AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

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EDUCATIONAL TECHNOLOGY FOR DEVELOPMENT
A Self-instructional Series

Office of Education and Human Resources
Technical Assistance Bureau
AGENCY FOR INTERNATIONAL DEVELOPMENT

Washington D.C.

September, 1975

MASTER

Developed by

Gilbert R. Green & Co. Inc.
Natick, Massachusetts
AID/ta-C-1138

Project Manager	Mildred Pollard
Video Production	Intermedia Systems Corp. Cambridge, Massachusetts
Technical Advisor	Academy for Educational Development Washington, D.C.

FOREWORD

"Educational Technology for Development" is a self-instructional program composed of three video cassette units, to be used in conjunction with three supplementary reading units. The reading units are contained in this document.

To derive the maximum benefit from this program, it is recommended that the participant follow certain standard procedures in interacting with the visual and written materials. This User's Manual provides guidelines for using the program package.

INSTRUCTIONS

Who This program is designed for a general audience of AID Mission personnel and host-country counterparts who are concerned with programs and projects that provide information or learning opportunities to target groups within the population.

This program is especially directed to individuals working in the areas of health education, agricultural development, nutrition, family planning, community development or formal education.

Participants may be planners, decision-makers, and/or line staff.

What A complete program package contains:

1. Video Monitor
2. Video Cassette Tape Deck
3. Three Video Cassettes (Units 1, 2 and 3)
4. User's Manual

How <u>Administration</u>

1. Equipment and materials may be housed centrally, or may be readily transported from one facility to another. The equipment is light-weight, and operation of the cassette player does not require a special technician.
2. Each participant should have (and preferably be able to keep), a complete User's Manual. If the Manuals are used by more than one individual, a complete set of unexecuted evaluation instruments should be provided to each participant.
3. The program can be used individually, or in small groups of 2-7 people. The individual study arrangement will allow the participant to work at his own pace, and at times convenient to him. The small group arrangement has the advantage of providing opportunities for discussion and

analysis of the materials. (Evaluation instruments should always be completed independently).

4. The total program requires to complete.

	Time Estimates
Introduction	5 minutes
Program Pre-test	5 minutes
Unit 1 - Video Viewing	18 minutes
Unit 1 - Video Post-test	5 minutes
Unit 1 - Reading	15 minutes
Unit 2 - Video Viewing	28 minutes
Unit 2 - Video Post-test	5 minutes
Unit 2 - Reading	20 minutes
Unit 3 - Video Viewing	14 minutes
Unit 3 - Video Post-test	5 minutes
Unit 3 - Reading	20 minutes
Program Post-test	10 minutes
	150 minutes or 2½ hours

5. Evaluation instruments have been included in this program for the following reasons:

   a) Evaluation information will assist the Technical Assistance Bureau in modifying the materials, and/or making plans for further dissemination.

   b) The evaluation procedure may serve to enhance the learning experiences of participants by providing immediate feedback on ideas, concepts and attitudes that have been affected or reinforced as a result of exposure to the materials.

Procedural Steps for Participants

1. Read User's Manual, pages 1 - 3, and complete the Program Pre-test before viewing Unit 1 - Video.

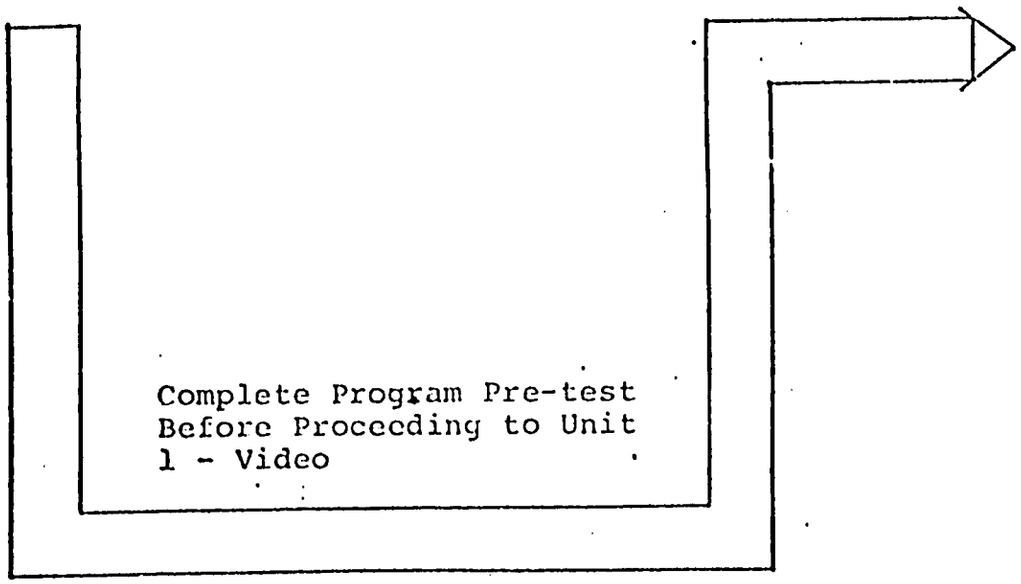
2. Follow operating instructions attached to the video cassette tape deck.

