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ABSTRACT

This document is a general introduction to the nature, purposes, and potential uses of a critique series that deals with the development and evaluation of course goals in six subject matter areas for grades K-12. The series provides an initial pool of course-level goals that are expected to be of considerable value in assisting educators with goal definition related to curriculum planning and development, instruction, evaluation, and accountability. The project involved examination of some 12,000 goals by 68 teachers, identification of the type and level of learning required for the achievement of each goal, and use of computerized methods. This document discusses needs to which the project responds, content, form, validation, uses, and update and revision of goals. Byproducts of the project and its curricular and measurement implications are also discussed. Related documents include EA 004 941, EA 004 943-948 and ED 061 043. (Author/DN)

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Course Goals General Introduction

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Course Goals in Mathematics, Grades K-12

Course Goals in Music, Grades K-12

Course Goals in Physical Education, Grades K-12

Course Goals in Social Sciences, Grades K-12

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AN INTRODUCTION TO THE CRITIQUE DRAFTS OF THE COURSE GOAL COLLECTIONS

by

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Tri-County Goal Development Project
November 1972

Needs to Which the Project Responds

This is a guide to the nature, purposes, and potential uses of eight course goal collections produced through the cooperative efforts of school districts and intermediate education districts of three counties in the metropolitan Portland, Oregon area.

This Project has as its initial objective the production of collections of educational goals (learning outcomes) appropriate for use in management and planning at all school system levels, and the labeling of these goals with codes which make their curricular uses apparent and permit their retrieval in various combinations from a computerized storage system. Its long-range purpose is to help bring consistency to the way school districts develop goal structures for instructional planning and evaluation. It provides a non-prescriptive system of alternatives for the consideration of those seeking to answer for themselves the questions, "What is to be learned?"; "How to help students learn it?"; and "Has it been learned?" Thus, while the Project is initially occupied with the production and coding of "program" and "course" level goals (over 12,000 have been produced and coded to date), it is also concerned in the long run with the ways these goals are attained and measured. A schematic overview of the Project's goals and progress is provided in Figure 1. These goals and the ways they are being met will be discussed in detail after a brief review of the needs to which the project is addressed.

The needs the project is designed to meet include:

1. Participation of students, parents, teachers, school boards, and local community citizens in decisions about what the schools should teach.
2. Individualization of instruction.
3. Cross-disciplinary education.
4. Accountability.
5. Long-range planning and systematic control of educational development.
6. Effective teacher evaluation.

Participation of students, parents, teachers, school boards, and local community citizens in decisions about what the schools should teach.

If this growing movement is to be channeled into constructive paths, it is necessary that the nature of educational goals be better understood, and that the roles of all groups pressing for greater participation be understood as they relate to the legal responsibilities of state and local boards of

Figure 1

-Status of Project Goals-

	Define and Code Program and Course Level Goals in Eight Major Subject Areas	Define and Produce Related Measurement Criteria	Define and Produce Related Aids to Goal Attainment
Plan	C	C	P
Develop	C	P	U
Disseminate	P	U	U

C = Completed P = In Progress U = Uninitiated

education. By providing a rationale and a broad set of alternatives for generating goal statements appropriate and useful at various levels of management and participation, it is hoped that the Project will provide an important resource for improving the effectiveness of these groups in decision making at all levels. An intensive examination of roles and functions of each group in generating, reviewing, contributing to, and approving goals will be a part of the Project's efforts.

Individualization of instruction.

The desire to treat students more as individuals in diagnosing and meeting learning needs is a long-standing interest of educators, but one that has been frustrated by the apparent organizational and economic constraints under which schools operate. With the advent of the computer and the development of teaching systems and programs based upon carefully defined and detailed sequences of instructional objectives, hope rose anew for individualization of instruction. Such systems have largely been failures, however, since they have gained little or nothing in the economy of individualized instruction while sacrificing the adaptive and flexible support of the learner by the teacher.

A fortunate by-product of the learning system movement has been the attention focused on careful defining of instructional outcomes. A major assumption of the Tri-county Project is that the production of a type of goal which specifies desired behaviors in a manner suitable for instructional planning without prescribing teaching or measurement methods provides teachers and students with a resource which they can use to arrive at explicit, accountable statements of desired learnings. This leaves the teacher and the student free to select the most appropriate methods of achieving and measuring the chosen outcomes. In adopting this open, humanistic approach to goal setting, the Project developers have taken to heart the words of William James:

> "Teaching is an art; and sciences never generate arts directly out of themselves. An intermediary inventive mind must make the applications by using them originally. William James, Talks to Teachers on Psychology."

Cross-disciplinary education.

There is probably no concept in education currently more abused than "interdisciplinary education." Where the goals of subject matter learning are at least implicit in the textbooks and other materials used by teachers, the goals of interdisciplinary education do not have even that questionable point of tangible reference. The Tri-county Project, by developing extensive coding and retrieval systems, permits selection of goals in terms of various combinations of subject

matter, grade level, types of knowledge and process, subject matter and career education program goals, concepts and values, and index words. This coding system provides important cues to interdisciplinary planning. The goals being produced, although they appear in discipline-based collections such as science, social studies, mathematics, music, etc., may be related and grouped through computer retrieval by specifying one or more of the seven code parameters. Thus, for example, a teacher interested in teaching a unit in marine biology is able to request from these files goals dealing with related concepts in science, social studies, language, mathematics, or any other subject field. A detailed discussion of the seven coding systems which make this interdisciplinary use possible is provided in the section on "The Coding of the Goals" (page 12).

Accountability

Perhaps the greatest need addressed by the Project is for a sound basis for accountability in education. Accountability has been vastly over-simplified in the minds of most who have become interested in the concept. Most seem to regard accountability as a simple, straight line relationship between the worker and his superior. Because it exists in an enterprise impinged on by so many levels of organization and support, accountability in education almost defies analysis. Accountability has the horizontal elements of management, support, and instruction, and the vertical elements of federal, state, intermediate, local systems, and school organization. The aspect of accountability that is the concern of this project is exclusively the horizontal element of educational goals and the vertical elements of local school systems and schools. It is the assumption of the project that this aspect of accountability, though it may operate within state and occasionally federal guidelines, must find its first really explicit expression at the school system level and that it must undergo translations at the program (science, social studies, etc.), course (biology, bookkeeping, or a mini-course), and finally at the classroom or teacher level. The system of definitions and examples that illustrate this are presented later.

In any event, if systems such as planning-programming-budgeting or even general concepts such as management by objectives are ever to reach the point where costs and benefits can be related in any meaningful way, it is essential to have logically consistent operational definitions of educational goals and ways to generate and relate them from level to level in a school system. The Tri-county Project provides such a system of definitions and the tools required to make them operational.

Long-range planning and systematic control of professional development.

