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ABSTRACT

As the first volume of a 4-volume report evaluating the University of Massachusetts Non-Formal Education Project (UMass NFEP) in rural Ecuador, this volume presents summary responses to the following evaluation questions: (1) What does UMass NFEP purport to do? (2) How does UMass NFEP go about implementing its goals? (3) To what extent is UMass NFEP carrying out its intended objectives effectively? (4) What are the learning outcomes of selected nonformal education materials developed by UMass NFEP? (5) What are (6) What are the characteristics of materials that work well with learners of what characteristics? (7) What facilitator/teacher variables have affected the relative effectiveness of various materials? (8) What are the motivational attributes of each of the four educational games selected for indepth experimental analysis? (9) What changes in attitudes and behaviors (critical consciousness) are produced by each of the selected non-formal educational games? (10) What sequencing factors/prerequisites are important for the four nonformal education games? (11) What are the effects of replay frequency for each of the games? (12) Can UMass NFEP be replicated in other countries? (13) What is needed to develop effective nonformal education materials/programs in countries similar to Ecuador? (JC)

AN EVALUATION OF NON-FORMAL EDUCATION IN ECUADOR

VOLUME I: EXECUTIVE SUMMARY

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The authors have been encouraged by the contracting agency to express freely their professional judgment in the conduct of this evaluation. Points of view or opinions stated do not, therefore, necessarily represent official AID position or policy.

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AN EVALUATION OF NON-FORMAL EDUCATION IN ECUADOR

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QUESTION 1: WHAT DOES THE UNIVERSITY OF MASSACHUSETTS NON-FORMAL EDUCATION PROJECT PURPORT TO DO?

(A fuller discussion can be found in Vol. II, and in Vol. III, pp. 1-15)

The UMass NFE project began in late 1971, with the signing of a contract with the Agency for International Development. The contract called for the development of non-formal educational methodologies and materials, their testing in rural Ecuador, and their eventual implementation by and through existing Ecuadorian institutions.

UMass/Amherst's definition of non-formal education was one of decentralized, non-directive, participant-centered learning, whose benefits--both cognitive and motivational--were to be of immediate applicability to the rural learner's daily needs. The first year of project activity (1972-1973) centered on the development of materials that would translate that ideal to a workable form. Educational and simulation games were tried out, as were cassette tape players in conjunction with radio programs, and different materials and training models. A variety of Ecuadorian institutions were contacted, and the project appeared to be balanced nicely between developing new materials and experimenting with new methodologies.

But the apparent success of the games when used with "facilitators" (campesinos, or rural dwellers, trained in motivational techniques and non-formal literacy methodologies) led the UMass team to concentrate much of their energy and enthusiasm on this single aspect of the project's activities, especially during the contract's second year (1973-1974). Emphasis shifted noticeably from the project's original charge to develop a range of ideas that could be implemented by other institutions, to its desire to function as an autonomous generator of non-formal "messages" for rural peasants (i.e., self-awareness, pride, local control, etc.).

This created a good deal of misunderstanding between the project staff and the project's sponsors, AID. Both agreed on the NFE's general goals, as stated in the 1971 contract, but there were sharp differences of opinion over the weight being given to them by the project, and over the ultimate direction the project appeared to be taking. In the view of many, the UMass project had begun to see itself as a permanent non-formal education institution instead of the short-term experiment it was intended to be.

The differences were resolved, at least officially, with the project's third--and final--contract year. AID limited UMass activities to a consolidation of ongoing experiments and a general summation and conceptualization of their experiences in the non-formal field. In March, 1975, the project passed into the Ministry of Education as a center for continuing development of ideas for non-formal education. After three years of great leeway in its actions, the UMass project was brought back to its original conception: a generator of innovative educational ideas and materials.

Much of the project staff has never fully agreed with this limitation, despite AID insistence on it and the project's recent "institutionalization" in the Ministry of Education. For them, non-formal education continues to be a much broader, deeper process than that which the UMass project now officially accepts as its task.

QUESTION 2: HOW DOES THE UMASS NON-FORMAL EDUCATION PROJECT GO ABOUT IMPLEMENTING ITS GOALS AND OBJECTIVES?

(A fuller discussion can be found in Vol. II, and in Vol. III, pp. 16-39).

The UMass NFE project had two basic goals: 1) the creation and development of non-formal techniques and methodologies; and 2) the implementation of these through existing Ecuadorian institutions. But because of the wide variety of activities in which the project engaged, and its varying sense of commitment to each of them, the objectives for each activity were quite different, although aimed at the same general project goals.

In order to assess the implementation of the goals over the project's three years in Ecuador, we were forced to look at each activity separately, using UMass documents, staff interviews, and observations and participant interviews in a series of UMass-impacted rural communities chosen for study.

