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**Development and Evaluation of a Module  
on Comparative Analysis of  
Contemporary Social Issues  
Using Science Fiction**

**Louise Falardeau**

**A Thesis Equivalent  
in  
The Department  
of  
Education**

**Presented in Partial Fulfillment of the Requirements  
for the Degree of Master of Arts at  
Concordia University  
Montréal, Québec, Canada**

**November 1985**

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## ABSTRACT

### Development and Evaluation of a Module on Comparative Analysis of Contemporary Social Issues Using Science Fiction

Louise Falardeau

The purpose of this thesis equivalent was to design and evaluate a module in contemporary social analysis.

The module provides students with a method to analyse contemporary social issues as well as promote comparative analysis by using science fiction stories dealing with parallel issues. While not constituting a course in itself, this module would serve as enrichment material for junior college students registered in social sciences / humanities courses. The module could be implemented during regular class time as a workshop or laboratory period.

There were two 3 hour practice sessions during which the students analysed short fiction stories and contemporary social issues using the method of analysis.

The module was evaluated in three phases. Content experts reviewed the materials, and one to one trials were conducted. After revisions were made on the basis of feedback from these two groups a small group evaluation was conducted.

Analysis of learning involved a comparison of total pre-post test scores and comparisons of three subcomponents. Pre-post differences yielded significance at p. 001. Subcomponent comparisons also yielded significant differences. The results imply significant learning gains in all areas.

Questionnaires indicated that student attitudes were very positive to both the analysis procedure and the use of science fiction.

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## Problem Definition

Preliminary interviews with social science teachers in junior college indicated that students have difficulty performing analysis in the area of social sciences. How to analyse contemporary social issues is not taught per se, the assumption is that this skill, learned in a variety of ways throughout the lower levels of school, will be transferred and elaborated upon with new subject matter, and that methods will be discovered by students during class discussions and through teacher feedback on written essays. The first part of the problem was to develop a specific method of analysis that would be appropriate for junior college students analysing contemporary social issues.

The second part of the problem involved the use of content to make comparisons in order to produce an analysis of social issues. While historical and cross cultural comparisons based on existing, or past existent societies have been used, many contemporary social issues in North America are specific to our culture, technological advancement and rate of societal change. These limitations act as restraints upon teachers in selecting settings and topics. When models are available they are not necessarily of interest to the students. The event or setting may not be seen as particularly relevant and does not stimulate students interest. To deal with these restrictions a number of teachers have moved from comparing issues in real societies to comparing real societies to fictional societies. To do this they are using science fiction.

In order to clarify the problem a literature review was done to better understand the following:

- The importance of the mode of comparative analysis
- The use of science fiction as a model for comparison

## Literature Review

### Analysis and Comparative Analysis

One of the methods used to analyse contemporary social issues is the comparative analysis. Within the guidelines of social studies the need for a comparative perspective has been emphasized. Westhues states,

Careful and systematic comparative analysis of alternative societies calls one's own society into question....the student comes to understand how variation in cultural and social structures accounts for variation in the social problems experienced (Westhues, 1971).

In addition, in 1970 the California Statewide Social Science Study Committee, composed of more than 200 social scientists, released their proposal 'Social Sciences Education Framework for California Public Schools' asserting that an effective curriculum should have as one of its components, "the process of comparison and contrast within the analytical mode of learning". This suggests that to analyse something by examining the parts is a different process than examining the parts by comparing the parts of one whole to parts of another whole.

Social studies are taught in elementary and secondary school and comparisons are introduced through a variety of subjects such as history, geography etc., so that the student becomes aware of the differences between people, environments and institutions.

However, contemporary social issues per se are introduced in junior college where more complex forms of analysis are required by studying social issues which cross the boundaries of individual disciplines and draw upon all of the social sciences. It is at this level that students encounter courses such as 'Third World Politics' and 'Crime and Society'. Through lecture, discussion and writing papers, students are expected to acquire the skill of analysis of more complex concepts.

How this procedure occurs is largely a matter of discovery learning. No procedures for making such comparisons are emphasized, unlike the natural sciences such as chemistry and biology which have practical laboratories, and which focus on methods of investigation which include observation, classification, definition and analysis.

Procedures that assist analysis are taught however as separate courses at the junior college level. Two such courses offered at Dawson College called 'Critical Thinking' are designed to help students develop their analytical abilities. These courses examine deductive, inductive, analogical and statistical arguments.

The general rules of analysis learned in these classes are more appropriately transferable to philosophy where these kinds of arguments are encountered.

The analysis of contemporary social issues belongs to a different class than does the analysis of a philosophic argument. The operation, or cognitive actions, may be considered different than the operation required to perform a philosophical analysis, since the purpose of analysing social issues is not to establish whether an argument is valid within formal structures but to understand the implications of the issues involved.

Romiszowski quotes Landa in this regard as stating that analysis appears in many different kinds of cognitive actions and is applied to different classes of problems (Romiszowski, 1981).

In addition to the limited use of these courses another problem that occurs is that since these are elective courses, many students, not perceiving their relevancy, do not take them. Thus, any benefits that might be gleaned are lost.

One method of dealing with the analysis of contemporary social issues can be achieved by using the comparative approach and supplying procedure guidelines; incorporated into a variety of existing classes, students would learn the value of inductive and deductive reasoning within a given class of problems. This given class of problems is social issues, the analytical purpose being the understanding of implications.

Classroom discussion plays a large role in social science/humanities classes. Research indicates that using science fiction stimulates these classroom discussions. Since science fiction seems to stimulate student interest and participation in classroom discussion, it may also increase their performance while working with the proposed module.

## Science Fiction In Social Science Comparative Analysis

Earlier I quoted Westhues as stressing the importance of 'calling of one's own society into question' as an objective of comparative analysis. In order to do this teachers must stimulate reflective thought. Questioning one's society is an internal process which requires reflection. If reflection is to occur however, certain internal experiences must also occur.

The linchpin of reflective social studies teaching is student enthusiasm for the social problems being investigated. The materials selected for classroom consideration must appeal to students as interesting, relevant and challenging items (Cooper, 1977).

This need for student interest, relevancy and challenge are implied when Bloom says,

The more complex ...categories of the cognitive domain require far more sophisticated learning experiences than the simple communication of a correct version of an idea or event to the student. Much more motivation is required, much more activity and participation on the part of the learner is necessary ... (Bloom, 1956)

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Why does science fiction motivate, stimulate interest, offer challenge and appear relevant? Part of the answer may be in the nature of the subject matter itself and because of the manner in which the subject matter is presented.

The subject matter explores man the individual,

The answers provided in works of science fiction supply clues in the continuing search of guiding values, for comprehension of the nature of the universe ... Science fiction is neither science nor fiction but man in search of himself and the meaning of his existence (Finch and Svengalis 1979).

While this statement may sound dramatic there is no doubt that the subject matter of science fiction, while exploring human responses to novel situations, deals with the same issues that moralists, politicians and psychologists have been working on for a very long time.

Another area science fiction aims at exploring is the social and ecological consequence of science and technology. Since World War II, and especially in the past decade, there has been an increasing concern about crises directly connected to science and technology. The popularization of concepts such as the 'doomsday clock', reports from the Club of Rome, books such as Alvin Toffler's 'Future Shock' and 'Third Wave' have reflected a growing concern for the future.



This concern with the future has generated an audience for science fiction since much of science fiction is about the consequences of science and technology.

Science fiction is a difficult literary genre to define and writers do not necessarily agree on any one definition. Disagreement among the experts is based on a number of reasons; separating fantasy from myth from science fiction has not reduced one definition that everyone can agree upon.

For the purpose of this module science fiction is that fiction which is used as a vehicle for social criticism taking into account the possible future effects on human beings of scientific method and fact.

In North America sociologists Daniel Bell and John McHale, the economist Robert Theobald and physicist Herman Kahn of the Hudson Institute, responsible for the creation of the 'think tank', have contributed to developing a futuristic perspective (Finch and Svengalis 1979). This perspective, started by scientists, many of whom are science fiction writers, was eventually reflected in the education system, and its popularity in schools should minimally indicate that this subject matter is of interest to the students.

In 1975 Jack Williamson listed 215 college and 29 high school courses using science fiction in different disciplines (Williamson, 1975). By 1978 there were approximately 2000 different courses being taught using science fiction (Poll, 1978).

The themes of man as individual, as member of society and as part of an ecological system are presented against a dramatic, action-filled background. The difference between science fiction and other kinds of literature has been described in this way,

Like science itself Science Fiction is an accumulation of discoveries. Science Fiction feeds upon itself by building and improving on earlier ideas, continuously striving to transform itself with novel and more imaginative forms, breaking taboos and other barriers as it strikes out in new directions. Thus unlike other types of literature, Science Fiction constantly renews and regenerates itself from within as well as keeping ahead of scientific and societal developments (Finch and Svengalis 1979).

The manner in which subject matter is presented can exploit curiosity. An 8th grade physical science teacher gave an example of this,

Because many of my students saw a science fiction film about anti-gravity propulsion, I was able to introduce my class to Newton's laws and Kepler's laws with a very smooth transition (Reynolds, 1977).

A survey of 300 teachers covering 2 academic years and completed in 1977 indicated that 59% or 177 teachers successfully used science fiction in grades 7 to 12. A summary of the reasons why science fiction worked for them corroborates the notion that it is a combination of both the nature of the subject matter and the manner in which that subject matter is presented that renders science fiction a useful teaching device (Reynolds, 1977).

Social science educators using science fiction have found it to be both valid and useful. It is a valid form of social criticism because much of the subject matter in science fiction is a criticism of the weaknesses/problems in our society.

The roots of these future societies can invariably be found in the present because of the inability of even the most imaginative science fiction writers to fully transcend the cultural perspectives from which they write ... science fiction is uniquely suited to identifying the weaknesses of society (Finch and Svengalis 1979).

Science fiction has been found useful because social sciences tend to emphasize process to the detriment of content (Cooper, 1977).

Teachers have found science fiction to be an accessible source of non-traditional teaching materials. Many lists and reference books exist classifying short stories by topic area. Many articles covering a variety of disciplines exist that supply the stories with activities for younger grades as well as supplying questions for discussion from elementary to university level.

In addition to its supplying content and being available, science fiction can be used in an interdisciplinary teaching approach. One such course has successfully combined English, History and Science. (Walker, 1980). The list of courses, studies and conferences supplied in Appendix A suggests the diverse disciplines and groups using science fiction today.

Despite the reference by a number of authors to educational technology tools such as Bloom's taxonomy, there remains a strong need for evaluation. While the use of science fiction has received glowing reports, few evaluations have been conducted. Part of the reason for this is that these materials are fitted into existing classes. They become part of whatever performance testing presently exists. Another reason is that much of social sciences testing methods have in the past been essay based. While essay based testing is unavoidable to measure certain higher order skills it poses problems for measurement.

The following excerpt from an interview with one student during the conceptualization of this module best exemplifies the position some students find themselves facing.

Interviewer: How does it work out when you have to write an analysis, when the teacher gives you something to read and says - analyse this and give me 5 or 6 pages.

Student: Pretty good I'm taking psychology and modern man.

Interviewer: What kind of marks do you usually get?

Student: Anything from a C- to a B+.

Interviewer: Have you any idea as to why it sometimes goes wrong?

Student: Not really, well I do pretty well, except sometimes I get off track I guess.

Interviewer: How do you know you're off track?

Student: If I go to speak to the teacher after class he'll say something like - you almost made it but you got off track.

Interviewer: Does the teacher show you how to stay on track, I mean does he give you points on what to write about or consider?

Student: No - I think that's why I get off track, I write about what I think I should write about and what I'm interested in.

Interviewer: Doesn't that get you off track?

Student: Maybe, but not always.

## EDUCATIONAL CONTEXT

### Intended Target Audience

The module was intended for 1st year junior college students enrolled in social sciences and humanities courses. Humanities students have been included because very often humanities courses deal with similar subject matter as do the social sciences.

### Educational Objective of Presentation

In order to produce a better analysis of a contemporary social issue than is presently possible the student was presented with a method of analysis and a science fiction story for comparative purposes.