If the events of the past few years have proved anything, it is that the benefits of educational experimentation and development under existing conditions are not applicable. In view of the millions of dollars that have been poured into educational development in universities and public school systems, this statement is at best disconcerting. However, it seems evident in view of the difficulty of defining educational goals that without clear, unambiguous, and consistent statements of desired learning outcomes, that the ability of school systems to determine the effectiveness of various innovations is virtually nil. Through the efforts of the Tri-county Project it is hoped to establish a set of goals so comprehensive that almost any desired learning is represented within that set. To insure this, the set is kept open and added to each time teachers or curriculum planners specify learnings not represented in the original collections. Any statement that is admitted to the collection undergoes a rigorous process of statement, definition, and coding to insure that its utility to teachers is equal to those goals already in the collection.

Plans are now being laid to collect and create illustrative evaluative criteria for each of the goals. The presence of these goal-measurement criteria combinations will mean that individual teachers will no longer have to struggle unaided with stating educational goals and measurement criteria. They will only find it necessary to select those goals and criteria suited to their planning and measurement purposes. The goals they select will have been formulated by teachers under editorial supervision so that they appear as teachers themselves would like them represented.

These goal collections will underwrite all curriculum development activities in the Portland School System within a year or two, and hopefully many other school districts in the tri-county area, providing a basis for the consistent use and evaluation of those goals. The stability this will provide educational experimentation is apparent. The power of the goal collections themselves in promoting good educational planning and the ease and convenience it affords teachers in that planning is equally evident.

Effective teacher evaluation.

As anyone who has attempted to evaluate teaching knows, absence of well-stated instructional goals has been the chief deterrent to teacher evaluation. Once the goal collections of the Tri-county Project are complete, any teacher will have for his subject area an extensive set of well-stated outcomes to use selecting and negotiating his responsibilities.

both process and product evaluation of teaching will be related to these course goals. Further, if the teacher is unable to reach the goals because of lack of support in the form of supervision, instructional materials, facilities, or for any other reason, a basis exists for the teacher to evaluate support services.

Tri-County Base of Participation and Support

From the beginning the question of the reasons for and nature of the involvement of different agencies and personnel in the Project were among foremost concerns of the project designers. Although the idea for the Project originated in the Evaluation Department of the Portland Public Schools and the first work of defining program goals was done there, it was evident that to launch upon the larger undertakings just described would involve a degree of financial and personnel support that could not be achieved with the resources available to the district. Involvement of all school districts in the tri-county area appeared to be the most logical approach to securing the needed financial and personnel resources. A further advantage is the relatively dense and compact population of the region. Three intermediate education district offices provided leadership and services, and the excellent teaching staffs of the urban and suburban school districts offered a fine resource for staffing the numerous committees required for the goal development work.

Careful measures were taken to secure highly qualified teachers for the summer goal writing projects. All districts in the tri-county area were invited to submit names of teachers who met the criteria of the steering committee. These criteria included outstanding teaching record, experience in curriculum development, experience in writing instructional objectives, thorough knowledge of subject matter in the field represented, and ability to work harmoniously in a group project. Teachers nominated were screened by the steering committee after receiving credentials and samples of work from them.

The selection process was followed by a series of inservice training sessions in which practice was given in writing goals of the type desired. These were held prior to the summer workshops and teachers worked under the close supervision of subject matter specialists and project personnel.

In the first year support came from the budgets of the Portland School District, the three intermediate education districts, a small grant from the Regional USOE Office, and a small grant from the Oregon Board of Education. In the second year these sources of funding were continued, but in addition,

school districts throughout the tri-county area supported their own teachers who were selected for participation in the project. Through this device, resources were built from approximately $30,000 in the first year to around $70,000 the second year.

The State of Oregon has shown keen interest in the Project because of its potential in management by objectives and the improvement of instruction. It is quite possible that once the developmental work has been completed, the State will assume the maintenance and support of the system.

Content and Form of the Goals

Levels of Generality of Goals Chosen for Development - Program and Course.

In public K-12 education there are many levels of interest, resource allocations, and activities. These include: the national educational program, state school systems, local school districts, clusters of schools, individual schools, classrooms, individual teacher/student pairings, and individual students. A goal statement which is appropriate to the interests, resource allocations, and activities at, say, the level of the state school system is not appropriate for helping an individual child move forward on a given day.

Four levels of goals will be discussed here. These are system, program, course, and instructional. For reasons explained later, only the program and course levels are the immediate concern of the Course Goal Project.

The board of education is responsible for approving statements of purpose at the system level (level 1). These statements generally reflect the expectations of the community and the larger societies of the state and nation regarding the kinds of learning that should result from school experience. The best of such goal statements:

A. Are sufficiently general to encompass all outcomes within relatively few statements.

B. Are expressed in terms of learnings serving the dual needs of the individual and his society.

C. Provide clear direction to program planners in establishing programs and defining curricular goals.

D. Are measurable in terms of broad indicators.

They are employed mainly to inform the citizenry of the broad aims of the schools and to elicit their financial and political support. The Tri-county Project has not produced system level goals as yet. It is expected that these will be influ-
ed by the program and course goals produced at the next two lower levels of
erality.

Examples of system goals are:

> Every child respects the rights of every other child regarding his possessions, his physical safety, and the free expression of his ideas.
>
> Every child is able to read and to comprehend what is read within unavoidable constraints of ability and physical and mental health.
>
> Every child is able to set goals for himself, formulate plans for attaining them, execute his plans, and evaluate his efforts.
>
> Every child attains that level of self-confidence and confidence in others required for personal and social effectiveness in this society.
>
> Every child possesses sufficient knowledge of the facts and principles of science, technology, government, and human relations to make effective decisions as a person and as a member of this society.
>
> Every child is able to communicate with others, both orally and in writing, in a manner that satisfies his own need for expression and the requirements of those under whom he may become employed or receive further education.
>
> Every child is able to make effective use of the resources of the school and community in pursuing his learning interests.

A second level goal is required to elaborate the meaning of each district level goal, and to move from the political to the educational domain. Such goals, which we designate as program level goals, should be sufficiently comprehensive to provide for the full implementation of any district goals and should be sufficiently precise to provide a basic reference for formulating the goals of courses and other units of educational experience. These goals may be chosen and formulated by curriculum specialists at the district, area, or even school level using the Goal Development Project alternative program goals as a resource. From 8 to 30 alternative program goals have been produced in each of the eight subject areas addressed thus far by the Tri-county Project. Program level goals are used as a basis for defining the outcomes of an entire area of instruction such as mathematics, language arts, or health education.

Examples of program level goals are:

> Students are able to spell all words enjoying common usage in the English language.
>
> Students are able to employ elements of structure of the English language appropriately in their oral and written expression.

Students are able to employ the conventions of punctuation appropriately in written expression.

Students are able to locate appropriate references in doing research, to document such references according to common conventions, and to employ the findings appropriately in support of a conclusion.