The area of greatest project activity was in the development and spread of the non-formal game materials and, almost simultaneously, the facilitator concept. Both had as their major objectives the transfer of basic literacy and numerical skills, and the development of "critical consciousness" in peasants. In the first year the games were tried out with various local groups, but during the next two years their use was limited to the facilitator groups and the Ministry of Education's Adult Education centers. The facilitator concept was picked up in 1972 from an Ecuadorian research group, and then expanded to the Coast and an Indian area of the highlands, both in 1973. To a large extent the cognitive and motivational objectives of both the games and the facilitators were intended to be realized through a careful structuring and design prior to their implementation. That is, the games were designed to be flexible, captivating, and educational, while the facilitators were to be well trained in group motivational techniques and basic non-formal literacy methods. In neither case were the realization of the objectives ever fully, systematically tested by the UMass NFE project staff.

Other project activities in the first two years (1972-1974) concentrated on the use of existing networks for transfer of non-formal "messages," both educational and motivational. Through the use of the Tabacundo radio school programs, the printing of thought-provoking fotonovelas (comic books using photographs rather than drawings), and even the short-term utilization of a traveling education fair, the UMass NFE project hoped to spark campesinos' interest in further education--in short, to "turn them on" to their own possibilities for learning and development. Of these activities, only the radio school program had definite stated objectives, which were later measured by the NFE project itself through questionnaires; the others were highly experimental means of testing existing communications channels for possible use later in more structured non-formal approaches.

A major continuing activity of the UMass NFE project during its three years was the training of personnel from outside institutions in game use and non-formal methodologies. It was hoped that by intensive short-term training sessions, the project could impart its outlook and approaches to education to a wide spectrum of interested parties, who would in turn implement the major project objectives (cognitive and motivational) in their own

organizations. This mode of implementation proved to be less than effective; non-formal education as it is conceived by the UMass project requires a root change in the way teachers have learned to deal with pupils, and the constraints on time and finances prevented the project from ever developing a short-term training module that could effect such a change.

In short, the UMass NFE project set a variety of objectives for the realization of its two major goals, depending on the individual activity. Likewise, it was the nature of the activity--whether it involved direct project intervention or required only cooperation with other groups--that determined the way in which the objectives were implemented. With the non-formal games and the facilitators, the objectives were reasonably clear and well-planned; implementation was followed closely. The mass media techniques were much less didactic in nature, which was reflected in their lack of exact learning objectives. Implementation was through a "shot-gun" approach; that is, it was the implementation, the activity itself, that counted rather than the objective. Finally, the transfer of non-formal capabilities to local institutions was carried out through a variety of training modes, none of which were able to satisfy all their intended objectives with regard to a non-formal approach.

QUESTION 3: TO WHAT EXTENT IS THE UMASS NFE PROJECT CARRYING OUT ITS INTENDED OBJECTIVES EFFECTIVELY?

(A fuller discussion can be found in Vol. II, and in Vol. III, pp. 40-72)

Because of the present evaluation's focus on the changes in individuals affected by the UMass project's non-formal games, we limited the scope of this question to an examination of the facilitator-games model as it was implemented by UMass. A sample of eight rural villages where the model had been used was selected, using as the criterion for selection that these communities were considered to be "successful" UMass NFE communities as reflected in UMass documents and interviews with project personnel. In each of the communities the evaluation staff conducted in-depth interviews with project facilitators, participants in the facilitator-led learning sessions, and community residents outside the program; the interviews were aimed at a qualitative analysis of the UMass project as it had affected individuals and communities. In addition, between six and eight participants (not the facilitators) in each village were given the measurement instrument used in the evaluation and control communities; this was in order to quantitatively gauge the impact of the UMass project at the individual level, especially that of changes in fundamental skills or critical consciousness due to game use. Since no individual pretest data were available, it was assumed that residents of these communities (which were similar in demographic characteristics to the baseline data obtained from the large number of virgin communities under study) had substantially similar literacy, numeracy, and critical consciousness levels prior to the UMass impact. Thus, differences in test scores were attributed to the UMass project impact.

Two of the eight UMass-impacted communities were part of a group of seven villages where the facilitators had been trained in 1971 by CEMA, an Ecuadorian consulting and training group. In these villages the UMass project supplied the learning materials and, from 1972, the back-up support. In the other six project-impacted communities--two in the Sierra and four on the Coast--the UMass project implemented the entire model (i.e., selection and training of the facilitators through to continuing support). In the latter six communities we found a series of problems, largely related to the selection of the facilitators and their subsequent training, that acted to limit the spread effect of this non-formal model. As contrasted to the first two communities, in the latter six the participant groups were small, the games were used only sporadically, and the program generated little if any community-wide interest.

