

PRACTITIONER'S
IMPLEMENTATION
HANDBOOK

The Outcome-Based Curriculum

Second Edition

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TABLE OF CONTENTS

1. Introduction to Outcome-Based Education

The Premises of Outcome-Based Education.....	1
Organizing Outcome-Based Education.....	4
Pre-Implementation Condition.....	5
Implementing Components.....	7

2. The Elements of an Outcome-Based Curriculum

Curriculum: Definitions.....	11
The Elements of an Outcome-Based Curriculum.....	12
Alignment in Outcome-Based Education	15

3. Objectives and Units of Instruction

Types of Objectives	17
Organizing Objectives into Units	21
Specificity of an Objectives.....	23
Elements of an Objective	24

4. The Quality of the Objectives

Analyzing and Improving the Quality of the Objectives.....	27
Curriculum Integration.....	28

5. Assessment and Standards of Mastery

Alignment with Instruction.....	33
Normative and Criterion-referenced Assessment.....	34
Formative and Summative Assessment	36
Categories of Assessment.....	38
Standards of Mastery	40

The Role of Instructional Materials.....43
 Selecting Instructional Materials.....45

7. Steps in Developing an Outcome-Based Curriculum

Developing Educational Goals.....51
 Developing Program Goals.....53
 Developing the Specifications.....56
 Planning Courses.....58
 Establishing the Units.....59
 Planning Units in Detail.....60

Appendix

EDUCATION

OUTCOME-BASED EDUCATION is a system for the organization and delivery of the instructional program in elementary and secondary schools which assures success for every student. It incorporates the findings of the Effective Schools Research, linking them together into a comprehensive and powerful model. Educators in outcome-based schools know that if they organize their schools properly, and offer high-quality instruction, all students will succeed with no change in standards.

The Premises of Outcome-Based Education¹

Outcome Based Education is based on three simple premises which guide the thinking and the actions of professionals in outcome-based schools (a) all students can learn and succeed; (b) in schooling, success breeds success; and (c) the schools can cause every student to be successful, and they cannot evade the responsibility for doing so.

All Students Can Learn and Succeed

In the world of pre-school children, there are no unsuccessful students. Young children differ in learning speed, but in the home environment, all children learn a great deal. As pre-schoolers, children learn the extremely complex tasks of walking and talking and they acquire a spoken vocabulary of between 3,000 and 10,000 words. Children learn the many rules, spoken and unspoken, that prescribe behavior in their world. They learn hundreds of facts and relationships among facts. Pre-school

¹ Developed by Dr. William Spady, founding director of the Network for Outcome-Based Schools.



children are effective and efficient learners, and this is what everyone expects them to be.

When the same children enter school, though, they enter a world of very different expectations. In this new world, some of the most important people in their lives - some of their *teachers* - *expect some of them to fail*. They expect only a few to learn well, a few more to learn a bit better, and so on through the whole range of learning ability - down to the few who, they expect, will not be at all successful in learning. In the minds of some people, the bell-shaped curve is a valid representation of student capabilities to learn.

The bell-shaped curve is indeed a valid representation of student *achievement* in specific circumstances, but not of learning capabilities. If instruction is provided over a limited period of time, student achievement will be distributed in a pattern resembling a bell shaped curve. However, it has been conclusively demonstrated that if schools are organized to provide appropriate conditions for learning, virtually all students are capable of learning the essentials of the school curriculum. Some schools have achieved results in a familiar school setting that are close to those of individual tutoring.

Success Breeds Success

The circular relationship between academic success and high self-concept has been well documented. When students succeed in school, they feel capable of such success, and are willing to take on additional challenges. The converse is also true; when students begin to fail, their school behavior becomes motivated increasingly by avoidance. They disappear into the back of the room, or down into their chairs.

In the past, schools seem to have been organized around the belief that students are motivated by failure and the fear of failure. It is now recognized that the reverse is true; that fear of failure motivates only those with a pattern of success. For others, it only reinforces an already-poor self concept.