Students are able to reach conclusions based on the weighing of relevant facts and authoritative opinion, and shall demonstrate ability to alter conclusions where new evidence indicates this should be done.

The second level of specification should be sufficiently general as not to suggest specific grade placement, but as had been stated, specific enough to provide a sound basis for generating the subgoals of the courses and other units of educational experience that will comprise the program.

The third level of goal specification provides the basis for organizing educational experiences within schools to accomplish the program level goals. In this process, program level goals must undergo both an elaboration of detail and a differentiation in terms of learning levels. Typically, these will be the learning goals of courses (high school and departmentalized elementary schools) and areas of instruction (non-departmentalized or non-graded elementary schools). These goals may be chosen and formulated using the Goal Development Project alternative course goals as a resource and the chosen program goals as a guide. From 750 to 3,500 course goals have been produced in each of the eight subject matter areas.

Examples of course goals are:

The student knows that rhythm is the primary element in music that elicits spontaneous physical response.

The student is able to identify, describe, and distinguish among rhythmic features in music he hears.

The student is able to construct a metric system for music.

The student is able to associate meter in music with meter signature and conducting patterns.

The student is able to devise a system for notating sound durations.

The student knows the conventional ways music is rhythmically represented in notation (e.g., accents, main beats, bar lines, sub-divisions of beats, time signature, notes and rests, ties).

It is the prerogative and responsibility of the teacher and only the teacher to elaborate from level 3 to level 4, the instructional goal level. It is the teacher who must create instructional methods appropriate to carry out the planning done with the help of course goals in such a way as to satisfy the particular

needs of the children in a given class or school. The very essence of teaching is combining a thorough understanding of desired outcomes with a perceptive adaptation of methods to help children of many kinds and conditions achieve those outcomes. Any teacher who is provided a set of course goals should be able to design instructional goals and select appropriate methods of achieving them.

Figure 2 is provided to further clarify the different goal levels, and also to illustrate how they differ from behavioral and performance objectives.

Figure 2

System Goal

The student is able to communicate with others, both orally and in writing, in a manner that satisfies his need for expression and the requirements of those under whom he may become employed or receive further education.

Program Goal

P. The student is able correctly to apply the conventions of English grammar and usage in speaking and writing.

Course Goal (Planning)

K. The student knows that special verb forms exist for use with singular and plural subjects.

P. The student is able to use appropriate singular and plural verbs with singular and plural subjects.

Instructional Goal

K. The student knows the singular and plural forms of the verb "to be" for present and past tenses:

S	P	S	P
I am	We are	I was	We were
You are	You are	You were	You were
He, she is	They are	He, she was	They were

P. The student is able to use appropriate singular and plural forms (present and past tense) of the verb "to be" with singular and plural subjects in writing sentences.

Behavioral Objective (Measurement, diagnosis, instruction)

Given 20 sentences, ten with plural subjects and ten with singular subjects, the student will identify the correct number form of the verb (is, are).

Performance Objective or Criterion Referenced Test Item (Measurement)

Given 20 sentences, ten with plural subjects and ten with singular subjects, the student will identify the correct number form of the verb (is, are) with at least 90% accuracy.

Writing the Goals

The program level goals, as mentioned above, were initially written by curriculum specialists in each field and were revised by the course goal developers in the summer workshops. The criteria produced by the project planners and supervisors to guide the curriculum specialists in producing program goals are given in Figure 3.

Figure 3

Program Goal Criteria

1. Is the meaning of the goal clear and concise?
   a. Is its meaning apparent to the general public?
   b. Do the words used have a common dictionary meaning?
   c. Is it parallel in construction with the other goals in the statement?
   d. Is the form consistent?
   e. Is it brief and to the point?
2. Is the goal expressed as a learning outcome?
   a. Does it identify the outcome of the learning rather than the method used to attain it?
   b. Can one identify what the student will be able to do, know, or value?
   c. Are the limits of the desired outcome clear?
   d. Does its precision increase with subdivision?
3. Is the goal readily subdivided into goals suitable for course planning?
   a. Is the meaning of the goal so clear that its component meanings are readily derived from it?
   b. Can subpoints be generated which adequately represent the total meaning of the program goal?
4. Can behavioral indicators be identified that are likely to be agreed upon by professionals, the public, and students as representing the attainment of the goal?
5. Is the goal an important learning in the opinion of the public, the professional educator, and the student?
6. Is the goal an important learning in terms of the needs of society and the learner?
7. Does the totality of program goals provide a comprehensive description of all learnings in the program?

The course goals were written by groups of teachers and curriculum specialists during summer workshops after intensive (and continued) training in course goal writing. This work included a review of existing goal writing efforts and collections. The criteria used by the project planners and supervisors to guide the course goal developers in producing course goals are given in Figure 4.

Figure 4

Course Goal Criteria

1. Is the educational outcome stated potentially significant?
2. Does the goal begin with "The student knows.." if it is a knowledge goal and "The student is able to.." if it is a process goal?
3. Is the goal stated in language that is sufficiently clear, concise, and appropriate? (Can the goal be stated in more simple language and/or fewer words?)
4. Does the goal deal with a single learning outcome (beware of "and")?
5. Can learning experiences be easily thought of that would lead to the goal's achievement?
6. Do curricular options exist for the goal's achievement? (The goal should be free of implications for method.)
7. Does the goal clearly contribute to the attainment of one or more of the stated program level goals in its subject area?
8. Can the goal be identified with an approximate level of student development?
9. Is the goal stated so that evaluation criteria that indicate its attainment can be easily identified?

In producing program and course goals in eight basic K-12 subject matter areas in accord with the two sets of criteria above, the Tri-county Project was modifying a course already charted by the work of Bloom, Walbesser, Mager, and others. In the next section of this report we shall examine the coding systems developed to make these collections useful to clients with widely divergent curricular orientations. In this relatively uncharted area lies the chief innovative contributions of the Project.

The Coding of the Goals

As mentioned earlier, seven coding systems have been developed and applied to each of the course goals. The names of these codes are given in Figure 5. A sample page of coded goals is given in Figure 6.

The codes serve two purposes. First, they make it possible to retrieve subsets of goals to user specification. For instance, a subset can be retrieved containing the primary (or any other level) reading (or any other subject matter subdivision) goals which deal with the process of decoding (or any other process or knowledge category). Or, a subset can be generated containing all the goals in all eight collections (or only some of them) which deal with the concept of "adaptation" (or any other concept or value coded) at a level appropriate for high school students (or any other instructional level).

Secondly, the codes help the user understand the curricular dimensions of a goal he retrieves -- the concepts and values it reinforces, the type of knowledge or process it represents, and the larger program goals (including career education program goals) to which it relates.

