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Introduction to Technology: A New Task for the 80's
Production and Evaluation of a Video Tape Program For Students and Teachers

Edward Rudolph Roberts

A Thesis

in

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ABSTRACT

Introduction to Technology: A New Task for the 80's

Production and Evaluation of a Videotape Program

For Students and Teachers

Edward Rudolph Roberts

A 20-minutes videotape program was produced to assist Introduction to Technology teachers in the task of orienting students to their new course. The opening session of the tape portrayed a student in a typical interaction with technology first thing after waking in the morning. This was used to demonstrate 'dependence on technology' and the effect when technical objects malfunction. A commentary was used to emphasize the reasons for the course and its importance as a high school subject, and a simulated classroom setting illustrated the development of a technological lesson in ITT. The lesson was centered around the concept of a technical object and consisted of four basic stages: identification of a problem; selection of proposed solutions; implementation (building) of the practical design; and testing and evaluating the result based on the originally stated purpose. This process demonstrated both an 'intellectual phase' and a 'practical phase'. Key principles of instruction in the intellectual phase included problem solving, a combination of reasoning, logic, and critical judgement, and active participation. Key principles of the practical phase included group work, self-learning and hands-on

activities. The effectiveness of the videotape was evaluated at three different levels, cognitive, affective and production variables. Four schools were randomly selected from eight English language school boards on the Island of Montreal and in each school approximately sixteen boys and girls were randomly assigned to two groups in a pre/post evaluation procedure, each group having a different sequence of evaluation. The results indicated that there was a significant increment in learning, and that favourable production qualities were indicated but there was no overall significant difference in attitude as a result of viewing the videotape. The findings suggest that this videotape presentation was an efficient and effective technique for conveying information.

Dedicated to

Amanda Aisha

E.R.R.

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INTRODUCTION

Purpose of Media Presentation

The secondary school system in the province of Quebec is confronted with the new task of providing Introduction to Technology as a compulsory course at the secondary three level for all students, starting September 1986. Introduction to Technology or as commonly abbreviated (ITT) was first introduced in 1969 on an experimental basis and has since been revised. The Confessional Committees of the Conseil Superior de l'Education gave approval and authorization for use and phasing-in of the course in 1983. This was confirmed by the then Minister of Education Dr. Camille Laurin. (Document 16-4888A, Gouvernment du Quebec, Ministere de l'Education, 1983)

The phasing-in of the new ITT course presents special problems to those faced with the task of its implementation and subsequent use. As with the implementation of most new programs, there is a problem of familiarity, and this problem manifests itself to school administrators, teachers and students alike. In the Anglophone sector of education the problem is even more acute as almost all of the information available for the purpose of orientation is prepared for use by the Francophone sector.

In personal consultation with my colleagues, it was concluded that there was a definite need for easy access to English language orientation information aimed at the conceptual development of the course, methodolgy of teaching, preparation and physical layout of the class-

room and in general, information concerning what the course is about. It was in this context that the videotape production was conceived, to provide information aimed at, and designed to, enlighten the uninformed or the misinformed and so doing, help to promote the concept of the new ITT program.

Background

Technology and the ITT Program

It is unknown at what point in our evolution education actually appeared and further yet, when was the importance of technology acknowledged. The development of technology has gone on for years even though the technology was basic and the instruction informal or non-structured.

In discussing technology and education, it may be important first, to try to define the term 'technology'. The word 'technology' is a hybrid of two Greek words 'techne' meaning an art or craft, and 'logia' meaning science or study i.e. the science of an art or skill. In standard dictionaries the word is variously defined as: the science of mechanical and industrial arts; the study of arts and applied science; the body of tools, machines, materials, techniques and processes used to produce goods and services and satisfy human needs.

The meaning of the term technology however, is becoming increasingly difficult to determine. As mentioned by Harrison (1979) commenting on the aims of the U.K. 'Project Technology' he noted that, "The very word technology presented problems. It had and still has an awkward ambiguity, meaning both the generalized influence which

advancing industry has on society (as in "The Influence of Technology on Society"), or it is seen as one of the specific technologies such as fuel technology, communications technology, chemical or food technology, etc." In an unpublished document for the ITT course, Gradwell and Welch referred to technology as 'artificial (synthetic) a phenomenon created by humans', which is cumulative. This implies that technology is based on accumulated knowledge and technique and therefore is constantly changing, to the point whereby it is never completely the same at any two points in time.

Definitions of technology seem to have all been representative of the era in which they were written. The very early definitions reflected the tool-making and tool-using, later the use of machines and industry. Technology has even become completely independent of the machine as noted by Ellul (1964), and more recently the shift seems to be toward the effects of technology and society.

For educators involved in the planning and development of technological courses, it is essential that a working definition be adopted. Which definition to adopt is a fundamental question. Gradwell and Welch suggested that in trying to develop a working definition, it is important to identify those aspects or components of technology which remain unchanged, i.e., the skill of inventing, designing, planning and problem solving which not only endure but apply to many individual technologies.

The Ministere de l'Education in a series of curriculum guides for the Quebec-based Introduction to Technology course has over a period of time, defined and refined the term technology. Beginning with the

1971 guide, the Minister stated that a definition "varies in accordance with the different spheres of human activity". He explained that "from a historical point of view, technology may be defined as a study of manufacturing processes, a study of industrial operations carried out in the light of the result it is proposed to obtain. In its general sense, technology may be defined as an art which borrows certain principles from the exact sciences and which examines existing objects in order to design new ones which will fulfill well-defined needs." However, later in the 1975 curriculum guide the definition was modified to become "the totality of the means employed to provide objects necessary for human sustenance and comfort" and in the same document "a field of human endeavour aimed at improving living conditions". Based on these latter definitions, the goals of the new ITT program were developed. In the 1983 guide he states:

> The main goals of the Introduction to Technology course are to provide the pupil with knowledge, skills, and attitudes that will enable him:
>
> - to discover the technological principles of construction, mechanics, and electricity, through the practical application of these principles, so that he will:
>
> - understand the technical product
> - make intelligent use of the technical product
> - understand how the technical product influences the life of man;
>
> - to learn logical step-by-step techniques for problem solving;

- to learn the rudiments of graphic communication;
- to use his inventive ability and sense of form and design in seeking technological solutions to practical problems;
- to practice techniques that are useful in everyday life in the process of constructing mock-ups;
  - using common tools
  - using and transforming certain primary materials, putting into practice certain production processes,
  - applying knowledge acquired in other disciplines;
  - to develop his capacity to reason and to use critical judgement with regard to technical products and technology in general.

It must be acknowledged that in Quebec technology has evolved at a slower pace, and its cultural importance was not really understood until it was identified and explained by the Commission royale d'enquete sur l'enseignement au Québec in the early sixties. The minister noted that the Commission recommended that, in the light of the cultural and educational importance of technology, courses in technology should be made available to all pupils enrolled in secondary schools.

The teaching of a technology course is not unique to Quebec. In most industrial nations some form of technology course is offered as a part of their general secondary program. The philosophical concepts may be different but as the minister noted they all generally agree that the technology course should be centered in some way on the technical object or product. The teaching of technology which is

described here should not be confused with vocational education. Vocational education is designed to enable the student to acquire a trade skill but the technology course as discussed and described by the Minister is of a cultural nature and is included in the general school curriculum.

Media Selection

At present in our society, videotape is becoming widely used and accepted in many aspects of education and business as a powerful tool for communicating information. Due to the rapid reduction in cost, and the appropriateness of the technology many schools have invested in the purchase of videocassette recorders for the purpose of recording and playback of educational material. As stated by Zuber-Skeritt (1984) not that electronic equipment is 'cheap' but that it is 'reasonable' when compared to other more conventional methods of instruction. In general, television technology has improved rapidly in recent years, providing improved picture resolution, the availability of colour, reduction in equipment size and cost, and increased reliability, but the medium still retains its four fundamental capacities as stated by Maclean (1968): control of viewpoint, immediate distribution, time manipulation, and assembly. A definition of the terms television and video may be appropriate here. The terms as defined by Zuber-Skeritt (1984) state that television is considered to be the reception of information transmitted either through cable or by electro-magnetic waves and video is taken to mean material stored on tape or disc as magnetic or optical impressions. It should be included though, that in

both cases a moving pictorial is produced.

Videotape and film are two major sources of television production. However, while film is produced by film techniques and simply played back on T.V., videotape is a major production element of T.V. and has become an integral part of television's techniques. In relation to T.V., video has an added advantage. Zuber-Skerritt (1984) states that it is not transitory; it can be stopped and wound forward and backward, and thus it can be used more effectively by the individual learner at his/her own pace and by groups of students for in-depth discussion and analysis. Film has similar attributes but television production and consequently videotape have several advantages over film. In research comparing television versus film done by Monday (1962) the findings suggest that T.V. is a more powerful medium than film ever was. Not because more people watch television but because people accepted its image more readily, got more involved emotionally and were participants rather than observers. Video is also much cheaper than film and can be viewed while recording as well as immediately after which gives it the immediacy lacking in film. One main disadvantage of video which may be considered, however, is its relatively low resolution factor. In spite of this, Zuber-Skerrit (1984) thinks that in most education situations this is outweighed by its advantages.

