DOCUMENT RESUME

ED 206 330   IR 009 850

TITLE   Evaluator's Guide for Microcomputer-Based
                    Instructional Packages.
INSTITUTION   Northwest Regional Educational Lab., Portland,
                    Oreg.
SPONS AGENCY   National Inst. of Education (ED), Washington, D.C.
PUB DATE   [81]
NOTE   61p.: Developed by MicroSIFT, A Project of Computer
                    Technology Program.

EDRS PRICE   MF01/PC03 Plus Postage.
DESCRIPTORS   Computer Assisted Instruction: *Computer Programs;
                    Elementary Secondary Education: Evaluation Criteria:
                    *Evaluation Methods: Guidelines: *Microcomputers
IDENTIFIERS   *Microcomputer Software and Info for Teachers

ABSTRACT
                    This guide developed by MicroSIFT, a clearinghouse
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background information and forms to aid teachers and other educators
in evaluating available microcomputer courseware. The evaluation
process comprises four stages: (1) sifting, which screens out those
programs that are not instructional in nature and determines a
package's operational readiness and hardware compatibility; (2)
package description, including program format, instructional purpose
and technique, type of package, available documentation, and the
hardware configuration necessary for operation: (3) courseware
evaluation, i.e., an assessment of the content, instructional
quality, and technical quality of the package: and (4) in-depth
evaluation, which is not described in this guide. Forms for the
second and third phases are provided, together with explanations of
the kinds of information needed and discussions of some of the
factors to be considered in completing certain sections of the forms.
Definitions of 15 terms are provided in the introductory section.
(CHC)

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EVALUATOR'S GUIDE

For Microcomputer-Based Instructional Packages

Developed by

MicroSIFT

A Project of

COMPUTER TECHNOLOGY PROGRAM
Northwest Regional Educational Laboratory
300 S.W. Sixth Avenue
Portland, Oregon 97204

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MicroSIFT
EVALUATOR'S
GUIDE

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Clackamas Educational Service District, West Linn, Oregon

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Minnesota Educational Computing Consortium (MECC), Lauderdale, Minnesota

Minnesota School District Data Processing Joint Board (TIES), Roseville, Minnesota

Region IV Educational Service Center, Houston, Texas

Region X Educational Service Center, Dallas, Texas

San Mateo Educational Resource Center (SMERC), San Mateo, California

Technical Education Research Centers (TERC), Cambridge, Massachusetts

The field test also included faculty and students of Utah State University, Logan, Utah, and esepecially the use of the Guide in the graduate course Instructional Technology 622, "Computer Applications in Education".

MicroSIFT
EVALUATOR'S
GUIDE   TABLE OF CONTENTS

A. PURPOSE   Except in instructional situations where student
              programming is the primary activity,
              microcomputers can be used to assist the
              instructional process effectively only to the
              extent that quality software is available.

              This Evaluator's Guide has been developed to
              provide background information and forms to aide
              teachers and other educators in evaluating
              educational software and courseware. Two forms,
              "Courseware Description" and "Courseware
              Evaluation", are described. The design of the
              evaluation form is based on the assumption that
              most of the information on the description form is
              available.

              The forms were based originally on the forms
              developed and used by the CONDUIT Project for
              evaluating computer-based instruction packages for
              post-secondary institutions, with additional
              concepts adopted from forms developed by other
              organizations and individuals.

              The Guide was originally designed to be used by
              school personnel who are participating in the
              courseware evaluation process of MicroSIFT,
              described in the next section. In addition,
              however it has been found useful by individual
              teachers or others who wish to evaluate courseware
              before purchasing, and as a supplement to
              preservice and inservice courses concerned with
              the development or use of computer based
              applications.

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I.   INTRODUCTION
(Continued)

B.   PROCESS   In December 1979, under a contract with the
                National Institute of Education, the Computer
                Technology Program of the Northwest Regional
                Educational Laboratory began designing a
                clearinghouse for microcomputer-based educational
                software and courseware. The clearinghouse,
                called MicroSIFT (Microcomputer Software and
                Information For Teachers), has as one of its goals
                the development and implementation, of an
                evaluation process and related instruments for
                such courseware.

                The design of MicroSIFT includes a selected
                network of significant centers of instructional
                computing activities at the K-12 level. The
                centers are large school districts or regional
                consortia where full time instructional computing
                staff exist, and which have a history of
                development, evaluation and implementation of
                instructional applications of computers. This
                Network forms the basis for the evaluation process.

                The four stages of the evaluation process are
                described on the following pages.

I. INTRODUCTION
(Continued)

B. PROCESS
(Continued)

1. Phase I,   Sifting, Phase I of this process, is the
    Sifting   first look at a package which screens
                    out those programs that are not
                    instructional in nature. In addition to
                    a program's instructional value, the
                    sifting phase determines a package's
                    "operational readiness" and its
                    "hardware compatibility" status. The
                    MicroSIFT staff are responsible for this
                    stage.

