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Using Formative Evaluation  
As a Staff Training Method

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RADIO EDUCATION TEACHER TRAINING PROJECT

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## USING FORMATIVE EVALUATION AS A STAFF TRAINING METHOD

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One of the first tasks called for in the design of the Radio Education Teacher Training Project (RETT) was the development of a workshop to teach staff members the fundamentals of curriculum development and of the preparation of self-instructional materials. Those members of the project staff who would be involved in the production of self-instructional materials would participate, writers and producers who would be working directly with the radio broadcasts would be trained separately. Time was short if the project staff was to write, produce and field test written materials to accompany 150 hours of radio broadcasts in time to meet the production deadlines. Moreover the curriculum was long and compiled while the writers, deputed from the Ministry of Education and Culture and from the Institute of Education, were new to this field. Consequently, the advisor quickly began work to specify workshop objectives, to complete and summarize textbook materials, and to write applied exercises for the 6 week workshop scheduled to begin as soon as all of the approximately 16 project writers had been identified.

Despite staffing delays, the workshop was successful in terms of the original objectives. Staff members were introduced to all the steps involved in the design, organization, and preparation of a radio education project. Participants were pleased with the skills they acquired. However, in the course of the 6 week workshop, it became clear that training objectives had to be modified somewhat to reflect existing staff skills and the workshop was extended two additional weeks to try to complete a larger portion of the materials. However, after completing the workshop, the writers had a reasonably good command of the principles of curriculum development and had had experience writing sample materials in their subject areas.

Unfortunately, subsequent to the workshop, it quickly became apparent that the traditional type of pre-service training as conceived in the original project document would not be sufficient to meet RETT training needs. Writers produced materials which proved ineffective in field testing and they were unsure as to how to revise them. Countless hours were spent speculating about classroom situations and teaching problems which would be found among RETT target primary school teachers. New project staff members began arriving who had not participated in the workshops and who were uncertain how to proceed. It was clear that a further analysis would have to be done of the skills and training objectives needed to meet RETT production requirements. Since the radio script writers and producers who had a separate workshop were encountering the same difficulty, it seemed useful to consider all the production staff

(written material writers, scriptwriters, illustrators, radio producers, and editors) as a team and to identify their group training needs and production requirements in this analysis.

### Analysis of Staff Skills and Constraints

An examination of RETT staff skills following pre-service training and/or the production requirements they would have to fulfill suggested that the training goals had been both too ambitious and too narrow. Although they had gained new skills in the workshop, their familiarity with the objective of these activities was still weak. Since the RETT project is Nepal's first effort to teach an entire curriculum over the radio, the concept of radio education was quite new to the writers working on the teacher training program. Since the staff members participating in the pre-service training had not encountered this type of instructional system outside of the workshop, the only examples of self-instructional materials and scripts to which they'd ever been exposed were those covered during that two months of study. Bereiter and Engelmann (1966) have written that a concept can only be mastered after the learner has been exposed to the full range of examples which are included within that concept. Although participants had been exposed to a wide range of examples during their pre-service training, this set of sample materials was still small relative to the entire range of different types of self-instructional materials and radio scripts which could be prepared. Perhaps an even more serious problem might have been that RETT is a vanguard project; the only samples directly applicable to RETT target audience and curriculum were those prepared by the writers themselves during the workshop. There were no other examples which were directly applicable to the context in which they would be writing.

Bereiter and Engelmann (1966) also suggest that to understand a concept, the learner must have experience with both good and bad examples. That is, trainees should have been exposed to a variety of examples of materials which did not meet the criteria of good self-instructional materials as well as positive examples. Although some had been included, they were not directly relevant to the context in which RETT staff members were writing. It was difficult to generate sample materials which included the types of mistakes which RETT writers were making.