It is apparent that video technology has great potential for influencing the learning process, but for it to be effective it must be used within a theoretical framework so as to achieve the desired results. The use of T.V., consequently videotape, as a source of mass

communication is well-documented. The Open University suggests 24 uses of T.V. and some of these such as those cited by Schramm (1977) and used here in reference to this production are:

- to change student attitude
- to recruit or attract new students
- to condense or synthesize into a coherent whole a wide range of information
- to bring to students the views or knowledge of eminent people.

Zettl (1976) further suggests that: Television is not just a pipeline through which the software is purchased by hardware people; rather it is a creative process in which people and machines interact to provide the viewer with significant experiences.

The rapid advancement of videocassette technology has placed it in the realm of being practically an ideal source for its uses. Gordon and Falk state that: Videocassette technology, however the ultimate (to date) in recording instrumentation, is an important procedure (by no means revolutionary but important) both to "systemized" and to "informal" education. Zettl (1976) provided some principal uses of videotape:

(1) time delay
(2) building of a whole show by assembling parts that have been recorded at different times and/or locations
(3) duplicating and distribution of programs, and
(4) records for reference and study.

In considering these uses, it is important to understand that 'video technology' should not be used only in the sense of 'hardware and

software' but as Zuber-Skerritt (1984) suggested, it should be used as a part of educational technology in the wider sense.

Romiszowski (1974) discussed certain factors which might effect decisions about the choice of particluar media selection. He stated four main factors: Firstly, a choice of a particular instructional method. Secondly, the type of learning task facing the student. Thirdly the special characteristics of some students. And finally, practical constraints. Figure 1 is an illustration of the design for factors influencing media selection, by Romizowski (1974). It is reasonable to believe as alluded to previously, that videotape is appropriate as a medium for instruction. It is appropriate for the purpose of orientation, it does not limit the learning process, there is no evidence to show that certain students might have a specific aversion to this medium, and it is economical as compared to other conventional methods of instruction. One might then ask the following questions:

(1) Is instructional video of significant education value?

(2) Can instructional video programs change attitudes?

(3) Can instructional video programs increase interest and motivation?

(4) Do students learn more effectively from instructional video than from other forms of presentation?

In response to these questions, video technology is shown to be of significant educational value as exemplified by its many advantages previously stated. In addition, Cassirer (1962) noted that television and consequently videotape is time-saving as it can cover more material than the classroom teacher. Chu and Schramm (1967) also listed

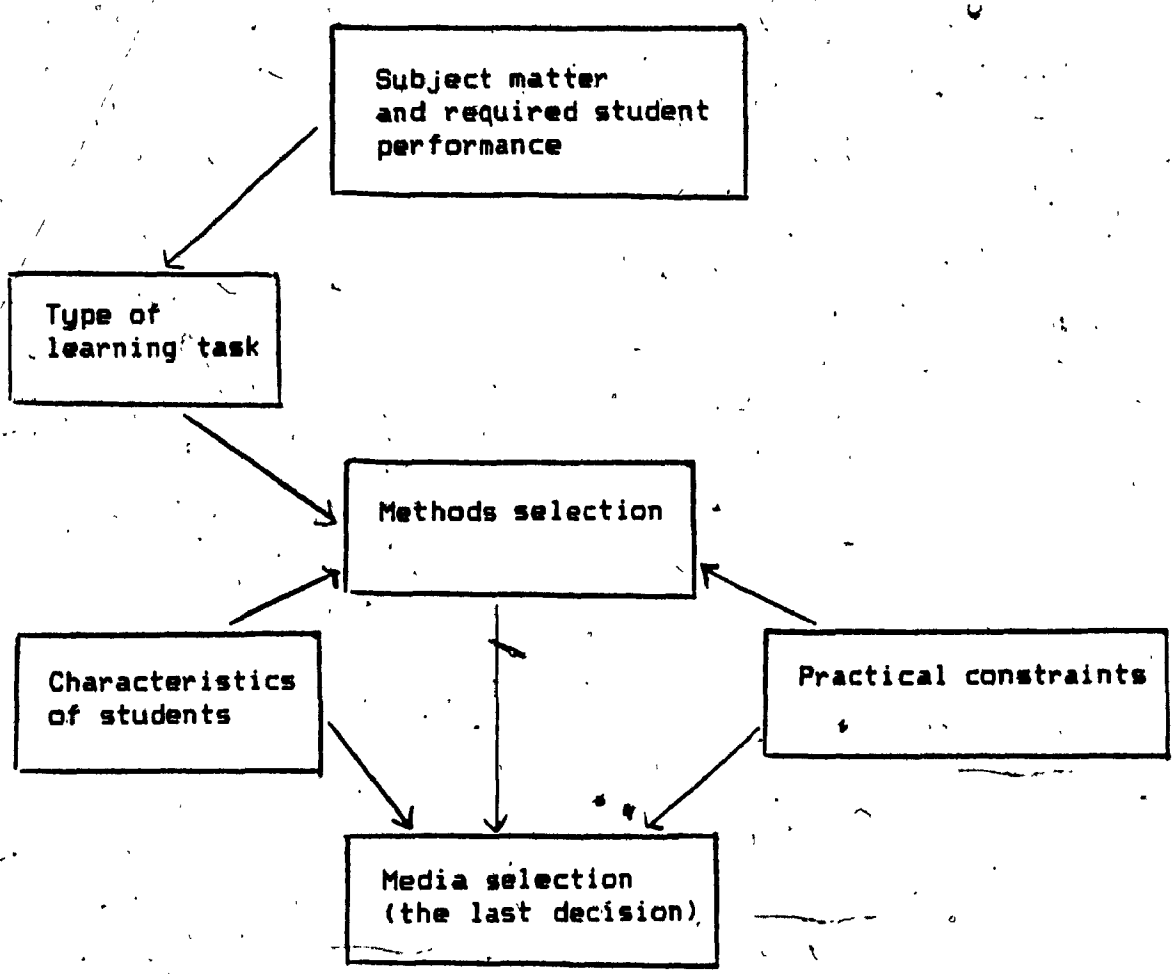


Figure 1. Factors influencing media selection

seventeen studies where the achievement of students who were exposed to television versus conventional instruction were significantly higher.

Videotape is an excellent medium to use in terms of changing the learner's attitudes. Romiszowski (1974) found that when groups of U.S. Army personnel watched a film entitled 'Why We Fight', the results showed that the group who had seen the film contained twice as many who were prepared to go to war, as equivalent groups who had not seen the film. He concluded that when a film and consequently videotape set out to change attitudes and emotions they can indeed be powerful tools. In view of this, the educational technologist must be aware of this power and must act in a moral and ethical manner.

The interest generated from television and film is well-documented, but it should be noted as suggested by Romiszowski (1974) that the interest produced by film or television stems from the content and the treatment the content is given not from the medium itself. Gone are the days when just seeing a film, a television show or a videotape was an experience in itself. The content and production must be of high standard if it is to generate interest and motivation. Today's students have become sensitized to high quality media.

At this point in time most of the research comparing the effectiveness of television to other forms of presentation is inconclusive. As with any experience there is no doubt that learning does take place but it is doubtful whether learning from television has a significant advantage over any other form of presentation. However, what is of

concern as the optimum media for this production is the overall advantage that television and video have over other forms of presentation, and this advantage seems to be overwhelming, as alluded to.

If videotape can be principally used as suggested here, one may then conclude that although it might not be revolutionary in terms of education, it is an excellent way to show different teaching situations in a short time, or to show a unique teaching method or to provide orientation to a new program. In reference to Romiszowski's chart on factors influencing media selection and along with the literature presented here, the medium of videotape seemed quite appropriate, consequently its selection for use in this production as the medium for orienting new ITT students.

EDUCATIONAL CONTEXT

Educational Objectives

The media presentation was designed within the context of the following educational goals to produce a videotape program which when viewed would:

1. Increase the viewer's knowledge of the basic conceptual development ~~of ITT and~~ the relationship between this course and the general objectives and values of secondary education.

2. Increase the viewer's knowledge of the general principles of instruction of the course and the difference between these principles and those of regular high school courses.

3. Increase the viewer's knowledge of the importance of the course in relation to the highly technological society we live in.

4. Reduce anxiety and negative feelings that many intended students may have (especially girls) when dealing with a new program of technology.

To direct a specific focus to the content of the program, two types of objectives were developed, one relating to instructional effectiveness (cognitive objectives) and the other affective effectiveness (affective objectives). Students were expected to be able to view the videotape program and demonstrate the ability to evaluate or

respond to components of these objectives which were incorporated into the evaluation design and are as follows:

1. Instructional effectiveness (cognitive objectives)

   The student will be able to identify the basic elements of the ITT course. These are:

   a) ITT is a course for both boys and girls

   b) ITT is not a trade course

   c) ITT is taught differently from other courses

   d) ITT is a student-oriented course

   e) the level at which ITT is taught

   f) the goals of the ITT course

   g) the credit worth of the ITT course.