Schools Control the Conditions of Success

Previously, many educators believed that the primary significant factor affecting a student's success in school was the socio-economic status of his parents. No one would dispute the importance of parental involvement in the education of children. The child from the home that is rich in learning opportunities - grammatical English, challenging questions at the dinner table, frequent trips to other places - will find school learning far easier than the child without these advantages.

However, while socio-economic differences do explain some differences in student achievement, they do not explain them all. Students from a given socio-economic background acquire a better education in some schools than students of similar socio-economic status in other schools. This is the thrust of the Effective Schools Movement. This discovery has demolished forever the excuse that "they come from poor homes; what can we expect?" By permitting some children to fail, the school, in effect, is throwing up its hands, and maintaining that there is nothing it can do.

Professionals in an outcome-based school, by accepting responsibility for the success of every student, proclaim that they do not give up on any child; that if a student is not making adequate progress, adjustments will be made until the successful combination of curriculum, organization, and teaching is found.

The three premises that are the foundation-stones of outcome-based education provide a comprehensive picture of the basic purposes of schools. A school is not a selecting or classifying agent. Its role is not to determine which 30 percent of the entering first-graders have what it takes to succeed in college. The school has no mandate to cater primarily to the intellectually elite or the socially privileged. In a democratic society education is for *everyone* - as it must be if democratic society is to survive.

Organizing for Outcome-based Education

Whether a school or district decides to implement outcome-based education abruptly or over a period of years, thorough planning will prove to be a first requirement for success. OBE assumes extensive planning in each of five components; this provides a framework for further, more detailed planning, the assignment of responsibilities, and the analysis of problems when they arise.

Moreover, in order for change of any kind to be systematically and successfully introduced into a school setting, three conditions must already exist. Because they are pre-conditions for any change, they are called "pre-implementation."

The three pre-implementation conditions, and the five implementation components are:

Pre-Implementation Conditions:

1. A professional environment
2. Strong leadership
3. Planning and budgeting systems

Implementation Components:

1. An aligned curriculum
2. School organization
3. Instruction
4. Information management
5. Instructional support

Each of the booklets in this series addresses one or more of these areas in depth. The following brief summaries will provide the proper context for the more detailed descriptions that follow.

Pre-Implementation Conditions

A Professional Environment:

A professional environment is one characterized by decisions based on information and data rather than past practice and tradition. While some past practices and traditions may survive close, critical scrutiny, others may have been benefiting only some, but not all, of the students. The professional imperative requires a school to keep all aspects of its operation under continuous surveillance, and to base all decisions - to change something, or to continue something else without change - on information and data, the sole criterion for acceptance being the probable or demonstrated effect on student learning.

A commitment to base decisions on information rather than tradition is the essence of professionalism. If medicine were not a profession, doctors would still be bleeding their patients to expel the evil spirits. In a school setting, the clinging to practices (e.g., grading on a curve, pulling students out of the classroom for special help, etc.) with no consideration of the demonstrated effectiveness of these practices is the equivalent of bleeding a patient.

Leadership:

The "principal principle" has been well documented in the research literature. In virtually every study of effective schools demonstrating high levels of student achievement, the principal has emerged as a strong leader. The principal sets the tone of any school, and establishes and maintains the culture. Strong principals have high expectations for themselves, their staffs, and their students. They know that the quality of the school can affect the learning of every student, and they are committed to success.

In practical terms, such leadership means that principals have the technical skills to improve the instructional process. They are able to model good teaching, where that is necessary. In addition, they protect instructional time from non-instructional interruptions, they allocate resources according to clear instructional priorities, and they monitor curriculum implementation. In short, the instructional program is clearly established as the mission of a successful school; a strong leader marshals the resources required to improve and maintain that program.

