The evaluation report is one of seven produced for the Occupational Exploration Program (OEP), a series of simulated occupational experiences designed for junior high school students. Describing the pilot testing of the simulation dealing with construction, the report contains sections describing the simulation context, evaluation procedures, results, and a Reviser's Information Summary (RIS). In the simulation, students planned a new junior high athletic facility. Occupational roles included architect, junior architect, civil engineer, draftsman, community representative, board of education representative, and superintendent of schools. The experimental design involved two Colorado schools, with a total of four experimental and four control groups involving 92 eighth and ninth graders. Instrumentation included knowledge and affective testing, student and teacher questionnaires, and a panel review. Analysis of variance and other descriptive statistics were employed, and reliability estimates were calculated. Analysis of variance results revealed that the simulation had a positive impact on student occupational knowledge, but no statistically significant impact on occupational preferences. The RIS records and extrapolates trends related to the strengths, weaknesses, and recommendations from all data sources. Appended materials include the evaluation instruments used and the teacher log. (MW)
PLANNING CONSTRUCTION PROJECTS
AN EVALUATION REPORT FOR THE
OCCUPATIONAL EXPLORATION PROGRAM

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This report is one of seven evaluation reports produced for the Occupational Exploration Program. The Occupational Exploration Program (O.E.P.) is funded by the National Institute of Education and is a joint development effort of The Center for Vocational Education (The Ohio State University) and the Jefferson County, Colorado public schools. O.E.P. is a series of experiences designed to provide junior high school students with the opportunity to explore occupations. One of the major vehicles for exploration is the simulation technique. In 'FY' 1974, 12 simulations were developed and seven of those twelve were pilot tested. This report describes the pilot testing of the simulation dealing with construction. The report contains sections describing simulation context, evaluation procedures, results and a Revisor's Information Summary (RIS). The RIS is useful for a variety of purposes and includes the strengths of the simulation as well as its weaknesses. Below is a synopsis of the specific content of the report.

SIMULATION CONTEXT: The participants of this simulation are involved in planning a new junior high athletic facility. The building of a new highway will destroy the present athletic facilities at the junior high. The participants become representatives of an architect's firm, the community, and the school, and simulate the planning processes concerned with the design, selection of site, and cost of the new facilities. In this simulation, the occupational roles include architect, junior architect, civil engineer, draftsman, community representative, board of education representative, and superintendent of schools. EXPERIMENTAL DESIGN: For evaluating this simulation, two schools, one in Jefferson County, Colorado and one in Denver, Colorado were used, each school having two experimental and two control groups. A teacher facilitated the implementation of the simulation with each experimental group. The experimental and the control groups consisted of 8th and 9th graders; the four experimental groups totaled 50 students and the four control groups totaled 42 students. INSTRUMENTATION: A 42 item multiple choice knowledge test, "What Do You Know?", and 5 item affective test, "What Do You Like?", were administered as pre- and posttests measuring student knowledge gain and attitudinal change. The student post module questionnaire, "What Do You Think?", administered to the experimental group after completion of the simulation, measured student perceptions of the module. Teacher questionnaires and a panel review were designed for the purpose of obtaining teacher perceptions of the simulation. ANALYSIS: The knowledge test and affective test results were derived through analyses of variance. Other descriptive statistics were employed where appropriate (i.e., frequency, percentage). Reliability
estimates were calculated to obtain the internal consistency estimates of the knowledge test and to determine inter-coder and intra-coder assessment for the attitude scale. RESULTS: The ANOVA results reveal that the simulation had a positive impact on student occupational knowledge in the construction field \( p < .05 \). In addition, the results did show shifts in student occupational preferences but, the changes were not statistically significant. Teachers and students were generally positive about the overall module quality as indicated from student and teacher comments collected from questionnaire data. REVISOR'S INFORMATION SUMMARY: The RIS was designed to not only assist revisors to assimilate information collected during the pilot-test, but also as a unique way of summarizing the data. The summary is a record of the strengths, weaknesses and recommendations for revisors from all data sources (i.e., student tests, student questionnaires, teacher questionnaires, etc.). Trends have been extrapolated which list the most apparent strengths and weaknesses of the simulation as well as recommendations to be considered in the revision of the simulation.
Acknowledgements

An evaluation report is usually a product of the endeavors of many individuals. The authors of this report therefore wish to thank:

1. Suzanne Damarin and Raymond Hinrichs for helping to develop some of the instrumentation used in this evaluation;

2. The teachers, administrators, and students in Jefferson County, Colorado and Denver, Colorado who, by participating in the use of educational materials and in the testing of those materials, made this evaluation report possible;

3. Jon Schaffarzick, Michael Hock, and David Hampson of the National Institute of Education for their support of this effort; and

4. The eleven project staff members identified on the cover, who by their support, expertise and/or direction contributed to the production of this report.
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Planning Construction Projects

I. Brief Description of the Module

The construction module consists of a preview*, a preparation section, seven major activities, and a summary. The Preview* is available in two forms, a booklet and a slide tape, both of which present the situation that provides the framework for the simulation. The building of a new road will destroy the athletic facilities at the junior high school. A planning team with representatives from an architect's firm, the community, and the school must design new facilities. An overview of the roles and the kinds of tasks to be performed is designed to give students information on which to make a decision about participating in the simulation. The preview is scheduled for one period.

The Preparation Section is a resource packet of materials designed to help the students to learn more about the role alternatives and to select a role. Students are directed to fill out a Job Interest Form and to score it by using an overlay. Then they read a Job Description Sheet and use the input from both to decide on job priorities and fill out a Job Preference Form. Their role is generally their first preference unless there are duplicate preferences. The preparation takes about one period.

In each of the first four activities there are two tasks carried on concurrently by designated students. Handbook 1A, Contacting an Architect, (with corresponding talking pages) describes a selection procedure whereby the Board of Education Representative and Superintendent can review the work and background of two different architects, choose an architect, and work out a contract with him/her. Meanwhile, using Handbook 1B, Finding Sites, plus a slide tape program and

*Prior to the preview, the students have seen a slide/tape and/or a booklet on Introduction to Simulation.
talking pages, the Civil Engineer, Draftsman, and Community Representative review the sites available with regard to location, safety, size, cost, and conditions. They narrow the alternatives down to the four most suitable. The time required for Activity 1 is two periods.

In a slide tape program and Handbook 2A, Identifying Client's Needs, the student playing the Architect is guided through a meeting with the Superintendent, Board of Education Representative, and Community Representative to determine exactly what kind of facility is needed.

The other students using Handbook 2B, Sketching Sites, and a set of slides, continue to work on the site alternatives by preparing sketches of the four selected previously. Both groups spend one period on this activity.

Handbook 3A, Writing Specs., is used with a slide tape program to pursue the conversion of the list of the client's needs into an acceptable design for the facility. Specifications are prepared by the Architect and reviewed by the Superintendent and the Board of Education Representative. The Draftsman, Civil Engineer, and Community Representative use Handbook 3B, Evaluating Sites, with corresponding talking pages, to complete detailed reports on the location, cost, and condition of the four possible sites.

After one period, all students except the one playing the role of Architect go on to Handbook 4B, Putting the Puzzle Together, where, with the aid of a slide set, the group is directed to use templates to represent parts of the facility and to plan the optimum layout of
the facility for each of the site alternatives. During this period, the Architect uses slide tape 4A and Handbook 4A, Creating a Design, to design and sketch several versions of the building for the athletic facility.

In Handbook 5, Selecting Site and Design, the entire group is directed to hold a meeting for one period to hear the results of the site evaluations and to see sketches of the proposed building. At the conclusion of the meeting, a final site and building design are chosen.

Handbook 6, Making Final Plans, is available in several versions according to role and is used for three periods of activity. A videotape, "Surprise! We have to build a model," introduces the client's request for a model of the facility. The Architect oversees construction of the model by the School Board Representative, Superintendent, and Community Representative who act as members of the architectural firm. The Junior Architect makes final working drawings of the site plan and a landscape plan; the Civil Engineer does the final drawings of the structural specifications; and the Draftsman does the final drawings of the floor plan and elevations. All of the students are involved in some aspect of representing the plans to a specified scale.

Handbook 7, Presenting Plans, gives directions for a one period group meeting for the purpose of presenting the completed drawings, specifications, and model to the client. At the conclusion of the meeting there is a brief review and evaluation of the total construction planning project.
The **Summary** for the module consists of three tasks, the first of which focuses on individual reactions with the original Job Interest Form, a Job Analysis Form and Evaluation Sheet as guides. Task 2 allows for the preparation of presentations for a group discussion so that the participants can share their experiences and personal feelings about what they did during the simulation. Task 3 encourages the students to review and update their occupational exploration plans. The summary takes approximately three class periods.

The overall length of the construction simulation is about 15-17 periods. By working through the module, students are exposed to the basic facets of careers involved in a construction planning project.
II. Description of Evaluation Procedures Employed

A. Specific Sample Used

1. Schools - for this module one Jefferson County and one Denver school were used. In Jefferson County there were two experimental groups and two control groups. In Denver the sample consisted of one experimental classroom and one control classroom. The experimental classroom in Denver was subdivided into two separate experimental groups, which independently carried out the simulation. (To accommodate the experimental design, the two experimental groups in this classroom were considered to be separate classrooms. In addition, the control classroom was randomly divided and treated as two groups.)

The schools and the teachers were selected via discussion with administrators and teachers in each of the districts. A brief description of the schools follow:

O'Connell Junior High School
(Grades 7-9), Jefferson County

O'Connell Junior High School is the largest junior high school in the Jefferson County school district with close to 1,300 students. The large number of students has required the school to be on a split session basis with 8th and 9th graders attending in the mornings and seventh grade students attending in the afternoons. The school uses a floating period schedule to provide for flexibility in student groupings. The school draws its students
population from two neighborhoods. One is in a somewhat older section of the city and the other is in an area with many homes ranging up to $50,000 in value. There is a large mix of socio-economic backgrounds represented in the student body. A small percentage (exact figures were not supplied by the school) of the students come from families receiving welfare or Aid for Dependent Children (ADC), whereas several families in the district have incomes exceeding $100,000 per year (again, exact figures were not available). The racial make-up of the school is primarily Caucasian (85 percent), with 13 percent of Spanish descent and 2 percent in other groups. Although data was not provided, school officials state that student achievement is about average for the district.

Rishel Junior High School
(Grades 7-9), Denver

Rishel Junior High School is a large school with approximately 1,400 students. Data regarding achievement, socio-economic status of the community supplying students to the school, etc., were not available from the school at the time of this writing. In its stead the on-site observations of this writer (J. W. Altschuld) will be substituted.

The student body of Rishel is primarily Caucasian (Anglo) with a small (5-15 percent) percentage of students from Spanish speaking backgrounds. The immediate area surrounding the school is middle class with homes ranging from approximately $22,000 up to the $30,000-35,000 range. The student population
in the school comes from a large geographic area as judged by the number of school busses unloading at the school during the site visit. (Further information regarding this school will be supplied as it becomes available.)

2. **Sample Within Schools**

   a. **Teachers**

   In O'Connell Junior High School two female teachers volunteered to participate in the teaching of the module. The following demographic data was collected:

   **Years of Teaching Experience**
   - 1 year or less (N=1), 2-4 years (N=1)

   **Subject Area Usually Taught**
   - English (N=2)

   **Prior Experience with Simulation Techniques**
   - As a participant and as a teacher (N=1)
   - No previous experience (N=1)

   In Rishel Junior High School one female teacher volunteered to participate in the teaching of the module. The following demographic data is available:

   **Years of Teaching Experience**
   - 8 or more years (N=1)

   **Subject Area Usually Taught**
   - English (N=1)

   **Prior Experience with Simulation Techniques**
   - No prior experience (N=1)
b. Students

The sixteen students who participated in the Denver experimental groups consisted of 12 males and 4 females. The students were selected (randomly) from an intact English classroom. The control group students who participated in both pre and posttesting totalled 13, with six male students and 7 females. The students were volunteers from an 8th grade language arts class.

The groups of students from Jefferson County who participated in this pilot test were somewhat larger. The experimental group consisted of 34 students evenly divided between males and females. The students were members of intact English classes. The control groups consisted of 29 students, 15 males and 14 females. These students were volunteered from existing 8th grade language arts classes.

In summary, the sampling was more mixed than ideal. It was impossible to conduct more systematic sampling due to program and organizational constraints within buildings. On the other hand, there are some very positive aspects of the situation. All classes involved in the testing of this module were either language arts or English classes. Moreover, the overall male to female balance was relatively good in most groups utilized for the pilot test.

When considering the experimental circumstances under which this module was tested, pretest group differences may be observed. The approach taken in the analysis however, is one which accounts
for the initial differences and tends to eliminate bias toward achieving spuriously, statistically significant results. In other words, the sampling procedures may have led to somewhat unequivalent groups, but the design and analysis take these differences into consideration.

Again, it should be noted that experimental results are based only on students who took both the pre- and posttest. There was sample loss in the testing of the module as follows:

- **Denver experimental groups**, of the 22 students who started the module, 6 students were lost (27 percent loss).

- **Jeff Co experimental groups**, of the 41 students who started the module, 7 were lost (17 percent loss).

- **Denver control groups**, of the 18 students who participated in the control group, 5 did not complete both pre- and posttest (28 percent loss).

- **Jeff Co control groups**, of the 39 students who participated in the control groups, 10 did not complete both pre- and posttest (26 percent loss).

Sample loss is always difficult to account for in an experimental situation. Some students may have been sick or otherwise out of the classroom during the pre- and posttesting time. The logistical set-up for the test of this module required that an administrator be present at each testing session. Provisions for follow-up testing of students who
Missed a session were not feasible given the available manpower in the field. Some students may simply have avoided taking the tests. The sample loss in this instance is somewhat large (i.e., in excess of 20 percent). It is generally evenly distributed across the groups who participated in the module. Assuming that there will ordinarily be a 12-15 percent loss rate, the loss in the test of this module will be considered as only slightly above a normal rate. It does not seem to be large enough to invalidate the results of the experimental design and efforts will not be made to study the loss in any detail.

B. Types of Classes and Groupings

The type of class or group setting in which the module has been tried is important in regard to interpreting the module results. In Denver the students who participated were able to experience it in a manner similar to that intended by developers. Two small groups of student volunteers from an English class were used in the pilot test. While the rest of their class engaged in other activities (e.g., reading, group discussions, etc.) the two groups met separately in the school library. They then conducted simultaneous, but independent simulations. The module was thus used generally free of competing distractions and no doubling up of roles was necessary.

In Jefferson County a similar situation prevailed. Two English classrooms were volunteered by their respective teachers to participate in the tryout of the construction module. Since both these teachers felt that it would be difficult to divide their classes into two groups—
doing the simulation and the other doing "make-work" types of activities. They requested enough materials to run two simultaneous simulations in their classrooms. Materials were so provided and essentially all students in each classroom participated in the simulations. To accommodate the experimental design, however, each entire class was treated as a single group. (Note: this can also be defended on the grounds that physical conditions in the two classrooms were far from ideal. As such, there was more than likely a great deal of interaction between the simulation groups. In other words, the independence of the simulating groups is highly questionable.)

C. Experimental Design as Implemented

Given the small size of the experimental groups, it was decided not to partition the design by sex as specified in the proposal. This eliminates the possibility of studying and comparing the test scores of males and females within the design framework. Aside from this small change, the design is basically the one stated in the proposal. Schematically it is as follows:
*In order for a student's scores to be included in the analysis, he/she would have had to participate in both the pre and posttest.
The analysis will be the same as designated in the project proposal for the Occupational Exploration Program (Fy '74) with the exception that the sex variable has been deleted. Of key interest will be the interaction between the experimental-control variable and the pre-posttest variable. If the module has had an impact upon students, a significant interaction would be expected with the source of the interaction being a sizeable experimental group gain on the posttest. Separate analyses will be run for the total cognitive test scores as well as for several dimensions of the attitudinal scale. The analyses will be in accordance with the abbreviated summary table shown below.
Table 1 - Partial Anova Summary Table
For The Construction Module

<table>
<thead>
<tr>
<th>Source*</th>
<th>df</th>
<th>Potential F Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Students</td>
<td>abcn-1</td>
<td></td>
</tr>
<tr>
<td>Term No.</td>
<td>Between Classes</td>
<td>abc-1</td>
</tr>
<tr>
<td>1</td>
<td>A</td>
<td>a-1</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>b-1</td>
</tr>
<tr>
<td>3</td>
<td>AB</td>
<td>(a-1)(b-1)</td>
</tr>
<tr>
<td>4</td>
<td>C/AB</td>
<td>ab (c-1)</td>
</tr>
<tr>
<td>Within Classes</td>
<td>abc (n-1)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>E/C/AB</td>
<td>abc (n-1)</td>
</tr>
<tr>
<td>Within Students</td>
<td>abcn (d-1)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>D</td>
<td>(d-1)</td>
</tr>
<tr>
<td>7</td>
<td>AD</td>
<td>(a-1)(d-1)</td>
</tr>
<tr>
<td>8</td>
<td>BD</td>
<td>(b-1)(d-1)</td>
</tr>
<tr>
<td>9</td>
<td>ABD</td>
<td>(a-1)(b-1)(d-1)</td>
</tr>
<tr>
<td>10</td>
<td>CD/AB</td>
<td>ab(c-1)(d-1)</td>
</tr>
<tr>
<td>11</td>
<td>ED/C/AB</td>
<td>abc(d-1)(n-1)</td>
</tr>
<tr>
<td>Total</td>
<td>abcdn-1</td>
<td></td>
</tr>
</tbody>
</table>

*A brief discussion of the variables will be included in the text immediately following this table.