The test instrument applied to individual participants showed that, in general, game session participants had "gained" significantly in several measurements of literacy and in the development of critical consciousness. No "gains" were found in math skills. Since these tests were taken up to two years after the individuals had last played the non-formal games, we felt that the improvement shown in these areas was probably the result of the over-all impact of the facilitator-games model rather than the games alone. That is, the increased receptiveness to educational stimuli over time that is generated by a change-oriented program might be as important as the specific learning and "conscientization" objectives of the individual materials employed.

QUESTION 4: WHAT ARE THE LEARNING OUTCOMES OF SELECTED NON-FORMAL EDUCATION MATERIALS DEVELOPED BY THE UMASS-NFE PROJECT?

(A fuller discussion can be found in Vol. II, and in Vol. III, pp. 74-92)

In order to provide objective information to answer this question, the evaluation staff introduced four of the most widely used non-formal education games developed by the UMass NFE Project into a total of 15 virgin communities. These NFE games were Hacienda, Syllable Cards, Syllable Dice, and Number Bingo. Each NFE game treatment consisted of a total of five game sessions led by the evaluation field worker (animador), one session per week. The villagers participating in the game sessions were administered tests on a pre-post basis designed to measure learning outcomes related to the objectives of the NFE games.

Results revealed that Syllable Dice and Syllable Cards in general were not effective in increasing level of literacy. An additional conclusion is that in several of the communities, these two NFE games tended to attract more individuals who were already literate than illiterates. Even those who were at the lower end of the literacy continuum in general did not increase significantly their literacy level as a result of playing either of these two NFE games.

Number Bingo was found to be effective in increasing simple numerical skills among villagers who had very low levels of these skills.

Hacienda was found to be effective in raising reading and functional writing skills only among villagers with low levels of reading ability, and only in the Sierra or mountain region.

The conclusions based on the empirical data presented herein in no way should be interpreted as suggesting that these non-formal education materials might not be effective in producing their intended learning outcomes if used in a different manner than the way in which they were implemented by the evaluation staff. The conclusions apply to the manner in which these treatments were implemented; these implementation procedures have been presented in detail in Chapter II of the present report. It is, however, with a great deal of confidence that we report the present findings as results of the treatments implemented by the evaluation staff.

As we have pointed out in responses to some of the other evaluation questions, the effects of the use of these non-formal education games seems to be a function of a host of factors, including principally the manner in which they are implemented by the facilitator, the nature of the group playing the game, and the number of times played. Moreover, there may be learning effects of the games that are measurable only in the long term and which do not manifest themselves after only five sessions.

QUESTION 5: WHAT ARE THE CHARACTERISTICS OF THE MORE AND LESS EFFECTIVE MATERIALS DEVELOPED BY THE UMASS NON-FORMAL EDUCATION PROJECT?

(A fuller discussion can be found in Vol. II, and in Vol. III, pp. 93-110)

The UMass project outlined in its series of Technical Notes a number of physical and cognitive characteristics felt to be crucial to the non-formal games' ability to transfer fundamental skills (i.e., literacy, numeracy) to their peasant users. The games were to have been of a simple physical format, which would allow campesinos to manipulate them easily and with little or no outside direction. It was hoped, too, that their simplicity would lend itself to the peasants themselves taking on a major role in reproducing and altering the games to fit their own educational needs. The various games were also to offer the peasant different useful learning experiences, and at the same time lead towards "reflection" on daily experiences and the development of communication skills.

Our experience with the games as they were used literally hundreds of times in the experimental communities allowed the evaluation to observe each of the intended characteristics under actual field implementation conditions.

We found, first, that the three "fluency" or skill games (Syllable Dice, Syllable Cards, Number Bingo) are all easily handled by the average peasant. They could be physically reproduced in rural communities, but this never occured. All can be used beneficially by peasants playing without a facilitator present, but only concerning their specific skill area (as opposed to their motivational objectives). A facilitator is often needed, however, to clarify or correct math problems, words, or unfamiliar concepts.

Hacienda, on the other hand, is physically a much more complex game. Its reproduction in rural villages would be extremely difficult. Likewise, a facilitator is needed to aid in its playing because of the game's numerous elements, roles, and concepts.

The three "fluency" games can serve as bases for facilitator-led reflection on rural reality. Their simple content and limited parameters (formation of individual words; short addition and multiplication problems), however, require a person who is skilled at drawing out the games' concept and expanding upon it; otherwise the games tend to become merely recreational. Hacienda offers a much wider base for reflection since it is based on rural reality itself; nevertheless, a facilitator is needed to lead the discussion because of the game's complex, often sensitive subject matter.