Planning and Budgeting Systems:

In order to implement successfully any change of substantial magnitude, a school or district must be capable of mounting a planning effort that will define the proposed change and the decisions that will have to be made as the project proceeds. Such a plan will establish a timetable for such changes and for adoption of each component of the project (with due regard for the budgeting cycle), and arrange for adequate resources to provide such support as the project may require along the way.

A formalized planning process has several distinct advantages over *ad hoc* decision-making. Primarily, it legitimizes a process. It provides a framework within which to set priorities and allocate resources. In general, people don't mind waiting in line if they know they are in line and that the line is moving. An impression of disorder in a process, or the impression that others are "cutting into line" following no procedure, quickly saps morale. The challenge in creating a planning and budgeting system is to ensure that the process involves all the appropriate people in appropriate sequence to assure both the quality of the decisions, and their acceptance within the organization.

All decisions are easier to implement if they have been part of a process. Even those people who would have preferred another final plan will devote energy to implementing the plan that was adopted if they have been part of the discussions that led to the decision. The existence of a formal system for decision-making and budgeting obligates all members of an organization to accept whatever decisions emerge from that process.

Implementation Components

Aligned Curriculum:

In an outcome-based program, the curriculum consists of three distinct elements, the instructional objectives, criterion tests, and materials. The objectives define the content of the school program. The criterion tests are used to assess student mastery of the objectives of the curriculum. The materials (texts, supplementals, films, etc.) define the resources for teaching.

These three elements must match, or be aligned. This alignment ensures that there will be no mysteries, no surprises, no trick questions. Everyone will know in advance what the learning objectives are, what materials are to be used, and how success is to be measured.

The curriculum objectives must be organized and sequenced into units of instruction, with any prerequisites identified. Prerequisites are most familiar in mathematics (subtraction with regrouping as a prerequisite to division, for example), but they exist in other areas as well.

An outcome-based curriculum may be established at any level of cognitive challenge. To say that instructional objectives are *defined* is not to say that they are at minimum competency, or low-level. The degree of challenge posed by a given objective is established by the objective, not by the act of defining it. Educators now have techniques for clearly mapping the cognitive level of the curriculum, and upgrading it if they want to do so.

The fact that students learn at different rates has implications for the organization of the curriculum. It may be organized as a single, non-graded sequence of units, through which students move at their optimal rate. It may be differentiated at different grade levels, with different strands, for example, of 10th grade English. Or it may be organized as a grade level curriculum with enrichment opportunities provided within each unit of instruction or as additional units. The decision of how to how to organize the curriculum is one of the first to be made, and will depend on many factors.

The development of an outcome-based curriculum is fully discussed in the remainder of this booklet.

School Organization:

Once a curriculum has been organized, sequenced, and aligned, it is the responsibility of each school in the district to see to it that each student is appropriately challenged within that curriculum.

Just how to do that will depend partly on the nature of the curriculum: a single, non-graded curriculum is handled differently from a differentiated curriculum or a grade-level curriculum with enrichment. It will also depend on internal factors within the school, among them the age and special needs of the students, the resources available to the school (for example, the number of Chapter I teachers or aides or both), the physical layout of the school, and the nature and working patterns of the staff.

For best results, each school in the district develops its own arrangements - its own Building Plan - for implementing the instructional program. Each Building Plan must provide for:

- assessment of student skills for placement of each student in the curriculum;
- assignment of each student to an appropriate instructional group and re-assignment when necessary to accommodate differences in individual learning rates;
- effective communication among the teachers within the school regarding the progress of each student; and
- effective communication with parents regarding the actual learning progress of each individual student.

Since each Building Plan is developed independently, different schools in the same district often have quite distinct plans. This subject is addressed more fully in the booklet "Developing the Building Plan."

Instruction:

The most important component of the educational process is the actual teaching of students. In an outcome-based instructional program, teachers teach to the carefully defined curriculum objectives. Lesson plans reflect the types of objectives to be taught; higher-order cognitive processes, for example, require a different approach from basic knowledge and skills. In addition, units may be designed around the objectives from several different curricula simultaneously, resulting in a powerful, integrated program.