Upon completion of the module the learner would be able to:

#### Science Fiction

- 1 - Read story, identify key issue/problem.
- 2 - Distinguish relevant from extraneous statements which support stated issue/problem.

#### Contemporary Social Issue

- 5 - Read material, identify similar issue/problem.
- 6 - Distinguish relevant information from extraneous statements which support stated issue/problem.

3 - Recognize primary unstated assumption/s and necessary supporting assumption/s made by author.

7 - Recognize primary unstated assumption/s and necessary supporting assumption/s made by sources.

4 - Draw inferences from facts given.

8 - Draw inferences from facts given.

9 - Formulate valid hypothesis about social issue and describe implications of hypothesis using the comparison between the SF story and the social issue.

The word 'hypothesis' in this module is used to mean 'rational explanation'. The hypothesis is a proto-conclusion which if it survives examining and testing becomes a conclusion (Organ, 1965). The chief functions of this hypothesis are: to clarify a puzzling situation; reach a conclusion to a problem; make predictions possible.

The formulation of the hypothesis would be induced by:

A - Summarizing the differences between the SF story and social issue data.

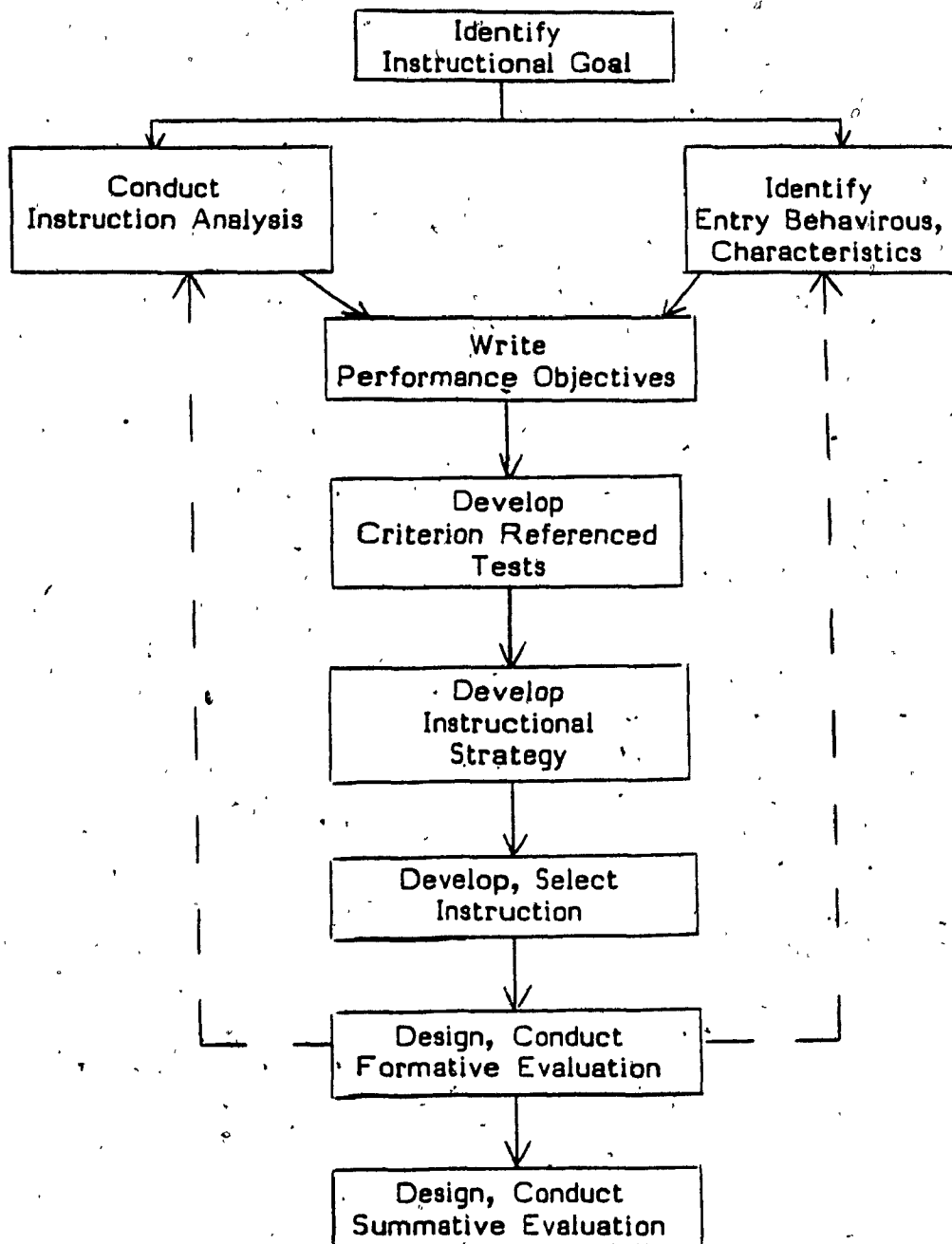
B - Summarizing the similarities between the SF story and the social issue data.

C - Formulating a generalization about the social issue by comparing the similarities and differences between the SF story and the social issue.

D - Inferring the consequences of the generalization.

## Content and Form of Presentation

The Dick & Carey model was used to design this module. This model presents ten steps to systematically develop instruction as follows.





The final step of the analysis procedure was identified as the instructional goal. As previously mentioned, discussions with students and teachers indicated a need for work in the area of comparative social analysis. The science fiction element was incorporated into the instructional goal as a result of research findings.

The instructional analysis produced steps one through eight of the analysis procedure. These subordinate skills needed by the student in order to achieve the instructional goal were based on procedures identified by Troy Organ (1965) critical thinking procedures.

Entry behaviours and characteristics had been generally identified at the beginning of the project. Discussions with students entering junior college had helped identify the initial problem. This step in the model brought attention to the fact that the target audience would be students in the social science and humanities programs as opposed to students involved in other programs. Another factor which emerged as age and primary language were identified was that students must be considered average. Because a method for assisting a majority group was being sought, students could not have an exceptional or high academic standing.

The necessity to identifying the performance objectives resulted in the 4 steps referred to as Parts A to D. While identifying these objectives further defining the word hypothesis for purposes of clarity was also identified.

The conditions were predetermined by the subject matter being studied; written tests would be given after reading selected texts. Students generally have to analyse readings and then produce written papers. In addition oral responses could not be reliably graded. Criteria could not be decided at this point however because the learning materials had not been selected and until this material was examined there was no way of guessing quantitative qualitative tolerance limits.

Developing criterion referenced testing was crucial for a number of reasons. Having identified the performance objectives of summarizing, formulating and inferring a limited response essay type question was selected.

This type of question was difficult to grade but suitable for this kind of complex learning situation. It was recognized also that the subordinate skills must also be tested even if they were not to be measured for learning gains because they were an integral part of the instructional event and students needed feedback. The testing of the first eight steps reinforced the learning of the procedure which would produce the final analysis. The multiple choice questions would directly reflect each step in the procedure, would be reworded, as conceptually translated as it were, thereby giving the student opportunity to review, reflect and clarify his/her position which must be made evident in the final step, the instructional goal of formulating a valid hypothesis.

• The testing of the subordinate skills or first eight steps in the procedure became part of the learning exercise and an important part of the instructional strategy as a result.

Designing the tests necessitated selecting the instructional materials. Although the pattern of the questions could be applied to any materials that might be used, the specifics were dependent upon the stories and articles to be used. Step seven of the Dick and Carey model was therefore partially completed during step five of the development.

The main features of the module were put into place during step six of the development. Discussing the problems of analysing social issues and reviewing the analysis procedure constituted preinstructional activities, explanations and metaphors for explaining the actual procedure were selected. The practice and feedback had already been basically designed and so was the testing. The lesson plan was written at this time and pre and post testing procedures were determined.

Since the learning materials had already been selected the teacher's manual was written, photocopying of student materials was done. Evaluation questionnaires were designed for content experts and students.

• The project was concluded with a small group evaluation; the results of which were used for statistical analysis.

The early attention to criterion reference tests was extremely helpful in clarifying the analysis procedure.

There were two 3-hour practice sessions during which the students analysed a short science fiction story and parallel social issue using the procedure which was supplied, explained and discussed with learners. Each session dealt with a different story and issue.

Students were asked to read the short story and data on the parallel social issue on their own time before each session. These materials were used during the class sessions. The data on social issues were selected from newspapers, magazines and existing textbooks.

Each 3-hour session consisted of:

- Presenting the analysis steps.
- Discussing each step with the learners.
- Practicing each step.
- Giving feedback on each step at it was completed.

Motivation, presentation, and student participation were focused upon in the Dick and Carey model.

At the first session the pretest was conducted. The second and third session was used for the post test. The fifth was used for debriefing and evaluation.

The motivational activities consisted of discussing the problems with this kind of analysis and following up with discussions of how the procedure was contributing to make the analysis process easier. Students responded well to this because they had problems in this area.

The information presentation did not basically change during the two practice sessions. Each step of the procedure was discussed at both sessions. However the materials the procedure was used on were different. This prevented boredom and also gave students a more in depth practice with the procedures.

Students participation was essential and ensured by treating the first eight steps as an exercise leading to the final analysis.

### Media Selection

Because of the abundance of printed material dealing with contemporary social issues, print was selected as a media source. Apart from radio and TV shows, which would not be practical, newspapers and magazines were a logical source for recent reports on the topics which constitute the social issues of the day.

Textbooks provided excellent subject matter background. For example, the background material taken from a textbook in the last session supplied economic and medical data on the elderly.

Photocopying short science fiction stories, exercises and the analysis procedure was cost effective.

The teacher was considered as the medium for presenting the dialogue. As recommended by Dick and Carey, when dealing with conceptual discriminations, the medium used should supply student feedback.

Ordinarily, classes in social science and humanities are teacher centered. The introduction of an analytical procedure and exercises shifted the emphasis from a purely teacher centered experience to a teacher/material centered experience.

The dialogue between teacher and students was essential to making the experience positive, however the materials were also essential to the learning. While the interaction between teacher and materials was interdependent; the use of materials acted as a control on teacher response to some degree. The structured assistance offered the teacher through the use of the procedure and exercises might assist a teacher who finds improvisation difficult and assist an experienced teacher to keep students from wandering away from the objective.

### Learning Exercises

The nine (9) performance objectives constituted the heuristic procedure for the social analysis. The first 8 steps were treated as a learning exercise since students did not presently have any such procedure to follow. The last step in the procedure, that of 'Formulate valid hypothesis about a social issue and describe the implications of the hypothesis using the comparison between the SF story and the social issue' was used as the pre and post tests. This last step 9 is discussed in the Method section.

The eight (8) steps in the learning exercise were each given one (1) objective practice question. These questions belong to the classification of the interpretive exercise as Gronlund (1981) defines it.

These questions are designed to test recognition of relevant information, warranted and unwarranted generalizations, assumptions and inferences. The design of the questions to test these areas belongs to the multiple choice category of questions, however, interpretation skills are required because statements have to reflect the objective. In testing assumptions for example, the student is presented with a number of assumptions based on the original material. The student must interpret the information and then select the right interpretation. Gronlund (1981) gives numerous examples of question structures designed to test areas such as generalizations, influences and assumptions over a variety of subject areas from mathematics to literature.

Students were presented with the entire procedure step by step and then practised each step by completing the learning exercise (steps 1 to 8) and then producing an analysis which is step nine (9) and consists of four (4) restricted response questions.

Each question in the learning exercise addressed the performance objective directly. For example, step one (1) requires identifying the key issue/problem; the exercise question presented a multiple choice of possible key issues. Step two (2) requires supporting the identification of the problem with statements, which is what the exercise question asks for.

Each question reinforced the procedure, students identified the problem, supported it, identified assumptions, decided on implications in the questions which were the procedure steps, over and over again. (see Appendix B Teacher Manual for all learning exercise questions).

The relationship between the learning exercise (Steps and questions 1 to 8) and the final analysis (Step 9, questions A, B, C, D) is based on the following rationale.



The differences between an informed and uninformed analysis of a social issue lies in the ability of the student to choose appropriate evidence and weight that evidence. In other words, select particular information and examine the relationship between that information. Even when an informed conclusion and uninformed conclusion are the same, the informed assessment of an issue is considered a more objective assessment.