Only Hacienda among the four evaluated games allows for a true development of individual and group communication skills. Its physical format and rural-based content force the participant to deal with other players and to learn to express him/herself on a variety of personal and social matters. The fluency games tend to be highly individualistic experiences, with no real need for thoughtful expression.

We found, too, that the four games met certain learning needs of rural dwellers, but that they were "needs" as defined by the people who introduced

the games. Their physical format and learning content (especially in the case of the "fluency" games) did not allow them to be used for a variety of purposes.

All of these characteristics affected the games' effectiveness as learning tools, but to different degrees according to the individual communities where they were used and the facilitator who introduced them. Standing alone, the games cannot be considered as "more" or "less" effective, but rather as offering a series of possibilities to be expanded upon.

QUESTION 6: WHAT ARE THE CHARACTERISTICS OF MATERIALS THAT WORK WELL WITH LEARNERS OF WHAT CHARACTERISTICS? WHAT ARE THE BEST MATCHINGS?

(A fuller discussion can be found in Vol. II, and in Vol. III, pp. 110-118)

In order to provide information concerning the relationship between antecedent conditions and the effects of each of the NFE games on the development of literacy, numerical skills, and critical consciousness, bivariate correlation coefficients were computed between variables reflecting antecedent conditions and gains effected by each of the games on literacy, numerical skills, and critical consciousness. These analyses were performed separately for groups of individuals in communities where each of the treatments was instituted by the evaluation staff.

Results indicate that Syllable Cards was relatively more effective in increasing reading level among villagers who had lower levels of formal education, who were older, female, had lower occupational status, lived in residences with a greater number of persons, and were leaders of community organizations. Syllable Cards, then, was most effective in increasing reading level among villagers who were among the most educationally and occupationally disadvantaged but who were active in community politics.

Syllable Cards was relatively more effective in increasing writing skills among villagers who had higher levels of formal education, who had participated in adult literacy classes, who lived in residences with a larger number of persons, and who watched less TV, movies, and read fewer newspapers prior to the treatment. Syllable Cards was most effective, then, in increasing writing skills among villagers who had received higher levels of formal education previously but who currently were least stimulated educationally by the media.

Syllable Cards sessions were relatively more effective in increasing the level of critical consciousness among villagers who were younger, who lived in residences with a larger number of persons, who were leaders and members of community organizations, and who read more newspapers and magazines prior to the treatment--that is, the most politically active and intellectually stimulated.

Syllable Dice was relatively more effective in increasing reading level among villagers who watched more TV and read more newspapers prior to the treatment, and who lived in residences with a large number of persons. Syllable Dice, then, was most effective in increasing reading level among those who were more socially and intellectually stimulated.

Syllable Dice was relatively more effective in increasing standard writing skills among villagers who read fewer newspapers and magazines prior to the treatment and who lived in residences with a larger number of persons. Syllable Dice was more effective in increasing standard writing, then, among those who had least contact with standard Spanish.

Syllable Dice sessions were relatively more effective in increasing critical consciousness level among villagers with higher levels of formal education, who went more to the movies but watched less TV prior to the treatment, and who lived in residences with a smaller number of persons.

For villagers who had lower levels of formal educational attainment, Number Bingo was relatively more effective in increasing numerical skills,

critical consciousness, and writing skills. For villagers who were younger, Number Bingo was relatively more effective in increasing numerical skills and critical consciousness. For villagers who were not members of community organizations, Number Bingo was relatively more effective in increasing numerical and writing skills.

Also, Number Bingo was relatively more effective in increasing numerical skills among females.

Number Bingo was relatively more effective in increasing critical consciousness among less formally educated villagers and among those who went to the movies prior to the treatment.

In general, then, Number Bingo was more effective among villagers who were more educationally and socially disadvantaged.

The effects of Hacienda on reading and on critical consciousness were greater among villagers with higher levels of formal education.

Also, the effects of Hacienda on increasing critical consciousness were greater among villagers who were younger, who had lower occupational status, and who lived in residences with a larger number of persons.

The effects of Hacienda on increasing reading skills were greater among villagers who were Indian rather than mestizo or white or mestizo rather than white, who lived in residences with a smaller number of persons, and who were members of community organizations.

The effects of Hacienda on increasing numerical skills were relatively stronger among villagers who spoke Spanish rather than Quichua and who listened to the radio prior to the treatment.

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Several relationships are common to two or more of the NFE games: Hacienda, Number Bingo, and Syllable Cards had greater effects on increasing critical consciousness among villagers who were younger. Both Hacienda and Syllable Dice had greater effects on increasing critical consciousness among villagers who were relatively more educated formally. Both Hacienda and Syllable Cards were more effective in increasing critical consciousness among villagers who lived in residences with a larger number of persons.