2. Phase II,   Assuming the software fails to meet the
    Description   MicroSIFT standards for the sifting
                    phase, the evaluation terminates.
                    However, if the software qualifies as
                    "instructional", "operational" and
                    "compatible" it then enters Phase II,
                    "Courseware Description." Phase II
                    briefly describes the package specifying
                    the program format, instructional
                    purpose and technique(s), type of
                    package, available documentation and the
                    hardware configuration necessary for
                    operation. MicroSIFT staff complete
                    most of this stage, using the
                    "Courseware Description" form described
                    in Part II of this Guide.

B. PROCESS
(Continued)

3. Phase III,
   Evaluation

Teachers with experience in the subject
and grade level of the material are
selected from schools served by the
network site to evaluate courseware
according to the content, instructional
quality and technical quality criteria
identified in the "Courseware
Evaluation" form described in Part III
of this Guide. An evaluation is also
done by an expert in instructional
computing employed at the network
center. These reviews are summarized
and published quarterly by MicroSIFT.

4. Phase IV,
   In-Depth
   Evaluation

Some materials because of complexity or
amount of curriculum covered,
warrant more extensive evaluation.
Activities in this category would be
pre- and post-testing or observation of
student activity at the computer.
Instruments to support this phase are
not included in this Guide.

C. DEFINITION OF TERMS

In the fields of microcomputers and education, terminology
can easily be misinterpreted. So that everyone using this
Guide will interpret words in the same way, a brief glossary
is provided below. Each definition conforms to some
standard use of the term, but is not necessarily a composite
of all uses nor the most common use.

Content   Facts, terms, ideas, concepts, principles,
               theories and constructs which make up the
               subject matter of an instructional package.

Courseware   Software and printed materials which support
               instruction in a complete course of study or
               a definable subset of a course. In this
               sense, it is not required that all
               instructional activities be supported by the
               package or that the tutorial mode of
               instruction be employed. Even a 30 minute
               student activity aimed at one objective can
               be courseware in this definition.

DOS   Disc Operating System: an operating system
               which includes the capability of controlling
               and coordinating the functions of a disc
               drive within a computer system.

Graphics   Images displayed on a video screen or printer
               which are generated by a computer program.

C.   DEFINITION OF TERMS
     (Continued)

Hardware	Equipment, including computers, disk drives, cassette players, cables, monitors.
Materials	Books, folders, envelopes, worksheets and similar items. "User Support Materials" are items which support the activity of a person using a computer program.
Micro	A microcomputer.
Microcomputer	A computer system, including peripheral hardware such as disk drive and monitor, based on a microprocessor (or "chip"), and having a typewriter-like keyboard.
Operating System	A program or set of programs which controls and coordinates the operations of the components of a computer system.
Package	One or more computer programs with related materials and the storage medium. A package represents a microcomputer application.
Program	A computer program, written in BASIC, Pascal, machine code or other computer programming language.

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C.   DEFINITION OF TERMS.
     (Continued)

ROM   Read Only Memory: a microelectronic storage
               medium which contains a program permanently stored
               there by the manufacturer to perform a specific
               function. The computer user may only use the
               program, and cannot store a program on ROM or
               alter a program stored there.

RAM   Random Access Memory: a microelectronic storage
               medium which ordinarily constitutes the main
               working memory of a microcomputer and which is
               re-usable. That is, the user of the computer may
               store programs or data in RAM, and in so doing
               erases information previously stored there.

Software   Computer programs, including application
               programs, operating systems, and languages.

Storage   Tape cassette, flexible disk, ROM cartridge, or
Medium   RAM for storing microcomputer programs.

Before a package can be evaluated, you will need some
factual information about it.   For example, does it have all
the components necessary to make it an instructionally
useful package?   Indeed, determining the existence of needed
components is itself an evaluation.

The "Courseware Description" form identifies the information
necessary for evaluation and use of a package.   In some
cases, a list of components is included.   In a complete
package, all the information should be readily available in
the program and support materials.

Completing the form should be a straightforward task.   If
however, some information is not provided in the package,
you may be able to infer some of it by a trial use of the
package.

Some of the sections on the "Courseware Description" form
are discussed below.

Version   A version number, a date, or hardware
                   identifier.

Producer   The original source (developer, publisher,
                   author; individual) who produced the package.

Grade/   The grade level, grade range, or other
Ability Level   ability level indicator for which the package
                   is intended.

II. COURSEWARE DESCRIPTION
(continued)

Subject Area | A general area, such as Mathematics, Reading or History.

Specific Topic | A subset of Subject Area, such as multiplication, phonics, or World War I.