It was also clear that RETT writers needed to receive feedback on their writing from sources which they considered reliable. Very few of our writers had had experience living in rural areas or in teaching in primary schools. Thus, they were generally unable to give each other suggestions on how to improve materials. Each writer had his/her own ideas of how it should be done and unfortunately, one person's opinions of outsiders.

The project staff reviewed the materials which had been written up to that point, examined the data from the limited field testing, and interviewed the writers. The result was the following list of potential production constraints:

1. Most of the RETT staff had had no previous experience in curriculum development, radio script writing, self-instructional materials writing, text book writing, or teaching in primary schools.

2. Many of project staff members were university lecturers who had had a great deal of experience teaching to a much higher skill level than that of the teachers involved in the project. Their writing style tended to be complex and their language formal and difficult.

3. Most of the writers had had limited contact with remote area teachers involved in the RETT project and were personally unfamiliar with the classroom situation and teaching problems inherent in that setting.

4. In general the RETT staff had little information on the language, writing, reading and listening skills of the group for whom they were writing.

5. Staffing patterns were such that the project was unlikely to have the full complement of writers until late in the project. (The production staff varied between six and 36 staff members during the duration of the project.) Many staff members had responsibilities in addition to those with RETT so they were frequently out of the office.

6. Scriptwriters and self-instructional materials writers had difficulty working as a team. Although writers on each team shared an office, materials were generally written independently and they were not well integrated.

7. The ideas involved in successful script and self-instructional material writing were quite new to RETT writers. They generally were unaccustomed to behavioral objectives and a number were unable to write a topical outline.

8. Writers were extremely varied in terms of the writing and language skills they brought to RETT.

#### The Reassessment of Training Needs and Specification of Revised Training Objectives

With a clearer understanding of staffing constraints, reassessment of training needs and objectives was done. It was apparent that the project staff needed to develop standards with which they could compare their materials. Since no other materials of this type existed in Nepal, the writers had to generate their own model materials. Once model formats had been developed which were demonstrably successful within the context of RETT teacher training objectives, it would be far easier to specify individual training needs.

With this in mind, the following list of revised training and production objective was developed. In some ways they were less ambitious than earlier goals, yet simultaneously, much broader and more comprehensive:

1. Writers should be able to prepare materials which met the following criteria:

A. Materials should be written in a concise, simple to read style which the teachers could easily refer to while involved in their classroom teaching.

B. Scripts should use a conversational style in simple language, with many teaching examples.

C. Units should be written to include exercises which would be effective and enjoyable for primary school children.

D. Units should only include resource materials readily available in the classroom.

E. Units should refer only to those simple concepts and skills which had to be mastered by teachers to be able to implement the primary school curriculum.

F. Units should be written from behavioral objectives, with scripts and self-instructional materials tightly integrated.

D. Suggested teaching skills should be based on skills already available in the teachers' repertoire and suggest improvements feasible within the 10 month duration of the project.

2. Writers should be able to evaluate their own materials and to be able to integrate evaluation data into revision of existing units and into the design of subsequent lessons.

Thus, training goals were now keyed directly into those skills specifically needed to develop lessons for the RETT curriculum. While this theoretically limited the scope of skills the writers acquired during the project's training program it ensured that the skills the staff acquired would enable them to meet the project objectives. It became easier for the writers to see the relevance of skills they were acquiring and to measure their success in terms of the products of their activity. The more general application of these skills to the development of curricula in other setting could be emphasized and discussed as the writers became more experienced and gained a clearer idea of the instructional model they were putting together. This could easily be handled in informal discussions.

A second change in the training goals was a broader definition of the performance goals of RETT writers. Simply being able to design and write curriculum materials was not enough. In a sense the RETT project staff had to develop skills as classroom teachers, primary school supervisors, and textbook writers as well developing skills in curriculum writing. All of these performance areas had to be addressed in the RETT training program and they had to be met quickly to meet production deadlines.