Considered essential to analysing a social issues were the four (4) elements of: identifying the issue, supporting the identification, understanding the author's assumptions and where those conceptions might lead to in practical application. If the student could be made cognisant of these aspects s/he might better understand the direction of social movements and the variation in social problems. These four (4) elements are the first four (4) steps in the procedure and are practiced in the learning exercise in the first four (4) questions. On the science fiction story, and then again on the social issues material in the next four (4) steps.

Step one (1) in the story and step five (5) in the social issue asks the student to identify the issue/problem. This can happen at a seemingly intuitive level. We often have an impression that things have likenesses. Step two (2) in the story and Step six (6) in the social issues asks for supporting statements of the issue.

This information permits the student to identify specific similarities and differences. In the first set of materials, for example, it is not sufficient to conclude that both the story and social issue materials suggest a lack of hi-tech people to run a hi-tech society. What elements of society contributed to the similarities or differences are identified by information such as middle class reaction to public school issues, educational system's response to compulsory education and so on. These first two (2) steps in the procedure relate to the first two (2) parts A and B in the analysis step nine (9) which asks for the summary of similarities and differences.

Steps three (3) and four (4) in the story and steps seven (7) and eight (8) in the social issues asks the student to examine the relationship between theory and practice. The student has the opportunity to see that certain beliefs make possible certain kinds of concrete policies and that policy formulation is based on particular value systems. Practicing this process in both the story and social issue, the student is requested in Part C and D of the analysis to perform the same operation. The student looks at the similarities and differences, having at his disposal the assumptions and implications, and choosing an area of import, presents a recommendation for change. This possible solution takes both theory and practice into consideration.

### Teacher's Manual

The manual provided the teacher with instructions for implementing the module, the learner's materials, tests and grading methodology. (see Appendix C)

### Procedure for Module Implementation

Three different topics were presented in module. These topics are:

- A - Education
- B - Technology
- C - Health & Welfare

Students were given information on the purpose and length of the project. Story and data on topic A - Education were distributed to them which they read on their own time. The first session occurred 3 days later at which time they brought the data with them.

NSF = Non Science Fiction; social issue data  
 SF = Science Fiction short story

- A - Education Story
- B - Technology Story
- C - Health & Welfare Story

Instruction Phase

1.	A - NSF PRE-TEST Write Analysis	1 hour
2.	A - SF & Procedures  A - NSF & Procedures	3 hours
3.	B - SF & Procedures  B - NSF & Procedures	3 hours
4.	C - SF & Procedures  C - NSF & Procedures	POST TEST Write Analysis 1 hour
5.	DEBRIEFING  GROUP INTERVIEW	ATTITUDE QUESTIONNAIRE  1 hour

Figure 1. Procedure for Implementation of Module

Implementation of the module then proceeded in the following manner, as presented in the accompanying schema:

1. Students were asked to write a 2-page analysis according to Pretest directions. These pretests were graded, and returned to students at session 2 for their own use.
2. Preinstructional Activity: (30 minutes)

Instruction began with discussion with students about their experience with analysis, the problems they have encountered.

Information Presentation: (1 hour)

The analysis procedure was presented to students, each step was discussed with them.

Materials were discussed to make sure they were understood.

Student Participation: (1 hour)

Students were then asked to apply the procedure to story A and topic A working through an exercise.

The teacher supplied feedback by answering questions on the procedure as the students went through the practice exercise. Exercises were self corrected by students as they progressed through procedure. Exercises were turned in so that teacher could get some idea of how understanding of procedure was developing.

Reading materials are distributed for session 3.

3. Preinstructional Activity: (30 minutes)

The analysis procedure was again discussed with students. The emphasis was slightly different inasmuch as they had had some experience with the procedure and were probably looking for certain kinds of information in the material.

Information Presentation: (1 hour)

Topic B and story B were reviewed and any questions about materials which were not clear were explained.

Student Participation: (1 hour)

Students were asked to apply the procedure to story B and then to social issue B by completing the exercise once again. Each item was discussed upon completion with the students. In this way students with incorrect answers could make notes and clarify problematic areas as they did in the previous session. They also completed the 4 part analysis which was reviewed.

Reading materials are distributed for session 4.

4. Preinstructional Activity: (30 minutes)

Increasing familiarity with the procedure was discussed.

Information Presentation: (1 hour)

Topic and story C were reviewed and any questions about materials which were not clear was explained.

Student Participation: (1 hour)

Students were asked to apply the procedure to story C and social issue C by completing the exercise and proceed to do the analysis which was the post test. No direction was given by the teacher.

Debriefing: (30 - 40 minutes)

An additional questionnaire was completed during a group discussion. Because of the length of time involved in this project individual interviews were not conducted. However, an open discussion with students about topic interest and use of science fiction, which students could write comments about during the discussion, did illicit additional information.

Note: Appropriate questionnaires were completed as indicated in the Questionnaires Content Outline Appendix D.



## METHOD

### Objectives of Evaluation

An evaluation was conducted in order to obtain data on:

- A) Learning outcomes. The objective being to produce a better analysis of contemporary social issues than is presently produced as measured by the pre-post tests.
- B) Appropriateness of method and materials. The events of instruction and the use of science fiction should contribute to the learning process of junior college students. Questionnaires used with 2 content experts, 2 one to one trials and 1 small group trial were used to explore the effectiveness of method and materials.
- C) Contribution of science fiction to students' motivation. Questionnaires elicited information from the students exploring the role of science fiction in motivating the student.

## Evaluation

### Content Experts

The content experts evaluated this module. One expert taught classes in both social sciences and humanities in the junior college system. In addition to presently teaching humanities in CGEP, he had teacher certification because he had also taught in the secondary school system. The second was a professional writer of science fiction. This writer also taught at the university level and had designed courses for teaching a variety of subjects using science fiction. Thus, both teachers were judged as having expertise in teaching, and one of them as having expertise in science fiction and the use of science fiction in teaching.

The purpose of the evaluation by content experts was to identify any problems the experts might anticipate prior to putting the module to 1 to 1 trials.

Data collected was in the form of questionnaires and interviews after experts had reviewed the materials which included instructor's manual, stories, social issues materials, instructional strategy and all exercise and tests.

Revisions were made based on a questionnaire designed to identify:

- Clarity of materials
- Level of appropriateness
- Equivalency of difficulty of stories since 3 different stories are used.
- Attitude toward materials.

### One to One Trials

Subjects used in the 1 to 1 trials were males, age 18 attending 1st year CEGEP. One student was in humanities at the Selby Campus, the other in Social Sciences at the Lafontaine Campus.

The purpose of the two 1 to 1 trials was to determine whether the content and instructional events presented any difficulties which might be corrected, increasing the effectiveness of the module. In addition, attitudes toward the analysis procedure, science fiction content, value of the learning experience and testing were collected in an attempt to assess receptivity toward the module and perceived relevancy of the module.

Data collected was in the form of questionnaires and interviews at each of the three sessions and produced the following results. (see appendix D)

Revisions were made based on a questionnaire designed to identify:

- Problems of performance
- Problems of clarity of all materials. (language and presentation of instruction and materials)
- Problems of level. (different ability and experience of students)
- Attitudes towards materials, presentation, practice exercises
- Time required.

#### Small Group Trial

#### Sample

Subjects used in the small group trial were CEGEP students in their 1st year, registered as full time students in humanities and social sciences. The group of 20 students was 18-19 years of age, 3 females, 17 males.

#### Sampling Procedures

True randomized selection of students was not possible. Volunteers were requested by teachers from the Selby and Lafontaine campuses. In addition posters were placed in public areas on the campus announcing the project.

The characteristics of volunteers may not be representative of the population but because of the length of time involved it was felt this was the best way to proceed in order to maintain the number of subjects. The length of time of the project and the purposes of the evaluation once explained may have compound volunteer characteristics.

#### Instrumentation and Data Collection

The pre-post test to assess learning gains was based on the last performance objective previously identified. (see appendix C for pre and post test directions)

Questionnaires were used to record:

- Content experts remarks
- One to one student evaluations
- Small group evaluations

Interviews were conducted with all groups. A complete outline of all questions is in appendix D.

The point method was used to score the performance objective 'formulative valid hypothesis'. This hypothesis is also referred to as an analysis. An outline of the expected analysis was prepared which constituted the grading criteria. (see appendix C for grading criteria) The analysis consisted of 4 parts.

- Identifying differences between the story and articles.
- Identifying similarities between the story and articles.
- Formulating a conclusion.
- Recommending implications for social change.

Each statement made by the student was compared to the list of possible answers and graded accordingly. According to Gronlund (1981) this method is well suited to scoring restricted response questions.

Possible similarities and differences were grouped because the students could approach a concept as one or the other depending on their perspective and explanation. Of the 10 possibilities, 5 constituted the perfect score of 5.

Of the 5 possible conclusions or generalizations, the student recommending 3 achieved the perfect score of 5.

There was only one implication possible however the criteria specified appropriate flexibility according to the previously made conclusion. If this was achieved the student was given 5 points.

The implications had the fewest possible right answers thus carrying the most weight. This was in keeping with the original conjecture that the purpose of analysing social issues is to understand the implications involved.

Two graders were used to score pre and post tests. Pre and post tests were originally mixed in an attempt to avoid bias in favour of post test results. However both raters agreed that upon examination of the tests it was easy to identify the pre from the post tests due to the increased organization and cohesency of the post tests.

Predetermined were ten (10) possible answers for similarities and differences; five (5) possible answers for implications, and five (5) possible answers for conclusions. Student responses had to match the predetermined answers clearly and in such a manner that neither examiner doubted the meaning of the student response.

Each of twelve (12) students had the possibility of selecting a twenty (20) correct responses, totalling two hundred forty (240). Raters disagreed on three (3) selected responses making agreement between raters 98.75% . Since these three responses were not clearly understood to represent any of the predetermined answers they were counted as incorrect.

Tests were mixed so that raters would not be sure which were pre and which were post tests.

For the complete grading criteria for pre and post tests see Appendix C.

### Evaluation Design

A one group pre/post design was implemented during the small group trial in order to assess learning gains as a result of using the module. See Figure 1. Procedure for Implication of Module which indicates when pre and post tests were conducted.



## Data Analysis

Learning gains were measured by a Sign test which was selected due to the non normal distribution of scores in the subcomponent: Implications. (see appendix C). The students obtained either a zero or a perfect score in this subcomponent. Consequently, the use of a parametric test such as the T-Test was not appropriate. The sign test provided a more conservative estimate of the differences between pre and post test scores than the T-Test would have provided.

## RESULTS

### Expert Evaluation

#### Content

Experts had no changes to recommend to content. The junior college teacher who had never read science fiction was surprised to see that science fiction stories could mirror present day events to the degree that they did.

#### Instructional Events

Both teachers felt that the procedure could be adapted to comparative studies generally and also to analytical studies in humanities when comparison is not required.

#### 1 to 1 Trials

While the learning objective of the module was understood, there was some confusion as to what the word 'analysis' meant. Both students believed an analysis varied according to what was being analysed.

The summary sheet which students composed to collect information from the exercises proved to be more useful than originally anticipated. Since the exercises were lengthy students found that constantly flipping through their sheets was confusing. Composing the summary sheet immediately prior to writing the analysis was found cumbersome as well. The use of the summary sheet was more functional when completed during the procedure; students completed the summary sheet as they completed each exercise item. In this way the student did not have to flip through all the pages of the completed exercise and perhaps miss something. In addition, any ideas occurring to the student while completing each step would not be lost.

While the exercises were lengthy students did not object to them. It was noted that the number of exercise items varied among the 3 sets of materials. This was corrected so that scoring problems would not occur later.

Students stated that the stories affected their recognition of specific areas in the social issues materials. If they encountered a concept in the social issues material which they had previously encountered in a story, they recognized the concept as though they were reading it for a second time. This implies that the SF stories were effective as models.

### Instructional Events

Students commented that after going through the analysis procedure once they tended to look for certain kinds of information when reading. Both students reported that the steps were easy to remember.

### Attitudes

Students felt the analysis procedure helped organize the reading materials.

They believed the procedure would be useful in other classes where comparisons were required. Comments suggest they did not previously understand the differences between assumptions and inferences and this would be useful in other classes where writing papers would be required.