2. Affective effectiveness (affective objectives)

   The student will make choices that reflect the following orientation toward the ITT course:

   a) the level of interest in terms of motivation to take the course

   b) the appropriateness of the course for high school

   c) the appropriateness of the course for girls

   d) the short term educational value

   e) the long term educational value.

Target Audience

The videotape presentation was primarily intended for use by ITT teachers for the purpose of orienting their new students to the ITT course. Since the course will be compulsory at the secondary three level in Quebec public schools, secondary three students of both sexes were identified as the target audience.

Content and Form of Presentation

The videotape presentation was designed for use in Quebec secondary schools, and the language used was English. It lasted approximately 20 minutes so as to facilitate adequate viewing and study time in a single class period, (see script Appendix A).

The opening session of the tape portrayed a student in a typical interaction with technology first thing after waking in the morning. This was used to demonstrate 'dependence on technology' and the effect when technical objects malfunction. A girl was chosen to portray the main character here since it was felt that this would help to emphasize the equal role of women in technology. A commentary was then used to stress the reasons for the course and its importance as a high school subject.

A simulated classroom setting illustrated the development of a technological lesson in ITT. The lesson was centered around the concept of a technical object and consisted of four basic stages:

1. Identification of a problem
2. Selection of proposed solutions
3. Implementation (building) of the practical design

4. Testing and evaluating the result based on the originally stated purpose.

This process demonstrated both an 'intellectual phase' and a 'practical phase'. Key principles of instruction in the intellectual phase included, problem solving, a combination of reasoning, logic, and critical judgement, and active participation. Key principles of the practical phase included group work, self-learning and hands-on activities. The simulated lesson was developed from the theme electrical technology; however, it should be noted that in the regular ITT course there is a basic minimum of five themes to be studied as stipulated by the Ministry, namely:

- Technology in the life of man
- Building/Construction technology
- Mechanical technology
- Electrical technology
- Technology in the world of work

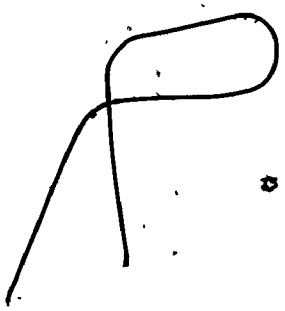
but it was felt that for the purpose of illustrating the didactics of the course, it would be more appropriate to focus on one theme. Electrical technology was chosen, since it seemed the most appealing to students.

Student interviews were used even though in some instances this technique seems to have an adverse effect to the one desired since responses appear to be rehearsed. In contrast it was felt that students would identify and be able to appreciate what their peers had to say as noted in observational learning Bandura (1969), Mischel (1976).

A second commentary was used to further explain and reinforce the

didactics of the course, and in conclusion it was illustrated in a home setting that the learning which took place was useful in terms of technology and everyday life.

The program was recorded in colour with a single camera on 1/2 inch videotape. Once recorded, it was edited at Concordia University. The production was titled: Introduction to Technology; A Task for the '80's.



METHOD

Purpose of Evaluation

Systematic educational evaluation consists of a formal assessment of the worth of educational phenomena (Popham, 1975). The intent of this evaluation was to formally assess the worth of the videotape production in terms of its appropriateness and effectiveness as a medium for orienting new ITT students and to gather additional and relevant information from the target audience.

The evaluating process was based on information from data gathered concerning the following general issues:

1. The quality and worth of the videotape in terms of how well it suits the purpose for which it was intended.
2. The limitations of the videotape
3. Change of attitude in relation to the content of the videotape presentation
4. The amount of learning taking place in terms of knowledge gained of subject matter.

Evaluation Hypothesis

The following statements represented the evaluation hypothesis:

1. Instructional Effectiveness

   As a result of viewing the videotape, students will increase their knowledge about ITT (as specified in the cognitive objectives)

2. Affective Effectiveness

As a result of viewing the videotape, students will demonstrate a more positive attitude toward the ITT course (as specified in the affective objectives).

3. Production variables

The students will express positive opinions about the quality of the production i.e., production variables such as, message design and technical quality.

In addition, the evaluation gathered general data on an 'information sheet' concerning the appropriateness of the medium, basic demographics, student expectations and the state of facilities and equipment.

Sample

The sample consisted of 28 secondary three boys and 38 secondary three girls who were registered to take the ITT course for the first time in English language public schools under the jurisdiction of the Montreal Island Council

Sampling Procedure

A population frame was obtained from the eight commissions involved, and four schools were randomly selected in which to conduct the evaluation. The sample consisted of the four teachers who were teaching the course and all of the students who were present for the first ITT class that day in each of the four schools selected. Through

the use of personal records, students who had special problems such as hearing or sight defects which might have effected the evaluation or students who were late, were eliminated. They went through the same procedure as did the other students but their data was identified and later discarded from the evaluation process. Students were randomly assigned to two groups on an equal number basis in each class. In the case where there was a disproportionate number of students from groups in one condition, there was a random reassignment to make the groups approximately equal. Students were assigned as such, so that they were unaware of group membership.

Instrumentation

Evaluation materials were used in reference to each hypothesis and are described as follows:

1. Instructional effectiveness (pre/post cognitive test) consisted of 16 two-way questions each having a 'don't know' option, which was included to reduce guessing, (see Appendix D). Two-way questions were used because they can reduce the issue to the simplest terms and force a choice (Henerson, Morris, Fitz-Gibbon 1978) and also because the information solicited reflects learning at the knowledge level of Bloom's taxonomy and two-way questions are quite appropriate at this level. The questions were based on the eight components of the cognitive objective, using parallel items for each component (see Appendix B). Half of the statements were either positive or negative which helped to eliminate a bias

pattern in either direction. The questions for the pre- and post-test were identical except that the sequence of questions in each differed so as to eliminate bias of question sequence. However, it should be noted that there might still be a possiblity of sensitization to questions since in effect the questions were the same for both tests. The scoring was done whereby a correct response was scored one and an incorrect or 'don't know' response was scored zero.

2. Affective Effectiveness (Affective Questionnaire, see Appendix E). The attitude questionnaire consisted of 15 statements which were ranked on a 5-point scale from strongly agree to strongly disagree. The Likert-type scale was used because it achieves a wide range of scores by having respondents report the intensity of an attitude (Henerson, Morris, Fitz-Gibbon 1978). The questionnaire response statements used the following scoring key: strongly agree (A) 5, agree (A) 4, undecided (U) 3, disagree (D) 2, strongly disagree (SD) 1. The response statements were designed as parallel items to suit specific affective objectives. (See Appendix B.) Approximately half of the statements were either positive or negative in nature, thus helping to eliminate a bias response pattern in either direction.

3. Production variables (Questionnaire - See Appendices F and G). Teachers as well as students contributed information to this segment. The teachers' questionnaire had 17 statements using a

5-point Likert-type scale and 3 subjective response-type questions which were checked for specific trends. The students' questionnaires had 14 statements and 3 subjective-type questions which were scored by percentages and also checked for specific trends.

4. General Information (Information sheet - See Appendices H and I). Both teachers and students contributed information to this segment also. The students' information sheet had 10 statements using the Likert-type scale, five demographic questions, and one open-ended question. The teachers' information sheet consisted of 10 statements using the same type scale, five demographic-type questions, four two-way questions and one open-ended question.

Procedure

The evaluation consisted of six stages: (1) attitude questionnaire or information sheet; (2) pre-test; (3) videotape presentation; (4) post-test; (5) information sheet or attitude questionnaire; (6) production variables. Figure 2 illustrates the evaluation procedure. The total time taken to complete the task was not in excess of fifty minutes as was determined by a pilot test for the entire design and which allowed the evaluation to take place during a regular class period. The regular ITT teacher served as the supervisor and was instructed to administer the evaluation during any of the first four days of regular classes for the 1984-85 school year. He was instructed however, that the evaluation should also take place before any real explanation of the ITT program was given.

Subjects viewed the videotape presentation according to the particular set-up in that school. In all cases, the apparatus was pre-arranged and verified for proper functioning. Evaluation packages in excess of twenty copies were prepared to serve maximum class sizes. They were identified by a code A or B, part 1 or 3, representing the group and the sequence of testing. This method was used to provide an atmosphere of anonymity for the subjects.

At the outset, the supervisor briefly explained the purpose of the study and the procedure to be followed. He then proceeded to distribute the materials so that there were approximate equal group representation and random assignment of subjects to groups. When subjects were seated and quiet, the supervisor instructed them to refer to the first page, the instruction sheet. He then read the instructions aloud and when necessary he gave explanations to verify full comprehension by all students.

The evaluation consisted of three major segments. In the first segment, students in group A worked on the attitude questionnarie while group B worked on the information sheet. Both groups then proceeded to do the pre-test, after which, was the end of the first segment. The completed test sheets were collected and replaced into their respective envelopes. The second segment was the viewing of the videotape presentation and students were reminded to make an effort to concentrate and learn as much as possible from the presentation. After viewing the presentation students worked on the third segment. Both groups did the post-test, then group A did the information sheet while group B did the attitude questionnaire. Both groups completed the

Group A	Attitude Questionnaire	Pre-test Cognitive	Videotape Presentation	Post-Test Cognitive	Information Variables	Production
Group B	Information Sheet	Pre-test Cognitive	Videotape Presentation	Post-test Cognitive	Attitude Questionnaire	Production Variables

Figure 2. Evaluation Procedures

evaluation by doing the production variables. The test papers from segment three were then collected and replaced into their respective envelopes.