Figure 5

Course Goal Relationships

Within Discipline Codes	1. Subject matter 2. Instructional level 3. Program goals
Across Discipline Codes	4. Knowledge-process goal types 5. Career education goals 6. Values-concepts 7. Index (key words)

Codes for Within-Discipline Relationships

Three types of coding were designed for retrieval of goals within subject areas in ways that are useful for instructional planning. These are subject-matter taxonomy codes, instructional level codes, and codes for the broad program goals of the subject disciplines in question.

Subject matter taxonomies. The first and last sections from a subject matter taxonomy are given in Figure 7. The taxonomies of the eight subject areas were first written by curriculum experts as a framework for guiding teachers in writing goals, and were revised by the teachers as they produced the goals. By looking through the taxonomy at the front of one of the eight printed goal collections, a user can find what topics are covered and turn to

Figure 6

MUSIC

(1)

2. Reading Music (Orientation)

COURSE GOALS	Level P/I/U/H (2)	Knowledge or Process Classifications (3)	Subject Area Program Goals (4)	Career Education Program Goals (5)	Other Related Content Taxonomy Headings (6)	(C) Concept/ (V1, V2) Value Words (7)
2.2 Pitch						
The student knows the conventions used to denote intensity, highness and lowness of pitch (e.g., large to small, left to right, up and down as in acoustical and conventional organization of tones).	P I	K2 K7	1a 2a 2b		1.21	(C) Pitch
The student is able to distinguish like and unlike patterns of pitch in configuration of visual symbols.	P I U H	P33 P41 P45	1a 2a 2b		1.21 1.512	(C) Pitch (C) Symbols (V1) Aesthetic perception
The student knows that pitch is indicated by letter names and is represented on the grand staff by symbols placed on the lines and/or spaces.	P I U H	K1 K2	1a 2a 2b		1.21 6.12	(C) Pitch (C) Symbols
The student knows the function of pitch symbols used in conjunction with notes on the grand staff (e.g., clef signs, ledger lines, sharps, flats, natural signs, 8va).	I U H	K2 K7	1a 2a 2b		1.21 6.12	(C) Pitch (C) Symbols
The student knows the functions of organizational devices in pitch notation such as key signatures, chord designations, slurs and clef changes.	I U H	K2 K7	1a 2a 2b		1.23 1.322 6.12	(C) Pitch (C) Symbols
The student knows that any pitch may be indicated by various enharmonic spellings (e.g., $F^{\#}$ - $G^{\flat}$, E - $F^{\flat}$).	I U H	K2	1a 2a 2b		1.21 1.321 6.12	(C) Pitch (C) Symbols
The student knows the reasons for a difference in enharmonic spelling of a tone in musical writing (e.g., sharps in chromatic scale going up, moving notes in chord resolutions to a different scale degree).	U H	K2 K8	1a 2a 2b		1.23 1.323 6.12	(C) Pitch (C) Symbols
The student is able to write key signatures, scales and primary triads in any key.	I U H	P66 P75	1a 2a 2b	3a 4a 4d	1.23 1.322 6.12	(C) Pitch (C) Symbols (V1) Mastery-virtuosity

the topic in which he is interested. Also, a taxonomy heading may be used along with one or more of the other codes to retrieve subsets of goals from the computerized system.

Figure 7

Music Subject Matter Taxonomy

1. The Elements of Music
   - 1.1 Rhythm
     - 1.11 Duration
     - 1.12 Pulse
     - 1.13 Accent
     - 1.14 Meter
     - 1.15 Tempo
     - 1.16 Augmentation and diminution
     - 1.17 Polyrhythms
   - 1.2 Melody
     - 1.21 Pitch
     - 1.22 Intervals
     - 1.23 Scales
   - 1.3 Texture
     - 1.31 Monophony, polyphony, homophony
     - 1.32 Harmony and tonality
       - 1.321 Intervals
       - 1.322 Chords
       - 1.323 Chord progression
       - 1.324 Cadences
       - 1.325 Modulation
     - 1.33 Polytonality and atonality

6. Creating Music
   - 6.1 Knowledge and process in creativity
     - 6.11 The compositional framework
     - 6.12 Composition
     - 6.13 Rehearsal and performance
     - 6.14 Evaluation
     - 6.15 Other dimensions in creativity
7. The Role of Music in Society
   - 7.1 Arts
   - 7.2 Cultures
   - 7.3 Careers
   - 7.4 Technology

8. Valuing and Evaluating Music
   8.1 Formulation of musical values
      8.11 Affective response
      8.12 Aesthetic response
   8.2 Bases for comparing different kinds of music
   8.3 Bases for judging (evaluating) the worth of music
   8.4 Commitment to music

Instructional level. The levels chosen for coding were primary (P), intermediate (I), upper (U), and higher (H). The level code provides the teacher or curriculum planner the best estimate the writers could make of the level or levels at which the learning is appropriate. Many times the nature of the goal suggests continued learning over several levels, in which case all those levels are coded. These level indications are suggestive only, as it is evident that the appropriate time for learning varies with the interests and abilities of students.

Program level goal. A final code aimed at within-disciplinary relationships is the subject matter program goal. Recall that this more general type of goal has been written in each of the subject areas along with the more specific and numerous course goals. The code numbers of any related program goal are written beside each course goal to show the broader implications of the goal and to permit the retrieval of any or all course goals that contribute to a given program goal.

Codes for Across-Discipline Relationships

Five additional codes were designed for retrieval of goals for interdisciplinary planning. They are: knowledge-process goal codes; other related taxonomy codes; career education goal codes; value-concept codes; and index word codes.

Goal types - knowledge and process. All goals were roughly classified as knowledge or process depending upon whether they deal with something that is to be known or something the study is able to do. All goals, therefore, begin with the words, "The student knows.." or "The student is able to.."

By providing both knowledge and process course goals, the Tri-county Project offers alternative learning outcomes of both the traditional meaningful-reception/content-mastery type and the increasingly important rational thinking process development type. The increasing need for the latter type of goal is supported by the following observations: (1) Comprehensive mastery of the facts in any discipline is impossible since the huge body of the knowledge of man in most fields is doubling in something less than ten years. the time one knows "the facts" a new set has emerged. (2) "Established" facts change causing many fact-bound curricula to become obsolete during the approximately five-year lag between

their conception and their widespread dissemination. (3) Social mobility and true cultural pluralism make it increasingly difficult to identify the "important" facts. (4) Rapid social change makes it increasingly difficult to use the needs of students as criteria for selecting important facts since future needs will be very different from today's needs.

The influence of these factors is more or less according to the nature of the discipline. The "facts" about the structure of the natural number system in mathematics are not subject to change. The "facts" about the state of development of treatments for cancer in health are open to rapid evolution. In all discipline fields, however, for a given teacher, group of students, and situation there is a best combination of facts to be remembered and processes to be learned. By offering both knowledge and process learning outcome alternatives, the Tri-county Project provides a resource for the finding and learning of that combination.