3. After viewing and (optional) discussion, complete the video post-test.

4. Reading the supplementary unit contained in this Manual is recommended, but not essential.

5. The sequence described in steps 3 and 4 above, are recommended for Units 2 and 3.

6. The bibliography is a basic list of recommended reading for those who wish to secure more specific information on the use of educational technology for development.



PROGRAM PRE-TEST

To the Participant:

This questionnaire has been designed to allow you to express ideas and attitudes regarding educational technology as it relates to national development

You should answer these questions shortly BEFORE viewing your first video unit.

You will be asked to answer similar types of questionnaires AFTER you have seen each video unit, and at the completion of the entire program.

This Pre-Post administration of questionnaires is a common procedure employed in educational technology projects, particularly in the formative stages of the effort. Your cooperation in completing these questionnaires will provide the designers of the program with "feedback" for future revision and modification of the program's content and format.

The Pre-Post information will also permit you to make a self-diagnosis of how this instructional experience has affected your ideas, concepts and attitudes.

Instructions: In this section of the questionnaire, you will find a series of statements. There are five possible answers for each statement that range from "Completely Agree" to "Completely Disagree". You should chose the answer that most closely approximates your own opinion and put an "X" on the corresponding line.

Example: Education is important to developing countries

Completely Agree	Agree	Undecided	Disagree	Completely Disagree
	X			

PLEASE NOTE:

1. This section of the questionnaire should take no more than 5 minutes to complete.
2. There are no right or wrong answers.
3. Think in terms of your general past and current experiences. To the extent possible, do not focus on a specific country experience.
4. Be sure to answer each item.

1. Educational technology applications are too expensive for developing nations.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

2. "Educational technology" is a term synonymous with "communication media".

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

3. Educational Technology is most effective when used in the classroom.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

4. In the areas of health and nutrition, the application of education technology is limited.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

5. In the case of agricultural development, there are many possibilities for the application of educational technology.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

6. Educational technology is effective when applied to community development efforts.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

7. Educational technology primarily involves hardware.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

8. Educational Technology is simply the use of media.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

9. Educational technology is useful for promoting cooperation and integration among development sectors.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

10. Educational technology offers alternatives to the more traditional methods of providing learning opportunities and information.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

Test Battery # 1

UNIT 1 - POST-TEST

To the Participant:

This questionnaire should be completed AFTER viewing Unit 1 - Video, but BEFORE perusing the written supplement.

Instructions: The purpose of this section of the questionnaire is to measure the meaning of educational technology to various people, by having them judge it against a series of descriptive, bi-polar adjectives. Some of the adjectives may appear "strange" in relationship to education technology. This is an intentional part of the questionnaire design.

Think of the item being measured, e.g. "educational technology", as a concept. Mark the adjective rating scale in a manner that best matches your feeling with respect to the concept of educational technology.

A neutral feeling should, of course, be indicated by an X in the middle range of the scale.