Testing did not bother them because they viewed it more as a practice. Both students did say that had they been in a class and notified they were being tested they would have been more nervous. They believed these kinds of practice sessions would help them write papers that were tests and were being graded.

All three SF stories were liked and they believed these stories to be relevant to the issues they read about. Both indicated they were aware of the issues prior to the sessions but did not have as much information as the material provided.

### Open Comments

Neither student could specify anything they did not like and compared it to school classes. For example, one student commented 'compared to school there's nothing I didn't like.'

Both students found the SF stories entertaining and stated, they liked this aspect best.

### Small Group Trial

Analyses of Learning Gains involved a comparison of total pretest and post test scores, and comparison of three subcomponents; Similarities/Differences, Generalizations, and Implications. Table 1 presents mean scores, standard deviations and total scores for the total pretest and post test scores, and for the individual components. Non parametric Sign tests were conducted to analyze pre-post differences, thereby accounting for the non-normal distribution of scores. (See raw scores appendix C). Table 2 presents the positive, negative and zero differences associated with the comparisons. The 2-tailed probability for the total pre-post difference was significant at  $p .001$ . Analyses by individual component also yielded significance; Similarities/differences ( $p .001$ ), Generalizations ( $p .01$ ), and Implications ( $p .05$ ).

The results therefore imply significant learning gains in all areas.

<u>Components of Analysis</u>		<u>Mean</u>	<u>Std. Deviation</u>	<u>Total Score</u>
Sim/Diff.	Pretest	1.500	0.522	5
	Post test	3.000	1.206	5
Gen.	Pretest	1.333	1.371	5
	Post test	2.667	1.155	5
Imp.	Pretest	2.083	2.575	5
	Post test	5.000	0.0	5
Total	Pretest	1.639	.784	15
	Post test	3.556	.625	15

Table 1 Mean, Std. Deviation and Total possible scores, by individual components of analysis and for the total Pre and Post test scores.

<u>Components of Analysis</u>	<u>Negative Differences</u>	<u>Positive Differences</u>	<u>Zero Differences</u>	<u>2 Tailed Probability</u>
Sim/Diff	0	11	1	p .001
Generalizations	0	8	4	p .01
Implications	0	7	5	p .05
Total	0	12	0	p .001

Table 2. Results of the sign test conducted for total pre-post scores and for the individual components of analysis (indicating the frequencies of types of differences and the associated 2-tailed probabilities).

## Questionnaires

At the end of the sessions students were asked to complete a questionnaire. The results are as follows:

### Content and Instructional Events

Students understood the purpose of the module and steps in the procedure. Materials were clear and so were the concepts being discussed.

8 out of 12 students believed the length of practice exercises were adequate while 4 believed they were too long. The exercises were not too difficult nor too easy.

In all cases students believed the science fiction contributed to the sessions.

All students believed that the analysis procedure influenced their readings after their first exposure to the procedure. They tended to look for particular statements which would support the identified problem and would reveal the author's assumptions.

At all times students believed the presentation to be logical and used at the right time.

## Attitudes

All students believed they had benefitted by the model's approach to analysis and believed the science fiction stories helped them relate to the social issue.

During the interview students verbalized this by stating that the story "pulled it together" for them.

All students indicated that social issues had a different meaning for them. The value of the experience had been that consequences were now more relevant than they had been before. This was due to the particular stories they had read and their similarity to the social issues materials.

All students believed they could use the procedure either in its entirety or parts of it to present classes or future ones.

None of the students felt negatively about the testing but all believed it was because the sessions were not part of their regular school work.



Students responded positively to the use of science fiction. The social science teacher believed that the science fiction stories contributed to the module, making the comparison very relevant; while the science fiction writer believed that science fiction stories always contributed to understanding social issues since that was, most often, what science fiction were about.

While none of the students could identify anything they liked least all stated they like the stories best.

Further interview results are presented in discussion section since certain comments are the basis for recommendations.

## DISCUSSION

Three issues emerged as a result of pre-post test results and interviews. The first issue deals with analysis procedures generally. The second issue deals with the use of structural procedures. The third issue deals with the quality of analysis.

Content experts did not expect that students would not understand what an analysis was. Students stated they had never been given an explanation of the process of analysis. While english and philosophy teachers did teach analysis procedures, these procedures were discipline oriented and did not contribute to a functional understanding of the world at large.

These comments have two implications. First, students need specific directions as to what is expected of them when they are asked to analyse readings. Second, while students understand the need for learning the mechanics of a discipline, such as plot, character development, focus, narrative voice, style, how an author fits into the literary stream etc., they need a broader knowledge framework to accommodate specific studies. Students indicated that they would like to know if the author influenced the thinking of his day. Did he contribute to value changes in his society. Were his ideas, opposed and so on.

For example one student said that using the module definition of assumptions and inferences he was prepared to classify Dickens as a socialist, while a religion student argued that Christ was the first practising socialist. The religion student could compare Christianity to Judaism; but he wanted a broader context to place the study of religion within.

While too broad an issue to explore here, the purpose of why students study the social sciences and humanities is obviously part of any recommendations. If the instructional goal of these studies is not only an understanding and appreciation of how people come together to create knowledge or things of beauty, but of the effect of that knowledge or beauty upon individuals and society, modules could be developed for teachers to assist incorporating this perspective into existing courses.

A procedure for analysis was considered obvious by the science fiction writer whose background is mathematics. The social science teacher, believed it was a good idea but admitted that he had not considered it prior to reading the module. It may be that the content experts own learning was being made apparent here, since mathematicians deal with procedures in the form of formulas and strict organization methods generally, and social science teachers deal with descriptions and explanations, or there may be another less obvious explanation for this. Social science teachers may be less aware of analytical procedures they themselves use because they did not learn a procedural method as such. If analysis procedures among social science teachers were researched, what common analytical steps might be identified? What might we learn about the analysis of complex interdisciplinary data?

The social science teacher had had a background in high school and commented that the procedure might work well with the upper grades in high school. If the procedure and content were simplified could lower levels in high school also benefit?

The use of a structural procedure was positively received by students. The usual method is that a teacher will discuss some aspect of an issue and then open the subject for discussion with some questions.

The explanation of the procedure combined with the exercises and summary sheets lent organization to classroom time and made information more manageable.

This was an unexpected response because it is generally assumed that students want less work not more work. Content experts believed that students would learn from the structural procedure which included the exercises but were concerned that students might find these exercise too long. As previously stated however, 8 out of 12 students believed the length was adequate.

It may be that these kinds of exercises were sufficiently novel to maintain student interest. Another possibility is that the questions in the exercises permitted a review of the material which reinforced the learning. These exercises provided time to mull over the information as it were to examine the data presented in a different way. The information may thus have taken on a different dimension and keep student interest by helping them reprocess the information in a different and reinforcing manner.

There is no reason to believe that teachers would not react favourably if supplied with modules previously mentioned which offered this kind of structure.

If we proceed on the assumption that the more similarities, differences, assumptions and implications a student can identify, the more likely the possibility of producing a comprehensive analysis, post test gains imply that the module was successful. This gain however was not purely quantitative. For example, a learner who identified two similarities in the pretest identified three similarities in the post test. Students who could not formulate any conclusions or implications in the pre test did so in the post test. However the module did not address the quality of analysis. How individual concepts come together to form a perspective, or how these perspectives can be creatively manipulated to formulate recommendations for change, were not explored.

Each step in the procedure should be explored with individual modules, which might better address the following considerations.

- What components of an issue are examined to identify similarities and differences. Can criteria for this kind of identification be formulated so that students, regardless of their disciplines, have a practical procedure to identify similarities and differences.
- What statements are examined to identify author's assumptions. Do you examine descriptions of society or do you focus on conversations between characters, in a story, or both? When looking for assumptions in articles do you research the interest group's background, an individual's economic background and so on.
- When recommending a plan for change should you consider cost of programs, religious effects, international policy. Is a checklist possible that would stimulate the student's awareness of the complexities and therefore the depths involved in analysis.

Results of pre-post tests indicate that further research is needed to help us to develop heuristics procedures for teachers and learners in the area of contemporary social issues. Procedures for the three areas mentioned above might be developed as a more thorough breakdown of the initial nine step procedure that would permit a closer look qualitative improvement.

If quantity can be so dramatically affected by the use of procedures that help manage information, can we expect similar results with quality? While the design of qualitative measures would be complicated, the results might have implications for many subjects in the social sciences and humanities.

Some questions arise when examining the raw scores. Five (5) out of twelve (12) students were able to produce implications in the pre-test. Of those five (5), two (2) students achieved a score of zero (0) in generalizations and the remaining three (3) students achieved the minimum score of one (1).

We might venture a guess that a minority of students have learned to organize information either on their own or through a teacher. But of what does organizing information consist? Students would have to have a classification system or taxonomy of society; a method for translating theory into practice; a value measurement for deciding what variables in society can affect other variables and to what extent.

In this module what constituted organizing information was specified and understandably restrictive, however the issue of organizing information for purposes of analysing social issues could be approached other ways. Prior to attempting a procedure as presented here courses might be designed and tested on the ways and means of organizing information.

Finally, the attitude questionnaire indicated that the quality of the entire procedure was well received by students. All students believed that the science fiction stories helped them to relate to the social issues they had encountered in a different way. During discussions with the students, they stated that 'seeing the social issue in a different way' meant that there were consequences to our social issues, that in fact the world could really change radically over a period of time. Seeing the consequences of such issues in story form was the major factor in giving the issue substance.

The attitude findings on the procedure and use of science fiction confirmed this instructional procedure was effective.



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**Appendix A**

List of courses using science fiction  
studies, conference papers on use of  
science fiction.

<u>Category</u>	<u>Subject/Discipline</u>	<u>Level</u>	<u>Reason for using SF</u>	<u>Year</u>	<u>Location</u>
Course	Literature	Elem.	Appreciation	1980	Iowa Ed. Agency
Study	Reading Inst.	Jr. High	Increase sources for spatially gifted	1983	Intl. Reading Assoc. Anaheim, Ca.
Course	Anthropology Honors	Univ.	To present quality non trad. course stimulated enrollment	1982	Kentucky
Course/Thesis	Sociology	Gr. 12	Examine racial & ethical bias	1982	S.W. Missouri State Univ.
Paper	Communications		Interpersonal communications	1981	Speech Comm. Ass. Anaheim, Ca.
Paper	Geography	Univ.	Interdisciplinary geography through literature	1981	Ntl. Council for Geographic Ed. Pittsburg, Pa.
Paper	Reading Inst.	Elem/H.S.	Interdisciplinary reading/science	1978	Intl. Reading Assoc. Houston, Tex.
Paper	Humanities	Univ.	Future of societies	1975	College English Assoc. Atlanta, Georgia
Paper/Course	Population	Univ.	"SF coincides with one of the primary goals of sociology, the prediction & understanding of human behaviour in its social context"	1974	Population Assoc. of America N.Y.

<u>Category</u>	<u>Subject/Discipline</u>	<u>Level</u>	<u>Reason for using SF</u>	<u>Year</u>	<u>Location</u>
Course	Pol. Sc.	College	To study models of Hobbes, Locke, Rousseau	1977	Jersey City State College
Course	History	Univ.	Present a broader perspective on past & present	1978	Univ. of Tulsa
Course	Archeology	Univ.	Debunking false hypotheses	1975	History Teacher Journal
Course	Dept. of Govt.	Univ.		1975	Cornell Univ.
Course	Physics	Univ.		1975	Univ. of California
Course	Popular Culture	Univ.	SF is the consciousness of a technological age	1975	Bowling Green
Course	Réligion	Univ.	Impact of science and technology on morality	1975	Univ. of Dayton Ohio
Course	English for Foreign Students	Univ.	SF explores the entire range of our cultural assumptions	1975	Univ. of Wyoming
Course	Mathematics	Univ.		1975	Southwestern at Memphis, Tenn.
Course	Physics	Univ.	Interdisciplinary physics/psychology/english	1975	East Texas State Univ. Commerce, Texas

**Appendix B**

**Teacher's Manual**

**Teacher's Instructions**

**Teaching Analysis of  
Contemporary Social Issues  
using Science Fiction**

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## Preface

This module has been designed for use in social science/humanities teaching, junior college level. Its purpose is to help students learn how to analyse readings on contemporary social issues. To this end it provides a heuristic procedure for collecting specific information that can be used to formulate valid conclusions.