**The results from the two starred F tests are especially important in that if the test yields an insignificant F ratio, then the two terms 4 and 5, and 10 and 11, could be respectively pooled and used for the remainder of the appropriate F tests.
The independent variables for this module are described below:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Treatment (experimental vs. control)</td>
<td>Fixed; between levels of C</td>
</tr>
<tr>
<td>B</td>
<td>Schools (Denver vs. Jefferson County)</td>
<td>Fixed; between levels of C</td>
</tr>
<tr>
<td>C</td>
<td>Classrooms (N=8)</td>
<td>Random; nested within AB</td>
</tr>
<tr>
<td>D</td>
<td>Testing (Pre vs. Post)</td>
<td>Fixed; within S's (repeated measures)</td>
</tr>
<tr>
<td>E</td>
<td>Students</td>
<td>Random; nested within CD</td>
</tr>
</tbody>
</table>
D. Instrumentation - Instrument Specifics

1. Knowledge Test - What Do You Know? (The test is appended to this report).

The knowledge test for construction consisted of 42 questions. The test is a mixture of question types which is probably a reflection of the fact that this was the first test produced for the evaluation of the products in the Occupational Exploration Project. The test included the following question types:

- 17 Multiple Choice Questions (3 distractors, 1 correct choice);
- 1 Situational Question with 10 subparts contained within it;
- 3 Multiple Choice Questions (1 distractor and 1 correct choice);
- 12 Multiple Choice Questions (with 2 distractors and 1 correct choice.)

For purposes of analysis, each part of a question with more than one part was treated as though it were a single question. Thus, the test contained 42 total questions.

In general, the questions were at a low comprehension level in relation to the Bloom Taxonomy. Four basic thrusts or areas were emphasized in the test—process, responsibility, environment/tools, and skills. Below are examples of the four basic thrusts as well as of the question types discussed in the preceding paragraph.

An example of a process question is:

Test Question #12 (Situational Question with 10 subparts)

Mrs. Smith wants to build a swimming pool in her backyard and has hired an architect to help plan it. Which of the questions should the architect consider in planning the pool? (Check those questions that you think the architect should consider.)
**Where are the water pipes for the house?**

**Do the Smiths swim well?**

**Is the electrical wiring for the house above or below ground?**

**Where are the trees and other shrubbery?**

**What are the local laws about swimming pools?**

**What is the amount of traffic on the street in front of the house?**

**What is the average number of people likely to use the pool?**

**How much chlorine is necessary to purify the water?**

**How many pets do the Smiths have?**

**How many swimming pools are there in the city?**

*Denotes a correct answer*

Process questions generally deal with understanding the nature of steps involved in planning a construction project. The student would have to develop an understanding of the sequence of activities that occur in planning; that architects, engineers and draftsmen have to be responsive to the needs of clients, etc.

The second basic thrust of the test is the area of job responsibility. The students are tested on who has the responsibility for getting a job done or for making decisions at a certain point in time, etc. Test question #7 is representative of the class of questions dealing with responsibility.

**Test Question #7 Multiple Choice Question, (3 distractors and 1 correct choice.)**

The national headquarters of a large insurance company is located in your city. The company has made a decision to double the size of
their present office building. Whom would they contact in a typical architecture firm about getting plans developed for the addition to the building?

*a. The principal architect
b. The draftsman
c. The artist
d. The civil engineer

*Denotes correct answer.

A third major group of questions on the test dealt with the category of skills. The students are tested on the types of skills or special abilities that would be helpful in terms of performing in occupations related to the planning of construction projects. An example of a question in this area is given below.

Test Question #14, Part 2 (Multiple Choice Question, 2 distractors and 1 correct choice).

Part 2 was one of 12 parts. The students were instructed to circle the letter corresponding to the skill which they felt was more important for jobs involved in planning construction projects. If they felt both skills were equally important they were instructed to circle letter C.

A *B . C
A. Lifting Heavy Objects
B. Knowing Strength of Materials

*Denotes correct answer.

The last group of questions on the test and by far the smallest group (N = 4) dealt with the category of environment/tools. Here the
questions were designed to probe into the student's understanding of different environments and/or tools used in the planning of construction projects. Emphasis was placed on what were considered to be common misconceptions as illustrated by Test Question #10.

Test Question #10 (Multiple Choice Question, 3 distractors and 1 correct choice).

For planning a construction project, which of the following groups of tools would be most useful?

a. Hammers, saws, squares
b. Drawing boards, scales, triangles
c. Electronic gauges and meters
d. Electric drills and sanders.

*Denotes correct answer.

2. Affective Test - What Do You Like? (Appendix B)

The affective test was designed to measure attitudinal change on the part of the student. The first five questions consist of asking the student if he/she would like to try doing an activity. The student could respond in one of four ways to the item.

- Yes, I would like to try this.
- No, I would not like to try this.
- I'm uncertain about trying this.
- I don't have enough information to know if I would like to try this.

The scale is scored so that the stronger the preference for trying to do an activity, the higher the score. Thus yes and no responses receive the same scale value of 3, uncertain
responses receive a 2 and not enough information types of response receive a value of 1. These values are then summed and used in the analysis of variance described earlier. Summed scores can vary from zero (no response whatsoever) to 15. Note the scale is scored so that strength of preference, rather than direction of preference is the important factor (i.e., yes and no responses while being in opposite directions, represent the same strength of preference and therefore receive the same score).

In addition to the scaled responses, students were encouraged to state reasons for their preferences. These reasons were classified and in conjunction with the scaled responses, were coded and transferred to machine scorable forms. Inter-rater and intra-rater agreement checks were made on the scoring process (See results section).

There were 3 other questions included in the "What Do You Like" instrument. The questions were open-ended and asked the students about the experiences one should have before deciding on a job, the types of things that one should consider before taking a job, etc. The responses were classified and scored. Due to difficulties in scoring these questions, results will not be presented in this report.

3. Student Post Module Questionnaire - What Do You Think? (Appendix C)

This questionnaire was administered to students after they had completed the module and the module posttest. This instrument was administered only to the students who participated in the module. The content of the questionnaire related directly to student perceptions of the module. The first twenty questions are in a scaled
format. Questions in this set relate to a student's perception of the clarity of directions, the extent to which the module interested him/her, etc. For analysis and use, the results will be grouped and descriptively reported by the subject area to which they pertain. Other questions in the questionnaire deal with parts of the module the student liked best, parts he/she liked least, role(s) played in the simulation, etc. These questions will be descriptively summarized and included in the Reviser's Information Summary.

4. Teacher Evaluation Log (Appendix D)

The Teacher Evaluation Log consists of five instruments packaged in one booklet and an additional instrument to be used after the module was completed. The sixth instrument is entitled "General Module Evaluation." The instrument order within the log parallels the ordering of the module. In other words, after students had completed the Introduction to Simulation, teachers would fill in the questionnaire regarding that part of the module. After students had completed the preview, teachers would fill in the questionnaire pertaining to the preview and so on. Below is an instrument by instrument description of the five instruments contained in the log.
FIGURE 2. LISTING AND DESCRIPTION OF THE TEACHER LOG

<table>
<thead>
<tr>
<th>No.</th>
<th>Questionnaire</th>
<th>General Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>Introduction to Simulation</td>
<td>What materials were used; effectiveness in terms of student understanding and interest, technical quality, suggestions, etc.</td>
</tr>
<tr>
<td>II.</td>
<td>Module Preview</td>
<td>What materials were used, effectiveness in terms of student motivation, technical quality, etc.</td>
</tr>
<tr>
<td>III.</td>
<td>Preparation Phase</td>
<td>Similar to above questionnaires with the addition of questions regarding integration or fit with the rest of the module and questions pertaining to the role selection process.</td>
</tr>
<tr>
<td>IV.</td>
<td>Participation Phase</td>
<td>A questionnaire similar to a daily log wherein teachers primarily identified student and teacher problems in getting tasks done.</td>
</tr>
<tr>
<td>V.</td>
<td>Summary Phase</td>
<td>Questions relating to the summary in terms of it being a reasonable culminating activity, etc.</td>
</tr>
</tbody>
</table>

The General Module Evaluation questionnaire solicited teacher opinions of the module as a single entity through questions related to the overall adequacy of materials, the sequencing of materials, module implementation, student participation and learning, and recommendations. The first several pages of the questionnaire dealt with teacher and student background.
5. Teacher Post Module Panel Review

After a module was completed, the teachers who had participated in the pilot test were convened to discuss the module. Per each individual section of a module, teachers were asked about: the particular strengths of that section; the weaknesses; classroom solutions they used to overcome weaknesses; and what recommendations or suggested changes they had for revising the module. Emphasis during the review was placed upon probing into their perceptions of the module and looking for consensus among the teachers.
A. 1. **Knowledge Test - Internal Consistency**

**Internal Consistency (K.R. #21)**

By Total Groups and Testing Time

For Total 42 Item Test

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Experimental Group</strong></td>
<td>0.60</td>
<td>0.58</td>
</tr>
<tr>
<td><strong>Total Control</strong></td>
<td>0.73</td>
<td>0.82</td>
</tr>
<tr>
<td><strong>Total (Exp. and Cont.) Group</strong></td>
<td>0.67</td>
<td>0.77</td>
</tr>
</tbody>
</table>

**Interpretation/Comments**

As indicated by the table, the knowledge test is moderately reliable. In some instances (the total group posttest and the control group posttest) the reliability is quite high. For the total group posttest this result was anticipated since the group was heterogeneous, containing students with widely differing understandings of the occupational content of the construction module. Hence the test items did discriminate or measure that difference in knowledge. For the control group the high reliability is probably an indication of the wide range of students that participated in the testing.

The reliability coefficient for posttest of the experimental group is somewhat less than that of the pretest. One plausible interpretation of this result is that the mutual understandings gained by the experimental group may have reduced variability within the group. This, in turn, would have an effect on the obtained reliability. The reviser should note that this is but one of several possible interpretations for this result.
A. 2. Knowledge Test - Validity

See Reliability Table for upward bounds or estimates of potential validity coefficients. (These would be equivalent to the square root of the reliability coefficients.)

III. RESULTS

Interpretation/Comments

Although no direct attempt was made to develop strategies or methods for determining validity, certain factors which would contribute to test validity should be kept in mind. First, in test development, care was taken to eliminate items which were not occupationally oriented. Items dealing with trivial detail were omitted. Secondly, several individuals reviewed the drafts and final version of the test. The test was considered to have reasonable face validity. Other types of validity such as predictive, concurrent, construct, etc., were beyond the scope of this pilot test. For example, if a factor analytic study was attempted in order to determine construct validity, the values derived would be questionable with the sample size used in the pilot test.
### III. RESULTS

#### A. 3. Knowledge Test - Total Score Results

| Group Means and Standard Errors By Total Groups and Testing Time for Total 42 Item Test |
|---------------------------------|-----------------|-----------------|-----------------|
|                                | Pretest         | Posttest        |
|                                | Mean  | S.E. | N   | Mean  | S.E. | N   |
| Total Experimental Group       | 24.3  | 3.1  | 50  | 28.4  | 3.0  | 50  |
| Total Control Group            | 24.8  | 3.1  | 42  | 24.6  | 3.0  | 42  |
| Total (Exp. and Cont.) Group   | 24.5  | 3.1  | 92  | 26.6  | 3.0  | 92  |

### Interpretation/Comments

From this table several facts emerge. First there is a sizeable gain in experimental group scores from the pretest to the posttest. The gain of approximately 4.1 points is suggestive of a large module impact or effect on students. Second, the control group experienced a slight pre- to posttest loss (0.2 points) in total test scores. Ordinarily, slight to moderate gains would have been anticipated as a result of the pretesting effect. The loss might have been caused by some students losing interest or "turning off" at having to take the same test twice within a relatively short (3-4 weeks) period of time.
### A. Knowledge Test - Subtest Results

**Subtest Means and Standard Deviations**

*By Total Group and Testing Time*

<table>
<thead>
<tr>
<th>Testing Time</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D. N</td>
</tr>
<tr>
<td>Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>11.3</td>
<td>2.7</td>
</tr>
<tr>
<td>B</td>
<td>4.4</td>
<td>1.5</td>
</tr>
<tr>
<td>C</td>
<td>6.5</td>
<td>1.9</td>
</tr>
<tr>
<td>D</td>
<td>2.1</td>
<td>1.1</td>
</tr>
</tbody>
</table>

| Total Control Group |         |          |         |          |
|                     |         |          |         |          |
| A                    | 12.2    | 2.7      | 12.2    | 3.3      |
| B                    | 4.3     | 1.6      | 3.9     | 1.8      |
| C                    | 6.3     | 1.9      | 6.3     | 2.4      |
| D                    | 2.1     | 1.2      | 2.2     | 1.3      |

| Total (Exp. and Cont.) Group |         |          |         |          |
|                             |         |          |         |          |
| A                            | 11.7    | 2.7      | 12.7    | 2.8      |
| B                            | 4.3     | 1.6      | 4.6     | 1.8      |
| C                            | 6.4     | 1.9      | 6.8     | 2.2      |
| D                            | 2.1     | 1.1      | 2.5     | 1.3      |

*Subtest A = 18 Process Questions*

*Subtest B = 8 Responsibility Questions*

*Subtest C = 12 Skills Questions*

*Subtest D = 4 Environment/Tools Questions*

### Interpretation/Comments

In Table A-3 the overall gain in knowledge test scores was depicted. In this table (A-4) the scores are partitioned in accordance with the subtests included in the total test. As indicated in the table, most of the pre-posttest gain is found in the experimental group. This gain seems to be evenly distributed across the four subtests included in the knowledge test. In fact, the gain is about the same for each test although the number of items varied considerably, i.e., from 4 items on subtest D to 18 items on subtest A. If the subtests had been evenly balanced with respect to number of questions the results might have been even stronger or more pronounced than the observations made in this pilot test. At any rate, the module delivered cognitive content to students who participated in the module.
B. 1. Attitude Scale - Reliability

Inter- and Intra-Coder Percentage Agreement for Randomly Selected* Attitude Scales (Questions 1-8)

<table>
<thead>
<tr>
<th>Type of Agreement</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-Coder</td>
<td>80%</td>
<td>79%</td>
</tr>
<tr>
<td>Intra-Coder</td>
<td>85%</td>
<td>80%</td>
</tr>
</tbody>
</table>

* n = 21 test booklets randomly selected from the groups tested. Of these, 11 were pretest booklets and 10 were posttest booklets.

III. RESULTS

Interpretation/Comments

The figures in the table were devised by dividing:
- the total number of times the two coders were in disagreement by the maximum total of responses coded; or
- the total number of times the two codings by one coder were in disagreement by the maximum total of responses coded.

For questions 1-8 on the construction attitude scale there is a high degree of agreement between two independent coders (inter-coder reliability) as well as between two codings by the same coder (intra-coder reliability).

Thus, reliability of the scoring for the attitude scale was achieved. Two other important factors should be noted by the reviser/reviewer. They are:

- Reliability of the scale itself has not been measured in that the scale consisted of only a small number of items. Reliability estimates of such a brief scale with a relatively small sample would not be too meaningful;
- In determining the reliability of the codings, the two coders noted that the majority of their disagreements occurred in the scoring of questions 6-8. Due to this observation, these three questions were deleted from further consideration in this report.
III. RESULTS

B. 2. Attitude Scale - Validity

DATA NOT AVAILABLE

Interpretations/Comments

Data regarding the validity of the scale were not collected in the pilot test. The scale, however, was generated by staff members who were familiar with the content and goals of the module or who had actually participated in the writing of the module. The initial draft of the scale was reviewed by the staff and changes were made in accordance with their comments. Thus, a measure of face validity was achieved. (Also see the discussion of the ANOVA results for the attitude scale, Tables G-1 and G-2.)
III. RESULTS

B. 3. Attitude Scale - Preferences

Means (Strength of Preference)*
By Group and Testing Time For Questions 1-5

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>11.3</td>
<td>12.2</td>
</tr>
<tr>
<td>Control</td>
<td>11.4</td>
<td>11.0</td>
</tr>
</tbody>
</table>

*There were five questions each with a scale value of from zero (no response) to a strong preference value of 3 (yes or no). Hence the scale range is zero to 15 (5 x 3).

Interpretation/Comments

In terms of strength of preference, it is apparent from the table that the module did have some impact on the experimental group of students. On a relatively short scale (see footnote in the left hand column), the experimental group gained nearly a full scale point. Several interpretations of these results are offered below:

- The module has only moderate impact on student preferences and perhaps should be more heavily structured in ways to influence those preferences.
- The scale with only 5 questions was not sensitive enough to change. This becomes readily observable in analysis of variance for this data set.
- The module influenced other attitudinal variables not measured with the present instrumentation.