Required Hardware | Identify the types of hardware required as a minimum for package use. Some examples are:

    a. Computer (brand, version)
    b. RAM amount
    c. Mass Storage Devices (disk drives, cassettes)
    d. Output Devices (color or black-and-white monitor or TV, printer)
    e. Other Peripherals (joystick, paddles, voice synthesizer)
    f. Special Electronics (circuit cards, interfaces)

16.

II.   COURSEWARE DESCRIPTION
      (Continued)

Required Software   Identify the language, operating system, and utility software required to install and use the application software in the package. Include any drivers, subroutines or special software requirements not in the package or standard in the hardware specified.

Instructional   List the purposes, goals or objectives
Objectives   that the   package is intended to achieve.

Instructional   Describe the experiences, skills,
Prerequisites   concepts, understandings, maturity and ability levels which the intended user should possess for successful use of the package.

Describe Package Content and Structure

Abstract of | This information should be available in the
Content | material provided by the producer of the
             | package. However, you may wish to add
             | comments if the description is incomplete or
             | inaccurate. Some suggested components of the
             | description are discussed below.

General | Describe the general content domain of
Content | the package.

User's | Describe the dimension of user control
Role | over rate, sequence, amount, type and content
             | of problem examples, if applicable.

e.g. "The user determines how much time will
      be allowed for solving each problem."

"The user defines the number of
hospitals, the amount of medicine
available, and the quantity of
pesticides used for mosquito control."

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Describe Package Content and Structure
(Continued)

Instructional   Describe the instructional strategy used
Strategy   in the courseware.

               e.g. "This is a drill and practice program
                     designed to increase student proficiency
                     and speed in solving quadradic
                     equations."

                     "This courseware simulates a malaria
                     control situation by determining cost
                     effectiveness and impact of the
                     variables selected by the user."

Instructional   Describe the degree to which the package
Integration   is or can be an integral part of
                 instruction. For example, it may be intended
                 as a random or casual supplement, chosen by
                 teacher or student, one of several options.
                 On the other hand, it may be the only way an
                 important topic can be addressed with a
                 student activity.

Program   Describe the flow or sequence of
Structure   activity in the program.

               e.g. "The program contains three major
                     sections, a presentation of an example,
                     a section of controlled user activity,
                     and a section of uncontrolled user
                     exploration."

The Courseware Evaluation form is designed to be used after the
information in the Description form is available. The rating of
the 22 items in the centerfold of the form is to be the starting
point of the evaluation. The sections of the form are described
in the sequence they are to be completed.

Judgments should be based on thorough investigation of the
program and support materials in the package. It is intended
that where the term "package" is used, all components are to be
taken into account in making the evaluation.

III.   COURSEWARE EVALUATION
       (Continued)

Rating   Items 1 through 21 are to be rated on the scale
                  provided. It is anticipated that in some cases a
                  given item may be meaningless for the package
                  being evaluated, and so NA (Not Applicable) should
                  be circled.

                  NOTE: The descriptions of each of the items on
                  the following pages are intended to be suggestions
                  for consideration in arriving at a judgement on
                  the item. They are not necessarily checklists,
                  are not in order of importance, and are not
                  exhaustive of possible considerations. The
                  alphabetic identifiers are merely for reference
                  purposes.

Importance   All items on the list are considered to be
                  important. However, for a given package, certain
                  items may take on greater or lesser importance
                  than most items in the list. H or L may be
                  circled to indicate a higher or lower value for an
                  item in relation to all the other items. Since
                  this is an indicator of relative value, not all
                  can be identified as H or L. Use of this column
                  may help you to apply this set of criteria to
                  packages which differ from each other in mode of
                  instruction.

Comments   Brief comments concerning the rating of any item
                  may be written in the space to the right of the
                  item.

Student Use   It is not expected that student use of a package
               be observed in this evaluation process. However,
               if it is convenient, the evaluation may be more
               valuable. You as a professional are making a
               judgment based on your teaching experience in the
               grade level and subjects intended for the
               package. If students take part, check the box at
               the top of the center page.

III. COURSEWARE EVALUATION
(Continued)

1. <u>The content is accurate.</u>

Possible problems in content accuracy include:

a. outdated information or instructional approach

b. factual errors

c. invalid model used in a simulation

d. oversimplified model or examples

e. improper use of statistics

f. inaccurate graphs or displays

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2. <u>The content has educational value.</u>

Any decision on this item will be highly
subjective. Some considerations leading to a
positive judgment might include:

a. The content and objectives are addressed in
    common school curricula.

b. The knowledge and skills involved have
    utility in some aspect of life.

c. An instructional situation can be envisioned
    in which the package would be useful

d. Use of the package enables you to learn
    something about the nature or needs of the
    student using it.

e. The content of the package is central to the
    subject field.

3. <u>The content is free of race, ethnic and sex stereotypes.</u>

    a.   Certain racial, ethnic or sex groups may be overrepresented at the expense of limiting others in their contextual settings.

    b.   Some racial, ethnic or sex groups may be portrayed in terms that are indicative of false generalizations about the characteristics of that group.