The method of analysis is comparative and uses science fiction as the comparative model.

Science fiction has been successfully used to teach many different social science subjects. By comparing a contemporary social issue or problem, where alternative conclusions are possible, to a speculative scenario exploring the results of one conclusion, students can begin to see the importance of present social issues and question the social and value systems of their own society.

However, before this objective can be achieved, students have to learn to analyse issues which are multi-faceted. This kind of analysis is directed at understanding the implications of the issues involved.

This module is intended to be used as a social science workshop or laboratory. Used in addition to your regular classes it provides practice time for observation - through discussion and reflective thinking; classification - through grouping information into manageable categories; definition - through exploring relationships of ideas.

These activities permit an examination of the social issue as a whole, which is an analysis of organizational principles. Analysis is a prerequisite to evaluation. These 4 components of observation, classification, definition and analysis are the same skills that are developed in biology and chemistry laboratories, and it is for this reason that this module is referred to as a social science laboratory.

## 1. Overview of Module

There are nine steps in the analysis procedure which are explained and discussed with students based on particular readings. Teaching the steps and practicing them occur simultaneously. The practice is in the form of written exercises. These exercises consist of one question per step of the analysis procedure up to the last step at which time the student writes a 2-page analysis which is graded. While steps nos. 1 to 8 are not graded they are used by both instructor and student as a guide to the final step of producing the analysis. Simply stated, this is how the module works.

The learning objective is presented next broken into the 9 performance objectives.

Following the performance objectives there is a short discussion on your role as teacher and information manager.

An explanation of each procedure step is presented with suggestions for explaining these steps to your students.

The instructional strategy presents actual classroom procedures with materials used in each session. A sample 2 page analysis has been included which was chosen to represent an average 1st year CGEP student's performance.

I sincerely hope this module will be of some service to you.

## 2. Social Issues Analysis - Learning Objectives of the Module

Upon completion of this module the student will be able to:

Analyse a contemporary social issue using a science fiction story as a comparative model.

### Performance Objectives

This learning objective will be achieved by being able to:

- 1 - Read story, identify key issue/problem.
- 2 - Distinguish relevant from extraneous statements which support stated issue/problem.
- 3 - Recognize primary unstated assumption/s and necessary supporting assumption/s made by author.
- 4 - Draw inferences from facts given.
- 5 - Read material, identify similar issue/problem.
- 6 - Distinguish relevant information from extraneous statements which support stated issue/problem.
- 7 - Recognize primary unstated assumption/s and necessary supporting assumption/s made by sources.
- 8 - Draw inferences from facts given.

- 9 - Formulate valid hypothesis about social issue and describe implications of hypothesis using the comparison between the SF story and the social issue.

The formation of the hypothesis will be induced by:

- A - Summarizing the differences between the SF story and social issue data.
- B - Summarizing the similarities between the SF story and the social issue data.
- C - Formulating a generalization about the social issue by comparing the similarities and differences between the SF story and the social issue.
- D - Inferring the consequence of the generalization.

**Note:**

The word "hypothesis" is used here to mean 'rational explanation'. Hypothesis means 'to place under', and it is used in this sense, when 'placed under' the information the student has collected it gives a rational explanation for the state of affairs. If a hypothesis survives testing and examination it becomes a conclusion.

The hypothesis does not have to be presented in one or two sentences as are often seen in statistics. In social sciences and humanities the testing of a hypothesis sometimes takes a long time and the hypothesis or conclusion remain hypothetical as a result. One example of this kind of hypothesis is the Manifesto of the Communist Party. Because of certain economic events the hypothesis or conclusion is now being revised. The reason why the Manifesto is used as an example is because we do not generally perceive so long a document as a hypothesis.

When you read the text items for this last step you will see that it is not necessary to explain to the students the definition of the word hypothesis. This last step constitutes the analysis the student has been working toward, and within that analysis the student will produce a hypothesis.

### 3. Your Role in Implementing the Module

During the time you are explaining the analysis procedure you will be providing learning guidance. Since these steps in the analysis must be understood you may have to use different approaches with different students and build upon the feedback you get from the students during your discussions. It is not a question of discovering the steps but understanding the rules. Nor is it a question of memorizing the rules; when students are practicing with the exercise they will have the steps written out in front of them.

After the steps are discussed and the practice work begins, your role becomes one of information manager. You will want to elicit the right answer by hinting and questioning them as they work their way through the exercise; you might want to remind them of statements made earlier and provide them with feedback as to how accurate or inaccurate they are. During these practice exercises you can verify if everyone has completed a step and ask different students for the answers to each step along the way. Confirm the correctness of the answers and students can then correct their own exercises.



#### 4. Producing A Summary Sheet

This section is placed just before the explanation of performance objectives because as you explain these steps students will also be completing the exercise items which go along with each performance step in order to practice each performance step.

Compiling a summary sheet as the student works through the exercise will help the student prepare for the final step 9. This summary sheet consists of blank sheets of paper used in column fashion. Down one side of the page answers are transferred from the exercise sheet on the story. Down the other side of the paper answers are transferred from the exercise sheet on the social materials.

Students will probably reword lengthly answers on their summary sheet.

## 5. Explanation of the Performance Objectives

Step 1. Read story, identify key issue/problem.

Whatever the central issue or problem is in the story it is essential that students deal with what is stated. During discussions issues have a way of being reinterpreted. For example what may start off as a problem of unemployment, so stated by the author, may be reinterpreted to be a psychological problem or something else. The stated problem gives focus to the analysis, without this focus it becomes a question of personal perception. If that happens, reading the social issue will confuse them since similarities between the story and social issues material will be lost. They must stay with the objective of identifying the issue from the givens in the story.

Step 2. Distinguish relevant from extraneous statements which support stated issue/problem.

While many pieces of information supplied in the story may sound important at first reading, only certain statements will support the problem statement identified in step 1. If students wander off, you will have to bring them back to the original statement.

Step 3. Recognize primary unstated assumption/s and necessary supporting assumption/s made by the author.

This step is probably the most complicated of all the steps. In some stories the primary assumption is in fact stated. However, more often than not it is unstated.

One way of explaining this is to say that the primary unstated assumption is the point from which the author starts. In everyday living we all have certain beliefs or primary assumptions that permit us to function. For example, we make plans for next week based on the assumption that we will be alive to follow through with those plans.

In prose, a familiar story could be used like Little Red Riding Hood. While this may bring a chuckle from your students, most people are familiar with this fairy tale. It is easy to explain to ethnic students who do not know it. The primary assumption never stated in this story is that little red riding hood and her grandmother love each other. The supporting assumption is that people who love each other enjoy visiting each other. Recognizing primary and supporting assumptions is difficult at the best of times.

Students must ask themselves 'what is the assumption upon which all other assumptions are built'. That 'starting point' assumption is the primary assumption. You could ask the students "Is the primary assumption (in the fairy tale) that the granddaughter and grandmother like seeing each other, after all the story opens with red riding hood happily on her way to see her grandmother?". The answer is no - because this assumption is caused by something else. Why do they like to see each other? It is because they love each other. This is the starting point.

The stories your students will be dealing with will be more complicated than Little Red Riding Hood. You can alleviate your students' concerns by telling them that the practice exercises they will be doing give direction for this step. After all, the exercise is not a guessing game.

Step 4. Draw inferences from facts given.

In step 3 we performed a kind of looking backward to recognize assumptions. We were interested in deducing or drawing out what was contained in certain premises.

In step 4 we attempt to formulate generalizations which go beyond the evidence but to which the given evidence points. This is an inductive process.

Using Little Red Riding Hood as the example again, what generalizations can we make? Consider the wolf's role. We could generalize that 1 - wild animals prey on humans, or 2 - wild animals are the enemy of man. Consider the grandmother's role. We would generalize that 1 - the old are weak and need the strength and protection of the young. Little Red Riding Hood is also saved by the woodchopper, hence - the very young need protection of strong adults.

Steps 5, 6, 7 & 8.

Steps 5, 6, 7, & 8 are the same as steps 1, 2, 3, 4. Once you have explained the first 4 steps of the procedure to your satisfaction you will be reviewing them as you cover steps 5, 6, 7, 8.

While the material on social issues is more diversified, the process remains basically the same.

The social issues material is organized to attempt to deal with '1st things 1st'. For example Story A 'The Marching Morons' has as the first parallel issue an article called 'The Moron Scandal', which dispels some of the early work of Goddard in eugenics. The articles should be read in the sequence presented.

Step 9 Formulate valid hypothesis about social issue and describe implications of hypothesis using the comparison between the SF story and the social issue.

As previously stated in the performance objectives there are 4 steps to accomplishing this objective: They are:

Part 1 - Summarizing the differences between the SF story and the social issue data.

Part 2 - Summarizing the similarities between the SF story and the social issue data.

Part 3 - Formulating a generalization about the social issue by comparing the similarities and differences between the SF story and the social issue.

Part 4 - Inferring the consequences of the generalization.

The last step may be the easiest to explain to the student but the most difficult to complete. The 4 parts that constitute step 9 should produce a two page analysis.

As you will see in Part 3, formulating a generalization requires a decision be made by the student, a value judgement as it were. This also applies to the last part number 4. All the information gathered in the previous steps has helped make the information more manageable and stimulated reflective thinking. But as a heuristic procedure there are no guarantees that the 'right' analysis will emerge, if indeed there is such a thing. Social issues are never that 'cut and dried'. However, that does not dismiss content. You recall that in step 1 a statement was selected identifying the issue of the story; and again in step 5 a similar issue was identified in the social issue material. The student using deduction and induction then proceeded to examine possible causes and effects. The analysis must therefore reflect the previous work completed. That previous work has been recorded by the student in the exercise and should be consistent with what they choose to emphasize. This is possible because they have compiled their summary sheet as they proceeded through the exercise.

## 6. Instructional Strategy

Prior to First Session - Preparation for Classes & Pretest - 30 minutes.

1. Explain the purpose of the forthcoming sessions.

Points to emphasize:

- Student will learn a procedure that will help him/her perform analysis of contemporary issues.

- While science fiction stories will be used the word 'science' does not have to scare anyone. No one will need to excel in science.

2. Distribute Story A and Social Materials A. Ask students to read the Story first and the Social Material after.

Do not mention the pretest at this point. Too many students have an aversion to testing!

3. End this discussion with assurance that what they will be learning will be practical.

## Session 1 - Pretest

1. Ask students what they thought about readings. They will probably have noticed some similarities between the story and articles. Establish a relaxed atmosphere.
2. Remind them of the goal of learning how to analyse a contemporary issue.

Explain that they will now write a 2 page analysis of the social issue. They may use their reading materials.

Explain that they will be able to compare this analysis to the ones they will produce later on and see the difference for themselves.

3. Distribute writing sheets for analysis and blank paper for summary use. Analysis should take about 1 hour.
4. Advise students that they will get this analysis returned to them at the next session.
5. Explain that the following session will be on the same material.

## Session 2 - Approximately 3 hours



Motivation:

(20 min)

Return 1st analysis to students. Discuss analysis problems they have had in past including recent one. If possible relate some of their examples to procedure they will be learning. Ask students if they understand the process of analysing. Do they know what the word analyse means. Do they know what a contemporary social issue is? Above all do not assume that they understand what is required in an analysis. Many students have had analysis tasks in english classes which tested them for comprehension. These analyses required identifying the protagonist, examining character development etc.

Analysing social issues to understand the implications involved also requires taking things apart and examining the pieces. However having found out, for example, that X Y and Z are major factions in the universal education problem is not the objective. Each faction's belief system is based on certain assumptions, certain premises that imply certain kinds of action, certain possibilities that are more probable than other possibilities.

Make sure students understand that analysing a social issue leads to a specific kind of 'guesstimate'. It is not accurate in the same sense that a chemistry analysis can be accurate, on the other hand however, if certain social stances or practices continue or discontinue certain events are apt to result.

**Content Presentation:**

(20 min) Distribute sheet entitled 'Analysing Contemporary Social Issues using Science Fiction' and 1st exercise set entitled 'Analysis Exercise - Topic Education'.