The control group, in this instance, experienced a slight pre-posttest loss. This is probably attributable to a decrease of interest in taking the same instrument twice within a short (3-4 weeks) period of time.
B. 4. Attitude Scale - Number of Reasons

Means (Number of Reasons)* By Group
And Testing Time For Questions 1-5

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>3.7</td>
<td>4.2</td>
</tr>
<tr>
<td>Control</td>
<td>3.9</td>
<td>3.7</td>
</tr>
</tbody>
</table>

*Students were requested to state the reasons for their preference choice. The numbers in the table represent the mean number of reasons given for the first five questions for a group.

Interpretation/Comments

The only change indicated in the table is that the experimental group gave approximately one-half more reason per five questions on the posttest than it did on the pretest. The analysis of variance conducted (see Table G.2.) shows that the F ratio obtained is insignificant.

While on initial inspection the .5 change may seem large, it must be remembered that across 5 questions a half a reason change is really not that much of a difference. Several possible explanations of the table are offered below:

- the module had some but not much impact on students' statements of reasons;
- the use of number of reasons may not be the most sensitive measure of impact of the module.

These explanations are but two of many possible ones. The reviser and evaluator are reminded to keep that fact in mind.
III. RESULTS

Interpretation/Comments

Several factors are readily apparent from the table. First, there is pre-posttest shifting of categories of response. For example, on a percentage basis the experimental group shows relatively large shifts of response from the pre- to the posttest for reasons 2, 4, and 5. The control group experienced only small changes for these same reasons. Some fluctuation is to be expected as is observed with the control group, but undoubtedly a portion of the change in the experimental group is attributable to the module. This becomes clearer when the table is examined in greater detail:

- Reason 5 is ignorance of the job and 22% fewer experimental students used this as a reason on the posttest than did on the pretest;
- Reasons 2 (past experience) and 4 (interest and ability) were used much more frequently on the posttest by the experimental group students than on the pretest.

Secondly, more experimental group students responded on the posttest than did on the pretest (174 to 149). The control group experienced a very slight loss of response (144 to 139). The module may have triggered some interest in responding.

Another factor is observed when this table and Tables G1-G2 are looked at jointly. In Tables G1-G2 ratios considerably greater than 1.00 were obtained although they were of insufficient size to produce a statistically significant value with the rather limited degrees of freedom for these specific F tests. But the three tables considered side by side do tend to suggest that the module was having an impact on student attitudes.

**Reasons were classified into seven basic types. These are:
1 = liking or enjoying
2 = past experience
3 = financial reasons
4 = interest/ability
5 = ignorance of the occupation
6 = undecided
7 = other reasons

**Frequency in row divided by total frequency in respective column, multiplied by 100.
Lastly, one factor that is puzzling and difficult to explain is the rather large number of responses in reason four for the pretest of the control group. One possible explanation for this occurrence is that the control group contained a fair number of students knowledgeable about the construction industry. This knowledge and perhaps the past experiences that may have accompanied it led to the high frequency of reason four responses.
C. 1 - Student Questionnaire - Reliability and Validity

The Student Questionnaire was administered to experimental group students after they had completed the module. Since there was only one test administration, the use of a test-retest coefficient was not possible. Furthermore, the questionnaire consists of many different types of questions (including open-ended questions) regarding various aspects of the simulation experience. The meaning of internal consistency coefficients calculated for this type of instrument would be extremely questionable and hence they were not utilized. Validity was basically ascertained by having the writers of the simulation review the instruments and by incorporating their comments and suggestions into the final form. In terms of face validity the instrument was judged to be a reasonable means of assessing the student's perspectives of the module. Secondly, comparisons between subsets of questionnaire items and achievement test data do tend to support the conclusion that the instrument is at least partially valid. As a group, students did well on the achievement tests and reported that the module did answer questions they had about jobs and did provide much information about jobs.
The reviser and evaluator should also keep in mind one other important fact about the student questionnaire. The questionnaire was not designed to evaluate students but as a means for students to provide the project staff with their opinions of the module as well as their suggestions for revision. Students were informed about the use of the questionnaire. It was hoped that their responses would be open and honest.
C. 2. Student Questionnaire - Results From Questions Dealing With Perception of Learning

<table>
<thead>
<tr>
<th>Question</th>
<th>Positive</th>
<th>Uncertain</th>
<th>Negative</th>
<th>No Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I learned quite a bit about jobs from the simulation</td>
<td>27(68%)</td>
<td>10(25%)</td>
<td>2(5%)</td>
<td>1(2%)</td>
</tr>
<tr>
<td>2. I learned quite a bit about how to work with other people from the simulation</td>
<td>25(62%)</td>
<td>8(20%)</td>
<td>7(18%)</td>
<td>-</td>
</tr>
<tr>
<td>3. The simulations helped to answer some of the questions I have about jobs</td>
<td>27(68%)</td>
<td>5(12%)</td>
<td>8(20%)</td>
<td>-</td>
</tr>
</tbody>
</table>

*Interpretation/Comments*

Across the three questions 79 or 66% of the total responses (n = 120) were in the positive category, 23 or 19% in the uncertain category, and 17 or 14% in the negative category. The trend of student responses is obviously strongly positive.* The students felt that the module provided them with a great deal of information about jobs and how to work with other people, and helped to answer some of the questions they had about jobs. This result is corroborated by the achievement test results which indicate a 4.1 point gain in knowledge. Care should be taken that this salient strength of the module in terms of learning is retained through revision.

*A chi square statistic could be computed for the data, but the trend is so apparent that to do so seems superfluous.*
### C. 3. Student Questionnaire - Results from Questions Dealing With Overall Perceptions of the Module

Questions Dealing With Overall Perceptions of the Module By Response Category, Frequencies and Row Percentages*

<table>
<thead>
<tr>
<th>Questions</th>
<th>Positive**</th>
<th>Uncertain</th>
<th>Negative</th>
<th>No Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. The simulation was boring</td>
<td>22 (55%)</td>
<td>10 (25%)</td>
<td>8 (20%)</td>
<td>-</td>
</tr>
<tr>
<td>4. Would recommend simulation to friends</td>
<td>16 (40%)</td>
<td>13 (32%)</td>
<td>9 (22%)</td>
<td>2 (5%)</td>
</tr>
<tr>
<td>5. Would like to go through more simulations</td>
<td>19 (48%)</td>
<td>11 (28%)</td>
<td>9 (22%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>6. Would rather do something else with this time.</td>
<td>21 (52%)</td>
<td>11 (28%)</td>
<td>7 (18%)</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>

**Note that the wording on question 15 may have

### Interpretation/Comments

Across the eight questions 144 or 45% of the total possible responses (n = 320) fell into the positive category, compared with 84 (26%) in the uncertain category and 83 (26%) in the negative category. In general the module was well received by students. Clear majority statements emerge on questions 3, 6, and 12, indicating that students did not find the simulation boring, would not rather have done something else with time, and enjoyed interaction with other students. Forty-eight percent of the students would like to go through more simulations.

Students were more divided in their opinion about the length of the module. As questions 8 and 9 show, 42 and 45% of the students felt that the simulation was too long with the remainder (a majority) being uncertain (25%) or feeling that it was too short (28%).

Note that the wording on question 15 may have
8. Simulation took too long.  
|          | 17 (42%) | 10 (25%) | 11 (28%) | 2 (5%) |

9. Simulation was over too soon.  
|          | 11 (28%) | 10 (25%) | 18 (45%) | 1 (2%) |

12. Enjoyed working with others  
|          | 23 (58%) | 10 (25%) | 6 (15%)  | 1 (2%) |

15. Simulation was a good way of getting out of class.  
|          | 15 (38%) | 9 (22%)  | 15 (38%) | 1 (2%) |

---

*n = 40

**For questions with negative stems, disagreement with the stem constitutes a positive reaction to the module and is entered in the positive category on the table. This fact should be kept in mind when reviewing the table.**
### III. RESULTS

#### C.4. Student Questionnaire - Results from Questions Dealing With Specific Module Parts

Questions dealing with Specific Module Parts by Response Category in Frequencies and Row Percentages*

<table>
<thead>
<tr>
<th>Question</th>
<th>Positive**</th>
<th>Uncertain</th>
<th>Negative</th>
<th>No Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Tasks too complicated or hard</td>
<td>18(45%)</td>
<td>11(28%)</td>
<td>9(22%)</td>
<td>2(5%)</td>
</tr>
<tr>
<td>11. Summary helped pull things together</td>
<td>12(30%)</td>
<td>15(38%)</td>
<td>12(30%)</td>
<td>1(2%)</td>
</tr>
<tr>
<td>13. Activities were exciting to me</td>
<td>14(35%)</td>
<td>13(32%)</td>
<td>12(30%)</td>
<td>1(2%)</td>
</tr>
<tr>
<td>14. Had trouble knowing what to do next</td>
<td>9(22%)</td>
<td>7(18%)</td>
<td>23(58%)</td>
<td>1(2%)</td>
</tr>
</tbody>
</table>

**Interpretation/Comments**

Across the entire set of questions 152 or 42% of the total number of responses (n = 360) fall into the positive category, compared to 101 (28%) in the uncertain category and 96 (27%) in the negative category. This is a positive reaction overall, although less strongly so than shown in Tables C.1 & 2, indicating that there are some minor implementation weaknesses in specific parts of the module.

One of the strengths pointed up by a 68% positive response is the role selection process. A majority of students felt that the pre- and post-tests were not difficult while over forty percent felt that the preview helped to prepare for the simulation, that the simulation parts fit together well, and that the tasks were not too complicated.

The major negative reaction which came through was that students (58%) had trouble knowing what to do next, warranting a careful reworking of directions. The students' opinions on the remaining questions in this grouping were approximately evenly divided.

These results should be studied along with the teacher comments obtained from the panels and logs for further illumination.

(Continued on next page)
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>16. Too many tests and forms to fill out</td>
<td>16(40%)</td>
<td>11(28%)</td>
<td>12(30%)</td>
<td>1(2%)</td>
</tr>
<tr>
<td>17. Pretest and post-test were difficult for me</td>
<td>21(52%)</td>
<td>12(30%)</td>
<td>6(15%)</td>
<td>1(2%)</td>
</tr>
<tr>
<td>18. Simulation parts fit together well</td>
<td>17(42%)</td>
<td>11(28%)</td>
<td>10(25%)</td>
<td>2(5%)</td>
</tr>
<tr>
<td>19. Preview, etc., helped to prepare me for simulation</td>
<td>18(45%)</td>
<td>14(35%)</td>
<td>7(18%)</td>
<td>1(2%)</td>
</tr>
<tr>
<td>20. Liked the way I selected my role(s) in simulation</td>
<td>27(68%)</td>
<td>7(18%)</td>
<td>5(12%)</td>
<td>1(2%)</td>
</tr>
</tbody>
</table>

*n = 40

**For questions with negative stems, disagreement with the stem constitutes a positive reaction to the module and is entered in the positive category on the table.
### III. RESULTS

#### C. 5. Student Questionnaire - Results From Other Important Questions

Other Important Questions by Response Category in Frequencies and Row Percentages*

<table>
<thead>
<tr>
<th>Question</th>
<th>Response Category</th>
<th>Yes, All of the Time</th>
<th>Yes, Most of the Time</th>
<th>No, Not Usually</th>
<th>No, Not At All</th>
<th>No Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>22. Did you perform well in your roles?</td>
<td></td>
<td>3(8%)</td>
<td>32(80%)</td>
<td>3(8%)</td>
<td>-</td>
<td>2(5%)</td>
</tr>
<tr>
<td>28. Did your feelings about planning construction projects change?</td>
<td>More Interested</td>
<td>19(48%)</td>
<td>13(32%)</td>
<td>4(10%)</td>
<td>4(10%)</td>
<td></td>
</tr>
</tbody>
</table>

*71 = 110

**Interpretation/Comments**

Students responded in a very strongly positive manner that they felt that they performed well in their roles (8% all the time and 80% most of the time). It is probable that this indicates that the students felt reinforced about their abilities as a result.

Forty-eight percent experienced a positive change about work in planning of educational programs. In terms of discovering new interests, two out of five students gave a positive response.

*\( n = 40 \)
III. RESULTS


#23 List a few reasons why you liked or did not like your role (or roles).

I liked the drawing, designing, or making the model (7).

I liked it, it was fun, these were things I like to do (8).

I liked choosing people for jobs (2).

I didn't like it because it was boring, there was nothing to do, the things we did were dumb, or not what I like to do (6).

I didn't know what I was doing, or the directions were all messed up (4).

Single responses:

I had to write too much.

No. Because the teacher was always judging people.

I didn't like it that well but it was the best out of all of them I think.

I liked it because we got to work in groups.

Because it was simple, and not much work involved.
#23 (continued)

I did not like doing everyone's work!

It gave me a chance to decide on some things.

Because it gave you the actual experience.

(No response = 7)
**#25.** Describe the one thing which you feel you did best in the simulation and the one thing you did least well. Be sure to say why you did well or poorly.

<table>
<thead>
<tr>
<th>Best Thing</th>
<th>Reasons</th>
<th>Worst Thing</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>choose people</td>
<td>like it</td>
<td>painting</td>
<td>haven't got a steady hand</td>
</tr>
<tr>
<td>holding meetings and organizing</td>
<td>don't know</td>
<td>building</td>
<td>not given enough time</td>
</tr>
<tr>
<td>everything</td>
<td>because I did my own plus everyone else's work!</td>
<td>getting into it</td>
<td>I could have dropped out</td>
</tr>
<tr>
<td>draftsman</td>
<td>fun</td>
<td>civil engineer</td>
<td>boring</td>
</tr>
<tr>
<td>painted the project</td>
<td>because it was the easiest</td>
<td>fill out a sheet</td>
<td>I didn't know how to fill it out.</td>
</tr>
<tr>
<td>helping the architect</td>
<td>because it was fun</td>
<td>messed up on the assignments</td>
<td></td>
</tr>
<tr>
<td>drawing the house</td>
<td>because I did good</td>
<td>filling some of the charts</td>
<td>it was hard</td>
</tr>
<tr>
<td>drew plans</td>
<td>I made sure</td>
<td>don't know</td>
<td></td>
</tr>
<tr>
<td>drawing</td>
<td>I like to draw</td>
<td></td>
<td></td>
</tr>
<tr>
<td>finding a plot</td>
<td>It was easy</td>
<td>building</td>
<td>it was too long</td>
</tr>
<tr>
<td>writing, drawing</td>
<td>I did it most</td>
<td></td>
<td></td>
</tr>
<tr>
<td>help make the model</td>
<td>it's not hard</td>
<td>fill out forms</td>
<td>too hard</td>
</tr>
<tr>
<td>1A</td>
<td>it had the best instructions</td>
<td>model</td>
<td>not enough time or materials</td>
</tr>
<tr>
<td>helping people</td>
<td>because they needed help and I always helped them</td>
<td>building facility</td>
<td>didn't have enough time to build it</td>
</tr>
<tr>
<td>tests</td>
<td>understood them</td>
<td>building project</td>
<td>none</td>
</tr>
<tr>
<td>drawing</td>
<td>I like to</td>
<td>meeting deadlines</td>
<td>I'm slow</td>
</tr>
<tr>
<td>Best Thing</td>
<td>Reasons</td>
<td>Worst Thing</td>
<td>Reasons</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------</td>
<td>----------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>designing</td>
<td>I like doing it</td>
<td>tests</td>
<td>kind of hard to understand</td>
</tr>
<tr>
<td>made plans</td>
<td>I had helped</td>
<td>putting it together</td>
<td>there were too many people</td>
</tr>
<tr>
<td>plot in 3-D</td>
<td>It was fun and</td>
<td>filling out papers</td>
<td>I didn't enjoy it too much</td>
</tr>
<tr>
<td></td>
<td>I thought it was good</td>
<td></td>
<td></td>
</tr>
<tr>
<td>picking architect</td>
<td>picked best one</td>
<td>building plot</td>
<td>didn't get to do much</td>
</tr>
<tr>
<td>drawings</td>
<td>I liked them</td>
<td>on the final board</td>
<td>I think I could have done a lot better</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>because I asked a lot of questions</td>
<td>worked on project</td>
<td>I feel that it could have looked better</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I worked hard and well</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I did it all</td>
<td>painted</td>
<td>only one thing</td>
</tr>
<tr>
<td></td>
<td>I got to draw and build</td>
<td>meetings</td>
<td>I'm no good at it</td>
</tr>
<tr>
<td></td>
<td>fun</td>
<td>work</td>
<td>not fun</td>
</tr>
<tr>
<td></td>
<td>I like to draw</td>
<td>summary</td>
<td>I don't like to write</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>she asked me to and I wanted to</td>
<td>nothing</td>
<td>nothing</td>
</tr>
<tr>
<td></td>
<td>I did great!</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>because I want to get good grades</td>
<td>did nothing</td>
<td>did not understand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>nailing</td>
<td>building facility</td>
<td>didn't know what we were doing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I don't know</td>
<td>building model</td>
<td>I am not very good at stuff like that</td>
</tr>
</tbody>
</table>

(No Response = 8)
30. Name some of the things you liked most about the simulation and some of things you liked least about the simulation.