Both Syllable Cards and Syllable Dice were relatively more effective in increasing reading level among villagers who were white rather than mestizo or Indian, or mestizo rather than Indian, and who lived in households with a larger number of persons. Both Syllable Cards and Syllable Dice were relatively more effective in increasing writing performance among villagers who read fewer newspapers prior to the treatment. Both Number Bingo and Syllable Dice were more effective in increasing numerical skill among villagers who were younger. And both Number Bingo and Syllable Cards were relatively more effective in increasing numerical skills among villagers who had a lower level of formal education.

QUESTION 7: WHAT FACILITATOR/TEACHER VARIABLES HAVE AFFECTED THE RELATIVE EFFECTIVENESS OF VARIOUS MATERIALS?

(A fuller discussion can be found in Vol. II, and in Vol. III, pp. 119-126)

The individual facilitator has been found to be fundamental to the games' ability to function as effective learning and "conscientization" tools. Factors such as training received, personal motivations, maturity, and institutional support all contribute to the facilitators' ability to make the non-formal education project an over-all success; these are discussed in Question 12. There are four more specific facilitator attributes, however, which appear to directly affect the outcomes each game is capable of producing.

The first variable is the level of formal education completed by the facilitator. We found that years of schooling did not seem to affect the facilitator's ability to attract initial interest in the program, but it did relate to their ability to take advantage of the games' various learning possibilities. This was especially true of Hacienda, because of this game's complex nature. The facilitator with primary education or less was not as effective in using the games' strictly educational component.

The facilitator's originality and flexibility in using the games according to the different learning needs of each rural group was seen to be an important factor in maintaining the group's attendance and in developing a greater sense of participation in the learning process. In those communities where the facilitators adapted the games to the particular community, participants showed a greater inclination to use the learning in other community activities.

We found, too, that a facilitator's ability to identify with the community where he/she worked was reflected in the community's continued participation in the program and in the effective use of the game's learning and "conscientization" components. That is, a facilitators' demonstrated desire to live in rural villages and to relate to the problems found there affected the campesinos' response to the content and style of the four non-formal games.

Finally, we found that the facilitator's ability to conceptualize the content of the games was linked to the participating group's gains in critical consciousness. Where the facilitator was able to help the rural groups focus the experience of the games on local problems, the individual peasants demonstrated a sharper perception of their own reality.

Aside from the facilitator's educational background, which we found to affect the effectiveness of all four games' learning outcomes, the other variables discussed above were equally important across all the evaluated non-formal games, and in regard to their learning and "conscientization" possibilities. The facilitators' ability to adapt to rural villages and his/her flexibility in using the games largely determined the extent to which each of the games would hold an audience's interest and aid in developing changes in the individual.

QUESTION 8: WHAT ARE THE MOTIVATIONAL ATTRIBUTES OF EACH OF THE FOUR EDUCATIONAL GAMES SELECTED FOR IN-DEPTH EXPERIMENTAL ANALYSIS IN THE EVALUATION?

(A fuller discussion can be found in Vol. II, and in Vol. III, pp. 127-146)

The UMass project's non-formal games are intended not only to impart specific functional skills to their peasant users, but also to motivate them towards attitudes and activities that will lead to the development of the community. The evaluation examined each of the four non-formal games--Hacienda, Syllable Dice, Syllable Cards, Number Bingo--in terms of their physical aspect and their content, in order to identify those elements which acted to motivate Ecuadorian campesinos. Just as importantly, we wished to identify the specific ends to which such motivational elements appeared to lead, and the extent to which those ends were indeed being reached by rural dwellers who had used the various games.

A review of all available UMass project literature on the four evaluated games yielded a list of motivational objectives for each. We reduced these to three broad areas that were applicable to all four games: 1) the games should spark and maintain the participant's interest, 2) the games should promote the active participation of the peasant, and 3) the games should act to integrate the group and break down individual inhibitions. The evaluation's implementation of the games in close to 25 communities allowed us to observe those motivational elements in action literally hundreds of times under the most varied of conditions.

We found that all four evaluated non-formal games have approximately the same ability to arouse initial interest in rural communities, thus facilitating the introduction of a non-formal education program there, but they differ greatly in their ability to maintain that interest. Number Bingo, because of its extreme simplicity of content, quickly bored rural audiences and came to be seen as recreational rather than educational. The two literacy games (Syllable Dice and Syllable Cards) maintained participant interest among a wider selection of people and over a greater length of time, largely because of their greater complexity and greater flexibility of use. None of these three "fluency" games in themselves acted to motivate rural people towards specific ends. Hacienda was the most successful of the games in maintaining participant interest, because of its close approximation to rural reality. Its depth of content allowed peasants a variety of learning experiences; this appeared to motivate peasants to make practical applications of what they learned to daily situations.