Explain that one is an overview of the procedure they will be practicing in the other.

Discuss story and materials to be sure they are understood.

**Student Participation:**

(1 3/4 hrs) Present each step in procedure to students with explanation, working out each step in exercise. Students may have comments on their 1st analysis which you can use as examples if the occasion arises.

**Closing:**

(10 min) Distribute Story B and Issues B to be read for the next session, to be used in class.

Note on rest breaks: breaks have not been indicated but are calculated at 10 min. per hour. You should insert them as is appropriate.

Session 3 - Approximately 3 hours

**Motivation:**

(20 min) Discuss procedure again with students asking if they found themselves looking for the kinds of information as used in the analysis procedure.

**Content Presentation:**

(20 min) Review Story and materials B to make sure materials are understood. Distribute 'Analysis Exercise - Topic Technology'.

**Student Participation:**

(1 3/4 hrs) Once again, help students through the procedure step by step.

**Closing:**

(10 min) Distribute Story C and Issues Material C to be read for the next session, to be used in class.

P.S. Don't forget breaks - 10 min. per hour!

**Session 4 - Approximately 3 hours**

**Motivation:**

(20 min) Familiarity with procedure is discussed.

Discuss content of story and articles to verify that students had not problems with concepts.

**Post-test:** Distribute 'Analysis Exercise - Topic Health & Welfare'.

Students should complete the entire exercise in about 2 hours. This allows approximately 1 hour to complete the 1st 8 steps which they did not have to do in the pretest, and 1 hour for the last step - the 2 page analysis.

Session 5 - Debriefing & Evaluation

Summarize the project and give students the results of the pre and post tests.

During this last session make sure all the questions on the evaluation form are completed. Also make notes of any additional comments students may have. This will not only supply you with reference information but may also contribute to revising the evaluation form.

## 7. Student Handout

### Analysing Contemporary Social Issues

#### Using Science Fiction

##### Science Fiction Story

- 1 - Read story, identify key issue/problem.
- 2 - Distinguish relevant from extraneous statements which support stated issue/problem.
- 3 - Recognize primary unstated assumption/s and necessary supporting assumption/s made by author.
- 4 - Draw inferences from facts given.

##### Contemporary Social Issue

- 5 - Read material, identify similar issue/problem.
- 6 - Distinguish relevant information from extraneous statements which support stated issue/problem.
- 7 - Recognize primary unstated assumption/s and necessary supporting assumption/s made by sources.
- 8 - Draw inferences from facts given.

#### 9 - Produce analysis by:

- Summarizing differences between science fiction story and the social issue.
- Summarizing similarities between science fiction story and the social issue.

- Formulating a generalization based on the differences or similarities.
- Infer the consequences of the generalization by asking "what is likely to happen if the condition you have outlined continues".

## 8. Learning Exercises

### Analysis Exercise - Topic Education

1. Which of the following statements reflects the real problem of the aristocrats. Place a checkmark beside your answer.

- Millions of workers lived in wasteful luxury which they intended to continue.
- The middle class did not have enough children.
- Slum dwellers and tenant farmers had too many children.
- There were too few intelligent people to perform the tasks required in a hi-tec society. ✓

2. The problem you identified above must be supported by relevant statements which lead you to your conclusion.

read each statement and mark your answer according to the following key:

Circle YES if the statement supports the problem.

Circle NO if the statement does not support the problem.

"latest from Washington...Kingsley-Schultz says he gotta confess he did major in fly casting and got his P.H.D. in game fish at Florida."

YES

NO

"In a week there was hunger, in two weeks famine and plague, in three weeks war and anarchy..."

YES

NO

"The cities are ridiculous, expensive, unsanitary, wasteful conglomerations of people who'd be better off and more productive if they were spread over the countryside".

YES

NO

"You were a blind, selfish, stupid ass to tolerate economic and social conditions which penalized childbearing by the prudent and foresighted. You made us what we are today..."

YES

NO

"During the past couple of years I've designed a skyscraper, kept Billings Memorial Hospital running, headed off war with Mexico..."

YES

NO

3. Read the following paragraph. Read the list of assumptions below the paragraph. In the space provided indicate whether the assumption is primary with a P or supporting with an S.



"Wait a minute" objected Barlow. "There were lots of people in our crowd who had two or three children". "The attrition of accidents, illness, wars and such took care of that. Your intelligence was bred out. It is gone. Children that should have been born never were. The just average, they'll-get-along majority took over the population. The average I.Q. now is forty five".

List of Assumptions

Intelligence is inherited and cannot be altered. P

Stupid people have stupid children who cannot improve their intelligence.

S

4. By writing the proper symbol in the space provided, indicate a statement is TRUE if it may be properly inferred from the story / article supplied. Indicate that is UNTRUE if the information given in the story / article implies that it is false.

Use the following symbols in writing your answer. T if the statement may be inferred as TRUE. U if the statement may be inferred as UNTRUE.

The middle class are more intelligent than the lower class. (T)

There were too many people to educate. (U)

Intelligence is inherited but can be changed by education. (F)

All people regardless of their intellectual capacity must receive some form of education. (T)

Intelligence can only be protected by controlled breeding. (T)

There was only one quality of education. (U)

Changing educational standards means lowering them. (T)

If the poor are prevented from breeding there will be less stupid demanding people to satisfy and the skill needs demanded by a highly technological society can be met. (T)

5. The following comments are based on the different articles you have read. Each item below reflects some true aspect of the articles but only one item is more similar to the problem you have identified in the accompanying science fiction story. Place a checkmark beside the item which best reflects the problem you identified in the story.

- Morons, that is people who cannot manage their own affairs with ordinary prudence or competence in the struggle for existence are not a serious threat to our society. There is no evidence to believe they will outnumber higher I.Q. people.
- There are approximately 69 million people in the USA who have not completed grade 12. With the rate of speed at which our hi-tec society advances, functional illiteracy (as defined in the article) has a good chance of continuing to increase.
- While engineering education problems are due to a lack of money and faculty shortage, other sciences are also suffering. In fact the quality of math and science education is facing serious problems at lower levels of the educational system. While finance has something to do with it there may be more reasons why we are not producing enough scientists and mathematicians. ✓
- The problem of compulsory education for everyone is that not everyone has the same intelligence, and/or background, and/or goals. Schools are faced with the problem of how to meet the needs of a highly diverse population.

6. The problem/issue you identified must be supported by relevant statements which lead you to your conclusion. The following statements are selected from all materials you have read. Circle YES if the statement supports the problem. Circle NO if the statement does not support the problem.

"But 75 new teachers are only a beginning for a state with 430 unqualified instructors to replace."

YES

NO

"On the college level only 6 percent of all students ever enroll in engineering programs."

YES

NO

"While statistics indicate that the number of complete illiterates has dropped considerably (and consistently) since 1900, the extent of functional illiteracy is growing."

YES

NO

"Data provided by the National Advisory Council on Adult Education suggests that as recently as 1974 more than half of the adult population twenty-five years of age or older of nine states, all in the South had less than a high school education and were not enrolled in school."

YES

NO

"The strategies designed to improve higher education may fail unless high school math and science preparation improve".

(YES)

NO

7. Read each of the following paragraphs, one paragraph for each article you have read. Below each paragraph is a list of assumptions. In the space provided indicate whether the assumption is primary with a P or supporting with an S.

The poem Goddard complained "seems to imply that the man Millet painted came to his condition as the result of social conditions which held him down and made him like the clods that he turned over. Nonsense exclaimed Goddard; most poor peasants suffer only from their own feeble mindedness and Millet's painting proves it. (The Moron Scandal)

Intelligence is inherited and cannot be altered. P

Social conditions do not have any effect on intelligence. S

The North Carolina legislature has taken a different task in establishing the High School of Science & Math... for motivated juniors and seniors. The first 150 students graduate this June well versed in math and writing; and well rounded. These students are active doers... they come with clarinets and jogging shoes.

They are not just computer freaks. Other states are carefully monitoring the school's progress, ready to imitate if it is successful. (Technical Education: The Quiet Crisis)

In order to teach math and science properly you need a separate school.

S

The public school system cannot motivate students. (P)

"...the extent of functional illiteracy is growing. Although a variety of explanations have been offered for this fact, the essence of the problem is... "This really is a crisis of rising standards...we're working on the problem of how to make people learn to live with print (1978). As people have grown in their abilities to cope with rudimentary reading tasks, the literacy demands of society have increased at a much greater rate leaving many individuals worse off than before. (Illiteracy)

Many people disagree with the rate of technological change. (S)

Technological change is happening faster than our ability to teach it. (P)

There is already a marked growth in the number of special courses provided in high school for the mentally gifted and an increasing number of high schools organize their students on three or four levels at each grade, according to their ability.

There is a new emphasis on developing different curriculums to serve different needs.

These different programs are presumably based on differences in ability and interest, but in fact they often reflect differences in socioeconomic background. (The Schools)

Socioeconomic conditions affect intelligence. (P)

Streaming procedures for determining intellectual homogeneity are ineffectual.

(S)

8. By writing the proper symbol in the space provided, indicate that a statement is TRUE if it may be properly inferred from the article/s supplied. Indicate that it is UNTRUE if the information given in the article/s implies it is false. Use the following symbols in writing your answer: T if the statement may be inferred as TRUE, U if the statement may be inferred as UNTRUE.

(The Moron Scandal - Goddard's Positions prior to changing)

Those who are intelligent succeed, those who do not succeed weren't meant to.

(T)

(Technical Education: The Quiet Crisis)

More money and more teachers will solve the engineering education crisis. (U)

Unless changes are made to the system of teaching and learning math and sciences at every level of the education system the ability to maintain and develop a hi-tec society will rest with a small percentage of the population.

(T)

Increased corporation funding of research centers in Universities will increase the rate of technological development. (T)

(The Scope of Illiteracy)

Completing grade 12 will make a person functionally literate. (T)

The educational demands of our hi-tec society on individuals cannot be met by our present educational system or supplementary programs such as literacy programs. (T)

(The Schools)

If the society was more homogeneous, that is if everyone were more alike, schools would not have the problems of what to teach. (T)

There is a 'single-track' education system in effect today: (U)



Analysis Exercise & Topic Science & Technology

1. Which of the following statements reflects the real fear Mrs. Weston had.

- Gloria spent too much time with Robbie.
- Gloria preferred Robbie over her parents and Mrs. Weston was jealous.
- Mrs. Weston was afraid Gloria would have 'personality problems' in future relationships with other human beings. ✓
- Mrs. Weston was afraid Robbie would hurt Gloria physically.

2. The problem you identified above must be supported by relevant statements which lead you to your conclusion. Read each statement and mark your answer according to the following key:

Circle YES if the statement supports the problem.

Circle NO if the statement does not support the problem.

"You see George. She chatters away as if she hadn't a care in the world. It's just as I told you - all we need to do is substitute other interests."

YES

NO

"I won't hear of it. We're not giving up that easily. My child shall not be brought up by a robot if it takes years to break her of it."

YES

NO

"Some little jogger will come loose and the awful thing will go berserk and-  
and-"

YES

NO

"I won't have my daughter entrusted to a machine - and I don't care how  
clever it is. A child just isn't made to be guarded by a thing of metal."

YES

NO

"Gloria has lost five pounds in the last month and my little girl's health is  
more important to me than your comfort."

YES

NO

3. Read the following paragraph. Read the list of assumptions below the  
paragraph. In the space provided indicate whether the assumption is  
Primary with a P or Supporting with an S.

"The whole trouble with Gloria is that she thinks of Robbie as a person and  
not a machine. Naturally, she can't forget him. Now if we manage to  
convince her that Robbie was nothing more than a mess of steel and copper in  
the form of sheets and wires with electricity its juice of life, how long would  
this aberration last?"

## List of Assumptions

People should not form emotional bonds with machines. P

When you understand how a machine is created you understand how different they are from human beings and no longer confuse one with the other. S

4. By writing the proper symbol in the space provided indicate that a statement is true if it may be properly inferred from the story/article supplied. Indicate that it is untrue if the information given in the story/article implies that it is false.

Use the following symbols in writing your answer. T if the statement may be inferred as True. U if the statement may be inferred as Untrue.