<table>
<thead>
<tr>
<th>Liked Most</th>
<th>Liked Least</th>
</tr>
</thead>
<tbody>
<tr>
<td>making the board</td>
<td>disorderly people</td>
</tr>
<tr>
<td>making sketches</td>
<td>filling out forms, reading</td>
</tr>
<tr>
<td>working with other people</td>
<td>meetings</td>
</tr>
<tr>
<td>painting, sketching</td>
<td>working</td>
</tr>
<tr>
<td>drawing, building, planning, supervising</td>
<td>summary, groups</td>
</tr>
<tr>
<td>building, meetings, talking, fun</td>
<td>having meetings</td>
</tr>
<tr>
<td>sketching, TV</td>
<td></td>
</tr>
<tr>
<td>drawing, helping others</td>
<td></td>
</tr>
<tr>
<td>designing the model, designing the building</td>
<td></td>
</tr>
<tr>
<td>drawing the house</td>
<td>drawing the boundary</td>
</tr>
<tr>
<td>don't know</td>
<td>drawing plans</td>
</tr>
<tr>
<td>the drawing and making of the board</td>
<td>the order</td>
</tr>
<tr>
<td>finding the plot</td>
<td>sketching, writing all the stuff</td>
</tr>
<tr>
<td></td>
<td>the people that try to run it and the teacher that helps try to run it. They should have everybody equally running it.</td>
</tr>
<tr>
<td></td>
<td>filling out forms</td>
</tr>
<tr>
<td>making the models</td>
<td>model</td>
</tr>
<tr>
<td>the first part</td>
<td>trying to figure out what to do next</td>
</tr>
<tr>
<td>making precise drawings</td>
<td></td>
</tr>
<tr>
<td>drawing the floor plan, meetings</td>
<td>filling out papers and reading so many booklets</td>
</tr>
<tr>
<td>making the drawing for the plot in 3-D</td>
<td>pretest, building, and meeting</td>
</tr>
<tr>
<td>picking architect, watching the film, listening to talking pages</td>
<td></td>
</tr>
</tbody>
</table>
30. (continued)

**Liked Most**

- plans, the model
drawing
- the job I had, the building, the drawing, the sketching
- being able to help the Board of Education and working with them
- Board of Education Superintendent
- working in groups or in other words having the meetings - being able to understand some of it. (the checks)
- meeting with others, helping people playing the roles
- most everything
- working with others, drawing, finding information
- nothing
- facility
- picking sites
- filling out forms

**Liked Least**

- all the work, sheets, book, etc.
- reading
- reading, test, watching film strips
- filling out forms - calling meetings
- community representative - principal architect - draftsman
- talking pages - drawing the sketches of the building and being the only P.A.
- doing everyone's work!
- building facility, filling out papers, taking tests
- building
- working alone, there were big spaces in the things we did, and when you got alone, you had to wait until people caught up with you.
- not enough materials, not enough time, not a good instructor
- agenda
- building drawing

(No Response = 8)
31. Write down some of your ideas on how the simulation might be made better.

I do not know.

More simulations, longer, more drawing, I guess not as many tests, more making model buildings.

Less writing, more building, less discussion, more working time.

Well, I really don't have any changes right at this very minute, so maybe I can come up with some tonight.

None (4)

If it didn't take as much time. If everyone got together and worked harder it would have got done.

I can't think of any ways to make it better.

Better organization of directions.

Clearer instructions and more materials.

Having everybody doing a good share into it, not only the teachers' pet and the teacher so that way everything will work out.

If it was shorter. Not so many writing projects.

Some of the things are not in order, like we were drawing the building when we did not know what you wanted (in order of buildings.)

Draftsman not having to draw plans.

I thought this simulation was good if you like to do planning construction. If you make kits like this for all jobs, I think that will be great. Don't worry about my answers in here, but I was just being honest. I hope that's what you wanted.

One way it might be better is to not having us read so many booklets and try to cut it down so it's shorter.

Have more time, and have the materials come with the set.

Have the teacher understand more about it.

If it was a little shorter.

It could last longer.

Have more time to work on some things. Have better roles for people. Have more cooperation in the groups, have the simulation speak about and tell you about something you don't understand.
Have little groups to work with. Have more time for each step. Have better materials for the model.


Maybe not having so many forms, and not as many booklets to read.

Maybe you could make it a little more interesting and exciting.

Not so many booklets and forms and papers and things to read. Make it less complicated to understand.

Got a better teacher to teach this. I mean the regular teacher Miss Miller she made things 100% worse than they had to be!! Write more explanations in your booklets!!

Not so many steps. More time. Some of the equipment for the building of the model. The directions a little less complicated (not that they were really that complicated, I just got kind of confused sometimes and I know I wasn't the only one).

Not so many tests, and not so much reading.

I don't know how, but in some places it is real boring.

By having more activities involved.

(No response = 8)
The Teacher Log and General Module Evaluation is a set of six questionnaires completed by teachers as they observed students progressing through a module. The questionnaires varied considerably depending on the part of the module the teacher was to evaluate. Space was provided for teachers to supply comments about the materials and to make recommendations for change. The variable nature of the question format and the question content make it difficult to determine the reliability of the questionnaires. Further, even if a reliability coefficient could be calculated, the small sample size \((n = 4\) experimental teachers) would render the coefficients meaningless.

Validity was determined by having product developers review the Teacher Log and General Module Evaluation. The developers considered the instrument to be a viable means of collecting teacher observations especially with regard to problems incurred in implementing the module. Face validity seemed high. The developers did have some question about overall length of the questionnaire. (See Table III - D. II.)
D. II Teacher Log and General Module Evaluation

**Composite Results**

**Interpretation/Comments**

Due to the extensive length of the questionnaires, tables will not be included in this report. A composite set of teacher responses on the Teacher Log (5 individual questionnaires) and the General Module Evaluation will be maintained by OEP evaluation staff. These composite responses will be available upon request.

Several factors should be kept in mind when reviewing the composite results. First there were only 4 teachers who were facilitating or managing experimental group experiences. In many cases only two or three teachers responded to a question. Second, teachers, on several instances, commented about the length of the Log; hence length probably influenced response frequency. Third, favorable teacher comments were heard regarding the General Module Evaluation. Apparently, from the perspective of teachers, this instrument was of better quality than the other five. Fourth, it would seem that a fair amount of faith can be placed on the truthfulness of teacher responses. The questionnaires were designed to evaluate the program not to evaluate teachers. Teachers were informed on several occasions of the intent of the instrument package.

Lastly, the responses on the instruments were summarized and only the main thoughts or ideas were stated on the Reviser's Information Summary Sheet. These summarizations should be studied with other sources of data in view.
E. 1. Teacher Post Module - Reliability and Validity

The panel review procedure and reporting format was generated from similar efforts undertaken for the School Based Component of the Comprehensive Career Education Model (CCEM) in 1973. CCEM project staff felt that panel reviews provided an important source of data for revising curriculum materials. The process is purposely designed as an open-ended one to insure that teachers have the opportunity to freely discuss any concerns or comments they have about the module. Reliability in this instance is difficult to assess. It should be noted, however, that teachers were frequently asked during the review about the extent to which they agreed upon particular points. Thus, the panel report, in many cases, represents a convergence of teacher perspectives or opinions.

Validity is judged by the degree to which the revisers and evaluators will find the data collected from the panels useful for illuminating strengths and weaknesses within the module and helpful in determining revisions to be made in the module. Validity judgments will have to come sometime after the generation of this report.

Due to the open-ended nature of the panel review, Table III - E-11 is simply a copy of the actual panel review. The report, which is a summary of the panel discussion, was written by OEP staff. For the Reviser's Information Summary (RIS) the main ideas of the panel review have been abstracted and placed in the appropriate cells of the RIS.
III. Results*

E. II. Post Module Panel Review

Title of Module: Planning Construction Projects
LEA: Jefferson County, Colorado and Denver, Colorado
Panel Leader: John Radloff
Panelists: Trina Dale - Denver
          Barbara Miller, Pauline Rose - Jeff Co
Observer Participants: Sandra Pritz - CVTE
                      Margaret Erickson - Jeff Co
Dates Panel Met: January 3, 1974
Number of Hours: 4 hours total

*Interpretation has not been provided.
<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Classroom Solutions</th>
<th>Revision or Suggested Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The slides on the slide tape were very good.</td>
<td>Generally negative reaction.</td>
<td>Used both tape and handbook.</td>
<td>Slow it down and emphasize the work simulation.</td>
</tr>
<tr>
<td></td>
<td>Did not work without much teacher aid.</td>
<td>Teachers summarized the ideas and presented them.</td>
<td>Provide guideline questions at the beginning.</td>
</tr>
<tr>
<td></td>
<td>Was too fast.</td>
<td>One teacher did this and the Preview the same day and felt it helped.</td>
<td>Provide a review at the end.</td>
</tr>
<tr>
<td></td>
<td>No opportunity to review the ideas.</td>
<td></td>
<td>Slide tape script should be more direct.</td>
</tr>
<tr>
<td></td>
<td>Students did not understand the term simulation and were not motivated to go on.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Script was too subtle.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Both tape and handbook were necessary rather than being alternatives.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overwhelming and confusing; the students knew only that they'd be able to choose a role.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Students were not motivated to continue (one of the 3 teachers felt less strongly about this than the other 2. One teacher had 3 girls opt out.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vocabulary was too difficult, required much explanation. (This was seen as a strength later when, about Handbook 3 the students finally felt comfortable with words they would not have known otherwise.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The situation was introduced too late and wasn't personalized enough.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module Preview</td>
<td>Music good</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Both tape and handbook were necessary rather than being alternatives.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overwhelming and confusing; the students knew only that they'd be able to choose a role.</td>
<td></td>
<td></td>
</tr>
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<td></td>
<td>Students were not motivated to continue (one of the 3 teachers felt less strongly about this than the other 2. One teacher had 3 girls opt out.)</td>
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<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The situation was introduced too late and wasn't personalized enough.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teacher did much explaining and used both book and mediation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emphasize what is going to happen.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>Strengths</td>
<td>Weaknesses</td>
<td>Classroom Solution</td>
</tr>
<tr>
<td>-------</td>
<td>-----------</td>
<td>------------</td>
<td>---------------------</td>
</tr>
</tbody>
</table>
| Preview (Continued) | - None identified | - Too long, too much reading.  
- Took too much time to set up audio visual equipment.  
- The vocabulary was much too difficult so the students would not read the material thoroughly.  
- Lack of clear directions for what to do.  
- If a student chose to be the Jr. Architect, the later competition meant nothing.  
- Role-choosing process wasn't followed as intended. | - Teachers intervened and explained much of the material. | - Use a summary at the end.  
- Use stop-action technique with the tape.  
- Get the students into the action sooner to motivate them.  
- Introduce the simulation situation sooner and dramatize it to make it important to the students.  
- Shorten it by postponing some of the details.  
|  
| Preparation | | | | - Emphasize that the architect is a leadership role in the simulation (one teacher's comment).  
- Direct the students on how to trade roles if necessary.  
- Explain that interests and preferences prioritize (perhaps with arrow).  
<p>|<br />
| | | | | - Mention that the forms should be kept separate for use at the end of the simulation. |</p>
<table>
<thead>
<tr>
<th>Title</th>
<th>Strategies</th>
<th>Classroom</th>
<th>Revision or Suggested Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation (Continued)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handbook 1A - Contacting an Architect</td>
<td>- The teachers were unanimously happy with the talking pages.</td>
<td>- Had no impact because of preparation leading another way.</td>
<td>- None described</td>
</tr>
<tr>
<td>Handbook 1B - Finding Sites</td>
<td>- Students enjoyed it very much.</td>
<td>- Checks for the architect were never mentioned again.</td>
<td>- None identified.</td>
</tr>
<tr>
<td>Handbook 2A - Identifying Client's Needs</td>
<td>- Was nice and specific.</td>
<td>- P. 7 questionnaire skipped entirely by one group.</td>
<td>- Each student should be directed to put his name on the top of the map and to number the sites.</td>
</tr>
<tr>
<td>Handbook 2B - Sketching Sites</td>
<td>- Students found it a lot of fun.</td>
<td>- The directions were misunderstood by one group, so that each student was working individually to find all 10 sites.</td>
<td>- Underscore that the object is to narrow the choices to 4 sites.</td>
</tr>
</tbody>
</table>

- Checks for the architect were never mentioned again.
- P. 7 questionnaire skipped entirely by one group.
- The directions were misunderstood by one group, so that each student was working individually to find all 10 sites.
- Lack of labelling of papers caused some confusion.
- One group thought they were supposed to choose the one best site at this point.
- None identified.
- Each student should be directed to put his name on the top of the map and to number the sites.
- Underscore that the object is to narrow the choices to 4 sites.
- Check the scale used on p. 6.
<table>
<thead>
<tr>
<th>Title</th>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Classroom Solutions</th>
<th>Revision or Suggested Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handbook 3A- Writing Specs</td>
<td>Slide tape was good and the mess without specs came through well.</td>
<td>None identified.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handbook 4A- Creating a Design</td>
<td>Vocabulary beginning to be understood.</td>
<td>None identified.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handbook 4B- Putting the Puzzle Together</td>
<td>Understood what they were to do.</td>
<td>Some students thought they were to design an entire Phys. Ed. department.</td>
<td>One teacher skipped the activity on page 2.</td>
<td>Clarify that the facility is not to include a gym and classroom</td>
</tr>
<tr>
<td>Handbook 5- Selecting Site and Design</td>
<td>Students enjoyed it.</td>
<td>Page 2 activity not carefully labelled and little indication given as to who should do it.</td>
<td>One teacher skipped the activity on page 2.</td>
<td>Label activities and indicate (where it will stand out) who shall do it.</td>
</tr>
<tr>
<td>Handbook 6- Making Final Plans</td>
<td>None mentioned.</td>
<td>Was very quick (perhaps not a weakness).</td>
<td>None mentioned.</td>
<td>Early in the handbook the purpose of the activity and the intended product should be indicated.</td>
</tr>
<tr>
<td></td>
<td>&quot;Loved it&quot;.</td>
<td>Agenda not specific enough.</td>
<td>6E - Used whatever materials they had, did not use paper maché, students adapted to their own level.</td>
<td>Make agenda more specific.</td>
</tr>
<tr>
<td></td>
<td>6C - Some trouble with dimensions and scale (4.1 - 4.3).</td>
<td></td>
<td>6E - Simplify and explain scale p. 9. Remove change of scale (4.1) if it proves unnecessary after reevaluation.</td>
<td></td>
</tr>
</tbody>
</table>
| Handbook 6-  
| (Continued) |
| Task 1 |
| - No hand drawing along with earlier drawing assignments. |
| - OE - Video tape inconvenient and expensive. No indication of when to show videotape. Didn't find all materials called for. Didn't realize they'd need aerial photos again. |

| Handbook 7- |
| Presenting Plans |
| - None mentioned. |
| - Anticlimactic and short (10-20 minutes). |
| - Page 4, only one of two models unveiled. |
| - No real audience since the students all worked on the model. |

| Summary |
| - Task 1 |
| - Task 2 (nothing with which to compare their experiences). |

| Classroom Solution |
| - Used both models. |
| - Did not spend two periods on it. |

| Revision or Suggested Changes |
| - OE - Perhaps he could trace or use an earlier drawing. |
| - OE - Note that aerial photographs will be needed again here (whenever they're used). Use a super slide tape instead of video tape. Indicate at the beginning that video tape should be shown. |
| - Consider adding this activity to previous lesson. |
| - Use both plot model and facility model. |
| - Invite someone to the unveiling (principal, guidance counselors). |
| - Drop Task 2. |
| - Consider having a group discussion. |
Comments Across Entire Unit

--First page of each handbook should be explained as an overview and an important first step before proceeding with the rest of the material. Simplify the headings so that they are descriptive:

Here's what you'll do
whom you'll do it with
how long you have to do it
what you need to do it
where you can get the information

Shading on the schematic is so dark that some students thought they were not to do that activity.

--There was strong agreement that the module should be packaged by role rather than task and the number of separate pieces should be greatly reduced.

--More directions on what to do next are needed.

--One teacher did not follow the time schedule but felt it would have been better to have done so. It was suggested that a time sheet be included for the students to check off their own time blocks and deadlines met.

--One teacher felt that the story example was totally unnecessary and simply made for more reading. All agreed that it was too wordy and that the characters were not well enough identified by role. One suggestion was to keep the story separate and at the back of the handbook so that it could be tapped as a clarifying example.

--Check to see if all sketches are necessary and indicate which ones need to be drawn to scale and which can be traced.