Example:

EDUCATIONAL TECHNOLOGY

Fair ___ X ___ ___ ___ Unfair

Strong ___ ___ X ___ ___ Weak

PLEASE NOTE:

1. Complete the list quickly; do not deliberate your response.
2. Do not omit items.

Educational Technology

non-essential	____	____	____	____	____	essential
separate	____	____	____	____	____	combined
inexpensive	____	____	____	____	____	expensive
non-systematic	____	____	____	____	____	systematic
dynamic	____	____	____	____	____	static
inequitable	____	____	____	____	____	equitable
dehumanizing	____	____	____	____	____	humanizing
unproductive	____	____	____	____	____	productive
disorganized	____	____	____	____	____	organized
simple	____	____	____	____	____	complicated
fragmented	____	____	____	____	____	comprehensive
boring	____	____	____	____	____	exciting
inefficient	____	____	____	____	____	efficient
destructive	____	____	____	____	____	constructive
ineffective	____	____	____	____	____	effective
useless	____	____	____	____	____	useful
unsuitable	____	____	____	____	____	suitable

EDUCATIONAL TECHNOLOGY: NEW APPROACHES TO OLD PROBLEMS

Educational Techology for Development

Educational technology applications can help to serve as catalysts for social change. However, people must be aware of a need which is not being met by their present customs and behaviors, and they must be able to develop or adopt new behaviors to meet their needs.

"Social change", therefore, entails a change in the whole society and the whole man. It entails new behaviors and new information. It requires that people learn new skill It is here that educational technology demonstrates its great utility and can perform as an effective component in development efforts.

Its three principal tasks are:

1. providing information relevant to change and national development, that is, why change is needed, how it will be brought about, and what it will bring.

2. Organizing the decision process through the flow of information up and down the hierarchy to establish a dialogue between those sending the messages and those receiving them.

3. imparting skills - teaching literacy, hygiene, technical and other skills to people.

In the information tasks, educational technology can create a climate for development. In the decision-making functions, it can play a supportive role, feeding information to discussion processes. In the teaching function, it can help significantly in imparting various types of education and training to people wherever they happen to be.

Thus, it is that technology within development works toward changing structures and improving the human condition of people, young and old. Educational technology employs the full range of learning, information exchange and communication processes, from the simplest to the most complex.

Educational technology is more than media and messages. It is a process where:

- Problems are carefully diagnosed

- Alternative solutions are identified

- Objective and goals are clearly specified
- Ways of transmitting the needed information and educational opportunities are planned and implemented with careful evaluation, monitoring and revision of the process at each step

It has critical advantages for development:

- The relative speed with which learning systems can be developed to reach the mass of people with important information and learning.
- the ability to reach where local expertise does not exist in sufficient amount
- the relative equity with which even the poorest and the illiterate can have access to information and education.

But the processes and applications of education technology are not a panecea. Educational technology has,

Strengths, and Limitations

Systematic methodologies to deliver learning experiences - this is educational technology. It consists of process and tools.

As a process, involving behavioral science and rigorous scientific inquiry, technology helps to:

- define
- analyze
- develop
- implement
- evaluate

strategies for change.

It helps to identify problems; and establish objectives; goals and priorities; to study the needs of people; to analyze settings and organizational structures; to specify alternative solutions and approaches; to construct and analyze prototype programs; and to evaluate the results, revising and modifying where necessary.

As a tool, technology may use:

- print media (newspapers, books, magazines, pamphlets, circulars, billboards, posters, programmed instruction).
- Audio-visual media (film, videotape, television).
- visual media (blackboard, photos, pictures, transparencies, slides).
- audio media (phonographs, cassettes and cartridge tapes, radio, telephone).
- gaming media (simulations, models, puzzles, board games).

But, educational technology is more than hardware. Hardware is merely a convenient way to reach larger numbers of people in isolated areas, with quality services, and often in an economical way. Its benefits, therefore, are:

- relative speed
- uniform quality of delivery
- ability to reach large numbers of people
- relative equity with which it can reach all geographic and population segments
- ability to help integrate development sectors and promote intra-sectoral and inter-sectoral activities, projects and programs

Four Case Applications of Educational Technology for Development

REACHING PEOPLE IN HARD TO REACH AREAS

1. Kenya Radio Project. The project was started in 1968 as a way of assisting the Kenyan Government to raise the educational standards of basic education. Battery-operated radio and correspondence education was used to instruct groups of individual teachers in widely separated, hard-to-reach geographic areas of the country.

   A total enrollment of between 3,500 to 5,000 poorly prepared primary school teachers were seen as the target audience. Their training was accomplished on a sufficiently large scale and in a manner which would not withdraw the teachers from the classroom where they were urgently needed. The existing shortage of available teachers was almost of a crisis magnitude at the time.