In an outcome-based program, defining the specific instructional objectives is most effectively a district-wide process, performed by curriculum committees. Supervising and assisting students towards the mastery of those objectives is the domain of individual teachers. It is each teacher's responsibility to search out and use those teaching strategies which have the highest chance of success for students in their charge. In general, these strategies will be interactive and direct, with multiple opportunities for learning. In addition, an outcome-based approach mandates that teachers attend to the need for corrective measures, re-teaching students who need more time (and possibly a different approach) to learn the same material. This topic is discussed more fully in the booklet "Teaching for Mastery."

Information Management:

Once students have been assigned to appropriate places in a curriculum and are receiving appropriate instruction, the progress of each student through the curriculum is measured by the information management system. Such a system may be a simple manual tracking card, or an elaborate computerized monitoring system, or anything in between. Just how this is done is not important; the fact that the monitoring be continuous is crucial. The success of an outcome-based program depends on knowing whether students are actually learning what the teachers are presenting to them.

Monitoring is useful in other ways as well: it provides data for assessing the effectiveness of each segment of the curriculum; it provides the basis for decisions regarding assignment or re-assignment of individual

students to instructional groups; it simplifies reporting to parents as to the progress of their children; it is the source of information for transcripts and the record of progress toward the meeting of graduation requirements.

Instructional Support:

The instructional support system is that organization within the school and across the district that provides the safety net for student success. It provides additional resources to those students who need more instructional time, for example, or a smaller instructional group, or different materials, or different techniques to achieve success.

It is not unusual for a district's instructional support system to be largely financed by dedicated funds provided by federal or state agencies. (See the booklet "Using Categorical Funds for OBE.") Such use of Chapter 1, or state remediation, or transitional bilingual, or other categorical funds not only reduces the burden on the district's general fund but also frequently provides a focus for those categorical programs. This use of the funds frequently results in far greater benefits to the students than a more traditional program design.

The instructional support system, however, is not something separate from the school program. It is a component of the instructional program, and is fully integrated with all of the other components - one that ensures that every student successfully masters the objectives of the curriculum.

For an understanding of outcome based education, it is helpful to treat the different components separately. However, they do not function independently of one another, but interact in many ways. This booklet provides information for school practitioners on the details of an outcome-based curriculum, with the other components discussed in the other booklets in the series. As these other components come into contact with the curriculum, the connections will be mentioned.

2

THE ELEMENTS OF AN OUTCOME-BASED CURRICULUM

Curriculum: Definitions

This section describes briefly the various definitions which have been offered for the word curriculum, including the one which is most appropriate for an outcome based curriculum.

A curriculum, broadly defined, is the *what* of the instructional program, the content presented to the students. Beyond that, there is little agreement, even among practitioners, as to a clear meaning of the word.

The principal definitions of curriculum are:

the program of studies, (e.g., "the curriculum consists of Algebra, Trigonometry, etc.") This definition usually includes only the course offerings, although sometimes it also means the courses required for graduation.

the course content, the selection and organization of the information that the students are to learn, the topics the teachers are to cover. Thus, the curriculum might be considered to consist of simultaneous equations, the Revolutionary War and other specific items.

the *planned* learning experiences of the children held under the auspices of the school. This definition includes activities, projects, field trips, and assignments, in addition to classroom lessons.

all student experiences under the auspices of the school, whether planned or not. Such a definition includes the "hidden curriculum", those things that some students learn - such as to dislike reading, or to fear the teacher - which are certainly not intended by the professionals in the school.

a "structured series of intended learner outcomes". This definition is the most appropriate for discussions of an outcome-based curriculum. It focuses on outcomes, or what the students learn, as distinct from inputs or instruction. This definition also implies planning - a major element in outcome-based education - since learner outcomes don't become structured and organized into a sequential order all by themselves.¹

To say that the curriculum consists of a "structured series of intended learner outcomes" says nothing, of course, about the content of those outcomes. That is always a matter for debate, which occurs during the phase of development of a district's educational goals and program goals (see pages 49-53.)