--There was a general feeling that two people playing the same role tends not to work, as one tends to take over.
III. RESULTS

F. Knowledge Test - Analysis of Variance For Total Test Scores

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>1</td>
<td>309.1</td>
<td>309.1</td>
<td>7.5</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>749.8</td>
<td>749.8</td>
<td>18.3**</td>
</tr>
<tr>
<td>AB</td>
<td>1</td>
<td>292.2</td>
<td>292.2</td>
<td>7.1</td>
</tr>
<tr>
<td>C/AB</td>
<td>4</td>
<td>164.2</td>
<td>41.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Within Classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E/C/AB</td>
<td>84</td>
<td>2956.1</td>
<td>35.2</td>
<td></td>
</tr>
<tr>
<td>Within Subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>91.9</td>
<td>91.9</td>
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<td>195.3</td>
<td>195.3</td>
<td>15.5**</td>
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<td>38.7</td>
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<td>ABD</td>
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<td>3.4</td>
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<tr>
<td>CD/AB</td>
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<tr>
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<td>84</td>
<td>1679.8</td>
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<tr>
<td>TOTAL</td>
<td>183</td>
<td>6530.6</td>
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</tr>
</tbody>
</table>

*Where
A = Treatment (experimental vs. control)
B = Schools (Denver vs. Jeff Co.)
C = Classrooms (N = 6)
D = Testing (Pre vs. Post)
E = Students

**p ≤ .05

Interpretation/Comments

As described earlier in the text of this report, the key term to be observed in the analysis is the AD interaction. If AD interaction occurs in such a manner that the experimental group shows high posttest gains, then most likely the module had an impact on student career knowledge in this particular field. Tables A. 3 and A. 4 confirm in a descriptive fashion that the interaction did take place as expected. Table F. indicates that the interaction is statistically significant at the .05 level. Indeed, there is conclusive evidence to demonstrate the effect of the simulation.

There are other terms in the table that are significant. This was anticipated as a possibility in setting up the design and in no way detracts from the significant difference obtained in the major area of concern.
III. RESULTS

G. 1 Attitude Scale - Analysis of Variance
For Strength of Preference Scores (Questions 1-5)

SUMMARY TABLE*

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
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<td>Between Classes</td>
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<td>7</td>
<td>10.4</td>
<td>1.7</td>
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<tr>
<td>E/C/AB</td>
<td>83</td>
<td>604.6</td>
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<tr>
<td>Within Subjects</td>
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</tr>
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<td>D</td>
<td>1</td>
<td>3.4</td>
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<td>17.2</td>
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<td>CD/AB</td>
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<td>1.9</td>
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<tr>
<td>ED/C/AB</td>
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<tr>
<td>TOTAL</td>
<td>181</td>
<td>1028.9</td>
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</tr>
</tbody>
</table>

*See Footnotes in Table F.

Interpretation/Comments

An examination of Table G. 1 reveals that while no significant AD interaction was achieved, the $F$ ratio actually obtained is moderately large in view of the respective degrees of freedom for this specific $F$ test. This factor in conjunction with other additional data collected for the construction module tends to suggest the following conclusions:

- the module was having an impact on student attitudes but not an excessively large one; and
- the limited time allotted for testing and the trial nature of the attitude scale may have precluded the complete measurement of the attitudinal effect.

Note that the above conclusions are several from the many that could have been posited. Other interpretations are plausible and should be considered by the reviser and/or reviewer.
### III. RESULTS

#### G. 2 Attitude Scale - Analysis of Variance

For Number of Reasons

**SUMMARY TABLE***

<table>
<thead>
<tr>
<th>SOURCE</th>
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<td>AB</td>
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<td>Within Classes</td>
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<tr>
<td>E/C/AB</td>
<td>83</td>
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<tr>
<td>Within Subjects</td>
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<tr>
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<td>.2</td>
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<td>5.2</td>
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<tr>
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<tr>
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<tr>
<td>TOTAL</td>
<td>181</td>
<td>779.7</td>
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</table>

*See Footnotes in Table F.*

**Interpretation/Comments**

As described earlier in the text of this report, the key term to be observed in the analysis is the AD interaction. If AD interaction occurs in such a manner that the experimental group shows high post-test gains, then most likely the module had an impact on the number of reasons students gave for supporting a preference.

Results in Tables B. 3 - B. 5, presented previously in this report, indicate that the module was having some impact on student attitudes. In this Table, G. 2., the AD interaction that did occur was not of sufficient magnitude to produce a statistically significant result. The result, however, is in line with general trend of data reported in Tables B. 3 - B. 5.
IV. Reviser's Information Summary (RIS)

A. Description of the Summary

The Reviser's Information Summary was developed for the purpose of assisting revisers to assimilate information collected during the pilot test of a module. To accomplish this, information from each source available was first reviewed and then only major thrusts or ideas from the source were summarized. (These key thrusts or ideas were determined by the judgment of the authors of this evaluation report.) The summary was then transferred to the appropriate location on the large sheets which constitute the RTS. Lastly, each column was studied and trends were drawn and so recorded at the bottom of the sheet. In ascertaining trends the authors used their familiarity with data, the module, and the data collected.

In general there will be one Reviser's Information Summary sheet per part of the module and one-two sheets covering the overall nature of the module. On sheets which pertain to module parts, only some of the data sources provide information pertinent to that part. Hence, the sheets do have some blanks or missing data cells. The reviser should exercise extreme care in interpreting the information on the sheets and should always keep in mind that comments on the sheets represent only a summary of key points. In addition, it sometimes was most difficult to determine a trend in the information obtained.

B. Use of the RIS

One way the reviser might use the RIS is as follows:

1. Read the module - become thoroughly familiar with it;

2. Read the first part of this report (Sections I and II) thoroughly. Skim the results compiled in tables (Section III, parts A, B, C, D, and E.) Read section E-2, the teacher panel review report, closely;
3. Read and study the Reviser's Information Summary. (Consult original data sources, if necessary.); and

4. Generate a set of revision specifications based upon knowledge of the module, the Reviser's Information Summary, project developmental criteria and other information, if appropriate.
C. REVISER'S INFORMATION
SUMMARY
### STRENGTHS

- **On a reliable 42 item knowledge test,** experimental group students gained approximately 4 points per student from the pre- to the posttest (24.3 to 28.4). The scores of control group students remained basically the same on the two testings. The gain was evenly distributed across subtest scales.

- **On a reliably scored attitude scale,** the experimental group experienced positive change but it was of insufficient magnitude to produce statistically significant results. (The brevity of the scale may have precluded measurement of the full module impact.) The reviser might refer to Table B.5, in which positive changes in student reasons for preferences are given. The experimental group were definitely shifting in their responses, a result which is attributed to their participation in the module. (Also see tables B.3. and B.4. for other attitudinal effects.)

### WEAKNESSES

- Minor weaknesses observed here may it was difficult to determine if gains had occurred in the experiment available for testing as well as the scale may have dampened the opportunity of the module.

### STUDENT TESTS

Students gave strong positive response (68%) to the job information they got from the simulation. They found it interesting (55%), enjoyed interacting with other students, (58%), and would like to do another (48%). Over 40% had positive attitude changes in interests or attitudes toward work in construction.

Students were enthusiastic about the role selection process (68%), with a majority feeling that the pre- and posttests were not difficult. Over 40% felt that the pre-view helped to prepare for the simulation, that the parts fit together well, and that the tasks were not too complicated.

The favorite activities were drawing, designing, and interaction with others, although this may reflect individual differences rather than module quality. Eight-eight percent felt that they had performed well in their roles at least most of the time.

### STUDENT QUESTIONNAIRES

- Students were divided in their opinion of the module with substantial number (42%).

- A majority of the students (58%) felt they could be better. (Knowing what to do needed)

- The least favored activities (ment: meetings, filling out forms, drawing) may reflect individual differences.
Considerations

\textbf{ES RECOMMENDATIONS FOR REVISION}

66

The following considerations relate to the tests. They are:

1. Different subtest knowledge across the group; the limited time.
2. The brevity of the attitudinal part.
3. The feeling to observe the full attitudinal part about the length of the test.
4. That the instructions should be read more than once.
5. Reading, although this is more than module quality.

\textbf{Student comments for revision recommendations include: better instructions, less reading and writing to do, more time, less time, fewer tests, and a more exciting unit.}
The students were generally receptive to the module, especially when they got into the "construction phase" and became involved in their role-playing. Two teachers felt it was exciting for their students.

Two teachers felt that the module built decision-making and/or group discussion abilities.

There were varied, but positive, responses about how much the students learned about the module content (very much, much, an average amount).

One teacher commented that she had learned more about her students and that the classroom had become more informal.

One teacher saw positive changes in student interaction, with students consulting with each other who had not previously done so.

The films and talking pages were good for the non-readers.

All of the teachers rated the quality of the module high and felt that they would use it again and recommend it to others.

One teacher commented that students finishing earlier than anticipated and one teacher felt the "boss concept" is not yet developed.

The vocabulary was too advanced for some progress with it.

The students who found the module challenging others did the work for them.

It takes pushing, especially for those with little self-discipline.

The slower kids may have used the time to get out of work.

They seem to absorb much.

Story example was felt by one teacher to be less than engaging.

All teachers felt that the story was not well enough identified by readers.

With two people playing the same character.

Clearly the module was delivering job information as indicated by student test scores, student questionnaires, and teacher observations.

Additio.
Some students may need some difficulty with some aspects of the simulation. It was hard to coordinate this, as the "leaders" although the students made some difficult were bored because non-achieving students or those audio-visuals as a means of led others work but didn't need to be unnecessary. It was too wordy and the characters, one tended to take over.

With the fact in mind that the module was successful, nevertheless there are problems that should be attended to and some revisions are indicated. Besides trends below, see specific RIS sheets.

1. There are major problems with organization of the module. For some tasks the time allotment was not sufficient. For others, the task itself was questionable in terms of its value and relation to other parts of the module. For example, the problem situation itself was questioned, Task 7 was found wanting, etc. In some cases the time allotment might have been seen as more adequate if directions were clearer and if the module had been packaged more simply (fewer pieces with perhaps, highlighted directions). Time may have been wasted in these areas.

2. Time might also be saved by considering the use of an option such as pre-cut cardboard model kits. Perhaps time was also used in excessively redrawing designs. (Although this may be a realistic aspect of work in the field.)

3. Students indicated that they would like less reading and writing. In this regard, careful examination of all media should be considered and attention should be paid to the best way to deliver a concept (either booklet or media).

4. There should be provisions for better familiarizing the teachers with modules of this type given their complexity. The teacher's role in the module should be examined and possibly expanded.

5. Vocabulary problems may be handled in a variety of ways. A few possible ideas are offered as follows: include a glossary; define more carefully as words are used in the test; Alert students early to the fact that they will learn vocabulary as they go along so that they won't become discouraged or lose interest.

RECOMMENDATIONS FOR REVISION

1. Emphasize the importance of the first page of each handbook as an overview and make the headings simpler and more descriptive.

2. Lighten the shading on the schematic so the students won't think it's blacked out.

3. Package the module by role and reduce the number of pieces.

4. More directions are needed.

5. Include a time sheet for students to check off.

6. Keep the story example separate, to be tapped as a clarifying example.

7. Reduce the amount of drawing.

8. One teacher felt the unit should be more teacher directed.
<table>
<thead>
<tr>
<th>DATA SOURCE</th>
<th>STRENGTHS</th>
<th>WEAKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>STUDENT TESTS</td>
<td>From an incremental test* done in the Fall of 1973 the following results were obtained: 37% (n = 15) or more of the students using the materials felt that they understood the materials and that the vocabulary was easy to understand.</td>
<td>When students were questioned with regard to the introduction, the quality picture became somewhat more mixed in: Only 53% of the students were finding the booklet or the slides. Only about 1/3 of the students were liking the illustrations.</td>
</tr>
<tr>
<td>STUDENT QUESTIONNAIRES</td>
<td>*test data was collected from students in Upper Arlington, Ohio</td>
<td></td>
</tr>
<tr>
<td>TEACHER LOGS</td>
<td>The slides were rated high in quality.</td>
<td>1. The students in all four classes were liking the concepts presented, partly due to the speed with which ideas were presented.</td>
</tr>
<tr>
<td>TEACHER PANELS</td>
<td>The slides on the slide tape were very good.</td>
<td>2. The booklet was rated poor to good because it is too technical and detailed.</td>
</tr>
<tr>
<td>TRENDS</td>
<td>1. Teachers were consistent in their comments about the high quality of the slides. 2. Comments collected from tests of these materials in other settings indicate that students were able to generally understand the concepts presented in the materials. (However, there are some problems with the materials as indicated in the next column.)</td>
<td>3. It was necessary to use both the slides and the booklet.</td>
</tr>
</tbody>
</table>

With regard to data collected from the module and from other uses of these materials and inconsistencies emerge. 

Consistencies: 
1. Key ideas are not repeated often enough for reviewing the important concepts presented too quickly. 2. The introduction is not motivating; this may have been partially caused by the understanding of the concepts presented. |

Inconsistencies: 
1. Students who used the materials module apparently had more difficulty understanding the concepts presented. 2. There were varying perceptions of the materials. For example, in consistent ratings of the term, "simulation".
Slightly over one-half of the students recommended that the slides and booklet be used together, with the slides coming first.

1. Direct teachers to use slides first for visualization, then reinforce with a simplified form of the booklet.
2. Use color in the booklet.

1. Provide guideline questions at beginning, review at end.
2. Slow it down, explain simulation more directly.
3. Use both tape and handbook for reinforcement.

1. Repeat key ideas more often, provide opportunities for review or for students to become more involved, and slow down the presentation. (Perhaps this will solve the motivation problem.)
2. Special attention should be paid to the manner in which the concept, simulation, is introduced. It, perhaps, should be more explicit.
3. Re-examine drawings.
<table>
<thead>
<tr>
<th>DATA SOURCE</th>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>STUDENT TESTS</td>
<td></td>
<td>Less than half (45%) of the students to prepare for the simulation.</td>
</tr>
<tr>
<td>STUDENT QUESTIONNAIRES</td>
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<td></td>
</tr>
<tr>
<td>TEACHER LOGS</td>
<td></td>
<td>1. One comment was that the vocabulary hard.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. There was too much information to slide tape.</td>
</tr>
<tr>
<td></td>
<td>1. The booklet had medium effectiveness in stimulating student interest and was of medium to high technical quality.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. The booklet provided the information necessary and could be referred to again.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. The slide tape also had medium effectiveness in stimulating student interest with medium technical quality. One teacher commented that the music was very effective; another that it was an informative novelty.</td>
<td></td>
</tr>
<tr>
<td>TEACHER PANELS</td>
<td>Music good.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Seemed overwhelming and confusing much reading, vocabulary too difficult.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Students not motivated to continue.</td>
</tr>
<tr>
<td>TRENDS</td>
<td></td>
<td>The preview had the following weaknesses:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- too long and too much information</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- vocabulary too difficult;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- not highly motivational, and too</td>
</tr>
<tr>
<td></td>
<td>1. According to teachers, the booklet provided necessary information which could be referred to again, and was given a medium rating in both stimulation of student interest and technical quality.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. The slide tape was given similar stimulation and quality ratings. Note, the music was considered to be good.</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Recommendations</td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Add color to the booklet and change the vocabulary.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Provide a question sheet to give students some ideas to look for in the slide tape.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Make the preview more dramatic so it is more important.</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Emphasize what is going to happen at beginning; summarize at end.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Introduce the simulation situation sooner and more dramatically (perhaps stop-action tape technique) and get the students into the action sooner.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Shorten it.</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Improve the motivational qualities by using color in booklets, introducing the simulation situation sooner, making the preview slide tape a more active experience for the students, and shortening the preview.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Provide a method e.g., question sheets, revised organization, etc., by which students can better sort and understand the content of the preview, and perhaps the goals of not only the preview presentation but also the simulation itself.</td>
<td></td>
</tr>
<tr>
<td>DATA SOURCE</td>
<td>STRENGTHS</td>
<td>WEAKNESSES</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------</td>
<td>------------</td>
</tr>
<tr>
<td>STUDENT TESTS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STUDENT QUESTIONNAIRES</td>
<td>There was strong positive response (67%) to the role selection.</td>
<td>1. The booklets were rated medium vocabulary was too hard and the students didn't read, but flipped 2. There were problems with the scoring 3. The Job Preference Form was confusing, and students didn't read or fill it out correctly 4. There was difficulty in two classes</td>
</tr>
<tr>
<td>TEACHER LOGS</td>
<td>The Preparation was well integrated with the Preview.</td>
<td>1. Vocabulary too difficult 2. Directions unclear, role-choosing was not intended 3. No provision for choice of Jr.</td>
</tr>
<tr>
<td>TEACHER PANELS</td>
<td></td>
<td>1. Vocabulary too difficult 2. Directions unclear, role-choosing was not intended 3. No provision for choice of Jr.</td>
</tr>
<tr>
<td>TRENDS</td>
<td>Student response was strongly positive to the role selection process. The preparation phase was well integrated with the preview.</td>
<td>All weaknesses cited above relate to the preparation materials. These included unclear directions, etc. Due to these, the role choosing process was not integrated.</td>
</tr>
</tbody>
</table>
1. Number each sheet in booklet.
2. Number the steps rather than writing in paragraphs in booklet.
3. Provide circles at bottom of Job Interest Form and label the occupations on the form for scoring.
4. Encourage students to go through whole process by giving them only one part at a time.
5. Provide instructions for where to go next.