Normal personality traits are developed by being in contact with other human beings while growing up. T

If youth becomes attached to electronic gadgetry there is not room in their lives for other relationships. U

Hi tec inventions will become acceptable when we learn to trust that these inventions perform as we have designed them to. T

Endowing mechanical things with personality is normal and healthy. U

Machines are faster than human beings. T

Machines are more attractive than human beings because we can dominate or control them. T

We can stop technological progress. U

Because machines can be programmed to pose no physical threat to our well being physically they are not dangerous to us. T

5. The following comments are based on the different articles you have read. Each item below reflects some true aspect of the articles but only one item is one similar to the problem you have identified in the accompanying science fiction story. Place a checkmark beside the item which best reflects the problem you identified in the story.

Computer technology offers certainty, order and a kind of companionship for so many people that the benefits of human relationships are becoming less and less attractive. The benefits of human relationships are the development of emotion. The capacity to share feelings and the ability for intimacy. But these human skills are more difficult to acquire than mastery over a computer program.

Intense, prolonged involvement by children with machines distorts their perception of time and expectations of self and others. During their personality formative stages the machine role model affects their ability to relate to human activities, interests and needs. Their identity becomes confused with machine capability.

6. The problem/issue you have identified must be supported by relevant statements which lead to your conclusion. The following statements are selected from the materials you have read. Circle YES if the statement supports the problem. Circle NO if the statement does not support the problem.

"Under the spell of the machine we are at risk of losing that special ability of humans to be intimate."

YES

NO

"Baseball, like other typical children's pursuits is simulating in a variety of ways... learning about teamwork and competition, enjoying exercise, chatter, and camaraderie, honing eye-hand coordination and peripheral vision.."

YES

NO

"Some children claim to have no idea of the difference between using a computer and dealing with people."

YES

NO

"Often we find it easier to make commitments to our jobs than to other people: people are unpredictable. Harder to trust and full of inconsistencies."

YES

NO

"The computer can become a refuge from the problems and conflicts of the real world, and well rounded development and maturity can suffer."

YES

NO

7. Read the following paragraph. Below the paragraph is a list of assumptions. In the space provided indicate whether the assumption is Primary with a P or Supporting with an S.

"Computer manufacturers and vendors have fostered this illusion by giving personal computers personal names like Lisa, Victor and Adam and selling them as some kind of mechanical pet...the upshot is confusion - we are being asked to buy and use machines that are not really machines at all; they are too friendly to be machines... but once it has become an integral part of human interaction, it alters the content as well as the form of that interaction."

#### List of Assumptions

Personality should only be attributable to living things. S

When a machine is perceived as human it acquires a special attraction for us.

P

8. By writing the proper symbol in the space provided indicate that a statement is true if it may be properly inferred from the articles supplied. Indicate that it is untrue if the information given in the articles implies it is false. Use the following symbols in writing your answer; T if the statement may be inferred as True, U if the statement may be inferred as Untrue.

The social structure of modern society is not conducive to developing intimate relationships which all human beings need. T

Adults are afraid their children will be smarter than they are. U

An increase of psychotic adults and children, as a result of prolonged contact with computers, will change the definition of what it is to be human. T

We should speed up our technological innovations. U

Machines have the answer to all our problems. U

The more a machine imitates human behaviour the more we question what it means to be human. T

In the future there will be a union between some machines and some people so that at least some cases man and machine will be indistinguishable. T

Analysis Exercise - Health & Welfare

1. Which of the following statements reflects the problem that Marlow and Flix were dealing with.

- A police state existed which controlled the actions of everyone.
- Democracy had collapsed.
- > The standard of living had declined and the result was widespread poverty. ✓
- There was a disregard for the elderly and non-producers.

2. Support the problem you identified above by relevant statements which lead to your conclusion. Read each statement and mark your answer according to the following key: Circle YES if the statement supports the problems. Circle NO if the statement does not support the problem.

"Resentment glared out of him! Think I want to come here? Crazy old house, crazy old bitch - "

YES

NO

"You got no room to talk - it was your lot got us in this mess in the first place. He stood up". You think we want to live like this, no jobs, nothing? You got no idea. If it weren't for the Corps I'd be - "

YES

NO



"You got to produce. You got to work. You got to be worth keeping on Welfare. Or else - and don't tell me it ain't fair. I know it ain't fair, but that's the way it is".

YES

NO

"I know I heard about that. I hear about it all the time from my old man. Free this, free that, free the other; holidays in the sun, cars for everybody, everybody working - yeah, I heard..."

YES

NO

"You don't know what it's like," Marlow said. "Five of us in a two - room flat, and the power not on, and never enough food, and for why? Because there's no work, and if there was, there's nothing to buy with the money! At least he's making it better. At least there's less of that".

YES

NO

3. Read the following paragraphs. Read the list of assumptions below the paragraph. In the space provided indicate whether the assumption is primary with a P or supporting with an S.

"You'd be being tested - like I am now, - to see how fit you are to survive. To qualify for government food. To get government water, so you don't die of cholera. Government housing, so you don't die of cold."

"I was never one for housework - and besides, I've got you to do it for me haven't I? Courtesy of the Welfare State. Until such time as the state decides I'm not worth keeping alive."

#### List of Assumptions

Control of economic resources by government threatens individual freedom.

S

As goods and services decrease human beings become increasingly defined solely in terms of their economic contribution. P

4. By writing the proper symbol in the space provided indicate that a statement is TRUE, if it may be properly inferred from the story/articles supplied. Indicate that it is UNTRUE if the information given in the story/articles implies that it is false.

Use the following symbols in writing your answers. T if the statement may be inferred as TRUE. U if the statement may be inferred as UNTRUE.

1. As long as there is unanimous agreement by the government on social policy individual rights will be protected. U

2. Neither the free enterprise system nor the welfare state is addressing the real problem issues of unemployment, and increasing poverty. T
3. If the 'real' problems are not addressed by the government in power, a new government who can deal with them will take over power. U
4. Unpopular decisions are needed to deal with the increasing unemployment and poverty. T
5. Good intentions do not solve economic problems; decision making and budget redirection by the government are needed. T
6. Authoritarianism is necessary to solve economic problems because it eliminates the need for consensus. U
7. There is too great a reliance upon technology to solve economic problems. T
8. If present problem of increasing poverty goes unchecked, everyone will suffer eventually including those who presently have financial security. T

5. The following comments are based on the different articles you have read. Each item below reflects some true aspect of the articles but only one item is more similar to the problem you have identified in the accompanying science fiction story. Place a checkmark beside the item which best reflects the problem you identified in the story.

- The mental and physical well being of the aged can be improved by improving nutrition, physical fitness and preventative medicine. Economy however, inflation creates problems which affect the ability of the average worker to pay more taxes or contribute to adequate pension plans. Early retirement programs funded from general tax revenues are a serious drain off the government's budget. The public need is therefore increasing at a faster rate than government can afford to meet its' present committments.
  
- In Montreal private business is contributing to feeding the poor. While an estimated 550,000 Montrealers live below the poverty line up to 25% of all food produced is wasted. Hotels, hospitals, bakeries and grocery chains as well as well off private citizens are giving the poor food which they would ordinarily throw in the garbage.

- Food banks in Regina, Edmonton and Vancouver now help feed an estimated 300,000 people that cannot afford to eat on the amount of money they receive from welfare. While some officials feel these food banks permit government to escape from their responsibilities others are developing policies to make food banks permanent.
- The estimate of homeless in the U.S.A. is presently 3 million and the yearly increase is estimated at 2.5 million. Federal and state budgets can no longer maintain the standard of living for these millions and despite the help from charities, it is estimated that poor will continue to increase by 10% annually. (10% of 3 million is 300,000) It must therefore be concluded that poverty is spreading at an alarming rate in the U.S.A. ✓

6. The problem/issue you identified must be supported by relevant statements which lead you to your conclusion. The following statements are selected from all the materials you have read.

Circle YES if the statement supports the problem.

Circle NO if the statement does not support the problem.

"Physicians and adequate nursing homes are in short supply now. What will happen when the demand nearly doubles? The mental health needs of the older population are 85% unmet now. What will happen when the over 85 population more than doubles? Health insurance cannot pay for services needed now. How can it cope with both inflation and the population explosion of older adults?"

YES

NO

"Thousands of Montrealers can't afford to eat for the last few days of every month when their welfare cheques run out, Legault said."

YES

NO

"It really is a return to a charity society observes Mr. Richie. We need to look at whether this is what we want."

YES

NO

"One of the earliest (food banks) was created in 1981 in Edmonton. The movement spread to Greater Vancouver in 1982 and there are now more than 40 banks in British Columbia. Alberta has 10 ..."

YES

NO

"The problem is clearly seen in Denver, where up to 1,500 families are evicted each month."

YES

NO

"Nationally, you've got 60 million dollars to help 3 million suffering people ... that figures out to \$20.00 for each - less than \$2.00 per week for a 12 week winter.

It's not enough for beans and chicken necks, much less a bed."

YES

NO

7. Read each of the following paragraphs, one paragraph for each article, you read. Below each paragraph is a list of assumptions. In the space provided, indicate whether the assumption is primary with a P or supporting with an S.

(The Social Forces In Later Life - Older Population as Economically Dependant)

While the strains on the federal budget are obvious, they are still at tolerable levels. Not so with some state and local systems. Many state and municipal governments have pension systems that fund pensions completely or largely from current revenue. This has led to severe economic problems for many government systems. For example, some cities have bargained with municipal unions to keep down current salaries and wages by liberalizing retirement ages and benefits. But eventually these pension IOU's come due. And when they do, governments often find it difficult to find the necessary revenue. Part of this problem is no doubt related to the fact that the political regime which creates the liability will probably not be the one that has to satisfy it.

#### List of Assumptions

Demands for an increased standard of living cannot be met by some government's revenues systems. P

The 'band-aid' approach to solving the problem of people wanting more than the system can afford is to pass the problem on to the next government and generation. S



(Waste No - Want Not - The Gazette)

The surplus stock Montreal Harvest distributes is perfectly edible, unspoiled food that would otherwise be chucked simply because hotels and hospitals don't feature the same items on their menus every day. Food stores regularly toss out baked goods, dairy products and frozen foods because the 'Best Before' date approaches or the label isn't glued on straight. According to industry estimates, up to 25% of all food produced is wasted, Legault said.

#### List of Assumptions

In order to maintain our standard of living more food must be produced than can be consumed. P

Waste has been institutionalized in our system for such a long time that until recently we have dismissed it. S

(The Poor Get Hungrier - The Globe and Mail)

No one seriously believes any more that the current levels of welfare assistance enables the recipients to eat on a regular, daily basis. The explosion in the use of food banks and soup kitchens is testament enough that the country has quietly dissolved its postwar human contract to protect helpless citizens from hunger ...

Canadians who had witnessed people begging for food vowed that this country would never again tolerate humiliation. But winter has fallen on the economy. The summer soldiers are departing. The poor and wretched are left behind in the cold to beg for bread.

### List of Assumptions

In the modern welfare state everyone must be provided with the basic means of staying alive. P

Goods and services have declined and as a result government has decreased its commitment to individual welfare and increased its commitment to the welfare of the state. S

Increasingly the newly homeless are the product of two developments: The tightening supply of low-income housing and the accelerating discharge from institutions of mental patients unable to fend for themselves ... In New York State the number of people in institutions has dropped from 500,000 in 1955 to 146,000 ... a recent survey of Boston shelters found that 2 out of 3 residents had mental problems. The National Housing Law Project estimates that 2.5 million low-income people lose their homes each year through eviction or other reasons. The squeeze has become even more acute with the halving of federal low-income housing funds in recent years.

List of Assumptions

Governments can no longer financially afford to care for the non-producers in our society. P

Mental illness is being redefined. S

8. By writing the proper symbol in the space provided, indicate a statement is TRUE if it may be properly inferred from the story/article supplied. Indicate that it is UNTRUE if the information given in the story/article implies that it is false.

Use the following symbols in writing your answer. T if the statement may be inferred as TRUE. U if the statement may be inferred as UNTRUE.