4.   The purpose of the package is well defined.

Purposes, goals and objectives may be in the
program or in user support materials. The
identification of instructional objectives is
important to the transferability and use of an
instructional package.

a.   Objectives should be explicit, rather than
     inferred.

b.   Objective statements should be clear; i.e.,
     unambiguous and without multiple meanings,
     succinct, free of jargon.

c.   Objectives should be stated in terms of
     expected student behaviors.

The package should include both general and
specific statements of purpose. That is, the
overall purpose of the package ought to be
concisely stated, with specific objectives stated
for specific components.

MicroSIFT
EVALUATOR'S
GUIDE   III.   COURSEWARE EVALUATION
                              (Continued)

5. <u>The package achieves its defined purpose.</u>

> Courseware can be evaluated in much the same way
> that other instruction is evaluated--the starting
> place being the instructional objectives. Based
> on these objectives, the student using the
> instructional package should learn what the
> material sets out to teach, rather than merely
> being engaged in the process.

> The most effective way to substantiate this aspect
> of instructional quality is through a sample run
> of the program, preferably with a learner from the
> target audience. However, if such a learner is
> not available, the evaluator should make a
> judgement as to how well the package would
> actually accomplish its objectives when used by a
> student of the appropriate maturity and ability,
> based on the evaluator's experience with students
> of that type.

COURSEWARE DESCRIPTION

microSIFT

Package Title _____

Version _____ Cost _____

Producer _____

Subject Area _____ Grade/Ability Level _____

Specific Topic _____

Dewey Decimal _____

Sears Subject Headings _____

ERIC Descriptors _____

- -

Medium of Transfer: _____ Tape Cassette   _____ 5" Flex. Disk

_____ ROM Cartridge   _____ 8" Flex. Disk

- -

Required Hardware:

- -

Required Software:

Type of Package: _____ Single Program _____ Integrated program series component

---

Instructional Purpose: (Please check all applicable)

_____ Remediation _____ Standard Instruction _____ Enrichment

---

Instructional Techniques: (Please check all applicable descriptions)

_____ Drill and Practice _____ Game _____ Learning Mgmt.

_____ Tutorial _____ Simulation _____ Utility

_____ Informational Ret. _____ Problem Solv. _____ Other

Documentation Available: (Circle all that are available in the computer program (P) or in the supplementary materials (S))

P S Suggested grade/ability level(s)   P S Teacher's information

P S Instructional Objectives   P S Resource/reference information

P S Prerequisite skills or activities

P S Sample program output   P S Student's instructions

P S Program operating instructions   P S Student worksheets

P S Pre-test   P S Relationship to standard textbooks

P S Post-test

   P S Follow-up activities

   P S Other _____

Is listing and alteration of the computer program allowed?
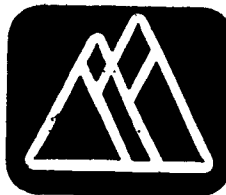
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micro SIFT **COURSEWARE EVALUATION**

Package Title _____ Version _____

Reviewer's Name _____ Date _____

25. Describe the potential use of the package in classroom settings.
    (NOTE: Complete the centerfold section before completing this item.)

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	RATING	Not Applicable	IMPORTANCE (OPT)			Evaluator's Guide Page Reference →
	Strongly Agree / Agree / Disagree / Strongly Disagree		Higher / Lower			

RATING: Circle the letter abbreviation which best reflects your judgment (use the space following each item for comments).

IMPORTANCE: Circle the letter which reflects your judgment of the relative importance of the item in this evaluation.

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☐ Check this box if this evaluation is based partly on your observation of student use of this package.

Category	Rating	NA	Importance	No.	Item	Page
CONTENT	SA A D SD	NA	H L	1.	The content is accurate.	18
	SA A D SD	NA	H L	2.	The content has educational value.	19
	SA A D SD	NA	H L	3.	The content is free of race, ethnic, sex, and other stereotypes.	20
INSTRUCTIONAL QUALITY	SA A D SD	NA	H L	4.	The purpose of the package is well-defined.	21
	SA A D SD	NA	H L	5.	The package achieves its defined purpose.	22
	SA A D SD	NA	H L	6.	Presentation of content is clear and logical.	23
	SA A D SD	NA	H L	7.	The level of difficulty is appropriate for the target audience.	24
	SA A D SD	NA	H L	8.	Graphics/color/sound are used for appropriate instructional reasons.	26
	SA A D SD	NA	H L	9.	Use of the package is motivational.	27
	SA A D SD	NA	H L	10.	The package effectively stimulates student creativity.	28
	SA A D SD	NA	H L	11.	Feedback on student responses is effectively employed.	29
	SA A D SD	NA	H L	12.	The learner controls the rate and sequence of presentation and review.	30
	SA A D SD	NA	H L	13.	Instruction is integrated with previous student experience.	31
	SA A D SD	NA	H L	14.	Learning is generalizable to an appropriate range of situations.	32
TECHNICAL QUALITY	SA A D SD	NA	H L	15.	The user support materials are comprehensive.	33
	SA A D SD	NA	H L	16.	The user support materials are effective.	36
	SA A D SD	NA	H L	17.	Information displays are effective.	38
	SA A D SD	NA	H L	18.	Intended users can easily and independently operate the program.	40
	SA A D SD	NA	H L	19.	Teachers can easily employ the package.	42
	SA A D SD	NA	H L	20.	The program appropriately uses relevant computer capabilities.	43
	SA A D SD	NA	H L	21.	The program is reliable in normal use.	45

