

1987

Interactive video a new tool for teaching

Belisario Laguado Bueno
University of Northern Iowa

Let us know how access to this document benefits you

Copyright ©1987 Belisario Laguado Bueno

Follow this and additional works at: <https://scholarworks.uni.edu/grp>



Part of the [Education Commons](#)

Recommended Citation

Bueno, Belisario Laguado, "Interactive video a new tool for teaching" (1987). *Graduate Research Papers*. 2163.

<https://scholarworks.uni.edu/grp/2163>

This Open Access Graduate Research Paper is brought to you for free and open access by the Student Work at UNI ScholarWorks. It has been accepted for inclusion in Graduate Research Papers by an authorized administrator of UNI ScholarWorks. For more information, please contact scholarworks@uni.edu.

Interactive video a new tool for teaching

Abstract

Finding new and functional methods for instruction has been one of the most important factors in education. Human beings have learned new technologies by using different techniques for teaching. Starting with direct experiences with nature, body- language, hieroglyphics, graphic symbols, codes and creatin1 different ways for displaying those characters, scientists have used them in the diffusion of science.

INTERACTIVE VIDEO
A NEW TOOL FOR TEACHING

A Research Paper
Submitted
In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

Belisario Laguado Bueno
University of Northern Iowa
May 1987

This Research Paper by: Belisario Laguado Bueno
Entitled: INTERACTIVE VIDEO A NEW TOOL FOR TEACHING

has been approved as meeting the research paper requirements
for the Degree of Master of Arts.

Roger A. Kueter

5/11/87
Date Approved

~~Director of Research Paper~~
Roger A. Kueter

5/11/87
Date Approved

~~Graduate Faculty Adviser~~
Sharon E. Smaldino

5-11-87
Date Approved

~~Graduate Faculty Reader~~
Greg Stefanich

5/14/87
Date Approved

~~Head, Department of~~
Curriculum and Instruction

Table of Contents

Chapter	Page
I. INTRODUCTION.....	1
Factors in Teaching Accurately.....	2
II. REVIEW OF THE LITERATURE.....	7
What is Interactive Video?.....	7
How Interactive Video Works?.....	8
Basic Elements in an IV Program.....	10
Producing Educational Programs.....	11
Selection and Planning.....	12
Needs assessment.....	12
Audience Analysis.....	13
Formulation of Behavioral Objectives.....	14
Task Analysis.....	15
Development.....	15
Planning.....	16
Scripting.....	17
Exercise and Evaluation.....	18
III. SUMMARY AND CONCLUSIONS	20
REFERENCES	23

CHAPTER I

INTRODUCTION

Finding new and functional methods for instruction has been one of the most important factors in education. Human beings have learned new technologies by using different techniques for teaching. Starting with direct experiences with nature, body language, hieroglyphics, graphic symbols, codes (which have their own meaning) and creating different ways for displaying those characters, scientists have used them in the diffusion of science.

Print word has been the widespread medium for broadcasting knowledge; however books today have many competitors: radio, film, television (video), slides, computers (modern teaching machines), and now, interactive-video (IV). Most of them have many advantages and some limitations. Our main purpose as educators is to provide to the learners media and methods which offer basically the following characteristics: (a) motivation--an attractive, clear and dynamic presentation which catches and holds the attention of the learner, (b) simplicity--clear messages expressed in a language familiar to the receivers, (c) accuracy--concrete information which lead the receivers to understand and to learn more rapidly the contents avoiding distractions and lack of interest, and (d) evaluation--instant feedback for reinforcing student's performance when practicing their knowledge.

The purpose of this paper is to describe the advantages and limitations of this medium (interactive-video) and give a basic example of the process that a chosen topic has to follow before becoming an interactive-video program. It is necessary to clarify that IV is not a substitute of the teacher; it is an excellent educational aid which must be used for helping instructors in the teaching learning process. It is useful to explain why it is important to keep in mind the characteristics previously mentioned and to give some guidelines for getting good results in the educational process.