The familiar knowledge/process distinction is subdivided into twelve knowledge and five basic process categories: communication processes, inquiry-problem solving processes, production processes, services processes, and human relations processes. To date the only process category that has undergone substantial elaboration is the inquiry-problem solving category in which over seventy sub-elements have been identified under the following headings: acquiring information, validating information, organizing information, interpreting information, using information to produce new information, acting upon the basis of information, and communicating information.

These knowledge and inquiry-problem solving process categories are represented in Tables A and B following. It will be noted that these classifications owe a partial debt to earlier researchers: notably, Benjamin Bloom, David Krathwohl, Robert Glaser, Henry Walbesser, and Ralph Tyler in Education; Robert Gagné and Robert Miller in Psychology; Jean Piaget and Jerome Bruner in Child Development; and others. Major differences appear, however, in the manner in which the categories are organized and in their content. This is in large part due to validation and revision from applying our original a priori categories to 12,000 goals from a variety of areas. Notice, for example, that the knowledge categories do not deal with knowledge of generalizations as a basic category, but rather assume that any goal representing a generalization must also deal with one or more of the basic categorizations. Generalizations as a class of knowledge are therefore given superordinate status and divided into two classes: principles and laws, and simple generalizations. Also,

notice there is no category of knowledge of specific facts as found in Bloom for we have been able to subsume all such goals under the basic ten categories. New categories not found in Bloom include knowledge of properties, parts, characteristics, features, elements, dimensions; knowledge of contexts, locations, orientations; knowledge of operations, methods, functions; knowledge of causes and effects including costs and benefits, advantages and disadvantages; and knowledge of relationships that are not cause-effect.

Perhaps the most significant departures from Bloom concern the process categories under problem solving and inquiry. First, the entire taxonomy is intended to represent standardized or conventional processes of problem solving and inquiry that can be taught and learned rather than psychological processes as is the case in Bloom's handbook on the cognitive domain. This difference is of utmost importance to teachers who have found it difficult to deal with learning goals within the context of Bloom's taxonomy, because it is not clear how these descriptors of psychological processes can be treated instructionally.

Table A

Knowledge Categories

G1	Principles and Laws
G2	Simple Generalizations
K1	Conventions: Names and Nomenclature
K2	Conventions: Symbols, Rules, Standardized Processes, Definitions
K3	Properties, Parts, Characteristics, Features, Elements, Dimensions
K4	Trends and Sequences
K5	Similarities and Differences, Discriminations, Classifications
K6	Contexts, Locations, and Orientations
K7	Operations, Methods of Dealing with, Functions
K8	Cause and Effect Relationships (Costs and Benefits)
K9	Criteria or Standards
K10	Non Cause-Effect Relationships

Table B

Inquiry-Problem Solving Processes

P1	Input	Acquiring Information
		P11 Viewing
		P12 Hearing
		P13 Feeling (tactile)
		P14 Smelling
		P15 Tasting
		P16 Using sense extenders
P2	Input Verification	Insuring Validity and Adequacy
		P21 Evaluating authoritativeness of sources
		P22 Evaluating logical consistency and accuracy
		P23 Evaluating relevance to desired learning purposes
		P24 Evaluating adequacy for acting or deciding (comprehensiveness and depth)
P3	Preprocessing	Organizing Information
		P31 Labeling, naming, numbering, coding
		P32 Recording, listing
		P33 Classifying, categorizing, grouping, selecting according to criteria
		P34 Ordering, sequencing
		P35 Manipulating, arranging, transforming, computing
		P36 Estimating
		P37 Summarizing, abstracting
P4	Processing I	Interpreting Information (drawing meaning from data)
		P41 Decoding verbal and non-verbal symbols (reading and literal translating)
		P42 Inferring, interpolating, extrapolating
		P43 Analyzing
		P44 Associating, relating, equating
		P45 Comparing, contrasting, discriminating
		P46 Synthesizing
		P47 Testing against standards or criteria
		P48 Generalizing
P5	Processing II	Using Information to Produce New Information
		P51 Theorizing, predicting
		P52 Formulating hypotheses
		P53 Testing hypotheses
		P54 Revising hypotheses

P6 Output I — Acting on the Basis of Information

- P61 Reacting
- P62 Making decisions
- P63 Solving problems
- P64 Restructuring values (adapting, modifying)
- P65 Restructuring behavior (adapting, modifying)
- P66 Encoding verbal and non-verbal symbols prior to communication
- P67 Creating on the basis of knowledge and process

P7 Output II — Communicating Information

- P71 Vocalizing (non-verbal)
- P72 Gesturing, moving
- P73 Touching
- P74 Speaking
- P75 Writing
- P76 Using art media (painting, drawing, sculpting, constructing, etc.)
- P77 Dramatizing
- P78 Singing, playing instruments
- P79 Dancing

The Project is attempting to define process learnings that can be taught within the respective categories. We know that many are specific to particular fields of inquiry and that some, such as the formulation of hypotheses and statements of sound generalizations, are applicable in any field of inquiry. Distinctions will be made between those that are specific to a discipline and those that are of universal character.

Since taxonomies have not been developed for the other main categories of process tentatively identified, no detailed reference will be made here to communication, production, service, and human relations processes.

At this point the reader may question the reason for the rather detailed and elaborate system of classifying educational outcomes that has evolved during the Project. We have found that providing teachers with these classification systems has resulted in a more critical approach to the writing of educational outcomes. Having written a goal, a teacher in attempting to place it in its appropriate category may find that its intent is clearly related to one of the categories but its form of expression does not immediately identify it with that category. By rewording the goal, the teacher brings the true intent of the goal into sharper focus, and in almost every instance improves its meaning and clarity.

Of interest also has been the developing recognition that generalizations, concepts, and values depend upon a wide range of sublearnings and that statement of goals in terms of these broader modes is more useful in defining instructional parameters and long-term outcomes than in describing precise, short-term learning outcomes.

Finally, the value of detailed classifying of knowledge and process goals provides insight into teaching, measurement, and evaluation requirements. Work has already begun in analyzing types of measurement appropriate for each type of knowledge goal, as described later in this article. This work will be extended to process learning as rapidly as resources permit.

Other related content taxonomy headings. This coding is provided to show that goals are often rightly classified under more than one category of subject matter. For example, a course goal coded under economics may be relevant to some aspect of history. This information is provided by coding the economics goal with the relevant taxonomy number in history. For purposes of computer retrieval, it is possible to request all goals which deal with a particular content taxonomy heading, and to extract not only the goals placed under that heading, but also all other goals cross-referenced to it wherever they are located in the collection. While this capability presently exists only within a subject field, it later will be provided among subject fields.