22.

CHECK ONLY ONE

_____ I would use or recommend use of this package with little or no change. (Note suggestions for effective use on the front page.)

_____ I would use or recommend use of this package only if certain changes were made. (Note changes under major weaknesses on the next page.)

_____ I would not use or recommend this package. (Note reasons under major weaknesses.)

ERIC

23. Describe the major strengths of the package:

24. Describe the major weaknesses:

Instructional Objectives: • Stated [ ] Inferred [ ]

Instructional Prerequisites: Stated [ ] Inferred [ ]

33

Describe Package Content and Structure:

34

Describer's Name _____ Date _____

6. Presentation of content is clear and logical.

    The focus of this item is on how the terms, facts,
    concepts and principles of the subject matter are
    presented rather than on the content itself.

    a.   The information is well organized.

    b.   The structure of the presentation is evident
          to a user.

    c.   Definitions and explanations are available
          when necessary.

    d.   There is a smooth transition between concepts
          and cognitive clusters.

    e.   The progression of presentation is logical
          and well identified.

    f.   Examples, counter-examples and illustrations
          are used where possible.

    g.   The examples are relevant to the point of
          instruction.

7. The level of difficulty is appropriate for the target
    audience.

    a. The means of response (i.e., multiple choice,
        manipulating graphics, single keystroke,
        etc.) is appropriate to the target audience.

    b. The readability of support materials and
        program text is consistent with the expected
        ability level of the audience. Vocabulary,
        phrasing and sentence length are specific
        considerations here.

    c. Examples and graphic illustrations are
        suitable for the maturity of the student.

    d. The time required for typical student use
        does not exceed the attention span of the
        target audience.

    e. Size of steps in logical processes are suited
        to the ability level of the student.

    f. There are multiple levels of instruction,
        with diagnostic and reinforcement routines,
        for individual differences in the target
        audience.

        e.g. The program automatically branches to
             remediation subroutines if user
             responses require.

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7. The level of difficulty is appropriate for the target
    audience.
    (Continued)

        f.   There are multiple levels of instruction,
              with diagnostic and reinforcement routines,
              for individual differences in the target
              audience.
              (Continued)

                    The program automatically progresses to
                    more difficult problems to continually
                    provide a challenge to the user that has
                    mastered the easier problems.

                    The program automatically provides
                    easier problems to the user who is
                    having trouble.

III. COURSEWARE EVALUATION
(Continued)

---

8. <u>Graphics/sound/color are used for appropriate instructional reasons.</u>

    a.   Graphics, sound and color enhance rather than detract from the instructional process.

    b.   Use of sound does not disturb others in a classroom environment.

    c.   Graphics, sound and color focus attention on important content areas.

    d.   Good message design principles are used in order to place emphasis where important concepts are.

    e.   Visual and auditory effects stimulate student interest.

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III.   COURSEWARE EVALUATION
       (Continued)

9.   Use of the package is motivational.

> a.   Students are effectively addressed in a
>   personal style.
>
> b.   Narratives in the program use humor and a
>   conversational manner.
>
> c.   The overall tenor of interaction is warm,
>   friendly, helpful.
>
> d.   The package provides for a variety of student
>   responses and response modes.
>
> e.   A variety of responses to student inputs are
>   used.
>
> f.   Reinforcement is positive and dignified.
>
> g.   A student is left with a desire to use the
>   package again, or to pursue the topic in
>   other ways.
>
> h.   A student is left with a positive attitude
>   about the experience.
>
> i.   Using the package is a pleasant experience.

10. The package effectively challenges student creativity.

    a. The learner is involved in an active, rather than passive, manner in the instruction.

      e.g. The student has control over as many input variables as the program permits.

      The computer is used in a "hands-on" way rather than merely in a presentation mode.

      The program design allows the student as many decisions as possible.

    b. The package provides opportunities to answer open-ended questions that have no "right" or "wrong" answers, and gives the student evaluative criteria to judge his/her own responses.

    c. The program is designed to anticipate a wide range of possible responses.

    d. The student is provided with new ways of looking at the world.

    e. The package demonstrates a creative means of using the knowledge being acquired by the user.

    f. The package suggests areas of further exploration or other activity.

    g. The student is challenged to change an underlying model or design an alternative model.