The students were given adequate time to complete segments one and three and the supervisor recorded the starting and finishing times of both segments. In the case of students finishing early, they were instructed to review their answers and remain quiet. In the case of students taking too much time, the supervisor gave them a three minute warning and then collected their papers. All of the materials were replaced into four separate and coded envelopes: group A segment 1; group B segment 1; group A segment 3; group B segment 3. At the end of the evaluation, the supervisor thanked the students for their cooperation.

In each case the regular ITT teacher was the person responsible for administering the test. Since the evaluation was designed to take place in different schools at approximately the same time period, a different copy of the original videotape was sent to respective teachers as part of the evaluation package. The copies were transcribed from a 'Beta' original to one 'Beta' and three 'VHS' copies according to the format used in the particular schools. Instructions and the evaluation package were sent to the respective teachers approximately three days prior to the commencement of classes for the students, which specified the exact procedure to be followed for the evaluation (see Appendix C). A note mentioning the importance of carrying out a strict evaluation process in accordance with the directions was also included. Although a prior commitment to partici-

pate in the evaluation was made by the respective teachers, as incentive they were offered further use of the videotape at their discretion.

A set of instructions was issued for the students, explaining the evaluation process as it related to each sequence of events. (For instructions to students, (see Appendix C).

Evaluation Design

To evaluate the production based on the stated hypotheses, two designs as shown (figure 2) were implemented. As illustrated, for instructional effectiveness a one group pre/post-test was used for the cognitive segment, and reflected the accuracy of responses to a true and false test. Subjects served as their own control, and threats to internal validity such as history or maturation were reduced by having short intervals in the evaluation design, consequently, eliminating the need for a control group. However, as previously alluded to, the possibility of sensitization to questions still existed, but it was felt that for practical purposes using this design allowed more students to be exposed to more test items since all students were actual participants in a before and after measure.

An independent two-group pre/post-test was used reflecting a response to attitude on a Likert-type scale. Since both groups were randomly selected from the same population, there was no reason to believe that the data collected from two independent samples would not have been reflective of that same population. The design used here then circumvents the problem of reactivity of affective measures as a

threat to internal validity.

Data Analysis

The purpose of the evaluation was to measure the effectiveness of the videotape production based on the stated evaluation process. The data gleaned were from four main sources and were analyzed accordingly:

1. Instructional Effectiveness

A descriptive data summary was compiled using means and standard deviations per item and on the total for the pre-test of the eight components of the objective to establish a reference point of previous knowledge. The post-test means and standard deviations were then compared so as to make judgements, consequently giving a better description of the groups' behaviour. For the purpose of inference however, a Wilcoxon Matched-Pairs Ranked-Signs Test was subsequently used to detect learning gains between pairs of observations.

2. Affective Effectiveness

A Mann - Whitney U Test was used to detect statistically significant differences in attitude for each of the five stated objectives. Since the questionnaire items were both positive and negative in nature, the scoring key was reversed for negative items. A descriptive data summary was subsequently compiled illustrating before and after results of the same five objectives. This allowed for the level of behaviour to be established

so that important judgements could be made.

3. Production Variables

A combination objective and open-ended post-tests were used reflecting the quality of the production. The evaluation was based on the test being administered after the viewing of the videotape and was designed to solicit information from students as well as teachers concerning the quality of the production. The data were compiled and summarized by percentages so as to reflect major trends.

4. Information Sheet

A combination of general information questions were used prior to and after the viewing of the videotape, to solicit information from students concerning the appropriateness of the medium of television or videotape in the classroom. Teachers also participated and contributed information at the end of the evaluation by responding to questions concerning the state of television or videotape facilities in their schools and also to the appropriateness of the same medium from a purely teacher perspective. The data were compiled and summarized by percentages, reflecting major trends.

RESULTS AND DISCUSSION

The evaluation measured three levels of the effectiveness of the videotape program and provided relevant information concerning the appropriateness of the medium. The data gleaned were from instructional effectiveness tests, affective effectiveness questionnaires, production variables questionnaires and information sheets. These are reported according to the sequence of the evaluation hypotheses and the order in which it was felt that they would influence behaviour; i.e., a change in knowledge would indirectly affect the attitude of the learner. A discussion of the results follows concurrently with the same conceptual headings, after which the concluding remarks and recommendations are given.

Instructional Effectiveness

Performance on the pre/post-test was used as a dependent measure for instructional effectiveness. The test had eight knowledge components of the cognitive objective, and the primary goal here was to determine whether or not the production was effective in terms of conveying pertinent information to the viewers. Two types of analysis were done, a descriptive summary (see Table 1) and a Wilcoxon Matched-Pairs Signs Test (see Table 2).

The descriptive summary provided the means and standard deviations for the total group scores as well as itemized by cognitive components. Overall, the group scores indicated that there was a substantial increase in the level of performance on the post-test, while for the itemized components there was an increase in performance for

all except component F, (The goals of the ITT course) in which case a decrease was actually shown. Performance on the pre-test for the various components was relatively low as expected, except for component B, (ITT is compulsory for both boys and girls) where it was substantially higher than all others.

The data therefore indicated that except for component B, the target audience had a low level of knowledge of the subject matter before viewing the videotape but afterward their knowledge increased satisfactorily. Which means that they achieved an average score of approximately sixty percent or more, equivalent to a passing mark at the secondary three level. Nonetheless, the two areas of concern as alluded to were, the high pre-test average in component B and the decreased score on the post-test for component F. In the first instance, students might have been aware of the fact that the course was compulsory since they knew that the classes were comprised of boys and girls indiscriminately. Secondly, the poor result on the post-test might have been due in part to one or the combination of any of the following reasons; a certain amount of guessing in the pre-test, the parallel items might have confused the students, or the goals of the course not clearly stated. However, the overriding judgement here is that in response to the test items, students might have associated the actual making of the technical object as was demonstrated, with factual information coming from the teacher which is a common notion that most students have at this level.

Data from the Wilcoxon Matched-Pairs Signs Test was analyzed in total and according to the eight cognitive components. The learners

TABLE I

Cognitive Descriptive Summary

N = 66

Maximum Component Score = 2

Maximum Total Score = 16

Components	Pre-test		Post-test	
	Mean	SD	Mean	SD
A. ITT is a compulsory course	.8	.9	1.3	.9
B. ITT is a course for both boys and girls	1.5	.8	1.7	.7
C. ITT is not a trade course	.5	.7	1.1	.8
D. ITT is taught differently from other courses	.9	.9	1.8	.5
E. ITT is a student oriented course	.7	.6	1.5	.7
F. The goals of the ITT course	.7	.6	.5	.7
G. The level at which the ITT course is taught	.7	.8	1.1	.5
H. The credit worth of the ITT course	.6	.9	1.5	.7
TOTAL	6.5	5.7	10.6	4.1

TABLE 2

Summary for Number of Cases Scoring Lower, Same or Higher Between Pre- and Post-test for the Eight Cognitive Components

N = 66

Overall Z = 6.06

2-Tailed P = .000

Component A

I.T.T. is compulsory course

Lower	Same	Higher	Z	2-Tailed P
1	40	25	-4.3	.000

Component B

ITT is a course for both boys and girls

Lower	Same	Higher	Z	2-Tailed P
0	55	11	-2.9	.003

Component C

ITT is not a trade course

Lower	Same	Higher	Z	2-Tailed P
2	28	36	-4.9	.000

Component D

ITT is taught differently from other courses

Lower	Same	Higher	Z	2-Tailed P
0	26	40	-5.5	.000

Component E

ITT is a student oriented course

Lower	Same	Higher	Z	2-Tailed P
0	19	47	-6.0	.000

Component F

The goals of the ITT course

Lower	Same	Higher	Z	2-Tailed P
19	39	8	-1.9	.064

Component G

The level at which the ITT course is taught

Lower	Same	Higher	Z	2-Tailed P
8	24	34	-3.6	.000

Component H

The credit worth of the ITT course

Lower	Same	Higher	Z	2-Tailed P
4	19	43	-5.5	.000

performance before and after the presentation indicated that there was a statistically significant difference overall, $z = 6.06$ $p < .000$, and for the itemized components there was a significant difference in seven of the eight tested. Even though there was a non-significant result for the one component, this was not surprising since in the descriptive summary the problem was clearly illustrated and possible reasons for it were subsequently suggested. In terms of the effectiveness of the presentation at the cognitive level, the results demonstrated support for the hypothesis since there was a significant increase in knowledge overall as a direct result of exposure to the videotape program. However, the underlying concern which still remains is the negative performance pertaining to the goals of the course, which may be considered the most important cognitive component since all of the others are derived from it.