By the year 2000 (15 years from now).the lack of hospital beds, physician services, nursing homes will guarantee that more elderly people will be dying in the streets. T

While many efforts are being made by those 'who have' to help those who 'have not' the effort will not be sufficient. T

A change in government will solve the problem. U

If the present problem of increasing poverty goes unchecked everyone will suffer including those who presently have financial security. T

Good intentions do not solve economic problems; decision making and budget redirection by the government are needed. T

Unpopular decisions are needed to deal with increasing unemployment and poverty. T

If the problems of poverty and unemployment are not dealt with by the present government the next government will solve them. U

Neither the American free enterprise system nor the Canadian welfare state is dealing with the problems of unemployment and poverty. T

## 9. Pre-Test Directions

Having read the story and the social issues materials write a 2-page comparative analysis, comparing the social issues material to the story.

Present differences and similarities between the story and the articles or similarity state a conclusion be recommending certain changes if necessary. Following the conclusion state what you think will or will not happen; should or should not happen based on your conclusion.

These 4 sections should not be longer than 2 pages but may be shorter.

If any of your teachers have given you a method or any tips on how to do an analysis when you are comparing ideas please incorporate them or use them in any way you believe will help this analysis.

## Post Test Directions

A- Using the data you have assembled on the science fiction story and the social issue briefly summarize the differences between the science fiction story and the social issue. This summary should be no more than 1/2 page.

B- Again, using your data summarize the similarities between the science fiction story and the social issue in no more than 1/2 page.

C- When comparing similarities and differences between the science fiction story and social issue there are certain quantitative possibilities:

- There may be more differences than similarities between the SF story and the social issue.
- There may be more similarities than differences between the SF story and the social issue.
- There may be more or less equal amount of similarities and differences between the SF story and the social issue.

Regardless of which of the above three in the case

- select 1 on the basis of its perceived importance.

Explain your selection in not more than 1/2 page.

D- In light of the facts you have presented in your general statement in C, what is likely to happen if the condition you have outlined continues (in not more than 1/2 page).

## 10. Pre Test Answers

### "The Marching Morons"

Differences or similarities can include comments on:

- 1 - Control of science and technology by scientific community.
- 2 - Different qualities of education - teachers.
- 3 - Lack of hi-tech people for hi-tech society.
- 4 - Student lack of interest in math and science.
- 5 - Intelligence as inherited and unchangeable.
- 6 - Demands of hi-tech society or individual's personal choices - choice of business vs academia.
- 7 - Increasing numbers of functionally illiterate/literacy programs.
- 8 - Problems encountered by educational system between universal education and heterogeneous population.
- 9 - Low income situations create poor role models for motivation.
- 10 - Huge populations create a strain on education budget which cannot be responded too quickly enough.

### Conclusions

- 1 - Create changes in education system such as increase education budget and improve learning methods and teaching methods.

- 2 - Improve economic situation of poor outside school system so that student function better in school such as increase food allowances and better housing conditions.
- 3 - Propagandize the benefits of attaining higher level education emphasizing math and science. In other words build the value of education into the media system to motivate the general public.
- 4 - Adopt population control measures so that there is more money for fewer students.
- 5 - Establish controls that limit and direct what students can study in University.

#### Implications

- Increase of functionally illiterate and continuing decrease of qualified scientists and mathematicians.

#### Recommended changes would:

- 1 - motivate good quantified peoples to join/stay in educational system and keep student interest/develop latent talent
- or 2 - give students more of a chance by having proper food and shelter
- or 3 - increase interest of parents and students
- or 4 - improve student teacher ratio and increase educational dollar per student



or 5 - give potential university students less choice but educational system  
might prepare students better for sciences and math.

Final Comment:

If not importation of science and math people as in 'The Quiet Crisis' will  
have to continue.

Post Test Answers  
"Harvest of Wolves"

Differences or similarities can include comments on:

- 1 - Degree of poverty / unemployment / lack of goods and services.
- 2 - Political structure; authoritarianism and ours.
- 3 - Method of getting rid of non-producers.
- 4 - Economic definition of human beings.
- 5 - Change of values - lack of existence of charity.
- 6 - Treatment of aged in particular.
- 7 - Value of technology.
- 8 - Standard of living differences in our society.
- 9 - Various forms of government assistance available.
- 10 - Decline of national wealth.

Conclusions.

- 1 - Government not addressing social economic issues; redirection of budget; taxation of wealthy; control of government waste.
- 2 - Citizen participation in interest groups or associations that monitor government spending.

- 3 - Humanitarianism must become part of policies so that it is not a lip service proposition that disappears when economics gets tight.
- 4 - Redirect technology to help solve problems such as use of computers to simulate problems and find alternatives or / establish policies for companies that are laying people off work due to computers or robotics to pay unemployed.
- 5 - Interdependence of North American economy and other countries necessitates finding a solution for our problems.

#### Implications

Without change we will be in same depressed circumstances as in story.

#### Recommended changes would:

- 1 - increase social assistance budget
- or 2 - control government policy by threatening removal of government from office.
- or 3 - have more flexible attitude to redirecting budget in times of need.
- or 4 - adopt drastic measures that may make real differences.
- or 5 - give our society more time to improve 3rd world countries so that our economy is stimulated.

## 11. Scoring Method

As indicated in the pre and post test answers the similarities and differences have been combined. This allows the student a certain latitude depending upon the student's perspective. There are 10 possible answers but achieving 5 is considered a perfect score of 5.

Each of these 5 answers is ~~given 1~~ point.

There are 5 possible conclusions for part C. Achieving 5 is considered the perfect score of 5. Grading points are collapsed as follows:

<u>Correct Answer</u>	<u>Points</u>
0	0
1	1
2	3
3	5

In part 4 of the analysis 1 complete recommendation is given the full 5 points. A complete recommendation is achieved by stating the first part of the implications as mentioned in the answers sheet and following this statement with one of the 5 recommendations as listed. In the pre test the additional Final Comment should be included. By having this selection, students, regardless of the direction their studies are taking, have the opportunity to recommend social change.

**12. Outlines, Stories, Social Issues**

## Outline of Story A and Issues

The educational gap between the 'morons' and the 'aristocrats' has so widened that the maintenance and development of our hi-tec society, now rests in the hands of a very few 'elite'; who are sufficiently educated to handle society's complexities. As the population of 'morons' increase however, the 'elite' realize that there are simply too many 'morons' to take care of and their workload is too heavy. The story ends with their discovery of the 'ultimate solution'.

While a number of causes for this situation are explored, such as eugenics and population explosion, we explore the situation from the perspective of education problems. Education is an issue never explored and it seems taken for granted that 'morons' cannot improve their intellectual capacities nor would they ever want to.

The social issue materials presents information to dispel the early eugenics myth promulgated by Goddard which distorted Binet's tests. The education gap is then explored through articles dealing with various crises; math and science in universities, public school curriculums, illiteracy.

## Outline of Story B and Issues

This is a simple little story of a child's love for her favourite friend. Of course, true love never runs a smooth course. I don't understand why little Gloria's playfellow is so strange, I wouldn't mind having a friend like Robbie. It would be hard to replace my cats however, whom I anthropomorphized a long time ago. In any case I was really glad Gloria and Robbie re-found each other. Oh! Oh! That's what it's all about, isn't it?

The accompanying materials present the negative possibilities of computers which is not to often presented to youth and for that reason is presented here.

## Outline of Story C and Issues

The story Harvest of Wolves is almost not a science fiction story because as some critics have noted - some of it has already come to pass. In addition there are no scientific solutions only human nature responses to events - unfortunately. The 2 characters Flix and Barlow are victims of circumstance and, some might say - the creators of the circumstance. This story however is not analysed from the perspective of 'right-wrong' political philosophies but from the perspective of health and welfare and dwindling government budgets for the needy as the numbers of needy increase.

Some of the materials you will recognize as reflecting the recent and growing phenomenon of poverty in the USA and Canada. The section from 'The Social Forces In Later Life' presents some background information on the elderly that contribute to the worsening situation. This part of the poverty situation is not as easily dismissed as unemployment rates which we all want to see as fluctuating. Neither Flix nor Barlow were in a 'temporary situation'.



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## Appendix C

- Pre-Post Test Raw Scores
- Final Practice Exercise Scores

**TABLE 3 - Pre-Post Test Raw Scores**

Perfect score = 5		5	5	Pre-Post Totals					
Subject Similarities/Differences Generalizations Implications									
	Pre	Post	Pre	Post	Pre	Post			
1	2	5	1	3	0	5	3	13	
2	2	4	0	3	5	5	7	12	
3	1	2	1	1	0	5	2	8	
4	1	5	1	3	0	5	2	13	
5	2	2	5	5	0	5	7	12	
6	2	3	1	3	0	5	3	11	
7	2	3	1	3	5	5	8	11	
8	1	2	1	3	5	5	7	10	
9	1	2	1	2	0	5	2	8	
10	2	4	3	3	0	5	5	12	
11	1	2	1	3	5	5	7	10	
12	1	2	0	1	5	5	6	8	
<b>Totals</b>	<b>18</b>	<b>36</b>	<b>16</b>	<b>32</b>	<b>25</b>	<b>60</b>	<b>59</b>	<b>128</b>	

**TABLE 4 - Final Practice Exercise Scores as Percentages**

Question	1	2	3	4	5	6	7	8
Subject								
1	100	100	100	100	100	80	100	99.9
2	100	100	100	87.5	100	60	100	90.9
3	100	100	100	100	100	100	100	100
4	100	100	100	100	100	60	100	93.9
5	100	100	100	100	100	100	100	100
6	100	100	100	100	100	80	100	97
7	100	100	100	100	100	100	100	100
8	100	100	100	100	100	100	100	100
9	100	100	100	100	100	100	100	100
10	100	100	100	100	100	80	100	97
11	100	100	100	100	100	100	100	100
12	100	100	100	100	100	80	100	97
Total	100	100	100	99	100	86.7	100	97.2

**Appendix D**

**Questionnaires**

### Evaluation Questions

1. What was your overall impression of the manual as to explicitness?
2. Was the manual too long, too short or alright?
3. Were there sufficient examples. Were more, less or different ones needed?
4. Was the learning objective of the module clearly stated?
5. Did the performance objectives reflect the learning objectives?
6. Content experts: Was the vocabulary appropriate for junior college students?

Student: Were the materials clear to you?

7. Content experts: Were the concepts appropriate for junior college students?

Students: Did you understand the ideas being discussed?

8. Were the exercises clear?

9. Were the exercises too long, too short, or alright?

10. Did the use of science fiction contribute to, detract from the module?

11. Was the sequencing logically ordered so that you understood what was happening?

12. Was the placement of the exercises appropriate?



13. Were they too long, too short, or alright?

(When it was discovered that this question was a repetition of question number 9, it was left in so as not to disrupt the coding sequence - see Questionnaire Content Outline).

14. Were the exercises too easy, too difficult, or alright?

15. Did your experience with the analysis procedure influence your readings in any way? How?

16. Content Experts: Do you feel this kind of analysis procedure would be relevant for students?

Students: Have you benefited by this approach to analysis?

17. Content Experts: Do you feel science fiction would be relevant for students?

Students: Did the science fiction stories help you relate to the social issues?

18. Content Experts: Would any learning that came from this module be valuable for students?

Students: Has the experience been of value to you?

For example, do you see contemporary social issues in a different way than you did before?

19. Content Experts: Could they apply any learning they might acquire from this module to other subjects in school?

Students: Do you think you could apply what you learned to other classes in school? Which ones?

20. Content Experts: Would they object to the kinds of exercises used here?

Students: Did the exercises have a negative effect on you? If yes, why? If no, why not?

21. What did you like least about the module?

22. What did you like best about the module?

## Questionnaire Content Outline

Subject of Questions	Experts	1 to 1 <sup>a</sup>			Small Group			
		2	3	4	2	3	4	5
<u>Instructional Manual</u>								
1. Clearly presented	x							
2. Length	x							
3. Examples	x							
<u>Content</u>								
4. Learning objective	x	x			x			
5. Performance objectives	x	x			x			
6. Appropriate vocabulary	x	x	x	x	x	x	x	
7. Appropriate concepts	x	x	x	x	x	x	x	
8. Exercise/test clarity	x	x	x	x	x	x	x	
9. Exercise/test length	x	x	x	x	x			
10. Use of science fiction	x	x			x			