Factors in teaching accurately.

Motivation is a useful tool for catching the learners attention. Teachers can choose different ways for achieving this goal. One of them is the presentation of the content. An attractive format for displaying the topics to be taught will direct the students' attention to the subject matter and develop a good attitude which is the key stone in the implementation of the teaching-learning process.

The ideal situation for instructing is to work under natural conditions. It means that direct experience with the phenomenon to be taught will provide the learners with the best environment for showing them the different variables in which the fact takes place. Many times direct experience is not possible. One good

alternative for solving this limitation is to provide the students with a "model" as close as possible to the real phenomenon.

In some areas the direct experience is available for explaining to the learners the phenomena they are interested in. For example, in biology, teachers can use animals for dissection and analyze the different parts and their functions. In the same way, in physics, it is possible to "re-create" many phenomena like acceleration, gas expansion, changes in volume and temperature, etc. In other areas it is impossible to work with direct experiences. History is a good example of this. We cannot directly show the events which occurred years ago; instead, we can use films, pictures, or sound tapes in which the action was recorded or printed.

We must be conscious that the educational budget (even in developed countries) is not sufficient for providing the students with the best conditions for learning. If teachers cannot work under "normal" (natural) conditions in which images, color, movements, sounds, smell, touch and/or temperature can be tested, they must provide the students with the closer and more accurate way to observe reality. Instructors must keep in mind that we perceive life situations through our senses. They must try to simulate, in the classroom, as closely as possible to a real life

situation or events whose characteristics students are able to perceive in a clear and precise manner.

Besides motivation, simplicity plays a very important role in the teaching process. A good teacher who already knows the topics to be taught, must have the ability to simplify and facilitate the learning process for his/her students. Students will understand with less effort the contents when they are explained in a simple manner.

Some clues for achieving the goal of simplicity are related to three aspects: 1) Audience analysis. Not all groups of students have the same characteristics; individual differences about their cultural background, attention capability, intellectual skills, and personal attitude make them one particular group which deserves a special treatment. These characteristics will determine, as a guide for teaching, what kind of method, materials, and contents should be employed for giving them the most accurate instruction. 2) Technical vocabulary. Each subject has codes and/or symbols which have their own meaning; for this reason it is important to select and explain in advance, or parallel to the teaching learning process, the meaning of the technical words (terms), in order to provide to the group a common frame of reference for dealing with the subject under the

same "language." Once the technical concepts have been defined, students can express in their own words how they interpret the meanings of the basic glossary. At this point, teachers must clarify, exemplify or explain to the group the doubts or misinterpretations students have. Sometimes it is necessary to plan some parallel activities in order to get a common frame of reference which will facilitate the understanding among teachers, students and the topic. 3) Key points. Highlighting the main ideas and parts from a topic is a good guide for understanding technical processes. An additional clue related to the key points is to put them in a logical sequence; in this way, students will have a useful tool for developing study techniques. Having a technical vocabulary and main ideas highlighted, students and/or teachers can design sketches, diagrams, or charts for facilitating the comprehension of the whole topic by visualizing the entire process. Examples must be chosen from activities students are familiar with. The closer the examples are to the reality students already know, the better and easier the understanding will be.

The third factor is Accuracy. Students' attention will be disturbed if teachers include unnecessary information when they are explaining the topics. Essential information must be presented in sequential order for focusing students' attention in

the subject matter. It is necessary to be concrete and to follow a logic pattern which permits the students to catch the main idea without losing their interest on the topic. Students can obtain additional information by reading or consulting bibliography given at the beginning of the course. Highlighting differences and/or similarities between examples given is a good technique for clarifying and mechanizing concepts.

Evaluation, the fourth factor, is the tool teachers can use in order to know how the contents have been understood by their students. A systematic evaluation can be done by asking simple and concrete questions after each exercise done during the class, or after giving a test. This will provide a useful feedback which can be used for determining what are the weak points in the teaching-learning process. In this way, teachers will know if it is necessary to provide additional information or to clarify some concepts for increasing the effectiveness of the instruction. Evaluation must cover not only the topic to be taught but also methods, materials, and the relationship among them.