EXTENDING NEW LEARNING OPPORTUNITIES TO MORE PEOPLE AND REDUCING THE DEPENDENCE ON HIGHLY SKILLED MANPOWER

2. Project IMPACT: an acronmym for Instructional Management by Parents, the Community and the Teacher. The Project, underway on an experimental basis in Indonesia and the Philippines since 1974, emphasizes the use of community resource persons, such as parents, skilled workers and older students in combination with individualized learning packages, small group student sessions, and radio-assisted instruction to change the role of the teacher. The teacher's new role makes him less of an information presenter and more of an organizer and supervisor of learning activities and teaching resources. This type of non-traditional teaching approach makes it possible for one teacher to reach as many as two-hundred children at once.

QUALITATIVE AND QUANTITATIVE IMPROVEMENTS IN LEARNING

3. Educational Reform in El Salvador: - the systematic change of a rote-learning educational system through extensive curricula revision, teacher retraining, the development of inexpensive printed student workbooks and teacher guides, new grading and promotion policy changes and the use of instructional television. Here, communication media functioned in an integrated way as a catalyst for educational change.

GETTING URGENT INFORMATION TO SPECIAL TARGET GROUPS AND PROVIDING RURAL AREAS WITH MORE EQUITABLE SERVICES

4. The Basic Village Education (BVE) Project In Rural Guatemala: an experimental program of non-formal adult education which seeks to help the illiterate subsistence farmer to improve his production of basic grain crops and thereby augment his income and improve the conditions of his life. Radio is the primary communication media with the use of audio cassettes and supplemented by printed handout material and discussions with field monitors.

Using traditional extension methods, the number of rural farming families reached by such programs is limited. A much larger proportion of the rural population can be served, however, if the efforts started by extension agents can be reinforced through the use of communications technology.

Thus, the BVE Project seeks to determine effective and relative low cost ways of using selected combinations of communications media that have potential for use in development programs where resources are limited.

These four projects, representing both the formal and non-formal areas as well as three different geographic regions of the world -- Africa, Asia and Latin America -- indicate that educational technology is not just the exclusive province of educators. Applications of educational technology, as the examples illustrate, can be made in any sector -- be it agriculture, health, community development, population, family planning, nutrition or the formal school sector. It is a most useful support element for any program of human resource development.

Test Battery # 2

UNIT 2 - POST-TEST

To the Participant:

This questionnaire should be completed AFTER viewing Unit 2 - Video, but BEFORE perusing the written supplement

Instructions: The purpose of this questionnaire is to measure the impact of certain key ideas presented in Video Unit #2. Please complete each item with an appropriate check mark.

1. Development is concerned with helping people who have the greatest need.

	Yes	No
. Was this idea treated in the video presentation?	___	___
. Do you agree with the statement?	___	___

2. A current emphasis within the development community is on rural populations.

	Yes	No
. Was this idea treated in the video presentation?	___	___
. Do you agree with the statement?	___	___

3. Technology makes the process of development more effective.

	Yes	No
. Was this idea treated in the video presentation?	___	___
. Do you agree with the statement?	___	___

4. The systems approach permits the logical analysis of problems

	Yes	No
. Was this idea treated in the video presentation?	___	___
. Do you agree with the statement?	___	___

5. A key factor in the initiation of a national reform is top government commitment.

	Yes	No
. Was this idea treated in the video presentation?	___	___
. Do you agree with the statement?	___	___

6. Instructional television is not necessarily applicable to the educational needs of all countries.

	Yes	No
• Was this idea treated in the video presentation?	___	___
• Do you agree with the statement?	___	___

7. Educational technology applications help to extend and augment existing manpower resources.

	Yes	No
• Was this idea treated in the video presentation?	___	___
• Do you agree with the statement?	___	___

8. Educational technology is equally applicable to formal and non-formal learning systems.

	Yes	No
• Was this idea treated in the video presentation?	___	___
• Do you agree with the statement?	___	___

EDUCATIONAL TECHNOLOGY: METHODS AND APPLICATIONS

Development is characterized by the process of modernizing and strengthening those elements and structures that go to make up a nation. Education is concerned with one of the most essential of those elements:-human resources. The role of education in the development context relates to helping people learn and accept new and better ways of thinking and functioning - ways that will ultimately improve their conditions of life and strengthen the manpower capacity of the nation as a whole.