---

11. <u>Feedback on student responses is effectively employed.</u>

     a.   The feedback is relevant to the students'
          responses and therefore "credible".

     b.   The feedback is non-threatening, yet
          corrective when necessary.

     c.   The feedback is timely, i.e., given with
          appropriate frequency and given immediately
          after a response.

     d.   The feedback remediates (gives cues, hints
          and explanations).

     e.   There is quantitative feedback when valuable.

          e.g. The program indicates the number and
               percentage of problems correct out of
               the number of problems attempted.

     f.   The feedback tells "why" the response was
          incorrect (e.g., "You should have spelled the
          name correctly." or "Use no punctuation.").

     g.   The judgement of student responses properly
          assesses the concept being taught, not merely
          its form.

          e.g. Is word order more important than the
               content of the response?

     h.   The program adapts to the learner by
          adjusting the difficulty level of content.

12. <u>The learner controls the rate and sequence of presentation
    and review.</u>

      a.   Student has control over the time allowed for
        solving problems, allowing for quickening or
        slowing the pace as the user deems necessary.

      b.   Student has control over the rate of
        presentation of display material so that
        he/she can read and absorb the information at
        his/her own rate.

      c.   The program does not lock the student into a
        linear instructional sequence.

      d.   The program allows the student to begin at a
        point appropriate to his/her past
        achievements.

      e.   The program has a provision for review of
        instructions initiated by the user.

      f.   The program defines "functions" for learner
        options such as "HELP", "HINT", "DICTIONARY."

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13.   Instruction is integrated with previous student experiences.

      a.   Instruction is designed to take into account
         the background experiences typical of the
         target audience.

      b.   Inductive reasoning is employed. Known
         situations are used to explain new situations.

      c.   Commonly experienced examples are used.

         e.g. Some students may better understand
            liquid metric measurements within the
            context of filling the car with gasoline
            rather than filling a graduated cylinder
            with water.

      d.   Instruction moves from the concrete to the
         abstract, simple to complex, familiar to
         unfamiliar.

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14. <u>Learning is generalizable to an appropriate range of
    situations.</u>

    a.   The learning is applicable to a student's
          future experiences.

          e.g. The instruction prepares the user for
               the next unit in the package.

    b.   The student is presented with opportunities
          that require generalization of the rules
          acquired at the computer and opportunities to
          apply those rules to "real life" situations
          away from the computer.

    c.   The processes and information learned are
          useful in domains and situations other than
          the subject area of the package.

    d.   The content is organized in such a way as to
          facilitate recall and application away from
          the computer and outside of the immediate
          content domain.

          e.g. Is the metric system taught within the
               context of the decimal system, or as
               isolated measurements (meter, gram,
               liter, etc.).

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15. <u>User support materials are comprehensive.</u>

In this item, you are assessing the completeness
of the package, in terms of its support for the
teachers and students in the intended pattern of
use, and reasonable optional uses. Many different
types of information may be included in the
printed material accompanying the program. The
components of good user support materials
identified here can be packaged in many ways.
Separate identification does not imply a need for
separate booklets, although that may be
desirable. (See also item 16.)

a.   <u>Student materials</u>: sufficient materials for
     a variety of student activities should be
     provided.

     --   pre-instruction activities relating to
          the package

     --   a guide to use of the package

     --   follow-up activities to reinforce the
          instruction

     --   worksheets

b.   <u>Teacher's Information</u>

     --   a description of the instructional
          activities to take place

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III.   COURSEWARE EVALUATION
          (Continued)

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15.   User support materials are comprehensive.
      (Continued)

    b.   **Teacher's Information**
        (Continued)

        --   suggestions for classroom logistics in a
            variety of hardware situations (single
            or multiple machines, hardware not in
            classroom, etc.)

        --   a rationale for computer use

        --   prerequisite skills necessary for best
            utilization

        --   teacher directed pre and post
            instructional activities.

    c.   **Resource Information**

        --   bibliography of resources and references
            related to the content domain

        --   sample run of the program

        --   possibilities for program modifications

        --   a description of the model used in
            simulations

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III.   COURSEWARE· EVALUATION
       (Continued)

15. User support materials are comprehensive.
     (Continued)

           d.   Technical Documentation

                -- detailed explanation of how the program
                    and package operates.

                -- program code listings

                -- explanation of user definable options to
                    adapt the program for different
                    applications.