CHAPTER II

REVIEW OF THE LITERATURE

What are the advantages and limitations of interactive video (IV)? How does it work? What are the main characteristics of this process? Can the teacher control the process? Is it possible to evaluate students' performance by using this method? these are some common questions teachers ask when they face a new method or technique for teaching. Before answering these questions and explaining how IV works and what are its main characteristics, it is necessary to mention that IV is a new technology whose novelty makes it difficult to find a broad bibliography about its content. For this reason the main points in this paper are limited to a few authors and resources.

What is Interactive Video?.

Iuppa (1984) defined IV as "any video system in which the sequence and selection of messages is determined by the user's response to the material." (p.5). It means, basically, that users can obtain different outcomes from the video system, depending on the inputs they select. The outcomes are shown as visual representations on the tv screen. This is the way users interact with IV programs. They can control what kind of information they

want to get from their choices. IV can be used for many different applications; in this case, the author wants to emphasize training or instructional programming.

Besides varied outcomes, random access is another important characteristic of IV. This feature permits the user to go directly to the topic he or she is interested in, without passing through the previous contents. It is something like finding a word in the dictionary; if a person wants to find the meaning of the word "yellow", he or she must look under the letter "Y" where the words which begin with the letter "Y" are listed. This ability to retrieve pieces of information easily and rapidly regardless of its location in an IV program is called random access. It is necessary to clarify that the high speed of this feature is a characteristic of the laser disk. Random access is possible on videotape but slower.

How interactive video works?

The combination of video and the computer makes possible the use of this new technology in which the viewer is not just a passive receiver of information, but an active participant in the process. There are many ways for designing and mounting IV systems. It is possible to select among videotape, laser video disc or other disc systems and different kinds of computers to obtain the most adequate and functional operation of the IV system

for use in the teaching-learning process. Cost, availability or technical characteristics of these devices will not be described in this paper; its main purpose is focused on the general characteristics which IV offers to the users.

There are different ways of presenting the information in an IV program. Motion and/or still frame are two aids for teaching people interpersonal and manual skills. Designers must be conscious of the fact that motion is an excellent help whose use facilitates the comprehension and visualization of some topics which could otherwise be too difficult to teach by using a different presentation such as print or taped words. It is necessary to make a differentiation between motion and animation. Motion is a direct representation of movement. For example, a person moving from one place to another. Animation is an artificial movement in which it is possible to give action to inanimate objects by making small changes in their position. The camera takes pictures of these different positions and later, "the eye puts together the changes when the film is projected, and interprets them as continuous action." (Hall, 1980. p.39)

Computer and video lettering offer different levels of clarity, flexibility and readability on titles and graphics. The designer must decide which of them is more functional for the

program. The fact is that video lettering is better than computer lettering, but it is also more expensive to produce.

When sound is necessary , the video disc systems produce some of the best audio among the different technological devices available today. The questions are: Does the program need sound? How will the user react in front of a silent presentation? Will the sound reinforce user's motivation?

Basic elements in an IV program

In an instructional or training programming, there are four basic elements:

1. **Demonstration.** This part deals with the presentation of information. Instructors should choose the most appropriate way for displaying the topics to be taught. Graphics, motion, charts, animation, sound or typed words are the main sources for explaining to the students the contents which will permit them to meet the instructional goals.

2. **Exercise.** Once the information is given, students can offer responses to basic questions which will permit them to interact with the program or the subject matter. This phase plays a very important role in the teaching-learning process because the interaction between the learner and the program is the core of the process. Mark Sanders (1985) states "...what the

student sees/hears/does at any point is determined by his or her responses to the questions posed and the options developed throughout the program by the instructional developer." (p.40).