There are certain educational approaches which are specifically intended to maximize the utilization of available resources, maximize the number of people reached and the educational impact achieved. Conversely, these approaches are geared toward minimizing costs and error. In developing nations where resources are always limited, and where the numbers of people in need of educational opportunities increases daily, the need for high impact, low cost methods of educating, is significant.

Such methods are generally termed educational or communications technology.

The nature and scope of educational technology has evolved over the years. Particularly as it relates to AID projects, is it possible to observe a pattern of change in emphasis and methodology, when comparing earlier educational technology applications with more recent efforts.

One essential change over time has been a broadening of the range of educational and communications tools utilized. Whereas, at one time educational technology tended to be equated exclusively with electronic media, this concept is no longer accurate. Current educational technology projects show evidence of utilizing a wide variety of information transmission modes -- from the most basic written materials to audio-visual via satellite telecommunications transmissions.

Educational technology has also changed and continues to evolve as an applied science. The scientific method which is an inherent part of all educational technology application, is usually termed the systems approach.

As a planning concept, the systems approach is at once, old and new. This approach had its origins in the military and industrial communities, but is widely recognized today as a useful approach in the social sciences. There is a continuing

effort within the area of educational technology to refine the systems approach; to bring the art and science of educating closer to a time when learning processes can be efficiently and effectively controlled, and when results can be accurately predicted and measured.

The systems approach as it relates to educational technology should be viewed not only in terms of what planning steps are involved, but why certain procedures are followed and what techniques are employed.

A pre-requisite to educational change is to define the educational problem. Very often, an apparently obvious need, when subjected to thorough analysis, may not be exactly the problem we thought it was. Take for example the common concern for literacy. Many questions must be answered, and answers vary from one country to the next. Exactly what consititutes literacy? What is the minimal level of competency required? Should literacy include computation and writing skills as well as reading skills? What language or languages? It has even been reconsidered time and again if literacy is a desirable national goal, at all.

The rationale for what is to be learned must be very clear. By-and-large, problem definition is a thinking-out process as opposed to a technical procedure. However, it is often supported by available research data.

Closely related to problem definition is the specification of the desired outcomes. This is answering the question: "After some finite period, what changes in behaviors can I expect to observe, or otherwise measure?" Specification of the criteria for measuring success is a little more involved than problem statement, but it is basically a continuation of the process of specifying exactly what the problem is. In the first instance we were establishing what is needed; in the second instance, we are establishing how to recognize if the goal has been accomplished.

The design phase becomes still more complex, because it is at this point that a broad range of possible approaches and alternatives must be considered. Those involved in the design of educational technology applications usually call upon a vast resevoir of knowledge from a variety of fields.

Much is borrowed from the social sciences, in terms of collecting data with which to make more concrete design decisions. This might entail analysis of demographic data on the target population. It might entail original research such as a sample survey of the target population. Generally speaking, this type of preliminary research is done painstakingly.

Designers will also look closely at current advances in theories of learning and techniques of effective individual and mass communication. For instance, thinking has changed considerably over the years, as regards the use of punishment to induce learning. A more progressive concept which finds many forms in educational endeavors, is the management of incentives. In this approach, attempts are made to identify positive rather than negative reinforcers.

Equally as important as theoretical advances are those advances being made in written, audio and visual media technology. As was pointed out earlier, communications tools are not synonymous with educational technology, but along with a wide variety of methodological considerations, communications tools may become key elements if they seem appropriate to the problem being addressed.

The design phase, then, is the point at which detailed attention is given to the instructional content and the ways in which the content will be delivered

Closely related to design, is the development phase which involves final preparations prior to implementation. This takes into consideration such activities as the training of personnel, preparation and installation of facilities, and equipment, and the preparation of content materials.

Very often, the development phase involves a test-run: what is commonly referred to as validation of the prototype. Once necessary adjustments are made in the system, implementation can proceed.

Collection of project data is typically a complex and exhaustive task in educational technology applications. This is true first of all, because, we can make on-going adjustments by utilizing such information. We can also measure the success of the effort, and equally as important, make better plans for the future.