Career education program goals. Course goals in all eight subject areas were coded to a set of career education program goals. Career education, as envisioned by the coders, encompasses the total life of an individual, including day-to-day living, vocation, avocation, and leisure. Nearly every course goal bears at least an indirect relationship to career education viewed in that manner. Only those course goals, however, which have a "direct" relationship to a career education program goal were coded to that program goal.

Any goal that contributes to the personal and social qualities believed important to any individual in a career were coded to career education goals that define these qualities. All skills having direct vocational values were, of course, coded to their related career education goals. This coding is the first operational resource for the realization of the goal of "integrating career education and the rest of the curriculum." In addition to the cross-coding of course goals in subject areas to career education program goals, course goals on careers in the subject area were also written where the goal developers thought it appropriate. Both approaches to the treatment of career education as an integral part of the rest of the curriculum will continue to be explored.

Concepts and values. Another index highly useful for those seeking teaching strategies which cut across subject matter lines is the coding to concepts and values. Words chosen to characterize values represent constellations of behaviors conveniently described by such words. Thus, the word freedom connotes certain behaviors associated with the ideal state. Likewise, a word like honesty characterizes a set of behaviors which viewed from a societal perspective characterize an individual as "honest." From an educator's point of view, the only resources available to help students acquire the desired behavioral tendencies are the knowledge and process learnings of the experiences planned for and with students.

Viewed from this point of view, it is not possible to teach directly the value of honesty. It is possible to teach it through knowledge of the costs and benefits of behaving in ways regarded by society as representing a state of "honesty." In addition, the educator can provide the student an opportunity to behave in these ways and to experience from these behavioral processes the rewards or punishments associated with these particular acts. So it is with all value words relating to individual development.

Also important in considering the nature of values is the distinction between the process of forming values and values as end products. The curricular and methodological implications of teaching toward values as end products (inculcation of values) are entirely different from those concerned with decision making and value formation. Where the concern is with teaching how to make value judgments, the learnings sought are pure process and have nothing essentially to do with the nature of values being acquired.

In helping students acquire values, the pedagogue must rely upon teaching knowledge and skills that have a logical bearing upon these values. Where he is concerned with the teaching of valuing processes, he must teach such conventional skills as verifying information, relating information to criteria, and methods of clarifying personal and social values by which the interpretation and internalization of information can be accomplished. These processes can be taught within a wide range of subject matter.

The distinction between these two ways of viewing and dealing with values is extremely important from a curricular and instructional point of view. It seems preferable to some to deal with value formation as process learning rather than value learning, leaving free and clear the issue of whether or not values should be taught in the public schools and what these values should be. The value coding system used in these goal collections makes possible both ways of dealing with values.

The definitions and distinctions regarding concepts and values just presented are important to an understanding of the way these matters have been approached in defining, classifying, and coding goals in the Tri-county Project. For those interested in using the goals for teaching values as end products, sets of end-product value words, personal and societal, were formulated and every one of the 12,000 goals in the collections is being coded to indicate which, if any, of these values logically might be strengthened by that learning. For those interested in teaching the process of valuing, process goals will be generated within appropriate inquiry-problem solving categories that are considered useful in forming values and which may be applied by students in a wide range of personal and social situations. Concept words have been treated in the same way as value words representing learning end-products. They have been listed and each of the 12,000 goals has been coded to indicate which, if any, of these concepts are contributed to by the learning in question.

Index words. Other useful tools for interdisciplinary planning are the index words. Although they do not appear on the printed page, they are keyed to each goal for retrieval in much the way documents are retrieved from the familiar ERIC retrieval system. Users will have available lists of index words by discipline and across disciplines.

Logical combinations of goals. Finally, in the printed editions of the course goals, sets of goals which are logically related have this indicated by being included inside a bracket at the left margin. This alerts the user to possible sets and sequences of goals which it may be desirable to use as a unit.

Organization of the Project

It is impossible in this limited space to relate in detail the roles played and the numerous participants involved in the effort to achieve the project goals. Figure 8 lists the major functions and the main classes of participants for the school year 1971-72, and shows their interrelationship. A few of the classes of participants not discussed elsewhere will be singled out here for special brief comment.

The steering committee is the policy making body of the project. By their participation they have guaranteed a broad base of support and involvement in the project so that its outcomes are of potential use to every type of K-12 teaching/learning environment encountered in America from the most rural to the highly urban. Besides providing funding and policy direction they have kept constantly before the project workers the necessity for outcomes of real use to teachers and [illegible]ans to make them readily accessible.

Figure 6

PROJECT PLANNING and COORDINATION

MASTER CHART

FUNCTIONS

	Phase I: Funding & Developing												Phase II						
	1 FUNDING	2 DEVELOPING	3 Selecting Taxonomy Writers	4 Writing Taxonomy	5 Revising Program Goals	6 Selecting Course Goal Writers	7 Assembling & Organizing Existing Collections	8 Defining Criteria & Formats	9 Training Goal Writers	10 Goal Writing	11 Goal Editing	12 Publishing Critique Edition	13 DISSEMINATING GOALS & OBTAINING FEEDBACK (Newsletter)	14 EVALUATING & REVISING GOALS	15 DEVELOPMENT OF TEST ITEMS & INSTRUMENTS	16 COMPUTERIZING & ASSESSING	17 PUBLISHING EXTERNALLY	18 DEVELOPING THEORY & INTRODUCTORY MATERIALS	19 RELATING GOALS TO MATERIALS & CURRICULUM
1. *Steering Committee	X	X	X			X		X				X	X	X	X	X	X	X	X
2. Project Coordinators	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3. Data Processing																X			
4. Metropolitan Area Testing Program Board	X														X	X			
5. Taxonomy Writers		X		X	X	X	X	O	O	O	X							O	O
6. Goal Developers								X		X	X				O				O
7. Goal Editors										X	X			O	O				O
8. Media Specialists							X			X	X		X	X					O
9. Career Education Specialists							X			X	X			X					
10. District Goal Representatives	X	X	X			X	X						X			O			O
11. Feedback Review & Goal Revision Committee														X					
12. Evaluation Instrument Review & Revision Committee																X		O	O
13. Curriculum Development Committee																			X
14. District Curriculum Councils		X		O	O		O			O	O		X	O	O			O	X
15. State Board of Education	X	X		O	O	X	O		X	O	X		X	X	O			X	X
16. Teachers													X	X	X				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

KEY:

X = Certain Responsibility
O = Optional Responsibility

*STEERING COMMITTEE

Tri-County Curriculum Dept. Representatives
Tri-County Evaluation Dept. Representatives
Tri-County Data Processing Dept. Representatives

The media specialists reviewed each of the eight collections to add goals concerning the relevant print and non-print materials available in each district to support the learning of each subset of goals. In this way they have represented the first stage in developing the relationships of the goals to materials and curriculum.

The State Board of Education, through its administrators and specialists, provided financial, moral, and professional support. The possibility is being explored of having the project's outcomes maintained, revised, and disseminated at the state level once the period of development is complete.