3. Control. Control is the way the system selects the appropriate response to the input. This decision that the computer makes is represented in a flowchart by one diamond, instead of a box, because it represents a decision that the computer makes. It is not a segment, part of the content, displayed for the user.

4. Feedback is the response the system presents to the student. In this step the student has the opportunity to know if his/her answer was correct or not.

Producing Educational Programs.

Currior (1983) supports the idea that IV shows promise to be an effective instructional tool for all age groups and education levels because IV is one of the most versatile and dynamic methods for teaching. Keeping in mind that the interaction between the student and the program is the key for meeting instructional goals, teachers must know what the basic steps for developing an educational program are and how to use it in the implementation of individual studies. The main purpose of this section is to give general information about the different phases included in an IV program. The first phase is Selection and Planning.

Selection and Planning

In this phase there are four different steps; need assessment, audience analysis, formulation of behavioral objectives, and task analysis.

1. Needs Assessment. To find what the main needs of the audience are is the starting point for developing an educational program. Need assessment is a process which "begins with the identification of a need a gap between what is and what should be." (Dick & Carey, 1985 p.15). A major methodological problem that must be faced in establishing needs assessment, is to distinguish between what people say they need, felt need, and what they actually do; expressed need. If a needs assessment is not done, there is a risk that the program may not be needed or wanted by the audience. The author wants to work with an example which will be used throughout the development of this paper as a model for explaining how in a real life situation each step can be implemented. This example is related to the lack of instructional materials, a common daily problem teachers face when they teach in schools located in rural areas in Colombia. Several studies done in the Norte de Santander area, show that teachers need to be instructed in designing and producing instructional materials. One program which can be implemented for partially solving this

limitation is "Making graphics for teaching instructional objectives". In this case the course previously mentioned would be the answer for solving a real need teachers have in their schools.

2. Audience Analysis. If instructors want to effectively use any kind of media for teaching, they must look for a linkage between the characteristics of the learner and the content of the learning material and its presentation. Age, gender, grade level, intellectual aptitude, and cultural or socioeconomic factors are characteristics which will help instructors in determining the level of the content and selecting examples that will be meaningful to the given audience.

Within specific entry characteristics, prerequisite skills must answer the following questions: "do learners have the knowledge base required to enter the lesson? do learners have the basic competencies in language, math, reading, reasoning and the like needed to master the subject?" (Heinich, Molenda & Russell, 1982 p.36). Based on the example given at the beginning of this section, the audience analysis will describe the characteristics of the target population. For example, population age, ranges between 22 to 45 years old; gender, include both sexes; grade level and intellectual aptitude is described as an academic background equivalent to a bachelor degree and teachers able to

understand and develop self instructional programs and the like; socioeconomic factors, are basically determined by the normal characteristics of the rural environment. One of the advantages the self-paced learning IV offers is that each student can work at his/her own pace; IV is a flexible tool for individualized instruction. (Grabowski & Aggen, 1984).

3. Formulation of behavioral objectives. "Behavioral objectives serve to give the designer a goal or purpose which is stated in terms of what the learner must be able to do after instruction" (Schafer, 1982 p.28). Objectives must be clear and unequivocally stated, they must describe an intended outcome rather than a description or summary of the content; they must also describe what the learner will be doing when demonstrating his achievement of the objective.

Mager (1962) suggests the following steps for designing instructional objectives: (a) Identify and name the over-all behavior act. (b) Define the conditions under which the behavior is to occur and (c) Define the criterion of acceptable performance. These three aspects will permit the designer to know what kind of behavior students must achieve; under which conditions they will demonstrate their performance, and what is the minimum acceptable skill. The better behavioral objectives are stated, the easier the evaluation process will be. The person

who formulates the behavioral objectives must have a complete and accurate knowledge about the learner, program, materials, techniques, and the instructional process.