1. Lower the reading level.
2. Provide specific directions on role choosing including how to trade roles.
3. Emphasize that the architect is a leadership role in the simulation.
4. Label all pieces and list contents on all envelopes.

Teacher recommendations seemed to focus on the technical problems of student implementation of the role selection process. There simply are too many separate pieces for students to work with without much clearer labelling and directions. (See above recommendations for specific suggestions).
### DATA SOURCE

<table>
<thead>
<tr>
<th>STUDENT TESTS</th>
<th>STUDENT QUESTIONNAIRES</th>
<th>TEACHER LOGS</th>
<th>TEACHER PANELS</th>
<th>TRENDS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>One teacher commented that all of the tasks were well integrated.</td>
<td>Talking pages good. Students enjoyed it very much.</td>
<td>In general, teachers felt that students enjoyed this first major activity of the simulation. A series of minor problems were identified as indicated in the next column.</td>
</tr>
</tbody>
</table>

### STRENGTHS

|               |                         | One teacher commented that all of the tasks were well integrated. | Talking pages good. Students enjoyed it very much. | In general, teachers felt that students enjoyed this first major activity of the simulation. A series of minor problems were identified as indicated in the next column. |

### WEAKENESSES

| 1. Three of the four teachers felt long enough. | 2. The tasks were not appropriate to the students, who were not familiar to become involved. | 3. Insufficient information was given. | 4. There was not enough for the students to become involved. | 5. There were some resource materials slow with talking pages and get. | 6. The teacher had to organize the slowing down. | 7. The students had trouble understanding the problems but after they understood, they... |

| 1. Preparation didn't lead into the tasks. | 2. One group skipped one portion; organization and/or directions for activities. | 3. Directions misunderstood. | 4. Papers weren't labelled. | 5. Architect's payment is a loose end. | 1. Insufficient information is given organization and/or directions for activities. | 2. Problems with vocabulary as not appearing here and may have prevented involvement to the degree that the students could understand. | 3. Insufficient time was allotted. | 4. The Preparation phase and Task... |

---

**Construction - Tasks 1A and 1B:**

**Com**
RECOMMENDATIONS FOR REVISION

1. Give more guidance on how to conduct meeting.
2. Don't name architects as Jr. & Sr. in the beginning, because the work turns out like that anyway.
3. Perhaps the teacher could guide them more in their choices.
4. The sites should be numbered and maps of the sites kept in a safe place.

1. Provide directions for paying architect.
2. Label each piece and have students put their names on the maps.
3. Provide clear and unambiguous directions about the object of the task and how to reach it.
4. Let students know that they will reuse aerial photos in Task 6.

1. Provide clear directions about the object of the activity and how to reach it. Make certain that all pertinent materials are properly labelled.
2. Allot more time for Task 1.
3. Consider expanding the teacher's role in guiding or assisting the students to make site choices, etc. within Task 1.
4. Re-examine the integration of the Preparation Phase and Task 1A.
5. Consider lowering the vocabulary level used in this task.
### Construction - Tasks 2A and 2B: Identif...

<table>
<thead>
<tr>
<th>DATA SOURCE</th>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STUDENT TESTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>STUDENT QUESTIONNAIRES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TEACHER LOGS</strong></td>
<td>1. These tasks were more appropriate to the students' maturational level; they understood what to do and did it. 2. Resource materials were available. 3. The students especially liked doing 2B and did a good job.</td>
<td>1. Three of the four teachers felt it not long enough. 2. There were some failures to keep...</td>
</tr>
<tr>
<td><strong>TEACHER PANELS</strong></td>
<td>1. Was nice and specific 2. Students found it fun.</td>
<td>If the right scale graph paper isn't...</td>
</tr>
<tr>
<td><strong>TRENDS</strong></td>
<td>Teachers expressed strongly positive opinions about this activity and about student interest in the activity. Also compared to previous parts of the module Task 2 was much more easily implemented.</td>
<td>1. Insufficient time was allotted 2. There was a technical problem or...</td>
</tr>
<tr>
<td>RECOMMENDATIONS FOR REVISION</td>
<td></td>
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</table>

1. Check the scale of the templates.
2. If it is necessary to have more than one student per role and many groups of students calculating costs, developing site specifications, etc., then it would be helpful to have them work on the same sites.

3. Check the scale and instructions for the graph paper.

4. Allot more time for Task 2.
5. Correct the scale problem indicated in the weakness column.
<table>
<thead>
<tr>
<th>DATA SOURCE</th>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>STUDENT TESTS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STUDENT QUESTIONNAIRES</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| TEACHER LOGS | 1. The teachers felt that, although it took a while to get it together, the task was appropriate for the students and demanded just enough detail.  
2. The students understood the task and could implement it.  
3. The task was well integrated with the others. | All four teachers felt the recommendations to complete the task. |
| TEACHER PANELS | 1. Slide tape good and the point came across well.  
2. Was fun for the students.  
3. Demanded detail. |            |
| TRENDS | Clearly the task went well. It was appropriate for students, they understood it, it flowed well from previous tasks, and they enjoyed it. | Insufficient time for task completion. |
Task 3A: Writing Specs

RECOMMENDATIONS FOR REVISION

Time was not long enough

Allow more time; one day for preparing specs from the meeting after ideas are gathered.

Allot more time inasmuch as it seems to take students time to discuss their ideas before generating specifications.
### DATA SOURCE

#### STUDENT TESTS

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

#### STUDENT QUESTIONNAIRES

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
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</thead>
<tbody>
<tr>
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</tbody>
</table>

#### TEACHER LOGS

1. Two teachers found the task appropriate for the students' level and that the students could understand and implement the task.
2. The task was well integrated with the others.

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
</tbody>
</table>

1. All four teachers felt the recognition enough to complete the task.
2. One group had a little trouble.
3. Two groups kept losing material.
4. One teacher commented that the students kept up projects with her report.

#### TEACHER PANELS

- Students beginning to feel comfortable with vocabulary.

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

#### TRENDS

1. According to teacher comments the task went well, was integrated with previous tasks, and was understood and easily implemented by students.
2. Vocabulary difficulties began to ease at this point.

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
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</thead>
<tbody>
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<td></td>
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</tbody>
</table>

1. Insufficient time was allotted.
2. There were other minor difficulties, someone slowing down a group, etc.
Evaluating Sites

RECOMMENDATIONS FOR REVISION

1. Allot more time for the task.
2. Given the weaknesses described in the second column, some attention might be paid to improving the directions for implementing the task.
3. Make it clear that students will only be working with the four sites.
4. Since vocabulary difficulties are easing at this point, the reviser may well give some thought to retaining the challenge of new words in the simulation.
### DATA SOURCE STRENGTHS

<table>
<thead>
<tr>
<th>STUDENT TESTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>STUDENT QUESTIONNAIRES</td>
<td></td>
</tr>
</tbody>
</table>

### TEACHER LOGS

<table>
<thead>
<tr>
<th>Task 4A</th>
<th>Task 4B</th>
</tr>
</thead>
<tbody>
<tr>
<td>The task was appropriate for the students' level, they understood it, and seemed to enjoy it.</td>
<td>The task was on the students' level.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Task 4A</th>
<th>Task 4B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most students understood what they were to do.</td>
<td>Students enjoyed it.</td>
</tr>
</tbody>
</table>

### TEACHER PANELS

<table>
<thead>
<tr>
<th>Task 4A</th>
<th>Task 4B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some students thought they were to do it.</td>
<td>Instructions for activity on pg. 2 should do it.</td>
</tr>
</tbody>
</table>

### TRENDS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The two tasks were understood and enjoyed by students.</td>
<td></td>
</tr>
</tbody>
</table>

1. Insufficient time was allotted to complete the task.
2. There was confusion about the goal of the facility to include. (This may arise earlier in the module.) Does the new highway destroy the associated classrooms or does it go with small support buildings, such as is simply not clear.)
3. Technical problems as indicated.
4. Instructions on bottom of pg. 2 is apparent that draftsman and alone on two different sites.
**Task 4A**

Clarify what the facility is to include.

**Task 4B**

Label activities and indicate who shall do it, the purpose of the activity, and the intended product.

---

1. Allot more time.
2. Clarify what the facility is to include. (Task 4A).
3. Clarify instructions on bottom of pg. 2, as indicated in weaknesses column.

---

The recommended time was not per.

Graph paper -- scale used, sign an entire Phys. Ed. handbook don't indicate who for the task.  

All of task 4A and about what evaluator's note: the confusion in the actual problem situation. school's gymnasium and its cut through outdoor facilities check areas, etc.? This point above.  

Could be clarified so that it prior architect are working
Construction - Task 5: S

### DATA SOURCE STRENGTHS

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
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<td></td>
<td></td>
</tr>
<tr>
<td>STUDENT QUESTIONNAIRES</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| TEACHER LOGS | 1. Three of the teachers felt that the students could finish the task in the recommended time.  
2. The task was OK in terms of student level, integration, and resource materials. | Student implementation of task. |
| TEACHER PANELS |           | 1. Perhaps it was too quick.  
2. Agenda not specific enough. |
<p>| TRENDS | In general, Task 5 proceeded smoothly with very few problems observed by teachers. | The problem that was observed seemed specific meeting agenda which, in turn, students implemented the module. |</p>
<table>
<thead>
<tr>
<th>Recommendations for Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Delete parts of meeting.</strong></td>
</tr>
<tr>
<td>Make agenda more specific.</td>
</tr>
</tbody>
</table>

Recommendations are focused on the need to make the meeting agenda more specific.
### DATA SOURCE

<table>
<thead>
<tr>
<th>STUDENT</th>
<th>TESTS</th>
<th>STUDENT</th>
<th>QUESTIONNAIRES</th>
</tr>
</thead>
</table>

### STRENGTHS

<table>
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<th>TESTS</th>
<th>STUDENT</th>
<th>QUESTIONNAIRES</th>
</tr>
</thead>
</table>

1. Got new interest into project
2. Cut-away drawing good for learning perspective

### WEAKNESSES

<table>
<thead>
<tr>
<th>STUDENT</th>
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<th>QUESTIONNAIRES</th>
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</thead>
</table>

1. Three of the four teachers felt to be effective.
2. Much redrawing necessary; seemed
3. Difficulty in finding material

<table>
<thead>
<tr>
<th>TEACHER</th>
<th>logs</th>
<th>students</th>
<th>&quot;loved it&quot;.</th>
</tr>
</thead>
</table>

1. (6C) Some trouble with dimension
2. (6D) Too much drawing on top of
3. (6E) Video tape inconvenient, 
4. (6E) Couldn't find all of the trouble relocating aerial

<table>
<thead>
<tr>
<th>TEACHER</th>
<th>PANELS</th>
<th>students</th>
<th>&quot;loved it&quot;.</th>
</tr>
</thead>
</table>

1. (6C) Some trouble with dimension
2. (6D) Too much drawing on top of
3. (6E) Video tape inconvenient, 
4. (6E) Couldn't find all of the trouble relocating aerial

### TRENDS

<table>
<thead>
<tr>
<th>TRENDS</th>
<th>the task went extremely well and apparently</th>
<th>&quot;turned on&quot; students and renewed their interest in the simulation.</th>
</tr>
</thead>
</table>

1. (6C) Some trouble with dimension
2. (6D) Too much drawing on top of
3. (6E) Video tape inconvenient, 
4. (6E) Couldn't find all of the trouble relocating aerial

Primarily, there were the weaknesses as cited above. In addition, there seemingly unnecessary redrawing of expensive and mediocre video tape.
RECOMMENDATIONS FOR REVISION

1. (6C) Simplify and explain scale used.

2. (6D) Allow students to trace or use an earlier drawing.

3. (6E) Cue the video tape if used, but might substitute a slide tape.

4. (6E) Let students know earlier that aerial photos will be needed here.

Making Final Plans

Technical nature have been some signs and possibly an

and scale. Earlier drawing assignments sensitive, and not well cued. Materials called for and had photos.

1. The teachers recommended a review of the drawings with a view toward reducing redrawing where tracing or use of an earlier drawing would suffice. The problem would also be alleviated by the use of a simple and well explained scale.

2. An excellent slide tape might be substituted for the video tape, the quality of which did not seem to warrant the expense and inconvenience.

3. Cue the students earlier (See Task 1B) that the aerial photos will be needed here.
<table>
<thead>
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<tr>
<td>STUDENT QUESTIONNAIRES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEACHER LOGS</td>
<td>Few comments, seemed fair to OK.</td>
<td></td>
</tr>
</tbody>
</table>
| TEACHER PANELS |          | 1. Anticlimactic and short  
2. Only one of two models used  
3. No real audience |
| TRENDS | Teacher comments indicating that the task was fair to OK would tend to suggest the need for modification. | Anticlimactic, short and really no were made. |
2. Use both plot model and facility model.
3. Invite someone to the unveiling.

Given the enthusiasm for Task 6, the lack of enthusiasm here is quite apparent. Strongly consider rethinking this task, combining this task with Task 6, making provisions for an audience, etc. Clearly some revision is indicated.
<table>
<thead>
<tr>
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<td></td>
</tr>
<tr>
<td>STUDENT QUESTIONNAIRES</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| TEACHER LOGS      | 1. Three of the four teachers found the summary very effective as a culmination to the simulation.  
2. The summary was well integrated with the preceding tasks. | 1. There was not enough time to discuss important.  
2. Task II contained vague phrases, "levels of decisions".  
3. Task II was unnecessary because students should already be aware of others' roles.  
4. The summary was rated "somewhat helpful" in helping students learn about others' roles in the world of work.  
5. The comparison wasn't there for Form A. |
| TEACHER PANELS    | Task 1 was seen as the strong point of the summary.                        | Teachers felt that Task 2 was not worth the time on since the students had no basis to build on their experiences. |
| TRENDS            | The teachers agreed that the summary was an effective concluding device and was well integrated with the preceding tasks. Note, however, that students seemed to be more mixed in their reception of the summary. | 1. Only 31% of the students responded to the summary as a device that helped to "pull together" the simulation.  
2. Insufficient time was allotted for Task II, it was deemed unnecessary and contained many words that were unfamiliar to students at that point.  
3. The Job Interest Form completed by students was felt to be vital to the success of part of the simulation and students who had not completed it earlier may have felt disadvantaged. |
as Task I which was
g., "working conditions",
dents circulated enough
tive" in helping
ents who had not completed
in spending a great deal of
ons which to compare
positively to the summary
ings together".
Task I and Task II was
he phrases or phrases that
a level.
the preparation phase is
summary. Students who
ave had difficulty

1. Allot more time for Task I.

2. Consider dropping Task II and having a group discussion rather than a formal presentation.

Consider dropping Task 2 and substituting a group discussion.
<table>
<thead>
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</tr>
<tr>
<td>STUDENT QUESTIONNAIRES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEACHER LOGS</td>
<td>1. One teacher rated all of the packets high in terms of providing information needed by students.</td>
<td>1. One teacher (two groups) rated low, commenting that it was uneasy for most of the students. 2. Too many packets.</td>
</tr>
<tr>
<td><em>The only specific provision for collecting information about the skill packets was...</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEACHER PANELS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRENDS</td>
<td>One teacher rated the packets high in terms of providing information, although that opinion was not shared by another teacher.</td>
<td>1. One teacher felt they were unneeded. 2. Too many packets.</td>
</tr>
</tbody>
</table>
RECOMMENDATIONS FOR REVISION

1. All skill packets should have the numbers and everything that is in the packet written on the packet.
2. Put into book form or compress in some way.
3. Packet #6 should tell teacher when to use video tape.

in the Teacher Logs.

ecessary and too easy.

ecessary and too easy.

1. Improve labelling of packets.
2. Consider combining all packets into one booklet.
APPENDIX A:

KNOWLEDGE TEST - "WHAT DO YOU KNOW?"
Planning
Construction
Projects

"What Do You Know?"
The project presented/reported herein was performed pursuant to a grant from the National Institute of Education, Department of Health, Education, and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the National Institute of Education, and no official endorsement by the National Institute of Education should be inferred.

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Copyright for these materials is claimed only during the period of development, test, and evaluation, unless authorization is granted by the National Institute of Education to claim copyright also on the final materials. For information on the status of the copyright claim, contact either the copyright proprietor or the National Institute of Education.
"WHAT DO YOU KNOW?"

The purpose of this test is to help us find out what you and other students like you know about the planning of construction projects. This test does not in any way affect your grade.

DIRECTIONS: To complete the test first fill in the information requested at the top of the next page. For most questions on the test there are several short phrases or statements listed. Pick the one that best describes your answer and circle the letter in front of it. For several questions special directions will be included with the questions. Please follow those directions.

If you don't know the answer to a question, GUESS. When you have completed the test return it to your teacher.

Thanks for your help.

