instruction. A survey conducted in 2000 among trainees at NISMED also confirmed teachers' interest to listen to science and mathematics-related radio programs.

In 2001, *Radio Eskwela* was launched with the invaluable support of DZMM of ABS-CBN network, DOST, and DepED-NCR. The theme of the pilot program

was *Philippine Folk Science: Beliefs and Practices*. Its objective was primarily to promote science interest and literacy among the populace.

In 2002, the program was transformed to a radio course, adding the upgrade of inservice teachers to its objectives so as to maximize airtime. Thus, *Titser's Iskul on the Air* was aired from 2002, 2003, and 2005.

COMPONENTS OF THE RADIO COURSES

The three courses of *Titser's Iskul* that were conducted consisted of two components—radio and face-to-face training sessions. Each course had an overall theme and 16 lessons on either science or mathematics and their applications to everyday life were developed.

As an example, the theme of the Third Course was *Rational Numbers* that covered the following major topics: *Fraction, Decimals, Ratio and Proportion, and Percent*. For the radio component, sixteen lessons in *Taglish*, which is the language of radio, were developed. A short drama started each lesson to introduce the concept followed by a 5 to 7-minute discussion of the concept. Sixteen high-level questions were also developed with a question ending each lesson. Preregistered teacher-enrollees were required to submit their answers to the questions during the scheduled face-to-face training.

The training sessions for two days, on the other hand, consisted of: submission of the answers to the 16 questions aired over the radio; a pretest; a review of the aired lessons; work sheets or activity sheets, game boards; a more extensive discussion of the concepts and sharing of ideas; review of the questions aired over the radio and the answers; posttest; and program evaluation. The UP NISMED trainers shifted from English to *Tagalog* to encourage the enrollees to participate actively in the discussions and to clarify important concepts.

An essential feature of the Course was the development of a Trainer's Manual and two teaching/learning materials (Fraction Chart with the corresponding strips and Place Value Chart). The materials were given to both the facilitators and enrollees as support materials in future training programs they may conduct and may also be used in the classrooms. Except for the transcripts of the radio component, the Trainer's Manual used English as its language of communication and contained the following:

- Transcripts of the radio scripts, discussions, questions aired over the radio, and the answers with the scoring guides (rubric)
- Overview and Objectives of the major topics
- Restructured Basic Education Curriculum where the topics are included
- Activities: Specific Objectives, Instructional Procedures that included teaching hints and mathematical ideas
- Activity Sheets/Cards, Work Sheets, Game Cards/Boards that included the materials and procedures
- Answers to the Activities, Activity Sheets, Work Sheets, and Games

THE TEST AND PROGRAM EVALUATION INSTRUMENTS

Partial results of the Pre and Posttest and Program Evaluation instruments give bright prospects for the continuation of this mode of instruction. West Visayas State University-Regional Science Teaching Center (WVSU-RSTC), a Training Center in Iloilo, modified the Pre and Posttest instruments and the results reveal that the enrollees performed well *after the radio component* and performed better *after the face-to-face training*. The results of the tests were as follows:

- Pretest was administered *before* the airing of the radio lessons and Posttest 1 was administered *after* the airing of the lessons **or** *before* the training sessions. The results showed a significant difference between Pre and Posttest 1. Pretest mean score was 11.27 and Posttest 1 mean score was 13.17
- A significant difference was also seen between Posttests 1 and 2 results. Posttest 1 mean score was 13.17 and Posttest 2 mean score was 13.52.
- With the results of the Pretest mean score of 11.27 and Posttest 2 mean score of 13.52, it can be concluded that the face-to-face training sessions reinforced the radio component.

Significant observations were also noted during the NISMED-based training sessions. With 45 minutes allotted to discuss and do the activities for each of the 16 topics, the NISMED trainers observed the following:

- **STRATEGIES TO MOTIVATE LEARNING**

The teachers realized that simple activities can introduce a topic to motivate learning and arouse the pupils' interest in the concept. They also realized that there are many things around us that can be used to teach elementary mathematics concepts.

Examples:

Percent: To introduce the concept of percent, the participants "played" basketball using plastic balls and a recycled tin can as the goal.

Ratio: An activity used colored beads and a string to teach several repeating patterns, given a number of beads (ratio of the number of beads for each color).

Using the same number of beads, the participants learned how to come up with other repeating patterns if the sum of the number of beads for each color is a factor of the total number of beads.

- **RELATIONSHIP OF ONE TOPIC OR CONCEPT TO ANOTHER**

Examples:

Decimals: The participants realized that Place Value is not limited to whole numbers and can be extended to decimals. In the curriculum, Whole Numbers and Decimals are separate units.

Percent: Problems on percent can also be solved by using the concept of ratio and proportion. Again, these two topics are separate units in the curriculum.

Direct and Inverse Proportions: There are different situations for which direct, inverse, and partitive proportions may be applied.

Explanation of why cross-multiplication works to find the value of the unknown.

- **WRITING BASIC MATHEMATICAL SYMBOLS PROPERLY**

Decimals: The importance of writing zero (0) before the decimal point (.) to indicate there is no whole number.

Fractions: Fractions should be written using a horizontal bar (—) and not with the slash symbol (/).

e.g., $\frac{3}{4}$ and **not as** 3/4.

Equals signs: Equal signs are oftentimes written continuously in solving the discounted price given the rate of discount.

e.g., rate of discount = 30%; regular price = P100.00

$$0.30 \times 100 = 30 = 100 - 30 = 70$$

Proper way of writing the solution is:

$$0.30 \times 100 = 30$$

$$100 - 30 = 70$$

P 70 = discounted price

Units of measure: In problem solving, units of measure are oftentimes **not** placed in the final answer.