                -- explanation of the software/hardware
                    interface or any other extraordinary
                    features of the program

                -- flowchart or other diagrams of general
                    logic of individual programs and package

                -- interpretation of error messages

           e.   Containers

                -- folders, binders, pockets for storing
                    printed materials, disks, cassettes or
                    other components

                -- boxes or other container for organizing
                    and storing the entire package

16. <u>The user support materials are effective</u>.

    a. The appearance of the materials is attractive.

    b. The quality of the paper or binding is
        appropriate to its intended use and expected
        life.

    c. The printed text is clear, readable and
        attractive.

    d. Pictures, diagrams and graphs are appropriate
        and readable.

    e. The text, captions, labels, etc. are
        thoroughly edited, and free of errors in
        grammar, spelling and punctuation.

    f. The packaging of the materials is suitable
        for the intended use.

        e.g. student worksheet masters indented for
            reproduction are "loose leaf" or easily
            reproduced.

        teacher support materials can be
        separated from student materials.

    g. The program storage media are easily
        accessible, yet protected from random injury
        expected in mailing, dropping, etc.

    h. The entire package is storable as a unit in
        standard storage facilities (office shelves,
        cabinets, etc.)

16.   The user support materials are effective.
(Continued)

    i.   Materials are easily used in table space
typically available near a microcomputer
station.

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17. Information displays are effective.

          Good message design principles are incorporated
          into the visual arrangement of display material.

          a.   Graphic displays are not too complex or full
                of too much information.

                    There is adequate spacing on the screen
                    or printed materials for clarity.

                    Static and dynamic graphics are used
                    when applicable.

                    Screen and printed displays make
                    effective use of open space.

          b.   Text narrative on the monitor or printer is
                clear and easy to read.

          c.   Narrative is not ambiguous.

          d.   Text information is not too lengthy or
                wordy.

          e.   The user is given adequate time to read and
                absorb the information given in the displays.

          f.   Text is free from spelling and punctuation
                errors.

          g.   Character sets employed are appropriate for
                the intended audience.

III. COURSEWARE EVALUATION
(Continued)

17. <u>Information displays are effective.</u>
(Continued)

  h. Graphics are not too repetitive or too slow
    in presentation.

  i. Input options are independent of color, or at
    least avoid common color blindness problems.

  j. There is not too much text for the display.

    The text position is consistent and/or
    predictable (i.e., the student does not have
    to hunt for the information).

  k. Graphics are appropriately mixed with text
    material to give variety to the presentation.

  l. Transitions from display to display on a
    video screen are smooth and unobtrusive.

  m. Scrolling is used appropriately. Only
    pertinent information is retained on the
    screen.

  n. Adequate teacher/student options for use or
    nonuse of sound are provided.

  o. Graphics are not distracting to the user.

III.   COURSEWARE EVALUATION
       (Continued)

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18. <u>Intended users can easily and independently operate the
     program.</u>

    a.   The program has enough internal documentation
           to permit ease of use even without external
           paper documentation.

    b.   Formats and protocols for user-computer
           communication are consistently applied and
           logical.

    c.   Directions are accompanied by useful examples
           where appropriate.

    d.   Help pages and functions are provided and
           accessible at likely points of need.

    e.   The program does not allow the user to get
           lost in the program with no apparent way
           out. The student always has some options for
           getting the program running again, or
           returning to a beginning point.

    f.   The program doesn't stop or appear to be
           doing nothing without clues.

    g.   Traps are used copiously to catch potential
           errors of any kind, and to avoid moving
           control from the application to the operating
           system software.

    h.   Instructions and error messages are clear and
           unambiguous. They give the user clear
           directions as to what he/she must do to
           effectively use the program.

III.   COURSEWARE EVALUATION
       (Continued)

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18. Intended users can easily and independently operate the
     program.
     (Continued)

     i.   The program responds to inputs as the
           directions indicate.

     j.   The user can easily exit the program, return
           to menus, or move to another section with
           program-described conventions.

     k.   The program accurately evaluates student
           input; i.e., it does not misinterpret student
           responses and thereby identify a response as
           incorrect when it is in fact correct.

     l.   Computer operation does not interfere with
           concentration on the activity.

     m.   The program can be used with a minimum of
           computer competencies.

     n.   The user isn't uneasy using the sofware due
           to its complexity of operation.

     o.   The user is informed of which function keys
           he/she will use in the course of the program
           and their purpose.

     p.   There is the necessary cueing for function
           key usage.

     q.   Those function keys referred to in the
           program are available on the hardware.

     r.   The use of function keys does not necessitate
           re-input of user responses previously input
           into the computer.

19.   Teachers can easily employ the package.

      Not only should the program be easily used by the
      students, but it should be equally employable by
      the teachers. Many of the same considerations as
      in item 19 can be applied here, but also:

      a.   The program can be used by a person having a
            minimum of computer competencies.

      b.   The program requires a minimal amount of
            equipment manipulation by the teacher.

      c.   Software modifications or unusual
            manipulations of disks are not required to
            effectively use the program.

      d.   The package is easily adaptable to a variety
            of classroom learning environments, including
            placement of hardware inside, or outside the
            classroom.

      e.   Error handling and identification are
            sufficiently detailed so the teacher can
            easily help a student.

      f.   Students require a minimum amount of teacher
            supervision while using the program.