Summary: For purposes of outcome-based education, a curriculum is "a structured series of intended learner outcomes." This definition implies a planning process, and a focus on what students actually learn.

The Elements of an Outcome-Based Curriculum

The three elements of an outcome-based curriculum are: 1. the objectives, or the desired learner outcomes, 2. assessment of the outcomes, and 3. instructional materials. These three elements, and their relationship to one another, are discussed briefly here, and in greater detail in the sections that follow.

¹ This planning process, including who should be involved, in what order and for which decisions, is described in the booklet in this series "Introducing Outcome-Based Education".

Objectives

An outcome-based curriculum is very specific and detailed about what the learner outcomes are to be. These stated outcomes become the framework for the entire instructional program and a true guide for teachers. Many educators have had the experience of working on a curriculum committee, putting forth quality effort and producing what all believe to be a valuable document, only to see it gather dust on one's colleagues' (and even one's own) shelves.

In an outcome-based school the learner outcomes are made public, to the students and to the community at large, and they are clustered together into instructional units. Thus, when students embark on a unit of study, they know exactly what they are expected to learn.

Furthermore, objectives in an outcome-based program are defined in such a form that student progress may be readily assessed. That is, they are stated as student performances, not as topics for discussion. For example, an objective might be written as "the student will describe three major causes of the Civil War, and compare them to the causes of the Revolutionary War", with criteria established for how the resulting paragraphs should be scored. An answer to a question based on this objective is easier to assess than if the students were asked to "Discuss the causes of the Civil War".

Assessment

In addition to objectives, an outcome-based curriculum also defines the method of assessment (for example, a test, a paper, a project) and the standard of mastery that will be applied to student performance. Thus, students know not only what they are expected to learn in a given unit, but also what the standard of mastery is, and what they will have to do to demonstrate that mastery. Mastery learning, not mystery learning.

Assessment in an outcome-based program is entirely criterion-referenced, rather than norm-referenced. That is, students' skills and knowledge are assessed against the content of the curriculum as expressed in the objectives. Moreover, in an outcome-based instructional program, students are assessed frequently, with the results of the tests

used not for grading purposes, but to identify the need for remedial instruction, if any. Such tests are called "formative tests", and they are administered after a unit of instruction of about two or three weeks has been completed.

In a system with norm-referenced assessments, on the other hand, students take tests which are developed independently of the curriculum (usually by a commercial test-making firm), and their scores are based on how they compare with other students who have taken that same test. Typically, these tests are administered at most once a year, and often only two or three times in a student's entire academic career. The results are entered into the student's permanent file and never used for instructional purposes.

Materials

An outcome-based curriculum also defines the materials to be used in the instructional process. This is partly for the convenience of individual teachers (who, under a district's curriculum planning process, will probably have been involved in selecting the materials). But even more important, the specifying of the materials ensures that the objectives are teachable using materials available to the teachers and the students.

Materials include textbooks, workbooks, supplementary materials, films and filmstrips, computer-assisted instruction, and other teacher resources. The materials specified in an outcome-based curriculum are not different from the materials used in any good program. They need to be of high quality, to support the curriculum, and to be easily available to teachers. This last is important. If materials are not convenient, they will not be used; if certain materials are important to a curriculum but teachers have to chase all over the building to find them, the curriculum will not be as well taught as if the materials were close at hand.

Summary: An outcome-based curriculum consists of three elements: objectives, assessment, and materials.

Alignment in Outcome-Based Education

The three elements of an outcome-based curriculum (the objectives, the assessments, and the materials) must be tightly aligned with each other. That is, they must completely match. Any learning outcome identified as part of the curriculum must be assessed, and any item on a test must have been taught. Students are not "kept on their toes" by not knowing what to expect on a unit test, and they are never surprised by a trick question on a test.