Many educational technology projects have contributed to a greater general understanding of how to go about improving the quality of communications and educational systems. Contained in the documentation of many educational technology applications is information about:

- new ways of enriching the scope and depth of what is taught

- new methods of transferring learning, particularly in the area of helping people learn to read -- that is, literacy training

- new apparatus and equipment to facilitate communications in the educational process, or to extend the resources of the classroom teacher

- innovations related to structural improvements: better, more efficient design and use of educational facilities

- also, faster, more effective ways to train teachers

Educational technology projects are not isolated events. Any educational endeavor is intimately connected to its target population. Also, any nationally-initiated project has inherent relationships to national priorities and to the national network of decision-making and guidance.

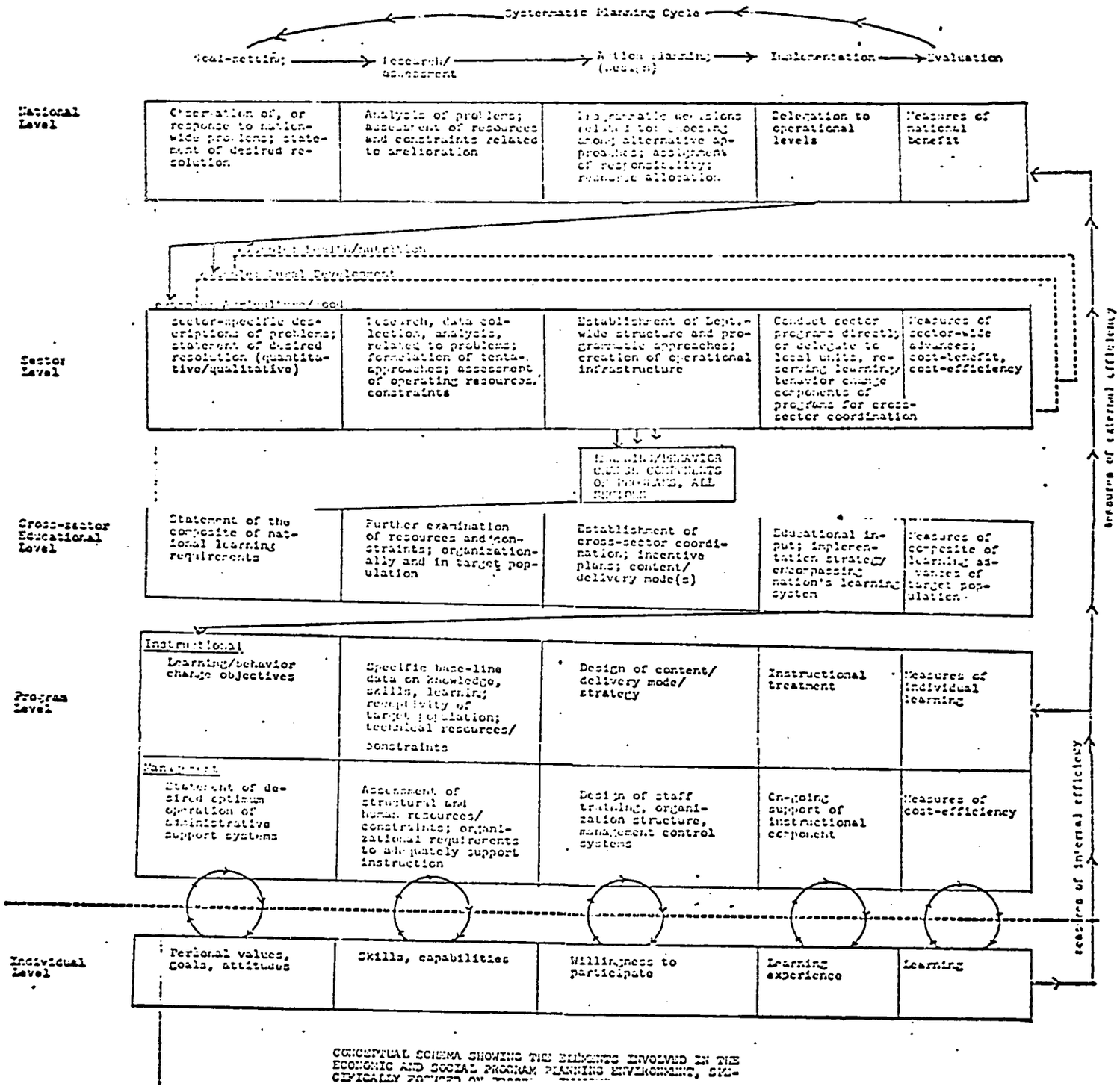
Figure 1 provides one way of visualizing the key steps found in an educational technology application, showing typical project relationships to other aspects of the planning environment.