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20. The program appropriately uses relevant computer capabilities.

The success of the computer as a means for instruction is due to those capabilities inherent in the technology. Computer software should take full advantage of the unique aspects of the computer rather than merely doing the same activities in a new way.

a. The application is well suited to computer use and not one that can be handled more appropriately by other means.

b. Course management or computer collection and organization of data on instruction is available.

e.g. The information about the student's performance is stored for retrieval at a later time.

c. The computer is used in a dynamic, interactive way.

e.g. The computer makes decisions based on student performance according to the teaching strategies inherent to the program.

d. The computer makes effective use of other peripheral devices (e.g., printers, light pens, paddle controllers, joysticks, etc.) for alternate input modes.

20. <u>The program appropriately uses relevant computer
    capabilities</u>.
    (Continued)

    e.   The computer is used to simulate activities
          that are too difficult, dangerous or
          expensive to demonstrate in reality.

    f.   The computer is used so that students are
          actively involved in a "hands-on" manner
          rather than only passively observing.

    g.   The computer responds to natural student
          input such as "YES" or "NO" or their first
          letter rather than "1 = YES, 2 = NO."

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III.   COURSEWARE EVALUATION
       (Continued)

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21. The program is reliable in normal use.

    a. The program will consistently run under all
        normal conditions.   No special precautions
        such as clearing memory are required for
        effective program execution.

    b. The program will consistently load into the
        computer without undue complexity, such as
        re-loading.

    c. The program is free of programming and
        operational errors ("bug-free").

22. Evaluator Recommendation.

Having concluded a review of the instructional
objectives, prerequisite activities, content and
structure, and rating the various considerations
of content, instruction and technical quality, you
are then ready to make a recommendation as to the
use of the package.

You have three options from which to choose to
represent your estimation of the program's
usability.   These options correspond to section 23
of the Evaluation Form.   Elaborations can be made
in sections 24 through 26, which ask for ways the
program can be used effectively and identification
of major strengths and weaknesses in the program.

a. Recommend   I would use or recommend use of this
    Program   program/package with little or no
                     change. (Note suggestions for effective
                     use, next page.)

b. Recommend   I would use or recommend use of this
    With Changes   program/package only if certain changes
                     were made.   (Note changes under major
                     weaknesses, next page.)

c. Do Not   I would not use this program/package.
    Recommend   (Note reasons under major weaknesses.)

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23. Describe the major strengths of the package.

24. Describe the major weaknesses of the package.

   In completing these items the evaluator should refer to
   Content, Instructional and Technical Quality ratings 1
   through 22. These ratings, along with any notes or
   comments that the evaluator made, should serve as the basis
   for specifying the program's strengths and weaknesses.
   Following are some example comments.

   Content Strengths   o   "The laboratory simulation was
                                accurate and could be used in
                                place of the real laboratory
                                situation."

                            o   "The instructional objectives
                                are stated and are very
                                specific as to terminal
                                performance behavior."

   Content Weaknesses   o   "Some equations were graphed
                                incorrectly on the monitor."

                            o   "The recommended audience age
                                is too young for program
                                content."

   Instructional   o   "The user has control over many
   Strengths   of the variables affecting
                                his/her instruction."

                            o   "The simulation adequately
                                considers all of the variables
                                related to the problem."

23. Describe the major strengths of the package,
     (Continued)

24. Describe the major weaknesses of the package.
     (Continued)

Instructional Weaknesses	o	"The program does not allow students to generate their own answers--only make a choice of four options."
	o.	"The student only watches the program. There is no active participation in the courseware."
Technical Strengths	o	"The directions were very clearly stated, giving examples when necessary."
	o	"The documentation is thorough and comprehensive."
Technical Weaknesses	o	"The computer was used as nothing more than an electronic textbook. None of the unique interactive characteristics were used."
	o	"The documentation included only a listing of the program. No objectives or prerequisites were mentioned."

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25.   Describe the potential use of the package in classroom
      settings.

      The list of items 1-22 in the centerfold of the evaluation
      form should be completed before this item. A
      recommendation for use with or without changes should be
      accompanied with a description in this space of the
      possible use you envision for the package in specific
      classroom settings. The description might include:

            a.   The different audience characteristics to
                  whom the program is applicable.

                  e.g. The package should be used with
                        individuals and small groups only

                        Program could also be used with
                        audiences older than the recommended
                        target audience.

            b.   The different teaching modes the program may
                  enhance.

                  e.g. The package can be used to introduce the
                        topic.

                        The courseware can be used to reinforce
                        related instruction and to test the
                        adequacy of that instruction.

            c.   Any "unique" applications the courseware may
                  have.

                  e.g. The package could be used in a "contest"
                        form to see which team can devise the
                        best strategy for solving the problem.