#### Development of the Feedback Training Procedure

Obviously more or longer workshops were not the solution to staff skill deficits. The initial workshop had proven inadequate for the existing staff and new staff were still slowly arriving. In addition, some staff who had participated in the workshop had also been assigned to offices away from the project. And always, the RETT staff was conscious of the production deadlines which had to be met. The project could not afford to tie up writers in more workshops yet some type of training method which could be integrated into RETT production procedures was needed. The method needed to allow the writers to produce materials and to learn from their mistakes, incorporating new skills in the revisions of existing materials and in the development of subsequent units. What was needed was an ongoing system which could provide both feedback and training to project staff.

At the on set of the project, feedback had been provided exclusively by expatriot advisors who tried to suggest revisions and improvement as they reviewed materials. However, this method was problematic for both advisors and writers since neither group was confident that the feedback provided would correlate with field testing data. The advisors could suggest improvements in format and style, but could not be sure if they would work in Nepal. Staff members lacked confidence in each other's opinions and the debates were endless.

Feedback from rural teachers would be available as the project began field testing broadcasts and written materials. However, this was a year away. It has been shown that feedback is a very effective type of instruction (Krumhus and Malott, 1980). Yet often the instructional value of the feedback is lost because the feedback is timed to occur after the program work is essentially completed. This was the case in the initial design of the RETT project. Feedback would not be available to writers until the bulk of their writing was finished which would greatly reduce its benefit to the project. At the point at which feedback would be available to RETT, it would be very expensive to make major modifications in material design and instructional systems.

Friend (1980) describes a similar situation in the design of the formative evaluation system for the Radio Mathematics Project in Nicaragua. To offset this potential problem, the project developed a system of forward revision in which data from a formative evaluation was used to write subsequent units. Only major problems were revised in existing materials. This system allowed the project to meet production deadlines in a cost-effective method while at the same time continuing to incorporate data obtained in their formative evaluation. An examination of these issues suggested that a formative evaluation system could be developed which would also meet RETT's ongoing training needs. A group of teachers would have to be identified who resembled the rural untrained primary school teachers for whom the program was being developed. They would have to live close enough to Kathmandu that RETT writers could visit their schools and return to the office on the same day i.e. no more than a few hours walk from a road. Also, since RETT materials are sequenced and mastering later units is contingent upon completion of earlier units, these teachers would have to be available over a long period of time. The teachers selected should be teaching in small, one-room, two teacher schools like those in which RETT teachers were generally found. A group of ten untrained primary school teachers who met these requirements were selected. Their schools were clustered at the northeast edge of Kathmandu Valley, about an hour away by road followed by a one-half to two and one half hours walk. Arrangements were made for these teachers to travel to the office each Friday afternoon (school is only in session for a half day on Friday) and on that day to provide feedback to any writer who wished to tryout a unit. Of the ten teachers who participated, no more than five worked with a unit on any particular Friday. This ensured the project staff of an additional group (the remaining five teachers) who were available for an additional try out if this proved necessary.

Two formats were established for obtaining feedback from teachers. The first was used to obtain feedback on content units. No specific, directly measurable classroom teaching skills were involved in content lessons. Rather the units provided background information for a methods unit which would follow or included more general information like "How to recruit female students and keep them in school" or "How to work with the School Managing Committee." For these units, members of the project research team were given copies of the behavioral objectives of the units being tested. They prepared six multiple choice items on the unit. The teachers were pre-tested on the six multiple choice items as soon as they arrived at the office. They then listened to a cassette recording of the unit and studied the accompanying written materials. Following this, they were given a post-test which consisted of the same six items they had responded to in the pre-test. The teachers also filled out a questionnaire which asked for feedback on such things as the speed of the radio voice, the number of points covered on the broadcast, the relevance of the illustrations in the worksheets, and

the integration of the scripts and written materials. Writers remained in the room during the time the teachers were listening to the tape and studying the written materials. They observed points where teachers became confused and noted questions, but tried not to provide answers until the post-test was completed.