4. Task Analysis. The purpose of the task analysis is to pinpoint the skills to be taught. One good method for describing these skills is to make a list of all the steps a person should follow, including the tricks -of-the-trade- without overlooking the small details which contribute to making the final product right. Iuppa (1984) call these steps "critical discriminations" (p.17). Within the example given, these basic skills will be related to the way students should design sketches for labeling. Steps related to the design of letters (arrangement, proportion, spacing, shape and size) must be accurately identified in order to provide learners with a complete sequence and clues which will facilitate the production of instructional graphics.

Development.

In the development phase, IV designers consider the best possibilities and treatments for including them in the final version of the program. The information gained from the previous phase, selection and planning, will be the pattern to follow for implementing the program. The first step in the development phase is planning.

1. Planning. When a designer has to plan a program for a well known group, the basic advantage is that this familiarity with the group allows him/her a great deal of latitude in terms of subject matter, use of colloquial language and regional or ethnic mores and cultural enrichment; these elements are often lacking in programs which have been developed for national distribution. (Schaefer, 1982). In planning a didactic treatment the designer should include a narrator who is a good representative of audience demographics; it is a matter of fact that people usually believe and accept someone most like themselves.

Another aspect to keep in mind is what kind of treatment is better for the program. During the planning process designers must choose among some different ways for showing the contents. These treatments can be described as follows: The controlled interview is a treatment which is usually inducted by a professional interviewer; he or she must control the development of the interview, focusing the comments on the chosen topic and avoiding unnecessary commentaries from the interviewee by cutting him or her off when he or she begins to ramble. Real time lectures is a technique which has a great effectiveness. Normally a classroom is set up in the studio, including students, audiovisual equipment, and materials. The performance quality of the lecturer is the base for obtaining good results. Role-plays

or dramatizations are good techniques for teaching; however they have a major limitation, the performance must be perfect.

Treatments, materials and performers must be carefully chosen in order to meet the objectives of the program. Including humor in the content of the program is not always a good idea because it is so subjective, "...one person's joke is another's insult." (Iuppa, 1985 p.80)

2. Scripting. Having chosen the steps to attain the objectives it is necessary to start the script outline. The script includes the narration which will accompany the visual representations of the program, starting from the beginning to the final frame or closing shot. One important aspect about the script is that the designer must be sure of getting the script approved before writing the final version. The final script will include a description of the pictorial and narrative elements in the program. When writing the introduction, it is a good idea to include an explanation of the interactive program and how it works, as well as a motivational overview about why the students should want to learn. The heart of a great script is the quality of the writing; for this reason it is sometimes necessary to rewrite it again and again. Questions such as What was I trying to say? Did I said it? Could I have said it better? These are the key questions which will help to write a good script. The script

should be seen not only by subject matter experts but by people from the target population who can tell the designer whether or not the exercises work.

3. Exercise design and evaluation. The interaction provided by the IV program is based on the exercise design. IV exercises will be more effective if they are based on simulations of the behavior to be learned. The basic exercise techniques deal with discrimination, generalization, and sequence. In general terms, discrimination is the ability to differentiate between several items. Learners must choose among the options provided by the program (usually simply three-way multiple choice). In generalization, instead of learning to tell things apart, students learn to put them into groups; identification drills (a variety of items are presented and must be grouped into several categories) are the most common type of exercises used to teach generalizations. Sequence deals with putting things in the right order.

When the student answers questions designed for evaluating the knowledge he or she has about the topic, the program will give an immediate feedback in which correct answers are positively reinforced and wrong answers are accompanied by a suggestion. This will encourage the student to review the content and try again to find the correct answer. This is, maybe, the most

important aspect about friendly programs. It doesn't matter if the user makes a mistake or selects a wrong answer; the program will always answer politely, encouraging the learner to continue working in the lesson. According to Larry Wilson, "...they learn to accept the fact that mistakes are part of the game - merely feedback along the way to achieve a goal." (1983,p.32). The immediate feedback students receive from the program, is the element in which evaluation is based. This nonthreatening feedback should be important in today's classrooms were students seem to be afraid to ask questions.