We found, too, that all four games invite peasant participation, but to a different degree. Number Bingo involves the person at a passive, receptive level; the individual makes no contribution to the learning process. The two literacy games call on the participants to create the learning (i.e., formation of words), but in a limited, highly individualistic way. All three "fluency" games have rather fixed cognitive parameters, and allow the peasants only limited grounds for developing a feeling of "ownership" or direction over the learning process; participation is active but not truly

creative. Hacienda, on the other hand, has much wider learning parameters and involves a much deeper individual participation; the players to a large extent control the development and outcome of the game, and thus the learning experience itself. It was through the use of Hacienda that rural groups became most motivated to continue their own education, and to apply that to actual situations (e.g., the marketplace, dealing with authorities).

Finally, we found that only Hacienda, because of its content and physical design, acted to foster a conscious sense of group identity, self esteem and efficacy among rural participants. The use of simulation allowed people to express themselves on important issues, while the experience of having played together as a group appeared to help break down many of the suspicions and fears that hinder peasants from working together. The three "fluency" games, because of their individualistic playing styles, acted to promote an individual sense of achievement and even competition, rather than group cooperation.

We found that all four games initially motivate the rural participant to attend the non-formal learning sessions. The games are not equally good at maintaining that interest. All the games involve the peasant actively in the sessions but to a different degree and quality. Hacienda, in particular, had characteristics that motivated the campesinos to a greater sense of participation in their own education and to possible community applications. Further, only Hacienda contained elements that motivated a group to a sense of local pride and group identity.

QUESTION 9: WHAT CHANGES IN ATTITUDES AND BEHAVIORS (CRITICAL CONSCIOUSNESS) ARE PRODUCED BY EACH OF THE SELECTED NON-FORMAL EDUCATION GAMES?

(A fuller discussion can be found in Vol. II, and in Vol. III, pp. 147-157)

The answer to this question is based on objective information collected by means of individually administered questionnaires in pre-post fashion to villagers before and after playing each of the non-formal education games introduced by the evaluation staff into a total of 15 virgin communities.

A principal component of each NFE game session involves a period of "reflection" which takes place usually after playing the game. The purpose of this "reflection" is to develop awareness and insights into one's everyday problems. This state of increased awareness and action is called "critical consciousness." In order to measure changes in "critical consciousness" as a result of using the NFE games, a questionnaire was developed and administered.

In order to determine the extent to which test-retest differences found in the 15 experimental communities could be due to factors other than the intervening treatments (e.g., test practice effects), a control sample was selected and administered the measures in a pre-post fashion without an intervening treatment. t tests for correlated means computed for the control villagers comparing performance on the pre and second test revealed no significant gains in critical consciousness. Thus, we could be assured that any significant pre-post test differences in our experimental communities would, in all likelihood, be attributable to the treatment.

Examination of the data from the UCLA evaluation communities provided the following results. Hacienda NFE sessions were found to be effective in significantly increasing critical consciousness in the majority of the Coast communities in which the sessions took place. Hacienda sessions, however, generally were not effective in significantly increasing critical consciousness in Sierra communities. Syllable Dice NFE sessions were effective in increasing critical consciousness in half of the Sierra communities in which they took place. Syllable Dice sessions, however, were not effective in increasing critical consciousness in any of the Coast communities. Syllable Cards NFE sessions were effective in increasing critical consciousness on the Coast, but not in the Sierra. Number Bingo NFE sessions were not effective in increasing critical consciousness in any of the communities in which they took place.

The conclusions based on the empirical data presented herein in no way should be interpreted as suggesting that these non-formal education materials might not be more effective in contributing to an increase in level of critical consciousness if they had been implemented in a different manner. The empirical portion of the evaluation report can only address the results of the intervention as employed in this study. The conclusions apply to the manner in which these treatments were implemented; the implementation procedures have been presented in detail in Chapter II of the present report. It is, however, with a great deal of confidence that we report the present findings as results of the treatments implemented by the evaluation staff.

As we have pointed out in responses to some of the other evaluation questions, the effects of the use of these non-formal education games seems to be a function of a host of factors, including principally the manner in which they are implemented by the facilitator and the nature of the group playing the game. It is also possible that the materials might have a stimulating effect that does not become manifest for a period of time.

QUESTION 10: WHAT SEQUENCING FACTORS OR PREREQUISITES ARE IMPORTANT FOR THE FOUR NON-FORMAL EDUCATION GAMES?

(A fuller discussion can be found in Vol. II, and in Vol. III, pp. 158-160)

It should be noted that because of the limitation of the present evaluation design the data available to support the findings on game sequences must be considered as limited. To answer the question to a fuller extent, additional data related to this question can be found in the responses to Questions 6 and 11.