A method unit consisted of a specific lesson which the teachers should implement into their classrooms. It included teaching objectives, suggested teaching method, examples, evaluation materials, and remediation procedures.

The format for obtaining feedback on a methods unit was similar to that used for content units in that the teachers still travelled to the office on Friday afternoons to listen to a cassettes recording of the radio materials and to study written worksheets. They also continued to fill out the general information questionnaire. However, for these units, written pre- and post-test items were not prepared. Since these units dealt with specific classroom exercises, the writers' success in preparing units was evaluated by observing the teachers actually try to implement them in their classrooms. RETT staff members visited the teachers in their schools to observe them implement the lesson they'd studied the previous Friday in the RETT office, the writers filled out simple observation sheets to help them organize their notes, including such items as "Did the teacher have any questions before beginning the lesson?", "Did the teacher use teaching procedures correctly which were covered in the unit?", "Did the children appear to learn the concepts covered in the lesson?".

Following both types of feedback sessions writers and members of the research team gathered to discuss data. Each member contributed comments and observations and provided suggestions for possible revisions. Initially many of these came from expatriot advisors, but as writers gained confidence and experience they provided a larger and larger portion of the critiques. The feedback training sessions occurred weekly for about one year. After that time sessions were scheduled only when a group of two or three units had been prepared on which the writers wanted feedback, approximately every three weeks.

#### Advantages of the Feedback-Training Procedure

The feedback-training procedure was well suited to help the staff members achieve the revised RETT training objectives. This procedure offered the following advantages to more typical training procedures:

1. The staff received ongoing feedback, i.e., immediately after preparing a new unit.
2. Formative evaluation provided writers direct contact with RETT primary school teachers and thus, increased their understanding and appreciation of the classrooms situation and teaching problems.

3. These procedures gave writers skills in analyzing their own writing style to determine which lesson formats and teaching techniques could be included in subsequent units and which would need further revision and testing.

4. While visiting teachers in the sample group, writers were able to actually take over classroom teaching for a few hours and tryout lessons themselves, thus gaining information on the speed with which children were able to master new material and improving the design of the classroom activities described in the written materials.

5. Group debriefing meetings following the formative evaluation sessions provided valuable training. Writers became better and better observers, focusing on critical features of classroom teaching practices. They learned how changes in their writing produced improvements in the effectiveness with which the teachers were able to actually implement these suggestions in their classrooms. Writers also became more skilled at criticizing their own writing and the writing of their peers. Over time they were increasingly able to suggest revisions in their materials and to incorporate these improvements into subsequent lessons.

6. The feedback-training format provided a simple arena for settling controversies about what resources were or were not available locally, what skills were or were not within the reach of the teachers' current repertoire, how much time the teachers would be able to devote to preparing materials, how many examples had to be provided in lessons, how much could be covered in one teaching period, etc. If project staff members were unsure about the answer to these or any other questions, it was very easy to simply prepare a sample unit and try it out.

The debriefing sessions also put writers into the position of thinking as a team. The entire team, scriptwriter, producer, self-instructional material writers and illustrator became accountable for the performance of the teacher on the unit being tested. Successes were team successes and revisions had to be incorporated into all components involved in the production of the lesson. Writers became more sensitive to the strengths and limitations of their team members' media of instruction and were better able to support each other's work.

7. The feedback-training procedure allowed writers to develop individually, at their own rate and in their own style. Some writers moved quickly through lessons, having many successes and trying a variety of formats; others progressed slowly, requiring many feedback-training sessions to produce a single workable style. The procedure also accommodated the staggered manner in

which new staff were deputed to the project. However, by the end of the feedback-training sessions, writers in all the core subject areas had developed at least one style which could be used effectively in the classroom and were able to adapt their successful format to subsequent materials.