Affective Effectiveness

The attitude questionnaire consisted of five components of the affective objective, represented by three parallel items for each component. Two types of analyses were done; a Mann Whitney U Test, (see Table 3) and a descriptive summary of the percentage of responses to each affective component. For the descriptive summary, responses to the questionnaire were grouped into three categories; strongly disagree and disagree were grouped to form a negative category, undecided remained the same, and strongly agree and agree were grouped to form a positive category. Since each component had three parallel items which were either positive or negative, a reverse of the scoring key was used

for the negative items. The percentage of responses in each category was then computed for the different components by adding all of the same responses for each test item then finding the percentage (see Table 4).

The Mann Whitney U Test was used to detect independent group differences of the five components. All tests utilized one-tailed probabilities since the only desired direction of change was positive, and of the five components tested only one (Educational value long-term effect) was significant at .05 level; $z = -2.15$, $p < .02$. This result did not support the hypothesis, which means that the videotape did not produce a significantly more positive orientation toward the ITT course.

The descriptive summary of percent response to each component was used to determine the level of behaviour of the target audience and to identify any change in response pattern as a result of viewing the videotape. The data indicated that for all five components there was a marginal increase in positive responses of between 5% and 17% and a marginal decrease in negative responses of between 3% and 15%. The undecided responses, although relatively high, showed negligible before and after differences as the maximum change in any one case was only 8%.

The interpretation of the descriptive summary indicated that the initial negative response to the questionnaire was relatively low, as only approximately a quarter of the students tested overall responded that way. This was contrary to what was expected, and might have been the main reason why more significant differences were not recorded

TABLE 3

Summary of Mann Whitney U on Pre/Post Test for the Five Affective Components

N = 33 TOTAL = 66 Significance level = .05

Component A
Subject's level of interest

	Mean Rank	Z Score	1-Tailed P
Pre-Test	31.85	-0.7	.2388
Post-Test	35.15		

Component B
Appropriateness of the course for high school level

	Mean Rank	Z Score	1-Tailed P
Pre-Test	30.64	-1.2	.1076
Post-Test	36.36		

Component C
Apropriateness of the course for girls

	Mean Rank	Z Score	1-Tailed P
Pre-Test	30.47	-1.3	.0962
Post-Test	36.53		

Component D
Educational value short-term effect

	Mean Rank	Z Score	1-Tailed P
Pre-Test	30.09	-1.5	.0709
Post-Test	36.91		

Component E
Educational value long-term effect

	Mean Rank	Z Score	1-Tailed P
Pre-Test	28.56	-2.2	.0156
Post-Test	38.44		

TABLE IV

Percent Response to Affective Components

N = 33

Total = 66

Affective Components		Negative	Undecided	Positive
A	Before	23%	34%	43%
	After	21%	31%	48%
B	Before	16%	26%	58%
	After	7%	18%	75%
C	Before	32%	12%	56%
	After	20%	14%	66%
D	Before	28%	27%	45%
	After	15%	30%	55%
E	Before	22%	22%	56%
	After	14%	23%	63%
OVERALL	Before	24%	24%	52%
	After	14%	23%	63%

since the attitudes of students were not sufficiently negative to start with. In the single case where a significant result was recorded, one might assume that the videotape presented a very positive orientation of the specific topic in spite of students already having a relatively positive attitude. Furthermore, judging from the base level behaviour, the mere fact that there was a decrease of negative responses and an increase of positive responses for each component irrespective of the amount of increases or decreases, indicated that overall, the medium and the message were still effective to a point. However, the relatively high but virtually unchanged undecided response overall was an area of concern, but this might have been attributed to the supposition that there is an attitude of apprehension and even indifference which many students seem to have in respect to school and the subjects taught, especially when they have little choice as to selection.

Production Variables

This segment of the evaluation solicited information from students as well as teachers concerning their appeal to the videotape presentation. The students responded to seven negative and seven positive statements on a Likert-type scale and then to three open-ended questions. A summary of the responses is given in percentages, (see Appendix E) and the following are major trends that were extracted:

1. A majority of students (61%) strongly agreed or agreed that the tape was informative in terms of presenting new information about the course.

2. The message of the program seemed to be easy to follow and was not disjointed or tried to do too much as (66%) were of this opinion.

3. The program was by no means exciting but it gained and held the attention of a slim majority (51%) who also indicated that technical problems were minimal and did not hinder their concentration.

4. The majority felt that the student interviews were rehearsed (54%) but of this percentage (23%) felt very strongly that this was indeed the case.

5. Some students agreed that the videotape did little to change their opinion of the topic, but the majority (61%) felt that it made them realize the importance of the course.

6. A majority were of the opinion that the tape provided a good orientation to the course (51%) which could not be done by a teacher alone.

The data from the open-ended section indicated that the students felt the most appealing aspect of the tape was students using tools and [redacted] to make technical objects, the worst was that the students interviews seemed rehearsed but in general the opinion was that the tape was informative. The data from the four teachers' response to

the effectiveness of the videotape indicated that:

- the videotape was informative and had a very clear purpose
- it really gained and held the attention of the students
- the show looked professional and well-produced and presented a realistic impression of the classroom activities
- the medium was very appropriate for the purpose it was intended, producing a convincing message.

Teachers' comments from the open-ended section indicated that the program caught the attention of the students and sensitized them to certain expectations. It also motivated them, in that they were able to identify with what other students were doing. The general concensus was that an excellent job was done, and that there is a real need to continue development of this type of material.

Information Sheet

Data from the information questionnaire was solicited from students as well as teachers. The students' information sheet consisted of data from three distinguishable parts. The first had biographical data, the second dealt with the appropriateness of the television or videotape medium in the classroom, and the third was an open-ended question concerning students' expectations of the ITT course (see Appendix F). In general, favourable opinions were indicated, the following are some of the major trends that were identified:

1. The majority of students (68%) were of the opinion that television or videotape would be more effective as a source of information for the purpose of orientation, than would a live presentation by a teacher.

2. They were also of the opinion (64%) that television or videotape would be capable of making a certain subject matter more interesting and attractive.

3. Although most students thought that television or videotape would be more effective than a live presentation in terms of providing information for orientation, a small majority (52%) were of the opinion that they would be better able to identify with the teacher than watching T.V. or videotape.

In response to their expectations of the course, the following are some of the trends that were identified:

1. Most student (24%) before and (40%) after indicated that they wanted to learn more about technology, which means that a substantial number had become interested and wanted to know more.

2. The undecided or 'did not know' responses (22%) before and (20%) after, was higher than expected and showed only minimal decreases in the after response, indicating that a substantial number of students were still not sure what to expect.

3. The no response (21%) before and (12%) after was considered normal, since there was a marked decrease in the after responses indicating that many of these students went on the make decisions about their expectations.

4. A substantial amount of students (12%) before, thought that it would be interesting, but there was only a minimal increase (1%) after, which means, that but a few more students became interested.

Of the teachers who participated in the study as supervisors, two were teaching the new ITT program and two a modified version of it. They were all male and most were teaching the course for less than two years. The following are some conclusions from the data they presented:

1. All teachers had access to televisions and videocassette recorders in their schools. They were all familiar with the operation of this equipment and most used it to teach.

2. They were of the opinion that television or videotape programs for use in the classroom is definitely not a waste of time and furthermore they suggested using it more, if more programs were available.

3. It was suggested that the medium would enhance the learning process and provide access to materials that would otherwise be unavailable.

4. In general the opinion expressed was that producing a videotape for the purpose of orienting new ITT students was an excellent idea, but that it should be comprehensive, explaining clearly the philosophy of the course and showing examples of technology in the real world and how this relates to what students do in the course.

Conclusions

The purpose of this study was to evaluate a videotape production on the subject of orienting new ITT students so as to assess its worth in communicating the subject matter, its effect in terms of fostering a more positive attitude and the overall quality and aesthetic value of the production. The results obtained were from measuring the three levels of the productions based on the stated evaluation hypotheses.

1. Significant results were obtained from seven of the eight knowledge components tested, from which it was inferred that if the videotape were used within the framework of its purpose, it would be an effective instrument for Quebec high school teachers to orient their new students as to what the ITT course is about.

2. Data from the attitude test indicated that there was a significant difference in only one of the five components tested, from which it was inferred that the videotape was not effective in providing a significantly more positive orientation. However, the initial attitudes were not as negative as predicted. This may help explain why a significant change was not obtained.

3. The aesthetics and quality of the production were judged favorably as the medium was found to be very appropriate for the purpose for which it was intended, providing a realistic impression of classroom activities which gained and held the attention of students.

4. In evaluating the overall worth of the videotape production, although it was found not to be effective in improving the attitude of students, one should realize that the improvement of an attitude is not always easily identifiable or attainable. Nonetheless, the worth of the videotape did not completely diminish, since not only was it an effective instrument in conveying information but it demonstrated a great efficiency in doing so. In a tweny-minute session it was demonstrated that students were able to recall important aspects of a relatively novel concept of teaching due to the fact that it was vividly illustrated before them, something that traditional teaching would be unable to do.

Recommendations

Although the evaluation demonstrated that the videotape was effective overall in conveying information about the ITT course, it was also able to detect an aspect of the content that might have confused the students. In view of this and since the subject matter of any such presentation is always an important factor, it is my belief as well as teachers who were involved in the evaluation, that a more comprehensive development of the course should be done, more clearly explaining its philosophy and showing examples of technology in the real world and how it relates to what students do in the course. However, one must be cautious when attempting to undertake such a task because of the practical constraints which might prohibit access to videotaping this kind of technology, since most industries adhere to a strict security policy which does not allow such access.