The answer to this question is based on empirical data. t tests for correlated means were performed comparing the pre versus third test performance on literacy, numerical skills, and critical consciousness for groups of communities in which the evaluation staff introduced each of four two-game sequences. In addition, analyses were performed within each group of communities for individuals who had low initial scores. Only those results which can be attributed to the game sequence (i.e., and not to the effects of either of the two games by themselves) are discussed.

In order to make statements about sequencing effects, significant differences between the pre and third tests are considered only if those significant gains could not be attributed to the effects of individual games within the sequence. That is, if the gain between the pre and third tests was significantly greater than the gain between the pre and the second, or between the second and the third tests, then it could be said that the demonstrated gain was due to the specific two-game sequence.

One of the four two-game sequences studied experimentally, the Syllable Cards-Syllable Dice sequence resulted in near-significant gains due solely to the sequence. This NFE game sequence resulted in a near-significant increase in critical consciousness. No other sequence effects were borne out by the data.

It should be emphasized that the present findings apply only to the manner in which the treatments were instituted by the evaluation staff. These have been described in detail in Chapter II. One may not, based on the present findings, discard the possibility that the same game sequences, if implemented as part of a different set of treatment conditions, or with different groups of individuals, might not result in significant effects. Nor are we commenting on the results of each game individually, since those results had been discussed in the answers to evaluation Questions 4 and 9.

QUESTION 11: WHAT ARE THE EFFECTS OF REPLAY FREQUENCY FOR EACH OF THE NON-FORMAL EDUCATION GAMES?

(A fuller discussion can be found in Vol. II, and in Vol. III, pp. 161-166)

Throughout the experimental implementation phase of the evaluation, an attendance record was kept for each villager participating in the treatments (i.e., the NFE animador-led game sessions). In addition, individual records were kept for each villager's use of the games outside of the NFE sessions.

Correlation coefficients were computed between attendance data and gain scores resulting from the use of each NFE game. These gain scores were computed for each individual on each variable. When interpreting the resulting correlation coefficients it should be kept in mind that the distribution of difference scores typically is not known, and that the shape of the distributions of the test variables in some cases deviates from normality.

The individual records of attendance of the NFE sessions trace participant attendance or lack of it to its causes. We found the greatest barrier to continued attendance was the work pattern of campesinos. Long days of labor in the fields (or all night on boats, which was the case in fishing villages), when coupled with the distances between one's home and the center of the village, acted to reduce the participant groups to only those individuals who were most highly motivated. In the case of Number Bingo, the motivating factor was often entertainment; this was usually not high enough to offset the participants' perception of the game as being of limited educational value, and desertion was high. Desertion was lowest when Hacienda was played, due to the game's multiple learning possibilities, its reflection of rural issues, and its great entertainment value. These acted to overcome what were otherwise strong barriers to continued participation in the sessions.

Attendance was lowest among adult females. In part this was due to the work pattern; women not only work in the fields during the day, but are expected to maintain the home and take care of the children as well. Too, certain cultural barriers to female participation (especially in Coastal communities) in community activities continue to exist in rural areas.

The other major reason for individual desertion of the program was lack of interest; that is, people felt the games and sessions were of little or no value to them. This reason was most common among those who had completed four or more years of primary school, and those individuals under 20 years of age and over 45 years. Hacienda was the only one of the four evaluation games we found able to largely neutralize this factor. That is, its attractiveness and apparent utility to the campesino were enough to motivate continued attendance among all types of people.

In situations where Syllable Cards was introduced as the second NFE game to Hacienda, increased replay frequency of Syllable Cards was effective in producing greater gains in Critical Consciousness. This was the case both for animador-led and non-animador-led sessions.

When Syllable Dice was introduced as the second NFE game (to Hacienda or to Syllable Cards) increased replay frequency of the first game in the sequence (Hacienda or Syllable Cards) at animador-led sessions was effective in producing greater gains in Reading as a result of playing Syllable Dice. Also, increased replay frequency of the first game in the sequence (Hacienda or Syllable Cards) without the animador, produced greater gains in Critical Consciousness.

Increased replay frequency of Number Bingo in animador-led sessions was effective in producing greater gains in numerical skills. Also, increased replay frequency of Hacienda in animador-led sessions prior to playing Number Bingo was effective in producing greater gains in numerical skills as a result of playing Number Bingo.

Increased replay frequency of Hacienda in animador-led sessions produced greater gains in Functional Writing as a result of playing this NFE game.

A general pattern emerges quite clearly; the more time that games were played, the higher the scores attained by participants. Another fascinating finding is that the replay sequence of the first game affects the learning and consciousness outcomes of the second game. These findings lead us to speculate about the potential increased game scores that might have been attained by the playing of the various games (discussed in Questions 4 and 9) if there had been a stronger (more game playing sessions) treatment variable. These speculations seem particularly appropriate given the strong correlation found between game playing frequency and gain scores.