The feedback-training procedure had additional benefits which had not initially been specified. Since the project research team was involved in the formative evaluation, the feedback-training procedure served as a useful opportunity for these staff members to improve their ability to write clear evaluation items. Good questions could usually be delineated from those which were poorly written by watching error patterns and/or by subsequent interviews with teachers.

The research team also gained skills in writing test items which adequately measured the attainment of the behavioral objectives specified in the unit. With both writers and research team members accountable to the same measure for achievement, the post evaluation discussions were lively and useful. Each team member was anxious to provide corrective feedback when problems occurred during the formative evaluation and anxious to share credit and praise when units proved successful as measured by evaluation gain scores.

A truly unanticipated benefit was the quality of the feedback provided by the teacher's. They gradually gained confidence and learned that writers really did want to know when materials were unclear or confusing. Teachers were shown revised units and could observe for themselves that the project staff had made changes based on suggestions they provided. During the time the teachers were involved with the project, they became increasingly constructive and helpful in their critiquing of RETT materials. This was a real bonus for the project staff. Earlier attempts to get critical feedback from other teachers had been unsuccessful. Even after two or three encounters, teachers were reluctant to suggest that RETT materials were anything less than perfect.

Thus, the feedback-training method proved to be very effective in helping the staff meet the RETT training and production objectives. New staff could fit into the system as could staff who had been in the system for some time. Staff members could participate in as much or as little of the procedure as their training needs required. Not all staff members were involved at all times so that the feedback-training could be scheduled around production deadlines.

Perhaps most important, although more difficult to measure, was a change in attitude among staff. Ambiguity in the criteria for successful writing had put everyone into aversary positions, arguing over questions

for which no one had reliable answers. When the feedback-training procedure began, the situation changed completely. The criteria for successful writing became clear and simultaneously observable to all concerned. Thus, the staff really began functioning as a team, united behind achieving a more clearly defineable, measurable objective.

#### Limitations of the Feedback-Training Procedure

The feedback-training procedure proved to be quite effective for RETT. However, there were potential problems which had to be resolved before the method could be effectively utilized to meet the project training objectives.

One issue was an assumption proposed initially by B.F. Skinner (1953), that is "the subject is always right." In the case of the RETT project, that assumption was translated to: "The teacher is always right." That is to say, the feedback-training procedure was based on the assumption that the teachers were doing as good a job as they could to implement the suggested methodology. If they were not successful or became confused, the project staff had to assume it was because the RETT unit being tested was not well designed and writers returned to their desks to revise their materials. Sometimes RETT writers felt that teachers involved in the feedback-training system were not taking their work seriously enough or trying hard enough to follow suggested procedures. Although it is difficult to assess the accuracy of the writers' concern, Skinner's assumption seemed essentially correct. Teachers involved in the feedback-training system with five or six RETT members observing them, certainly had a far stronger incentive to implement methodology than rural teachers would have. The teachers wrote songs and dramas and completed for opportunities to have RETT staff visit their school. If there was a problem with this assumption, it may have been that the teachers were somewhat reluctant to make a mistake with "such important people watching them." They generally appeared to be quite nervous and often lapsed into their more familiar, traditional teaching methods if they started having difficulty. It is possible that in a more relaxed situation they might have had more confidence about implementing a new methodology. Thus, this system may have had two effects on the teacher's behavior. In some ways they were more motivated to perform well, yet at the same time they were, perhaps, more reluctant to make mistakes and cautious about trying unfamiliar procedures.