You may turn the page and start as soon as you have completed reading the directions.
The final plans for the construction of a project are generally the result of the effort of:

a. The architect
b. The draftsman
c. The civil engineer
d. All of the above

Fees for architectural services are usually determined by:

a. Negotiations between the client and the architect
b. Standard fees from tables
c. The size of the construction project
d. The number of people required to develop construction plans
e. All of the above

Which of the following best describes work in planning construction projects?

a. Usually is done outdoors
b. Usually is somewhat hazardous
c. Usually is done indoors
d. Usually involves the use of power machinery

The result of planning a construction project may often include which of the following things?

a. Specification of buildings
b. Scale models of buildings
c. Layout of building sites
d. All of the above
5. What is the most important thing to know when you plan a construction project?
   a. The eventual use which will be made of the construction project
   b. The nature of the land on which the project will be constructed
   c. The type of material to be used
   d. The type of foundation to be used

6. Which of the following tasks does an architectural firm that is hired to plan a construction project do?
   a. Prepare drawings
   b. Hire a contractor
   c. Hire carpenters and plumbers
   d. Order building supplies

7. The national headquarters of a large insurance company is located in your city. The company has made a decision to double the size of their present office building. Who would they contact in a typical architectural firm about getting plans developed for the addition to the building?
   a. The principal architect
   b. The draftsman
   c. The artist
   d. The civil engineer

8. In regard to working in the planning of construction projects, what of the following is not important?
   a. Comfortable temperature
   b. Pleasant surroundings
   c. Good lighting
   d. Safety glasses

9. In which way do architects usually bid on construction planning?
   a. By submitting pictures of their past work
   b. By sketching examples of their ideas for the construction project
   c. By building models of their plans
   d. All of the above

10. For planning a construction project which of the following groups of tools would be the most useful?
    a. Hammers, saws, squares
    b. Drawing boards, scales and triangles
    c. Electronic gauges and meters
    d. Electric drills and sanders
11. Planning construction projects requires the skills of many different people. For each of the people named below two skills are listed. Pick the skill that you think is most important to his/her work and place the number of that skill on the line next to the person named.

<table>
<thead>
<tr>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Architect of Firm</td>
</tr>
<tr>
<td>Civil Engineer</td>
</tr>
<tr>
<td>Draftsman</td>
</tr>
</tbody>
</table>

12. Mrs. Smith wants to build a swimming pool in her back yard and has hired an architect to help plan it. Which of the following questions should the architect consider in planning the pool? (Check those questions that you think the architect should consider.)

- Where are the water pipes for the house?
- Do the Smiths swim well?
- Is the electrical wiring for the house above or below ground?
- Where are the trees and other shrubbery?
- What are the local laws about swimming pools?
- What is the amount of traffic on the street in front of the house?
- What is the average number of people likely to use the pool?
- How much chlorine is necessary to purify the water?
- How many pets do the Smiths have?
- How many swimming pools are there in the city?

13. Which one of the following activities is part of planning construction projects?

a. Hiring carpenters
b. Painting buildings
c. Purchasing building materials
d. None of the above
14. In each of the following problems there are two phrases describing different activities that people do in their jobs or things they need to know for their jobs. Read each pair of phrases carefully and decide which is more important for jobs involved in planning construction projects. Then mark an answer as follows:

Mark A if the activity described in Column A is more important
Mark B if the activity described in Column B is more important
Mark C if both are equally important

Examples:

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thinking about buildings</td>
<td>Thinking about baseball</td>
</tr>
<tr>
<td>Using a hammer</td>
<td>Using a ruler</td>
</tr>
</tbody>
</table>

1. A B C
   Lifting heavy objects
   Knowing strength materials

2. A B C
   Using chemicals
   Using measuring instruments

3. A B C
   Knowledge of arithmetic
   Knowledge of wood

4. A B C
   Using tools
   Using knowledge

5. A B C
   Using symbols
   Using tools

6. A B C
   Accuracy
   Speed

7. A B C
   Creating
   Describing

8. A B C
   Using materials
   Understanding materials

9. A B C
   Using a triangle
   Using a ruler

10. A B C
    Meeting deadlines
    Being under stress

11. A B C
    Working for yourself
    Working for a group

12. A B C
    Planning carefully
    Getting organized

6. An architectural firm in your city recently has been contracted to plan for the remodeling of the Easy-Vue Shopping Center. Who in the firm is most likely to be responsible for developing the initial sketches of the remodeling?

a. Landscape artist
b. Draftsman
c. Architect
d. Merchants from the shopping center
16. The evaluation of final construction plans is generally done by:
   a. An architectural company
   b. The people who need the buildings
   c. Both of the above
   d. None of the above

17. Which of the following people work the most with the strength and weight of special building materials?
   a. An architect
   b. A draftsman
   c. An electrical engineer
   d. A civil engineer

18. Which of the following steps comes first in the planning of a construction project?
   a. Organizing to build
   b. Studying the needs of the client
   c. Preparing a site plan
   d. Preparing working drawings

19. What statement best describes the group of people who work in "Planning Construction Projects"?
   a. They seldom work together
   b. They depend upon the work of each other
   c. They should not show their work to each other
   d. They all have passed the architect's examination

20. An architectural firm has won the contract to plan a football stadium for the Superior Blues, a professional football team. Since the stadium will be large (seating 75,000 people) it must be carefully planned. Who would be responsible for calculating how strong the stadium must be to safely seat the 75,000 people?
   a. The team owner
   b. The electrical engineer
   c. The civil engineer
   d. The draftsman

As soon as you have completed this test, please turn it in to your teacher. Thank you.
APPENDIX B:

ATTITUDE SCALE: "WHAT DO YOU LIKE?"
Planning
Construction
Projects

"What Do You Like?"
The project presented/reported herein was performed pursuant to a grant from the National Institute of Education, Department of Health, Education, and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the National Institute of Education, and no official endorsement by the National Institute of Education should be inferred.

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Directions:

This is not a test. The purpose of these questions is to find out what types of jobs in the planning of construction projects that you or other students like you might enjoy doing. We would also like to learn what reasons you have for liking these jobs and how you feel about exploring careers.

There are only eight (8) questions to answer. For the first five questions, place a checkmark (✓) in the column which best describes whether you like, dislike, or are uncertain about the job. If you do not have enough information about the job to answer, check the last column. List your reasons for your choice in the space provided on the right of the page.

The last three questions have space directly beneath them for you to write in your thoughts and ideas.

After you have completed the questions, please return this booklet to your teacher. Thanks for your help.

Please begin the questions as soon as you have finished reading these directions.
<table>
<thead>
<tr>
<th>Question</th>
<th>Yes, I would like this job</th>
<th>I'm uncertain about this job</th>
<th>No, I would not like this job</th>
<th>I do not have enough information about this job to decide</th>
<th>My Reasons for My Choice Are:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you like working in a job similar to that of a draftsman?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Would you like working in a job similar to that of a civil engineer?</td>
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<tr>
<td>Would you like working in a job similar to that of a landscape artist?</td>
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</tr>
<tr>
<td>Would you like working in a job similar to that of an architect?</td>
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<td></td>
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<tr>
<td>Would you like working in a job similar to that of an interior decorator or designer?</td>
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<td></td>
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</tr>
</tbody>
</table>
6. What kinds of experiences or activities do you think people should have before they select a job in the world of work? Briefly describe or list your ideas below.

7. Have you ever thought about how you would go about selecting a job? What are the most important things that you feel people should consider before they select or decide upon a job in the world of work? Briefly describe or list your ideas below.

8. Pretend that you have interviewed for several different jobs in the last few days. Yesterday two employers called you and each offered you a job in their organization. Both employers want you to decide within two days whether or not you are going to accept their offer. Briefly describe below how you would arrive at your decision.

Please return this booklet to your teacher. Thank you.
APPENDIX C:

STUDENT QUESTIONNAIRE: "WHAT DO YOU THINK?"
The project presented/reported herein was performed pursuant to a grant from the National Institute of Education, Department of Health, Education, and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the National Institute of Education, and no official endorsement by the National Institute of Education should be inferred.

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PLANNING CONSTRUCTION PROJECTS

"WHAT DO YOU THINK?"

Now that you have completed this simulation, the people who developed it would like to find out what you think about your experience. Your ideas will help to make the simulation better. Remember, THIS IS NOT A TEST and your answers will not be graded. So feel free to check and to say what you think about this simulation.

DIRECTIONS: To complete the questionnaire, first fill in the information requested at the top of the next page. Then there is a list of statements which describe a feeling or an idea about the simulation just completed. Answer each statement by circling the symbol which best matches your actual feeling:

(+): means the statement agrees with your feeling

(?) means you’re not sure how you feel about the thing mentioned in the statement

(-): means the statement does not agree with your feeling

For several other questions, special directions will be included with the questions. Follow those directions.

When you have completed the questions, please return this booklet to your teacher.

Thanks for your help.

You may turn the page and start as soon as you have completed reading the directions.
PLANNING CONSTRUCTION PROJECTS

"WHAT DO YOU THINK"?

FILL IN THE FOLLOWING INFORMATION:

Name ___________________________ Date _______________________

School ___________________________ City _______________________

Age ______________________________

Grade (circle one) 8th 9th other (please specify) ____________

Sex (circle one) Male Female

Subject taught in this class __________________________________

Teacher's name ____________________________________________

START THE QUESTIONS

Answer each statement by circling the symbol which best matches your actual feeling:

(+) means the statement agrees with your feeling

(?) means you're not sure how you feel about the thing mentioned in the statement

(-) means the statement does not agree with your feeling

Circle one for each statement

1. I learned quite a bit about jobs from the simulation. + ? -

2. I learned quite a bit about how to work with other people from the simulation. + ? -

3. To me the simulation was boring. + ? -

4. I would recommend the simulation to my friends + ? -
| 5. | I would like to go through more simulations like this one. | + | ? | - |
| 6. | I would have rather done something else during the time I worked with the simulation. | + | ? | - |
| 7. | The simulation helped to answer some of the questions I have about jobs. | + | ? | - |
| 8. | The simulation took too long. | + | ? | - |
| 9. | The simulation was over too soon for me. | + | ? | - |
| 10. | Some of the tasks were too complicated or too hard for me to do. | + | ? | - |
| 11. | The summary helped me to "pull things together." | + | ? | - |
| 12. | I enjoyed working with other students during the simulation. | + | ? | - |
| 13. | The activities that I did in the simulation were exciting to me. | + | ? | - |
| 14. | I often had trouble knowing what to do next in the simulation. | + | ? | - |
| 15. | This simulation was a good way of getting out of class. | + | ? | - |
| 16. | There were too many tests and forms to fill out with this simulation. | + | ? | - |
| 17. | The pretest and posttest were difficult for me. | + | ? | - |
| 18. | The simulation preview, activities, and summary fit together well. | + | ? | - |
| 19. | The preview and the other activities at the beginning helped to prepare me for the simulation. | + | ? | - |
| 20. | I liked the way I selected my role(s) in the simulation. | + | ? | - |
For the next questions, either write in your answers or check (✓) the appropriate answers as indicated in the question.

21. What was your role (or roles) in the simulation "Planning Construction Projects"? (Check all that apply.)

- Principal architect
- Junior architect
- Civil engineer
- Draftsman
- Superintendent of schools
- Community representative
- Board of education representative

22. Do you think that you performed well in this role (or roles)?

- Yes, all of the time
- Yes, most of the time
- No, not usually
- No, not at all

23. List a few reasons why you liked or did not like your role (or roles).

24. Would you choose this role (or roles) if you were going to be in the simulation again?

- Yes
- Not sure
- No

25. Describe the one thing which you feel you did best in the simulation and the one thing you did least well. Be sure to say why you did well or poorly.

<table>
<thead>
<tr>
<th>Best Thing</th>
<th>Reasons</th>
<th>Worst Thing</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
26. What other roles in the simulation did you find interesting? (Check all that apply.)

____ Principal architect
____ Junior architect
____ Civil engineer
____ Draftsman
____ Superintendent of schools
____ Community representative
____ Board of education representative

27. Why do you find this role (or roles) interesting? If you do not find any other roles interesting, can you say why?

28. Compared to your feelings about the work involved in planning construction projects before this simulation, how do you feel now? Why?

____ I am more interested now
____ I am less interested now
____ I do not feel any different now

29. Did you discover any new interests by participating in this simulation?

____ Yes, I am now interested in __________________________
____ No

30. Name some of the things you liked most about the simulation and some of the things you liked least about the simulation.

<table>
<thead>
<tr>
<th>Liked Most</th>
<th>Liked Least</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
31. Write down some of your ideas on how the simulation might be made better.

As soon as you have completed these questions, turn in this booklet to your teacher.

Thank you.
APPENDIX D:

TEACHER LOG AND

GENERAL MODULE EVALUATION
GENERAL INSTRUCTIONS

This instrument package is designed to obtain your reactions related to the simulation module which you are pilot testing as part of the Occupational Exploration Program. Your close association with the module places you in a unique position to evaluate overall quality, to note problems and to offer suggestions for further development and/or refinement. Hence, your candid appraisal of the module is sought by its developers. Your feedback will give direction to the revision process, which will be the next step in developing the module.

The package consists of several parts arranged in the order in which they should be used. These parts are described briefly below:

<table>
<thead>
<tr>
<th>PART</th>
<th>WHEN TO COMPLETE</th>
<th>Estimated Time Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction to Simulation</td>
<td>Upon completion of the Introduction</td>
<td>5-10 minutes</td>
</tr>
<tr>
<td>II. Module Preview</td>
<td>Upon completion of Preview</td>
<td>5 minutes</td>
</tr>
<tr>
<td>III. Preparation Phase</td>
<td>Upon completion of the Phase</td>
<td>5-10 minutes</td>
</tr>
<tr>
<td>IV. Anticipation Phase (task evaluation)</td>
<td>As students complete each task</td>
<td>5-10 minutes per task</td>
</tr>
<tr>
<td>V. Summary Phase</td>
<td>Upon completion of the Phase</td>
<td>3-5 minutes</td>
</tr>
</tbody>
</table>
Part 1: INTRODUCTION TO SIMULATION

SIMULATION - AN EXCITING WAY TO LEARN
Part 1: INTRODUCTION TO SIMULATION

SIMULATION - AN EXCITING WAY TO LEARN

Complete this part after your students have seen the slide presentation introducing the idea of simulation, have read the booklet which covers the same ideas or have used both the slides and booklet together. This part consists of several brief questions about the introduction to simulation. To respond, circle the letter of the phrase that best describes your answer. Several questions will require that you supply a short answer. Space has also been provided for you to write in any comments you have. You are encouraged to do so.

Thanks for your help.

1. How many total students in your class were introduced to the concept of simulation by one or both of the means described above?
   ________ students

2. How many students used: (count each student only once)
   ________ The booklet only
   ________ The slides only
   ________ The slides first and then the booklet
   ________ The booklet first and then the slides
   ________ Other, please specify ____________________________

3. Were the students able to understand concepts presented in the material:
   a. Yes, most of the time  Comments ________________________________
   b. Somewhat
   c. No, not much of the time

4. Was the vocabulary consistent with the maturational level of the students?
   a. Yes, most of it  Comments ________________________________
   b. Some of it
   c. No, not much of it

5. How would you rate the quality of the illustrations used on the slides and booklet? (Answer both parts of the question.)

   Slides  Booklet  Comments
   a. Very Good  a. Very Good
   b. Good  b. Good
   c. Average  c. Average
   d. Poor  d. Poor
   e. Very Poor  e. Very Poor
6. Overall, how would you rate the technical quality (appearance, ease of use, etc.) of the slides and booklet? (Answer both parts of the question.)

<table>
<thead>
<tr>
<th>Slides</th>
<th>Booklet</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Very Good</td>
<td>a. Very Good</td>
<td></td>
</tr>
<tr>
<td>b. Good</td>
<td>b. Good</td>
<td></td>
</tr>
<tr>
<td>c. Average</td>
<td>c. Average</td>
<td></td>
</tr>
<tr>
<td>d. Poor</td>
<td>d. Poor</td>
<td></td>
</tr>
<tr>
<td>e. Very Poor</td>
<td>e. Very Poor</td>
<td></td>
</tr>
</tbody>
</table>

7. Overall, do you feel that this introduction was stimulating to students?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Yes, very much</td>
<td></td>
</tr>
<tr>
<td>b. Somewhat</td>
<td></td>
</tr>
<tr>
<td>c. No, not much</td>
<td></td>
</tr>
</tbody>
</table>

8. In what order would you recommend the use of the slides and the booklet? (Choose only one.)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Use both in any order</td>
<td></td>
</tr>
<tr>
<td>b. Use both with the booklet first</td>
<td></td>
</tr>
<tr>
<td>c. Use both with the slides first</td>
<td></td>
</tr>
<tr>
<td>d. Use the booklet only</td>
<td></td>
</tr>
<tr>
<td>e. Use the slides only</td>
<td></td>
</tr>
<tr>
<td>f. None of the above</td>
<td></td>
</tr>
</tbody>
</table>

9. Would you recommend the use of the slides and/or the booklet to other teacher(s)? (Answer both parts of the question.)

<table>
<thead>
<tr>
<th>Slides</th>
<th>Booklet</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Yes, with minor modification</td>
<td>a. Yes, with minor modification</td>
<td></td>
</tr>
<tr>
<td>b. No, I would not recommend it</td>
<td>b. No, I would not recommend it</td>
<td></td>
</tr>
</tbody>
</table>

Please write in any other comments/suggestions you might have in the space below. (If extra space is required, use the back of this page.)
Part II: MODULE PREVIEW
### Module Preview

Complete this part when your students finish the "Preview" section of the module. Please rate each form used by your students by checking (√) the appropriate box in each applicable cell. You are encouraged to place comments and/or descriptions of any problems you encountered in the large spaces provided in each box. (Note: Answer only for the forms of the preview that your students used and count students only one time each for the second column.)