The improvement of an attitude is not always easily attainable as was demonstrated by the results. In an attempt to circumvent this problem it might be necessary to evaluate the students at the secondary two level instead, during the period of course selection so that they would be more receptive to the message and less likely to be affected by conditions such as the kind of teacher, a particular class or even excess prior knowledge. Secondly, a discussion session might be incorporated either as part of the videotape content or in the evaluation process, which should give more insight, or help to foster a more positive attitude.

Finally, although the videotape was judged favorably in terms of the technical aspects of the production, in an attempt to incorporate

more comprehensive information at a faster pace, I would suggest the use of more than one camera, since this would facilitate more sophisticated and creative editing thus providing a livelier presentation.

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APPENDIX A: SYNOPSIS OF SCRIPT

SYNOPSIS OF SCRIPT

	VIDEO	AUDIO	TIME
1.	Slides illustrating scenes of technology	Up - music	.30
2.	Title	Cut - music at the end of title	.10
3.	Scene identifying McGill University	Ambiance	.15
4.	An interview with Prof. John Gradwell of McGill	An interview statement explaining the need for technological education, consequently the course I.T.T.	1.00
5.	A group of students picking up Nadia	Conversation - ambiance	.30
6.	Scenes depicting disorientation because Nadia's electricity is not working	Ambiance	2:00
7.	Students' late arrival to class	Conversation	.30
8.	Cutaway - sign identifying I.T.T. and showing details of the class		.12
9.	Scenes showing the development of an I.T.T. lesson	Dialogue between teacher and students illustrating how the lesson is developed, from the statement of the problem to the design of a principle diagram	5:00
10.	Scenes showing students working in groups constructing a technical object.	Group dialogue - machines working	3:00
11.	Student interviews	Students expressing their views of the I.T.T. class	1:30

12. Scenes of students demonstrating projects they have made.	Students explaining how the projects were made and how they work	2:30
13. Interview statement from Prof. Gradwell	An explanation of the role of the I.T.T. teacher	1:30
14. Students leaving class and returning home	Conversation	.20
15. Scene showing Nadia in conver sation with her mother	Conversation - why the electricity is not yet on - Nadia suggest she has an idea to solve the problem	.20
16. Scene showing Nadia at the circuit breaker panel solving the problem	Ambiance - shout of delight when the problem is solved	.15
17. Scene of content, Nadia relaxing with her mother	Conversation - Fade in music	.20
18. Credits	Music	.30
19. Fade to black	Fade music - END	

APPENDIX B: CONTENT VALIDITY

CONTENT VALIDITY

Instructional Effectiveness (Cognitive Objective)

Components	Script Content	Parallel Items
1. I.T.T is a compulsory course	Inserts	I.T.T. will be an optional course in high school.(False) The I.T.T. course will be compulsory at the secondary three level. (True)
2. I.T.T. is a course for both boys and girls	Interviews - class scenes - inserts	The I.T.T. course is compulsory for boys but optional for girls. (False) Both boys and girls must take I.T.T. (True)
3. I.T.T. is not a trade course	Classroom scenes - inserts - Interviews	I will learn specific trades in the I.T.T. course. (False) I.T.T. is a shop course. It teaches you how to make things. (False)
4. I.T.T. is taught differently from other courses	Class scenes - Interviews -	The I.T.T. teacher guides the students so that they can make their own discoveries. (True) In the I.T.T. course the teacher uses a textbook which students must follow in a step-by-step manner.- (False)
5. I.T.T. is a student oriented course	Classroom Scenes - Interviews	I will be encouraged to make my own suggestions while working in the I.T.T. course. (True) In the I.T.T. class the teacher determines the exact content of the course. (False)

6. The goals of the I.T.T. course	Inserts - Classroom Scenes - Interviews	The purpose of the I.T.T. course is to help clear away the mystery surrounding technology (True)
		One main goal of the I.T.T. course is to teach students specific factual information about technology. (False)
7. The level at which the I.T.T. course is taught	Inserts	The new I.T.T. course may be taken at the secondary two or three level. (False)
		The new I.T.T. course is offered at the secondary three level only. (True)
8. The credit worth of the I.T.T. course	Inserts	I.T.T. is a four credit high school course. (True)
		Successful completion of the I.T.T. course allows you to gain three high school credits. (False)

CONTENT VALIDITY

Affective Effectiveness (Affective Objective)

Components	Script Content	Parallel Items
1. Subject's level of interest	Complete script content	I.T.T. is a high school course that I am really looking forward to taking. (Positive)
		The I.T.T. course really turns me off. (Negative)
		If I had the option I would not take the I.T.T. course. (Negative)
2. Appropriateness of the course for high school level	Technology as illustrated in the home - Industrial scenes - Interviews	Taking an I.T.T. course is a waste of time for high school students. (Negative)
		Becoming familiar with techno- is essential at the high school level. (Positive)
		High school is not the place to learn about technology. (Negative)
3. Appropriateness of the course for girls	Technology as illustrated in the home - Classroom scenes -Interviews Industrial scenes.	Most girls will never work with technology once they leave high school. (Negative)
		It is important for girls to become familiar with technology. (Positive)
		I.T.T. should be an optional course for girls. (Negative)
4. Educational value short-term effect	Classroom scenes - Interviews	The I.T.T. course will be relevant to my everyday life. (Positive)
		Learning about technology is not important in my day-to-day life. (Negative)

		The I.T.T. course will provide an interesting change in classroom activities (Positive)
5. Educational value long-term effect	Interviews	The I.T.T. course will prepare students for our rapidly changing society. (Positive)
		The information that I will gain in the I.T.T. course will be useless by the time I graduate. (Negative)
		Teaching about technology in high school is an excellent way to prepare students for the future. (Positive)

Appendix C: Instructions for Supervisor and Students

Instructions for the Supervisor

(1) The evaluation must take place on any of the first four regular school days of the 1984-85 school year, depending on which day is most convenient for you.

(2) The evaluation must take place during the first period that you have your I.T.T. class on the day chosen. The evaluation will be done for one class only.

(3) Prepare videotape apparatus in classroom or take students to room provided for such viewing. In either case and prior to viewing, verify that apparatus is functioning properly i.e. set volume level and make sure picture is well adjusted. The length of the videotape is approximately 18 minutes.

(4) You will be required to administer three major parts of the evaluation; part one will serve as a pre-test, part two will be the videotape presentation and part three will serve as a post-test.

(5) You will be given 26 test items for part one and 26 for part three. In each case, half of the items will be coded A for group A and B for group B.

(6) Announce to the students that they will be participating in the evaluation of a videotape production relating to the course I.T.T.

(7) Depending on the number of students in class, randomly distribute the items coded part 1 and 3 so that approximately half the class will get A for group A and half will get B for group B. This means that each student must have two packages, one marked A part

1 and the other A part 3, or B part 1 and the other B part 3. The videotape being part 2. Allow students who are late to participate but record their names so as to be subsequently deleted from the evaluation.

(8) After students are settled, have them refer to the first page marked 'Instructions for Students'. Read instructions aloud, and have students follow silently. If they have any questions concerning what to do, repeat instructions as they work through the sessions. Do not give any details of what is to come. Suggest that if any other questions arise during the process of completing the test, raise their hands, and an attempt will be made to answer their questions. Make sure students understand not to do part 3 until after viewing videotape.

(9) After the intial instructions are clear, proceed with testing. Be sure to write the beginning and ending times for items in parts 1 and 3 on the sheet provided. In all cases, let students work as much as possible at their own pace, but in the case of students taking too long, give them a three minute warning and then collect their papers. Remember that the complete evaluation must be done in one period. For those students who finish early, remind them to review their answers and to remain quiet.

(10) When students have completed this section, this is the end of part 1. Collect all of part 1 test items and place them in the envelope provided. Please maintain the minimum of conversation in class as possible.

(11) Proceed to the second part of the evaluation. This is to show the

videotape to the class. For the evaluation, the videotape must be shown only once. Inform the students to be attentive and try to learn as much as possible, as the presentation will only be seen once. Then proceed with the videotape presentation.

(12) Immediately after the presentation, inform the students to start working on the rest of the evaluation. Reiterate the importance of reading the instruction before each section and asking questions only if necessary.

(13) Allow students to work at their own pace, but determine how much time they have and if necessary give a three minute warning before the end.

(14) This will be the end of part three and the end of the evaluation. All test items for part 3 will be collected and placed in two envelopes with test items from parts 1. Items from parts 1 and 3 must be stored carefully to be picked up later. Finally, thank the students for their participation.

(15) You will also be required to submit some data. Please respond to the information sheet and the production variables provided specially for you. The information sheet should be completed before seeing the videotape and the production variables soon afterward.

Special thanks for your help and cooperation.

Instructions for the Students

You are about to participate in the evaluation of a videotape presentation dealing with the subject of I.T.T. There will be three major parts of the evaluation process:

a) You will be asked to read the instructions carefully, then complete sections one and two, after which the test items will be collected.

b) You will be shown a videotape presentation. Make an effort to concentrate and learn as much as possible from the videotape presentation, as you will be required to answer questions about it.

c) This part must not be done until after you have seen the videotape presentation. You will be required to read the instructions carefully before each section and complete sections one, two and three.