A second potential problem with the feedback-training procedure was the limited size of the feedback sample that essentially determined the design of the RETT instructional system. Since only ten teachers were primarily responsible for shaping the writing behavior of the staff and thus, the style, format, and the language of the RETT materials, it is possible that a small number of teachers could have skewed the

instructional system in a direction which would have made materials inappropriate for the majority of the rural teachers. The project staff made every effort to ensure that teachers participating in the feedback-training sessions resembled the profiles they had developed for the total population of teachers RETT would be training. But there certainly had to be differences between these two groups. If nothing else, the situation in which project staff observed the teachers attempt to implement the methodology was unique, i.e., a number of rather high level teacher educators and Ministry of Education staff sitting in a small classroom observing the primary school teacher. Thus, it was important that the feedback-training procedure was supported by a separate system of field testing conducted under more typical circumstances. Consequently, additional field testing was done with a more diverse group of rural primary school teachers. Without supportive data from this more extended population, the project staff could not have been assured of the applicability of the materials produced in this system to the larger target population of the project.

Another limitation of this method is that a few writers tended to use only one writing style. Finding a format and style which was effective was difficult for some RETT writers. When these writers found a system which appeared to be successful, they had a tendency to write unit after unit in that style. Although the style which evolved was effective in meeting unit teaching objectives, the lessons became a bit repetitious. However, the advantage of this methodology was that it was extremely individualized, that is, each writer developed a slightly different individual writing style. Consequently, although the feedback-training method may have reduced the variety of formats within a subject area, it may have increased the diversity between writers beyond what may have resulted from more traditional training methods.

A final limitation of the feedback-training method was that it was not always easy to assess the potential sources of problems in a weak unit. Was the language too difficult? Was the suggested teaching exercise too complex? Was the format of the lesson difficult to follow? Were the instructions unclear? It was in this area that project efforts to train the teachers to provide accurate feedback were extremely helpful. In situations where writers were unsure about the source of problems in the unit, they could simply ask the teachers and incorporate their suggestions into the revision of the materials. The teacher's feedback could then be validated by testing the materials again.

Thus, the limitations of the feedback-training methodology were largely surmountable within the constraints of the RETT project. In general, the problems of this method were related to the size of the group of primary school teachers involved relative to the total target population and the specificity to the feedback. However, with the support of an independent field testing procedure, it was possible to validate the general applicability of the materials produced under this training system. By including in the post evaluation session discussions of the more generic aspects of instructional system, RETT writers were able to begin to suggest ways that these ideas could be adapted to other

curricula. It is clear, however, that if RETT members were to initiate work on an entirely new training project, they would need further training in curriculum development. Or preferably, they could once again create an ongoing feedback-training group which give them the specific guidance and confidence needed to attack the new project.

#### Implications of this Method for Future Projects

The feedback-training system could be applied to any project in which the primary responsibility of the staff is to produce a set of materials which is to change the behavior of the recipients in some specifiable, observable way. If the project objectives provide information which must be understood by the target group, then the effectiveness of the materials could be measured with written tests or interviews and then "feedback" to writers and production staff. If the project is designed to produce a program which would change a more complex pattern of behavior, then this method becomes even more exciting. In this type of program as with RETT project, writers and production staff could jointly observe the extent to which their instructional methodology was effective in producing the desired changes in behavior. Since they had observed together the effectiveness of their unit in tryout sessions, it became easier to work as a team to identify ways to improve the product. In a sense this method almost functions as a kind of simulated game to shape "teamwork" as well as writing and production skills.

In applications to future projects, it would probably be useful to introduce this procedure as soon as staff members can begin to identify the characteristic of the target population well enough to form a feedback-training group which resembles the total target population. The procedure could replace pre-service training. Or preferably, it would be integrated into pre-service training to increase its relevance, to provide motivation to the staff to improve skills, and to help clarify the applicability of principles incorporated in the pre-service training. This procedure could also help staff members move more quickly into production, i.e., staff members could almost immediately begin producing products to tryout in feedback-training sessions. The feedback-training method could also help reduce the production pause or transition between training and production. Problems frequently result after the end of a highly motivating, highly structured pre-service training when a project staff faces the unprogrammed, more ambiguous every-day world in which they must produce their wares. By adopting this method, programs should be able to greatly reduce project start-up time and move rapidly to building a team of staff members who function as an efficient production unit, responsive to the skills and needs of their target population.

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