The Program Evaluation instrument included a question if the enrollees will recommend the Course to other teachers. Ninety-four percent of the UP NISMED enrollees answered YES and some of their verbatim responses were:

RADIO-RELATED COMMENTS

- Learned by listening to the radio
- *Malinaw at kayang abutin ng tagapakinig*
- Can easily be understood because the language used is Filipino
- Presentation of topics organized
- Arouse motivation

TRAINING-RELATED COMMENTS

- Very applicable for teachers to impart this kind of training to their pupils
- Will help teachers transfer the learning effectively
- Can add additional knowledge on how to teach effectively
- All topics relevant to my lessons; relevant to daily life
- Materials very useful
- Varied activities

In Retrospect

With the experiences in the three completed radio courses, further refinements of the different aspects of the course have to be made. Some setbacks of the radio component included the pace in the delivery of the discussions and questions; poor radio signal in some areas; comprehension of a dialect (*Tagalog*) that the enrollees in the regions were not conversant with; schedule of airing; and closer coordination between the national implementing unit and the local implementers in the choice of radio stations.

The setbacks for the training component were the limited time and the many activities during the sessions.

Looking Ahead

To attain the objective of promoting science and mathematics interest and literacy among the populace, UP NISMED can consider the empowerment of the communicators and disseminators—community leader trainers and radio program hosts—who can help effect social changes on the people they will serve. These lead persons can be trained and learning materials can be developed to support their community activities. New linkages have to be formed and old ones sustained to strengthen the activities of the community leaders and radio program hosts. New partners may include: LGUs, NGOs, Barangays, and other government and community or local radio stations. With an increase in dropout rates in the elementary and secondary levels from SY 2001 to 2004 at an average of 7.57% and 11.94%, respectively per school year (DepEd, 2006), translating some portions of the learning materials and feedback forms may be needed to suit the different target

learners. Another important aspect that needs to be looked into is the monitoring and feedback mechanism to evaluate the efficacy of an aired program.

To attain the objective of upgrading inservice teachers, the Institute can also use the radio program to upgrade teachers. The sad realities of the exodus of our teachers to higher paying jobs abroad compel the Institute to do this. From 1988 to 2004, a total of 12 734 teachers emigrated permanently to other countries either to teach or hold other jobs. And from 1992 to 2004, the country's experienced principals and best teachers in science and mathematics who were hired as teachers abroad totaled to 3 269 (Tabunda, 2005).

Another sad reality is the low performance of our Grades 4 and First Year students in science and mathematics in international studies (Martin, et. al., 2004; Mullis, et. al, 2004). Our Grade 4 pupils ranked 23 both in the mathematics and science tests out of the 25 countries that participated. Our First Year students, on one hand, ranked 42 in the science tests and 41 in the mathematics tests out of the 45 countries that participated.

Because of these sad realities, the Institute can again tap Teacher Education Institutions (TEIs) to be the Training Centers (TCs) for the face-to-face training component in the regions. A training program can also be conducted at the Institute for the TCs' Leader Trainers. Training Manuals as well as teaching/learning materials, if needed, can be developed. The TEIs/TCs can also act as the conduit between UP NISMED and the communities.

Getting OUR Acts Together

Aside from developing the learning materials for the radio programs, three aspects were considered critical for the successful implementation of the radio programs/courses. These aspects may be pursued easily in DepED's current programs and can be considered in the formulation of policy reforms in basic education for SY 2006 to 2015. These aspects are:

- **MAXIMIZING THE COST OF RADIO-BASED LEARNING MATERIALS**

Production of radio-based learning materials would be cost effective if the programs were institutionalized. DepED has already done this in 1995 and 1997 when the viewing of television-based learning programs was made mandatory in public elementary schools (PEFA, 2000).

Radio-based programs can be prerecorded or "canned" for broadcast. The audio format in cassette tapes or CDs can be replicated to suit the radio station's broadcast facilities and conditions in the communities of the learners/listeners. Because of the flexible audio format, radio programs can be replayed for small or big groups of learners/listeners at prearranged schedules. Coordination with the schools, local government units, and the community leaders re their programs and activities can be made.

Furthermore, many of our nonreaders, poor readers, or readers who do not comprehend, and the visually-challenged groups can also benefit from radio-based learning materials.

- **EXPANDING AND STRENGTHENING THE LINKAGES**

A multisectoral active participation and greater coordination of all the stakeholders in education is crucial to aggressively address literacy problems. Active participation would mean that all stakeholders will take part in all the phases of literacy programs. Linkages can extend to the LGUs, NGOs, Barangays, teachers, community leaders, radio stations, schools, universities, colleges, TEIs, and other key persons in the community who can help implement and monitor literacy programs. Provincial school boards can allot funds for the upgrade of inservice teachers (WVSU, 2006). Professional organizations, businesses, industries, and private foundations can also be partners to support literacy programs.

Strengthening the manpower needed for these programs would require the training of key community leaders and providing them with teaching materials.

- **LANGUAGE ISSUE**

A crucial aspect in radio-based instruction is the language to be used to communicate concepts or ideas. The pace in communicating the concepts is another important aspect to make the learners/listeners understand ideas. With eight major dialects spoken in our country, learning materials for airing and for print will therefore require translation.

Education is not solely the national government's concern or DepED's problem alone. A well-orchestrated effort of all stakeholders in education from planning to the evaluation phases will be needed to help raise science and mathematics literacy among our people and help them to function effectively as Filipino citizens. As the saying goes...*hope springs eternal*...and the hope that our fellow Filipinos will have better opportunities through education can only be realized if all truly concerned stakeholders in education will get their acts together.

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