By-Products of the Project

One of the major side effects of the Tri-county Project is the development of training materials for objective-based educational planning and the evolution of a core of teachers and others from throughout the tri-county area sophisticated in the use of goals as a resource for improving the teaching/learning system. In the course of developing the course goals produced so far, extensive training was undergone by the more than 100 developers and their support personnel in the course of which the assumptions, definitions, and procedures of the project were refined and extended.

Dissemination

Up to the present only limited printings of critique editions of the course goals have been distributed for criticism and review, and only a pilot version of the computer retrieval system is operational. During the coming year (1972-73), the project will concentrate upon developing the measurement dimension, validating and revising the goals and codes, and developing a dissemination system.

Any set of dissemination procedures developed by the project must accord with its philosophy of nonprescriptiveness. The project and its products are passive resources to be used by decision makers to fulfill their responsibilities more efficiently and effectively. It is envisioned for instance that school systems will select from the file those goals they subscribe to; that schools within a system will select those they believe appropriate to the needs of their communities and students; and that teachers will select from their school goals those they believe appropriate to the interests and abilities of students in their classes. Each selection will be made with the approval of the next higher echelon of authority; and once made will constitute the goals for which the school or teacher assumes responsibility. Nothing in this process is intended to preclude

statement and use of goals not included in the collection, provided they are approved by the next higher echelon of authority. The purpose of making the collection is to expose to view a full range of learning possibilities, stated well enough to be helpful to classroom teachers in planning learning experiences for students.

The dissemination procedures will include inservice education, seminars for administrators, slide presentations, written documents, media presentations, presentations to school boards and presentations to university personnel as well as distribution of copies of the course goal collections and access through intermediaries to the computer retrieval system for curriculum developers.

Two key resources in the dissemination process are project representatives appointed by the superintendents of most of the approximately 70 school districts in the tri-county area. This group meets bi-monthly and provides liaison and feedback for each district regarding the project. The other important resource is the many professionals who have participated in the project.

Validation of the Goals

All course goal collections are first released as critique editions for limited circulation to teachers and curriculum specialists. After one revision is made based on feedback from users, a first edition will be issued and the resources of the computer retrieval system will be made available.

An important step in this process is formation of a Review and Revision Committee in each of the eight subject areas. Each committee will have experts in the discipline assigned to validate the content of the course goals. In this way, it is hoped to authenticate the information in the collections and to eliminate bias.

Continual Update and Revision

Updating and revision by the committees will be continual. Since the course goals are an open-ended collection of alternatives, there will be no difficulty in continually adding to, deleting from and revising the goals to make them better reflect the range of learning outcomes any teacher might strive to attain.

Curricular Implications

A general concept of learning, and hence of curriculum design has been sumed in the structure and coding of the goal collections. Processes such

as communications, problem-solving, inquiry, production, and human relations are normally carried out within some kind of a learning context, and the interaction of these processes with the learning context produces knowledge and values. The components of this curriculum design, in terms of goals, are the various process learnings that can be developed within the learning context under the supervision of the teacher, and the knowledge and values outcomes that are desired and which will normally govern to a large extent the selection of the learning context.

The following schematic (Figure 8) illustrates these components and their relationships. The learning context in this arrangement is in effect the curriculum. It is the set of structured learning experiences provided by the school, the teacher, or the student himself, under teacher supervision.

In most curriculum development work in the past, too much attention has been paid to prescribing the specific learning experiences that it is believed will produce specified objectives. In fact preoccupation with curriculum has overshadowed the attention given to defining worthwhile learning, probably to the detriment of both.

By reversing this emphasis and stressing knowledge of learning outcomes on the part of the teacher, it is possible to achieve these advantages: teachers can employ those methodologies they are most effective in using; teachers are free to select learning experiences that are relevant to the interests of students; teachers can encourage students to find their own methodologies for achieving learning goals; and teachers and students can select learning experiences uniquely available in their own communities and neighborhoods.

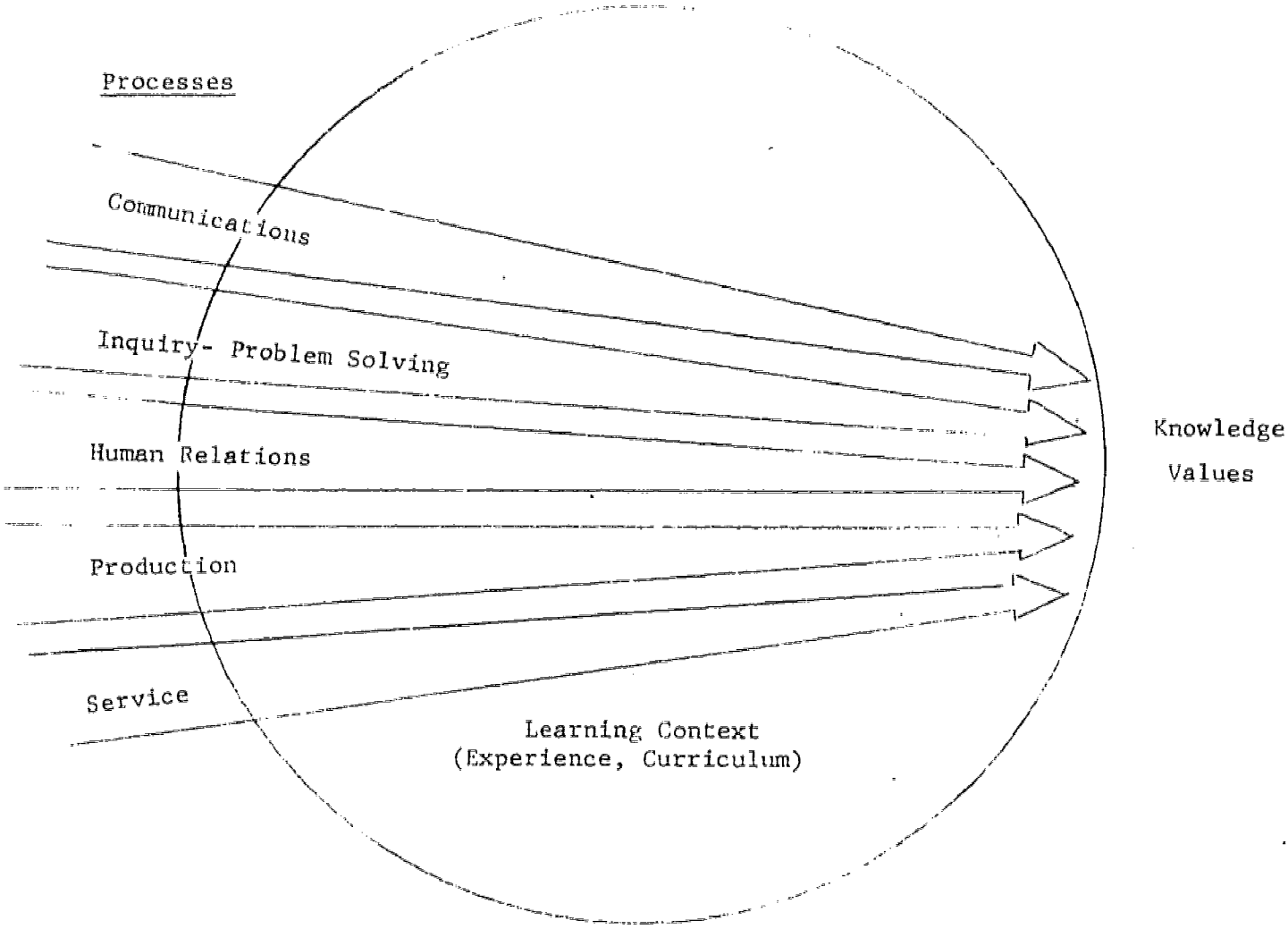
Each of these points has significance when we speak of relevance, of individual learning styles among students, and of individual strengths and differences among teachers. All of the above advantages can be lost when curricular experiences are too specifically prescribed.