The Schema suggests several key concepts:

- planning on each level ideally follows a similar pattern moving from a goal setting activity through initiation of actions and evaluation. The difference at each level is the degree of specificity moving from macroscopic decision-making at the national level to microscopic perspectives at the individual level.

- cross-sectoral educational planning introduces a new dimension to educational planning for development. By determining the composite of national learning requirements, it may be possible to analyze and plan strategies and projects in the formal, non-formal and informal segments of the nation's learning system in such a way as to create more effective reinforcing and complementary curricula and more effective utilization of resources.

- ultimately, the individual learner, his interaction with the educational or communications effort and his acquisition of information or skills is the measure of project success. This fact serves to emphasize the need to include specific strategies for incorporating the sentiments of target populations into project planning and decision-making.



CONCEPTUAL SCHEMA SHOWING THE RELATIONS INVOLVED IN THE ECONOMIC AND SOCIAL PROGRAM PLANNING ENVIRONMENT, SPECIFICALLY FOCUSED ON

In summary, educational technology is a specific approach to the mounting of educational and communications efforts. Educational technology applications utilize specific tools and methodologies. When applied to development problems, educational technology offers significant potential for being able to effectively respond to educational problems and learning requirements and to accurately measure results.

A major challenge of developing countries in the coming decades will be the need to find imaginative and innovative alternatives to current practices - alternatives that can effectively reach large numbers of learners inspite of limited resources. The case for educational technology as a respondent to this challenge, is a compelling one.

PROGRAM POST-TEST
SECTION I

To the Participant:

This questionnaire has been designed to allow you to express ideas and attitudes regarding educational technology as it relates to national development.

You should answer these questions shortly AFTER viewing the entire program.

This Pre-Post administration of questionnaires is a common procedure employed in educational technology projects, particularly in the formative stages of the effort. Your cooperation in completing these questionnaires will provide the designers of the program with "feedback" for future revision and modification of the program's content and format.

The Pre-Post information will also permit you to make a self-diagnosis of how this instructional experience has affected your ideas, concepts and attitudes.

POST-TEST
Section I

Instructions: In this section of the questionnaire, you will find a series of statements. There are five possible answers for each statement that range from "Completely Agree" to "Completely Disagree". You should chose the answer that most closely approximates your own opinion and put an "X" on the corresponding line.

Example: Education is important to developing countries.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree
	X			

PLEASE NOTE:

1. This section of the questionnaire should take no more than 5 minutes to complete.
2. There are no right or wrong answers.
3. Think in terms of your general past and current experiences. To the extent possible, do not focus on a specific country experience.
4. Be sure to answer each item.

POST-TEST
Section I

1. Educational technology applications are too expensive for developing nations.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

2. "Educational technology" is a term synonymous with "communication media".

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

3. Educational Technology is most effective when used in the classroom.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

4. In the areas of health and nutrition, the application of education technology is limited.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

5. In the case of agricultural development, there are many possibilities for the application of educational technology.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

6. Educational technology is effective when applied to community development efforts.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

7. Educational technology primarily involves hardware.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

8. Educational Technology is simply the use of media.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

9. Educational technology is useful for promoting cooperation and integration among development sectors.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

10. Educational technology offers alternatives to the more traditional methods of providing learning opportunities and information.

Completely Agree	Agree	Undecided	Disagree	Completely Disagree

POST-TEST
Section II

Instructions: The purpose of this questionnaire is to determine the general impressions made upon participants reference to both the written and video components of the Program.

Please complete questions with a brief narrative response.

1. Did you find the video-equipment easy to operate?

2. Did you feel the video method of presentation was interesting? Effective?

3. Did you feel the content and messages of the video units were informative?

4. Did you read the supplementary reading units? Partially? Superficially? In detail?

5. Did you feel the supplementary reading units were informative?

6. Would you recommend this Program for use by appropriate host-country officials?

POST-TEST
Section II

7. What additional information would you like to have about the Program, in general, or any of the projects described in the materials?

8. What recommendations do you have for improving or strengthening the Program, overall?

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