In each case, read the instructions carefully and try to follow exactly what has been stated. Different students have different test items, so it is necessary to concentrate only on what you are doing. Just answer the questions honestly and to the best of your ability. It is not necessary to write your name on test items.

If you have any questions during the sessions, simply raise your hand and the teacher will try to answer your questions. Do not ask another student. If you have finished before the rest of the class, please review your answers and then sit quietly until all the others have finished.

Thank you for your help and cooperation.

Appendix D: Pre- and Post-Test Questions

PRE-TEST

Indicate your response to the statement made by using a check mark ( ) in one of the brackets provided for each statement.

1.	I.T.T. will be an optional course in high school	( ) True ( ) False ( ) I don't know
2.	Both boys and girls must take I.T.T.	( ) True ( ) False ( ) I don't know
3.	I.T.T. is a shop course. It teaches you how to make things.	( ) True ( ) False ( ) I don't know
4.	The I.T.T. teacher guides the students so that they can make their own discoveries.	( ) True ( ) False ( ) I don't know
5.	I will be encouraged to make my own suggestions while working in the I.T.T. class.	( ) True ( ) False ( ) I don't know
6.	One of the main goals of the I.T.T. course is to teach students specific factual information about technology.	( ) True ( ) False ( ) I don't know
7.	The new I.T.T. course is offered at the secondary three level only.	( ) True ( ) False ( ) I don't know
8.	Successful completion of the I.T.T. course allows you to gain three high school credits.	( ) True ( ) False ( ) I don't know

9.	The I.T.T. course will be compulsory at the secondary three level.	( ) True ( ) False ( ) I don't know
10.	The I.T.T. course is compulsory for boys but optional for girls.	( ) True ( ) False ( ) I don't know
11.	I will learn specific trades in the I.T.T. course.	( ) True ( ) False ( ) I don't know
12.	In the I.T.T. course the teacher uses a textbook which students must follow in a step-by-step manner.	( ) True ( ) False ( ) I don't know
13.	In the I.T.T. class the teacher determines the exact content of the course.	( ) True ( ) False ( ) I don't know
14.	The purpose of the I.T.T. course is to help clear away the mystery surrounding technology.	( ) True ( ) False ( ) I don't know
15.	The new I.T.T. course may be taken at the secondary two or three level.	( ) True ( ) False ( ) I don't know
16.	I.T.T. is a four credit high school course.	( ) True ( ) False ( ) I don't know

POST-TEST

Indicate your response to the statement made by using a check mark ( ) in one of the brackets provided for each statement.

1. The new I.T.T. course is offered at the secondary level only.
   ( ) True
   ( ) False
   ( ) I don't know

2. The I.T.T. teacher guides the students so that they can make their own discoveries.
   ( ) True
   ( ) False
   ( ) I don't know

3. I will learn specific trades in the I.T.T. course.
   ( ) True
   ( ) False
   ( ) I don't know

4. I.T.T. is a four credit high school course.
   ( ) True
   ( ) False
   ( ) I don't know

5. Both boys and girls must take I.T.T.
   ( ) True
   ( ) False
   ( ) I don't know

6. I.T.T. is a shop course. It teaches you how to make things.
   ( ) True
   ( ) False
   ( ) I don't know

7. In the I.T.T. course the teacher uses a textbook which students must follow in a step-by-step manner.
   ( ) True
   ( ) False
   ( ) I don't know

8. I will be encouraged to make my own suggestions while working in the I.T.T. class.
   ( ) True
   ( ) False
   ( ) I don't know

9. I.T.T. will be an optional course in high school.
( ) True
( ) False
( ) I don't know

10. The purpose of the I.T.T. course is to help clear away the mystery surrounding technology.
( ) True
( ) False
( ) I don't know

11. Successful completion of the I.T.T. course allows you to gain three high credits.
( ) True
( ) False
( ) I don't know

12. The I.T.T. course is compulsory for boys but optional for girls.
( ) True
( ) False
( ) I don't know

13. The new I.T.T. course may be taken at the secondary two or three level.
( ) True
( ) False
( ) I don't know

14. In the I.T.T. class the teacher determines the exact content of the course.
( ) True
( ) False
( ) I don't know

15. One of the main goals of the I.T.T. course is to teach students specific factual information about technology.
( ) True
( ) False
( ) I don't know

16. The I.T.T. course will be compulsory at the secondary three level.
( ) True
( ) False
( ) I don't know

APPENDIX E: ATTITUDE QUESTIONNAIRE

The following questionnaire has been developed to get your opinion about the course Introduction to Technology, abbreviated I.T.T. Indicate your opinion of each of the following statements by circling the number on the scale which best corresponds with your opinion of that statement.

The scale design represents the following:

1 or SD - Strongly Disagree, 2 or D - Disagree, 3 or U - Undecided, 4 or A - Agree, 5 or SA - Strongly Agree. Please try to concentrate and respond carefully and honestly to each statement.

Try to avoid using undecided.	SD	D	U	A	SA
1. I.T.T. is a high school course that I am really looking forward to taking.	1	2	3	4	5
2. I.T.T. should be an optional course for girls.	1	2	3	4	5
3. Teaching about technology in high school is an excellent way to prepare students for the future.	1	2	3	4	5
4. Taking an I.T.T. course is a waste of time for high school students.	1	2	3	4	5
5. The I.T.T. course will be relevant to my everyday life.	1	2	3	4	5
6. If I had the option, I would not take the I.T.T. course.	1	2	3	4	5
7. Becoming familiar with technology is essential at the high school level.	1	2	3	4	5
8. It is important for girls to become	1	2	3	4	5

familiar with technology.

9.	The information that I will gain in the I.T.T. course will be useless by the time I graduate.	1	2	3	4	5
10.	Learning about technology is not important in my day-to-day life.	1	2	3	4	5
11.	The I.T.T. course really turns me off.	1	2	3	4	5
12.	High school is not the place to learn about technology.	1	2	3	4	5
13.	Most girls will never work with technology once they leave high school.	1	2	3	4	5
14.	The I.T.T. course will prepare students for our rapidly changing society.	1	2	3	4	5
15.	The I.T.T. course will provide an interesting change in classroom activities.	1	2	3	4	5

APPENDIX F: PRODUCTION VARIABLES - STUDENTS

The following are statements concerning the effectiveness of the message of the videotape you have just seen. Circles the number on the scale that best corresponds with your opinion of each statement:

		SD	D	U	A	SA
1.	The videotape was very informative.	1	2	3	4	5
2.	The program was slow and drawn out.	1	2	3	4	5
3.	The videotape tried to do too much.	1	2	3	4	5
4.	I had no problem following the message of the program.	1	2	3	4	5
5.	The content of the videotape program confirmed what I already knew.	1	2	3	4	5
6.	I now have a realistic view of what the topic is about.	1	2	3	4	5
7.	I learned new facts about the topic.	1	2	3	4	5
8.	After a while the information seemed the same.	1	2	3	4	5
9.	The program really gained and held my attention.	1	2	3	4	5
10.	The videotape program did little to change my opinion of the topic.	1	2	3	4	5
11.	The interview responses seemed rehearsed.	1	2	3	4	5
12.	The program made me realize the importance of the topic.	1	2	3	4	5
13.	Technical problems distracted me from concentrating on the message of the	1	2	3	4	5

program.

14. The videotape program provided a good orientation to the topic which could not be done by a teacher giving a live presentation. 1 2 3 4 5

What was the best thing about the videotape program you just saw?

What was the worst thing about the videotape program you just saw?

General Comments: Please feel free to state any other opinions of the videotape you just saw.

Thank you for your interest and cooperation.

APPENDIX G: PRODUCTION VARIABLES - TEACHER

The following are statements concerning the effectiveness of the videotape you have just seen. Circle the number on the scale that best corresponds with your opinion of each statement. The scale design represents the following: 1 or SD - Strongly disagree, 2 or D - Disagree, 3 or U - Undecided, 4 or A - Agree, 5 or SA - Strongly agree. Try to avoid using undecided.

1.	The videotape program was very informative.	1	2	3	4	5
2.	The program seemed slow and drawn out.	1	2	3	4	5
3.	The videotape program tried to do too much.	1	2	3	4	5
4.	I had no trouble following the message of the program.	1	2	3	4	5
5.	The show seemed to lack a clear purpose.	1	2	3	4	5
6.	The show was too academic.	1	2	3	4	5
7.	The individual segments were too short to accurately convey the message.	1	2	3	4	5
8.	The show looked professional and well produced.	1	2	3	4	5
9.	After a while the information seemed redundant.	1	2	3	4	5
10.	The program presented a realistic impression of the classroom activities.	1	2	3	4	5

11.	Technical problems distracted from the intended message.	1	2	3	4	5
12.	The show seemed amateurish and reduced my interest.	1	2	3	4	5
13.	The medium was well suited for the topic.	1	2	3	4	5
14.	The videotape program provided a proper orientation that otherwise could not have been done.	1	2	3	4	5
15.	The videotape program gained and held the attention of the students.	1	2	3	4	5
16.	The message of the show seemed convincing.	1	2	3	4	5
17.	The message might have been better conveyed by a different medium.	1	2	3	4	5

What was the best thing about the videotape program you just saw?