Measurement Implications

The accountability movement in education has joined hands with the behavioral objectives movement and the momentum attained by this alliance has carried it to the highest levels of state and national policy. The U.S. Office of Education revision of its manual of chart of accounts and its support of experimental PPBS programs under the sponsorship of the National Association of School Business Officials are two illustrations of national level policy attention, and the movement of several state governments towards state PPBS systems illustrates the strength of the movement at the state level.

Figure 8

Goal Based Curriculum Model



Areas in which goals currently being defined:

1. Universal inquiry-problem solving processes
2. Knowledge and discipline related process of communication, inquiry-problem solving, and production (eight subject disciplines)
3. Values (indirectly through coding to knowledge and process goals thought to have a supporting relationship)

Areas in which goals yet to be defined:

4. Universal human relations processes
5. Production processes
6. Service processes

Although the orientation of beginning PPBS programs in public schools has centered on accounting and budgeting practices primarily, a substantial effort has been mounted in many states to produce a rational approach to the use of goals and objectives in these systems. In general these efforts have been unsophisticated and crude. The fact that measurement in education is still in a primitive condition no doubt plays a large part in the difficulties now being experienced by those who work toward educational accountability.

Underlying the problems of measurement and evaluation is the absence of a properly developed science of goal and objective formulation in the school systems of the nation. In the absence of systematic and rational approaches to the development of desired instructional outcomes of public school programs, it is not surprising that measurement and evaluation is in its present state because the validity of measurement and evaluation is totally dependent upon their consistency with the goals and objectives of the educational systems to which they apply. One of the goals of the Tri-county Project is to point the way to a more rational theory and practice of goal formulation in the public schools for it is believed that it will not be possible to develop a system of educational accountability the absence of this theory and practice.

In the Project there have been three major directions taken toward rational measurement. The first is the defining of clear and measurable learning goals. The second is the development of a hierarchical goal structure that corresponds to the organizational realities of school systems. And the third is the analysis of knowledge and process learning to make clear the dimensions of what can be learned and the special measurement requirements of each type of learning. The work of developing measurement criteria and techniques will advance much more rapidly now that this foundation has been laid.

Uses of the Course Goal Collections

We conclude this guide to the course goal collections with a review of some of the uses to which they can and have been put. This is the crucial test of any educational research and development project -- can it be used to help students?

School systems may use the collections as a yardstick by which to measure the adequacy of goals and objectives already in use. Goals and objectives of local courses of study and textbooks can be contrasted with the goals in this collection to see how complete they are and how well they provide for different interests, abilities, and levels of achievement. They can also be evaluated for conciseness, clarity, and accuracy using these course goals as models.

These kinds of studies can be undertaken by teachers from all levels of a school system (to assure articulation and philosophic unity); across grade levels, divisions, or high school departments (to assure agreement as to goals and ways and means of attaining them) or by individual teachers.

A related use of the goals is as a starting point for reviewing what the schools should teach and the materials to be used to support teaching. The logical sequence of discussions about what is important to teach and learn is to move from broad policy goals to program goals to course goals, with appropriate community-board-staff-teacher-student representations at each level. The taxonomic classifications of this collection can serve as a check on higher order goal formulations, and the goals themselves can function as generators of lower order objectives and instructional plans.

The Project provides an important resource for improving the quality and extent of participation of students, parents, teachers, school boards, and other citizens in deciding the mission of the schools. An intensive look at the roles of each participating group in generating, reviewing, contributing to, and approving goals will be a future task of the Project.

Another use of the collection is to provide a basis for teaching-learning accountability. If a school approves all or part of the course goals for its students, grade level, divisional, or departmental representatives may choose from them those that are best suited to individual or group aptitudes and interests.

It is possible for teachers to review goals with each student and contract for their attainment if a completely individualized program is desired. Or, it is possible to stake out a set of goals for target groups (regular classes, special classes, mini-courses, etc.). In any event, the goals themselves are sufficiently explicit that means of teaching them and of evaluating their attainment can be devised and applied individually or to groups to suit the needs of teachers and management.

Another use of the collection is the rewriting and development of courses and curricula. By making curricular options explicit and sharable, the collection can help in the development of new or modified courses of instruction and the design or redesign of curricular experiences. One important example of curriculum development fostered by this collection is cross-disciplinary education. This use has been referred to in detail in the earlier discussion of "Needs to Which the Project Responds" (See pages 1-6).

Other uses can be cited, but districts will discover these. In all of the above activities, districts are invited and encouraged to use the collection selectively and to add their own goals wherever this collection is insufficient to their needs. We hope that where they do add and modify, they will use the feedback forms and contribute to the expansion and improvement of the original collections.

Meaning of the Critique Editions

The first publication of course goal collections, as stated earlier, is in the form of "critique editions." The entire project is developmental and it was believed especially important to recognize the incomplete and perfectable nature of this first massive effort to define entire subject disciplines in terms of explicit learning goals. At least one major and systematic revision was viewed as essential to the production of goal collections of the quality desired to serve the important multiple functions for which they were designed.

To underscore that belief, it should be noted that second-year, first-time collections are of better quality than first-year, first-time collections, simply because of the experience gained by project directors and coordinators the first year. Also, the theoretical advances made in developing knowledge and process classifications and in exploring knowledge-process-value relations (as well as relationships between learnings in the disciplines and career education goals) have produced in the second year collections new codings of considerable value to curriculum planners. Further developmental work will certainly modify the form and content of future collections.

Feedback from users of the collections is an important element in their continued revision and improvement. We invite and urge you to use the feedback forms and procedures that are provided for this purpose.

VWD:sw