<table>
<thead>
<tr>
<th>Form of Presentation</th>
<th># of students using this form</th>
<th>Rate the effectiveness of this form in stimulating student interest</th>
<th>Rate the technical quality (ease of use, appearance, etc.) of this form</th>
<th>Rate the quality of this form in providing pertinent information to students making decisions about module participation</th>
<th>Overall, how would you rate the educational quality or worth of this &quot;Preview&quot; form</th>
<th>Write in any other suggestions you have for improving the Module Preview. Also describe what you considered to be the strong points of the preview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illustrated Booklet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Flip-chart, filmstrip, etc.</td>
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<td></td>
<td></td>
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<tr>
<td>Game or similar activity</td>
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</tr>
<tr>
<td>Panel or some other activity in the same form, please specify</td>
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</tr>
</tbody>
</table>
PART III - PREPARATION PHASE
Complete this part after your students have finished the preparation phase of the simulation module. Questions here relate to the materials used to prepare students for participating in the simulation and the actual process of getting students into roles.

To respond, circle the letter of the choice that best describes your answer or how you feel. Some questions will require that you either check (√) an answer or write in a short response. Space has also been provided for you to write any comments or suggestions you might have. You are encouraged to do so.

Thanks for your help.

MATERIALS

1. In the following chart: describe or name the form of material used (e.g., slide tapes, booklets, combination of forms, etc.); specify how many students used the form counting each student only once; rate the technical quality of the form; and rate its overall educational quality or worth.

   Ratings are indicated by placing a check (√) in the appropriate box in the applicable cell. You are encouraged to place comments and/or descriptions of problems you encountered in the large space provided in each box.

<table>
<thead>
<tr>
<th>Name of Form</th>
<th>No. of Students</th>
<th>Rate the Technical Quality (appearance, ease of use, etc.) of the Form</th>
<th>Rate the Overall Educational Quality of the Form</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>Medium</td>
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</tr>
</tbody>
</table>

2. Were the students able to understand the concepts presented in the materials?

   a. Yes, most of the time
   b. Somewhat
   c. No, not much of the time

   Comments
3. Was the vocabulary consistent with the maturational level of the student?
   a. Yes, most of it
   b. Some of it
   c. No, not much of it

4. To what extent was the preparation phase integrated with (i.e., how well did it fit together with) the Module Preview?
   a. Very well, integrated
   b. Well integrated
   c. Somewhat integrated
   d. Poorly integrated
   e. Very poorly integrated

ROLE SELECTION PROCESS

5. Did the initial role descriptions provide students with enough information for selecting roles?
   a. Yes, the information was adequate
   b. Somewhat
   c. No, the information was inadequate

6. If schematic devices (e.g., schedule cards were available to help select roles, did students understand how to use them?
   a. Yes, with little or no help
   b. Yes, with some help
   c. Yes, with a great deal of help
   d. No
   e. Not applicable

7. Were the students able to independently select themselves into roles?
   a. Yes, with little difficulty
   b. Yes, with some difficulty
   c. No, some teacher assistance was necessary
   d. Extensive teacher assistance or direction was necessary

If you had to help the students select roles, please describe the nature of that assistance (e.g., asked students to draw lot; when several wanted the same role; explained use of schematic device; etc.) in the space below.
9. Overall, was the role selection process described in the module an effective way of getting students into roles?
   
   a. Yes, it was effective
   b. Somewhat effective
   c. No, it was ineffective

10. Can you suggest other ways in which this process could occur?
   
   a. Yes, I would suggest __________________________

   b. No, the process was effective

Please write in any other comments/suggestions you might have in the space below.
PART IV - PARTICIPATION PHASE

TASK EVALUATION

SKILLS PACKET
# PART IV - TASK EVALUATION

This part should be completed on a task by task basis as your students finish each task during the participation phase of the simulation module. Please write in the number of each task and answer the questions listed at the top of each column. **IN THE "PROBLEM AREA" SECTION, PLACE A CHECK (✓) IN THE APPROPRIATE CELLS WHENEVER PROBLEMS OCCUR FOR A PARTICULAR TASK.** Please write any comments, problem descriptions, and/or suggestions you have in the spaces provided.

A sample of a task evaluation is provided to help you complete this form.

<table>
<thead>
<tr>
<th>Task Number</th>
<th>Class Time spent on task in minutes</th>
<th>Teacher time spent working directly with students in minutes</th>
<th>Is recommended time appropriate for completing task?</th>
<th>Did you modify, delete, or change the position of this task in the simulation? (Specify change)</th>
<th>MAJOR PROBLEM AREAS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAMPLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>150</td>
<td>35</td>
<td>TAKES TWICE AS LONG AS ESTIMATED TIME</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>THIS TASK REALLY FOLLOWED UP ON IDEAS FROM PREVIOUS DUE</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>DIRECTIONS WERE UNCLAR ESPECIALLY FOR ROLE DESCRIPTIONS</td>
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</tbody>
</table>
### Task Evaluation

<table>
<thead>
<tr>
<th>Task Number</th>
<th>Time Spent on Task in Minutes</th>
<th>Teacher Time Spent Working Directly with Students in Minutes</th>
<th>Is Recommended Time Appropriate for Completing Task?</th>
<th>Did You Modify, Delete, or Change the Position of This Task? (Specify Change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
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</tr>
<tr>
<td>2</td>
<td></td>
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</tr>
<tr>
<td>3</td>
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<td></td>
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<tr>
<td>4</td>
<td></td>
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</tr>
</tbody>
</table>

**MAJOR POOL AREAS**

- Appropriate nose of task to developmental level of students
- Integration of task with previous, current, and/or following tasks
- Resource materials
- Special skills required of teacher and/or instructional techniques for implementing the task
- Student understanding of task and/or task materials
- Student tolerance of task

---

**PART IV - TASK EVALUATION**

---

**141**
### PART IV - TASK EVALUATION

<table>
<thead>
<tr>
<th>Task number</th>
<th>Class time spent on task in minutes</th>
<th>Teacher time spent working directly with students in minutes</th>
<th>Is recommended time appropriate for completing task?</th>
<th>Did you modify, delete, or change the position of this task in the simulation? (Specify change)</th>
<th>MAJOR PROBLEM AREAS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Appropriate-</td>
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**MAJOR PROBLEM AREAS**

- Appropriate-ness of task to maturational level of students
- Integration of task with previous, concurrent, and/or following tasks
- Resource materials
- Special skills required of teacher and/or instructional techniques for implementing the task
- Student understanding of task directions and/or task materials
- Student implementation of task
In some of the Occupational Exploration simulation modules it is likely that students may be asked to occasionally engage in activities with which they have little or no background. This lack of background will not significantly impede the operation of the module but students might feel somewhat more comfortable with the activity if their background could be enhanced. To help in providing that background, skill packets, (e.g., a "drawing skills" packet, metric system skill kit, etc.) have been included with several modules. Fill in the chart below for all skill packets provided with the module being used in your classroom. Write in the name of the skill packet (s), write in the number of students using the packet and then answer all questions listed at the top of each column by placing a check (√) in the appropriate box. Please comment in the space provided with regard to any problems you might have encountered or any suggestions you might have.

<table>
<thead>
<tr>
<th>Name of skill packet</th>
<th># of Students using this packet</th>
<th>Rate this packet in terms of providing information needed by students</th>
<th>Rate the difficulty of packet in terms of maturational level of your students</th>
<th>Other Comments/Suggestions</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>High Med Low Comments</td>
<td>Too hard Just right Too easy Comments</td>
<td>(Indicate: problems with skill packets; revision suggestions; other materials that might be used; etc.)</td>
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PART V: SUMMARY PHASE
PART V: SUMMARY PHASE

Complete this part when your students complete the "Summary" phase of the module. To respond, simply circle the letter beside the phrase that best describes your answer or supply the requested information. Space has also been provided for you to write in any comments/suggestions you may have.

Thanks for your help.

1. How effective was the "Summary" phase in providing a reasonable culmination to the simulation experience?  
   a. Very effective  
   b. Somewhat effective  
   c. Not effective

2. Was the "Summary" phase well integrated with the immediately preceding activities or tasks?  
   a. Yes  
   b. Somewhat  
   c. No

3. Did you have to modify or expand upon the "Summary"?  
   a. Yes, I did the following  
   b. No

4. How effective was the "Summary" phase in helping students learn about occupational roles performed by others in the simulation?  
   a. Very effective  
   b. Somewhat effective  
   c. Not effective

5. How effective was the "Summary" phase in helping students learn about tools, processes, and working conditions associated with that part of the world of work simulated in the module?  
   a. Very effective  
   b. Somewhat effective  
   c. Not effective

Comments

BEST COPY AVAILABLE
6. How useful do you feel the "Summary" phase would be in helping students identify and select alternatives for further action related to other occupational exploration activities?

   a. Very useful
   b. Somewhat useful
   c. Not useful

Please write in any other comments/suggestions that you might have in the space below.
Planning
Construction
Projects

General Module Evaluation

Teacher Form
GENERAL MODULE EVALUATION

TEACHER FORM

INSTRUCTIONS

This questionnaire should be filled out as soon as possible after the pilot test of this module has been completed, i.e., after the posttests have been given.

The questionnaire is divided into several sections. The first section deals with general background characteristics of students and teachers. This information will be used solely for the purpose of describing the students and teachers who participated in the pilot test of this module. Subsequent sections will deal with implementational problems, your perceptions of the quality of the materials, etc.

Fill in the information requested at the top of the questionnaire and then answer each question by circling the letter in front of the phrase that best describes your answer, unless given other specific directions in the question. Space has also been provided for you to write in any comments/suggestions you might have. You are encouraged to do so.

THANKS FOR YOUR HELP.
GENERAL MODULE EVALUATION

TEACHER FORM

Module Name  PLANNING CONSTRUCTION PROJECTS  Date

Teacher Name

School

City

TEACHER BACKGROUND

1. What is your sex?
   a. Male  
   b. Female

2. Including this year, approximately how many years of teaching experience do you have?
   a. This is my first year  
   b. 2-4 years  
   c. 4-6 years  
   d. 6-8 years  
   e. 8 or more years

3. In what kind of group setting (e.g., English classroom, math classroom, students from study hall, students from a guidance group, etc.) and at what grade level did you introduce this simulation?
   a. Group Setting (please specify) 
   b. Grade Level (please specify)

4. Have you had any previous experience with simulation as an instructional technique?
   a. Yes, as a teacher  
   b. Yes, as an observer  
   c. Yes, as a participant  
   d. No
5. If you answered yes to question 4, briefly describe the nature and extent of your previous experiences with simulation. If your response to question 4 was 'No' please proceed to question 6.
   a. My previous experiences with simulation include

   ________________________________________________________________

   ________________________________________________________________

   ________________________________________________________________

6. Which of the following statements best describes your reasons for participating in the pilot test of this simulation module?
   a. To try out new ways of organizing instruction for students
   b. Interest in Career Education
   c. Thought material was of value for students
   d. General interest or curiosity
   e. I was requested to participate
   f. Other, or some combination of the above (please specify)

   ________________________________________________________________

STUDENT BACKGROUND

7. How many students participated in the total simulation? (Include only those students who were involved in the module and received both the pre and posttests).

   ______ Students Participating

8. Of the students in question 7, how many were male and how many were female?

   ______ Males  _______ Females

9. How were students selected to participate in the simulation?
   a. Most of the students were volunteers from the class
   b. The class, rather than the students, was volunteered
   c. Student volunteers from a study hall
   d. Other, please specify

   ________________________________________________________________

   ________________________________________________________________
10. If you had volunteer students participating in the simulation which of the following reasons best describes your perception of why they participated. If you did not have any volunteer students please proceed to Question 11.

a. Interest in trying something new
b. Interest in particular area simulated
c. Interest in careers
d. Interest in just getting out of class or study hall
e. Other, or some combination of the above (please specify)

f. I can't really guess at the reason (s)

11. Indicate any special characteristics of this class, e.g., many slow readers in class; many students with exceptionally good verbal skills; etc., which may bias the results of the pilot test of this module. Also describe how you feel the results will be biased by these characteristics.

a. Characteristics Biases Produced


b. No special characteristics

SEQUENCING OF MATERIALS

12. In general, how well did the transition from phase to phase of the module proceed?

a. Very well Comments
b. Well

c. About average
d. Poorly
e. Very poorly

13. Are there any additions, deletions or changes in the order of module parts that you feel should be made?

a. Yes, make the following changes


b. No changes are necessary
ADEQUACY OF MATERIALS

14. In general, were the directions in the module clear enough for students to understand what was expected of them?

a. Yes
b. Somewhat
c. No

15. In general, was the vocabulary of the module consistent with the maturational level of the students in the simulation?

a. Yes
b. Somewhat
c. No

16. Do you feel that the knowledge (What do you know?) and the attitude (What do you like?) tests were adequate measures of the material contained in the module? (Answer both parts of the question.)

<table>
<thead>
<tr>
<th>Knowledge Test</th>
<th>Comments</th>
<th>Attitude Test</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Yes</td>
<td></td>
<td>a. Yes</td>
<td></td>
</tr>
<tr>
<td>b. Somewhat</td>
<td></td>
<td>b. Somewhat</td>
<td></td>
</tr>
<tr>
<td>c. No</td>
<td></td>
<td>c. No</td>
<td></td>
</tr>
</tbody>
</table>

17. To what extent was the knowledge test difficult for students?

a. Very difficult
b. Difficult
c. About average
d. Easy
e. Very easy

IMPLEMENTATION OF THE MODULE

18. How well did the in-service training prepare you to work with this module?

a. Very well
b. Well
c. Somewhat
d. Poorly
e. Very poorly
19. Did the in-service training provide you with a general understanding of your role in the module implementation?
   a. Yes  
   b. Somewhat  
   c. No  

20. While working with this module, did you have to allot (or spend) more time than you normally would for preparation (exclude the time spent in in-service training)?
   a. Yes; specify additional time in hours 
   b. Some extra time was necessary  
   c. No extra time was necessary  

21. How sizeable was the job of managing/coordinating this simulation module for you?
   a. Very sizeable  
   b. About average  
   c. Not sizeable  

STUDENT PARTICIPATION AND LEARNING

22. Did your students experience problems with the reading level of this module?
   a. Yes  
   b. Somewhat  
   c. No  

23. To what extent do you feel students were receptive (interested in, excited by) to simulation as a way of learning?
   a. Very receptive  
   b. Receptive  
   c. About average  
   d. Non-receptive  
   e. Very non-receptive  

24. To what extent do you feel that students were receptive (interested in, excited by) to the content of this particular module?
   a. Very receptive  
   b. Receptive  
   c. About average  
   d. Non-receptive  
   e. Very non-receptive
25. Was there any change in student interest or motivation as they progressed through the module?
   a. Yes, interest changed as follows __________________________
   b. Somewhat
   c. No

26. Do you feel that this module reinforced or helped to build the student's ability to make decisions?
   a. Yes
   b. Somewhat
   c. No
   d. Don't know

27. In your judgment, how much did students learn about the process of simulation and about the content of the module? (Answer both parts of the question)

<table>
<thead>
<tr>
<th>Simulation Process</th>
<th>Comments</th>
<th>Module Content</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>a. Very Much</td>
<td>a. Very Much</td>
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<td>b. Much</td>
<td>b. Much</td>
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<td>c. An average amount</td>
<td>c. An average amount</td>
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<td>d. Little</td>
<td>d. Little</td>
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<tr>
<td>e. Very little</td>
<td>e. Very little</td>
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OVERALL PERCEPTIONS AND RECOMMENDATIONS

28. In general was this module
   a. Exciting to students.  Comments
   b. About average for students.
   c. Boring to students.

29. In general did this module change the working relationships (personal interactions) between you and participating students?
   a. Yes, relationship changed as follows __________________________

   __________________________

   b. Somewhat
   c. No
30. Are there any students or groups of students (e.g., some students may have difficulty working in small self-directed groups) that you feel would have difficulty participating in simulated types of experiences?
   a. Yes, (please specify) ____________________________________________
   b. No

31. For what grades would you consider this module to be appropriate? (Circle as many as apply).
   a. 10th or higher
   b. 9th
   c. 8th
   d. 7th or lower
   c. Other, please specify __________________________

32. Overall, how would you rate the quality of this module?
   a. Very good
   b. Good
   c. Average
   d. Poor
   e. Very Poor
   Comments

33. If possible, would you use this module with students again?
   a. Yes, with no modification
   b. Yes, with minor modifications
   c. Yes, with major modifications
   d. No
   Comments

34. Would you recommend this module to other teachers?
   a. Yes
   b. No
   Comments
COMMENTS AND/OR SUGGESTIONS FOR REVISION

Add as many comments and/or suggestions for revision of the module as you might have.

THANK YOU.