What was the worst thing about the videotape program you just saw?

General Comments: Please feel free to state any other opinions of the videotape program you just saw.

Thank you for your interest and cooperation.

APPENDIX H: INFORMATION SHEET - STUDENTS

Are you male ( ) or female ( )

Please state the name of your school _____

Where do you live (city only)?_____

What is your present age? _____

In terms of economic status, how would you consider your family?

Rich ( ) Middle Class ( ) Poor ( )

The following are statements concerning the use of videotape or television programs in the classroom. Circle the number which best corresponds with your opinion of each statement.

The scale design used represents the following:

1 or SD - Strongly Disagree, 2 or D - Disagree, 3 or U - Undecided, 4 or A - Agree, 5 or SA - Strongly Agree. Please try concentrate and respond carefully and honestly to each statement.

		SD	D	U	A	SA
1.	Videotape or television programming is an ideal way to inform students about a new course.	1	2	3	4	5
2.	Given the same amount of time, a videotape or TV program can provide a lot more information than a live (teacher presenting) presentation.	1	2	3	4	5
3.	Students prefer to watch a videotape or TV program rather than a live presentation by the teacher.	1	2	3	4	5
4.	Television or videotape in the classroom is an 'easy way out' for students.	1	2	3	4	5
5.	Television or videotape usually makes a particular subject matter a lot more interesting.	1	2	3	4	5

		SD	D	U	A	SA
6.	Videotape or television usually has a way of really commanding my attention.	1	2	3	4	5
7.	Another medium other than TV or videotape might be a better way of providing students with information.	1	2	3	4	5
8.	I can identify more with my teacher rather than just watching a videotape or TV program.	1	2	3	4	5
9.	Educational television or videotape in the classroom is boring.	1	2	3	4	5
10.	Television or videotape in the classroom detracts from learning.	1	2	3	4	5

What are your expectations of the I.T.T. course?

APPENDIX I: INFORMATION SHEET - TEACHER

Sex: ( ) Male ( ) Female

Name of your school commission: _____

Subject(s) taught: _____ _____ _____

Years of experience teaching I.T.T.: ( ) None

( ) Less than two years

( ) More than two years

Will you be teaching:

( ) The old I.T.T. program

( ) The new I.T.T. program

( ) A modified version of the I.T.T. program

In your school are you equipped with:

1. A television monitor and VCR* on trolleys that can be moved from class to class?
   ( ) Yes
   ( ) No
   ( ) Don't know

2. A television monitor and VCR in a central central location requiring the class to move?
   ( ) Yes
   ( ) No
   ( ) Don't know

3. Can you operate video playback equipment
   ( ) Yes
   ( ) No

4. Do you use video playback equipment to teach?
   ( ) Yes
   ( ) No

*VCR-Video Cassette Recorder

The following are statements concerning the appropriateness and use of videotape or television in the classroom. Circle the number which best corresponds with your opinion of each statement.

		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1.	I find that videotape or TV provides an active viewing environment in my classroom.	1	2	3	4	5
2.	I have difficulty incorporating videotape or TV into my teaching schedule.	1	2	3	4	5
3.	The technology of the videotape or television medium can provide experiences that cannot be created in most classrooms.	1	2	3	4	5
4.	Television or videotape programming for the classroom is a waste of time.	1	2	3	4	5

5.	I would use TV or Videotape more if there were more programming information available.	1	2	3	4	5
6.	TV or videotape in the classroom is an easy way out for teachers.	1	2	3	4	5
7.	TV or videotape can enhance the learning process in my subject.	1	2	3	4	5
8.	The videotape or television medium provides easy access to materials that I would otherwise be unable to get.	1	2	3	4	5
9.	A live presentation by the teacher is a much better way of orienting my classes.	1	2	3	4	5
10.	Another medium other than TV or videotape might be a better way of orienting my classes.	1	2	3	4	5

What do you think of providing a videotape presentation to orient new I.T.T. students?

APPENDIX J: RESULTS - PRODUCTION VARIABLES

Effectiveness of the Message

		SD	D	U	A	SA
1.	The videotape was very informative.	3%	18%	17%	52%	9%
2.	The program was slow and drawn out.	8%	33%	24%	26%	9%
3.	The videotape tried to do too much.	5%	58%	24%	11%	3%
4.	I had no problem following the message of the program.	2%	11%	18%	56%	14%
5.	The content of the videotape program confirmed what I already knew.	14%	50%	17%	18%	2%
6.	I now have a realistic view of what the topic is about.	2%	14%	17%	58%	11%
7.	I learned new facts about the topic.	3%	9%	18%	47%	6%
8.	After a while the information seemed the same.	2%	41%	12%	35%	11%
9.	The program really gained and held my attention.	9%	20%	26%	42%	3%
10.	The videotape program did little to change my opinion of the topic.	5%	41%	21%	24%	8%
11.	The interview responses seemed rehearsed.	6%	27%	11%	32%	23%
12.	The program made me realize the importance of the topic.	6%	8%	24%	53%	8%
13.	Technical problems distracted me from concentrating on the message of the program.	12%	45%	18%	20%	2%

14. The videotape program provided a good orientation to the topic which could not be done by a teacher giving a live presentation.	6%	14%	26%	39%	12%

The three open-ended questions and their responses were:

1. What was the best thing about the videotape program you just saw?

Response	Percent
- Students making technical devices using tools and machines	19.70%
- No response	19.70%
- The content showed the importance of technology	18.18%
- Identifying with and learning from own age group	15.15%
- Informative	12.12%
- Development of the lesson without using books	6.06%
- Changed my opinion of what the subject is about	3.03%

2. What was the worst thing about the videotape program you just saw?

Response	Percent
- No response	40.90%
- The classroom activities seemed rehearsed	13.63%
- The explanations on the chalkboard	9.09%
- Difficulty understanding the teacher	6.06%
- Could not ask questions	3.03%
- The tape was too long	3.03%

3. General Comments

Response	Percent
- No response	50.0%
- It was informative	18.18%
- It was interesting	12.12%
- There should be more such videotapes	6.06%
- The classroom activities seemed rehearsed	3.03%
- The videotape program was drawn out	3.03%

It should be noted that the only responses listed were those which had a frequency of more than one.

Biographical Data

The sample was composed of 66 subjects, 62% female and 38% male. Their ages ranged from 13 to 16 years and were distributed as follows:

Number of subjects	Age	Percent
5	13	8%
44	14	66%
16	15	24%
1	16	1%

Their resident distribution was:

City	Percentage Subject Residency
Montreal	29%
St. Leonard	15%
Dollard	12%
Beaconsfield	9%
Pte. Claire	8%
Ville D'Anjou	8%
Ile Perrot	6%
Baie D'Urfe	3%
Pincourt	3%
Ste. Anne de Bellevue	3%
Senneville	3%

Their economic status was:

Status	Percent
Upper-class	7%
Middle-class	90%
Lower-class	3%

APPENDIX K; RESULTS-INFORMATION SHEET

Appropriateness of Medium

Using the Likert-type scale, ten questions were used to solicit information concerning the appropriateness of television and videotape medium in the classroom. The questions and their responses were as follows:

		SD	D	U	A	SA
1.	Videotape or television programming is an ideal way to inform students about a new course.	5%	2%	10%	65%	18%
2.	Given the same amount of time, a videotape or TV program can provide a lot more information than a live (teacher presenting) presentation.	6%	18%	29%	38%	6%
3.	Students prefer to watch a videotape or TV program rather than a live presentation by the teacher.	3%	8%	9%	49%	27%
4.	Television or videotape in the classroom is an 'easy way out' for students.	6%	33%	20%	26%	15%
5.	Television or videotape usually makes a particular subject matter a lot more interesting.	3%	11%	17%	46%	24%
6.	Videotape or television usually has a way of really commanding my attention.	6%	11%	21%	50%	12%

		SD	D	U	A	SA
7.	Another medium other than TV or videotape might be a better way of providing students with information.	5%	15%	44%	30%	3%
8.	I can identify more with my teacher rather than just watching a videotape or TV program.	5%	14%	30%	36%	15%
9.	Educational television or videotape in the classroom is boring.	18%	42%	15%	17%	8%
10.	Television or videotape in the classroom detracts from learning.	12%	33%	33%	12%	9%

Students' Expectations of the Course

One open-ended question was used to solicit subjective responses from students in two independent groups. One group responded before viewing the tape presentation, the other group afterward. The question was: What are your expectations of the I.T.T. course? Responses with a frequency of more than one were selected and are as follows:

	Response	Before	After
1.	To learn more about technology	24%	40%
2.	Undecided or did not know what to expect	22%	20%
3.	No response	21%	12%
4.	It would be interesting	12%	13%
5.	It would be a new experience	9%	9%
6.	To learn more about my surroundings	6%	3%
7.	To fail	3%	3%
8.	To learn the same as boys	3%	0%