Finally, the findings on desertion indicate that game playing frequency is lowest among that group of rural dwellers which appears to benefit greatly from the games' learning attributes: women. (See Question 6.) Replay frequency is high, however, among another group that benefits from the materials, male adults having between zero and three years of formal schooling; it is low among those groups--adult males or youths with over five years' education--who appear to need the games' learning content the least.

For each NFE game, the maximum possible replay frequency for animador-led sessions was five times. Therefore, no conclusions are made regarding potential situations with a larger possible number of animador-led sessions. The non-animador-led replay frequency, however, was limited only by the test-retest time frame of ten weeks per two-game sequence or of five weeks where only one NFE game was introduced.

QUESTION 12: CAN THE UMASS NON-FORMAL EDUCATION PROJECT BE REPLICATED IN OTHER COUNTRIES? WHAT CONDITIONS ARE MOST NECESSARY TO ENSURE SUCCESS?

(A fuller discussion can be found in Vol. II, and in Vol. III, pp. 167-200)

The UMass NFE Project in Ecuador has functioned under a very favorable, very special set of personal and institutional circumstances during its three years of experimental activities. At the same time, the continuing world-wide interest in cost-effective means of rural education, formal or otherwise, has turned the interest of governments and international development agencies to the UMass project, in hopes of finding elements or successful formulae that can be applied elsewhere. Since an entire project, especially one as complex and multi-faceted as that of the UMass Ecuador program, could not be transplanted to another country, we decided to focus our attention on the replicability of the facilitator-games component of UMass' activities. It is the aspect that has drawn the most attention to the NFE Ecuador program, and it is a non-formal model which many people feel holds great promise for effective literacy-and-development programs in rural areas.

Our research into this question began the moment the evaluation started its implementation of a modified facilitator-games model in order to introduce and evaluate the non-formal games in rural communities. Interviews with UMass project personnel and project-trained facilitators, with AID/Quito staff, and with Ecuadorian institutions working in the rural areas were all followed by eight months of direct field experience in implementation procedures; we observed the workings of the model in UMass-impacted communities and in evaluation communities, interviewing facilitators and participants in each. From this, we were able to identify those factors that would allow for a facilitator-games model to effectively reach its two major goals: the transfer of functional skills (literacy, numeracy) to the rural participants, and the development of individual and group critical consciousness (conscientización; that is, the ability to analyze one's situation objectively).

We found that, first, there was the need for the model to be supported by a national institution in order to assure greater financial stability, continuity of program content, and a wider choice of possible applications of its learning components. At the same time, the sponsoring institution must be flexible and open enough to allow for the lack of specific program outputs, and for the development of critical, change-oriented rural groups.

Further, the model requires the careful prior selection of proposed impact communities. We found that not all rural villages are interested in more educational programs, nor are all campesinos in need of basic courses in literacy and numeracy skills. Likewise, not every community that may demonstrate a need for such programs will have the basic physical, racial, or economic infrastructure necessary to support this kind of non-formal approach to education.

As the key personal component of the model, the facilitators must be selected and trained with great care. We found that facilitators need not be native to the community where they will work, nor even from a rural

background at all; rather, personal factors (motivation, adaptability, maturity) are much more crucial in their ultimate success. Their training should be theoretical as well as practical, and should concentrate equally on group motivation techniques and the skillful use of the specific educational materials. The facilitators, we observed, must also be able to count on regular support from the program, be it financial, personal, or professional.

Finally, we found that the nature of the non-formal games themselves was as important to the effectiveness of the model as the other components; they were not, as has been sometimes argued, merely one interchangeable tool among many. Their careful design and useful content served to attract campesinos to the program, while the act of playing and learning at the same time served to create an atmosphere of informality, confidence, and personal efficacy in the group. They can be (and are, if employed skillfully) tools for simultaneous education and critical consciousness development, leading to positive action on the part of rural participants.

These four factors--institutional setting, community selection, the facilitators, the games--were found to be mutually dependent if the model is to function as intended by the UMass project. We found that in the absence, or weakness, of any of the links, the facilitator-games concept still maintained its value as a useful means of imparting literacy; the absence of a link, however, diminished the possibility of the game having value for raising consciousness. Obviously, the loss of this second (or consciousness) component diminishes the model's effectiveness as a means of rural development.

QUESTION 13: WHAT IS NEEDED TO DEVELOP EFFECTIVE NON-FORMAL EDUCATION MATERIALS AND PROGRAMS IN COUNTRIES SIMILAR TO ECUADOR?

This question is a subtle restatement of Question 12. We have preferred to respond to the concerns of both questions by the ample discussion of Question 12.