CHAPTER III

SUMMARY AND CONCLUSIONS

During the development of this paper two main topics have been separately explained; general aspects about teaching techniques and the steps for designing an IV program. For practical reasons each topic has been explained as a single, independent element, but in reality they must be integrated. This integration can be done by designing the elements of the program according to the characteristics and needs of the target population. The contents must be displayed by combining the most adequate features IV programs offer, in order to get an effective impact on the learner.

When using animation, for example, the sequence in which graphics are designed and displayed, will permit teaching with accuracy and simplicity because each graphic has been designed with the characteristics of the audience in mind. There are no rigid patterns or formulas for getting a correct design; it depends on the objectives students should achieve, the complexity of the topic and basically the educational level for which the materials were designed.

The best way for catching learners' attention and keeping them motivated is to offer graphics and contents composed by elements whose familiarity and simplicity permit them to easily

understand the topics. Graphics can be made by using different techniques and elements; as Giloi (1978) states "Graphic objects maybe photographic images, or they maybe created with the aid of a computer in the form of alphanumeric characters, special symbols, line drawings, or gray-shaded areas." (p.3). In the same way graphics are designed by following some guidelines, the treatment of the program, the script, must be clear and concrete in order to avoid misinterpretations.

The way of presentation, as well as the instructional method used, will allow the students to progress as fast or as slow as they need to. For example, linear programs are the simplest in form and are usually played from beginning to end without any branching. In programs which have the branching capability, flexibility in catering to each individual's needs, students who need to start at a higher level may do so without risk of compromising important concepts. If a student seems to get ahead of him/herself, the program can branch to another segment which will assist the student in clarifying his/her questions. Branching gives the most flexibility if used to its full capabilities (Floyd and Floyd, 1982).

Individual differences and capabilities for learning will determine the progress of the students. They can work as fast or as slow as they need. Students who work at a faster pace or start

on a higher level aren't required to wait for the slower students in the class, and the slower students can work at a comfortable pace without falling behind. Students can work and be assessed on the amount of work they are capable of completing.

Planning the materials' design according to the learners needs and the objectives the students must achieve, and facilitating the interaction between the user and the program by using the best features IV offers, designers can be sure that the students will understand and easily learn the concepts which compose the instructional process.

REFERENCES

- Currior, R.L. (1983). Interactive videodisc learning systems. High Technology, 3(11), 51-59.
- Dick, W. & Carey, L. (1985). The systematic design of instruction. (2nd ed.) Glenview, IL: Scott, Foresman and company.
- Floyd, B., & Floyd, S. (1982). Handbook of interactive video. White Plains, NY: Knowledge Industry Publications.
- Giloi, W.K. (1978). Interactive computer graphics: Data structures, algorithms, languages. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Grabowski, B. & Aggen, W. (1984). Computers for interactive video learning. Instructional Innovator, 29(2), 27-30.
- Greelis, M. & Haarman, B. (1980). ABC's of video therapy. Novato, CA: Academic Therapy Publications.
- Hall, N. (1980). How to make an animated film. Instructional Innovator, 25, 39-40.
- Heinich, R., Molenda, M. & Russell, J.D. (1982). Instructional media, and the new technologies of instruction. New York: John Wiley & Sons, Inc.
- Iuppa, N.V. (1984). A practical guide to interactive video design. White Plains, NY: Knowledge Industry Publications.
- Mager, R.F. (1962). Preparing instructional objectives. Palo Alto, CA: Fearon.
- Ortrun, Z.S. (1984). Video in higher education. New York: Nichols Publishing Company.
- Sanders, M. (1985). Interactive video courseware for graphic communications teachers and students. Technology Teacher, 44(5), 39-41.
- Schaefer, F. (1982). Interactive audio-visual programming. Springfield, IL: Charles C. Thomas.
- Wilson, R.L. (1983). Interactive video: What makes it work. Performance and Instruction, 22(9), 26-27.