Most teachers have their own anecdotes concerning misalignment from their student days; many can recall the college professor whose lectures did not follow the course syllabus or the textbook, and whose tests had nothing to do with either.

In an outcome-based instructional program, not only are the three elements of the curriculum aligned to one another, but all three are aligned to instruction. That is, it is the teachers' responsibility to teach the curriculum (i.e., the objectives), and not something else. Some educators may wonder why such alignment even needs to be mentioned; of course, teachers teach the curriculum. But it does deserve mention, because some teachers appear to believe that the curriculum is what happens when the door is shut, and anyway, what they have to offer is more important than what is in that district-provided curriculum guide.

But if what is in the district's curriculum guide is what they and their colleagues have decided should be there, and if it is on the contents of the district's curriculum guide that their students will be tested, and frequently, then they are more likely to teach that content. Just *how* they go about teaching that content is part of the professional responsibility of each teacher, and is an appropriate outlet for their creative energies.

Extensive research has demonstrated the dramatic results that can be achieved when a curriculum is aligned, and when teachers teach for mastery. Most recently, under the leadership of Benjamin Bloom at the University of Chicago, studies have been conducted in which the achievement of the average student in a mastery learning environment was higher than that of 84 percent of the students in the control class. In addition, 70 percent of the students in the mastery class reached the level

of attainment of only highest 20 percent of the control class. These results were found for students of different ages and in different subjects.²

However, to state that the elements of an outcome-based program must be aligned to one another, and that all three must be aligned to instruction, is not to suggest that every word a teacher utters, and every concept discussed in a textbook, finds its way onto a unit test. On the contrary, in order for a learning environment to be rich, a teacher must present, and the students must read and discuss, far more than is directly required by the objectives.

To be sure, the extraneous material must support the objectives - it can provide additional information on which concepts are based, or provide additional examples, or relate concepts to one another - but it is always supportive of the objectives. If teachers feel constrained by the specific objectives, if they find them too narrow, and believe that the most interesting parts of their classroom session fall into the "extraneous information" category, possibly they have written their objectives too narrowly. In that case, the objectives - and the tests - should be rewritten by the curriculum committee to reflect the broader scope of the subject.

Summary: The three elements of an outcome-based curriculum - the objectives, the assessments and the materials - must be aligned to each other and to instruction.

² "The Search for Methods of Group Instruction as Effective as One-to-One Tutoring", *Educational Leadership*, May, 1983, pp. 4-17

3

OBJECTIVES AND UNITS OF INSTRUCTION

Objectives define the content of the curriculum, and provide the framework for the instructional program. They are the basis on which materials are selected and tests are written. This section discusses several aspects of outcome-based objectives: the different types of objectives, their organization into units, and their relationships with one another.

Outcome-based education is not the same as minimum competency. Objectives in an outcome-based program can be at whatever level the staff professionals choose to place them. It is not true, as some educators apparently believe, that such objectives are of low cognitive challenge. There is nothing low-level, for example, about Shakespeare's treatment of jealousy in *Othello*, yet that could appropriately serve as the basis for an objective in a course in English literature.

Types of Objectives

Objectives may be classified as to type: knowledge, inquiry and process skills, psychomotor skills, social skills, and values. Every curriculum area includes objectives from one or more of these categories. The different types of objectives are described here and listed in the Appendix.

Knowledge

Examples of objectives in the category of knowledge are knowing the sound made by the letter "p", the dates of the Civil War, the elements of the novel, the differences between planets and stars, the trends in the

relationships between monarchs and parliaments through history and the causes of excess pressure in a steam boiler.

Knowledge is specific to the curriculum area; knowledge is *about* something - history, or science, or literature, or mathematics. When we speak of a person as well-educated, we mean that the person knows a lot, or possesses a lot of knowledge.

The two lowest levels of knowledge¹ consist of conventions - nomenclature, symbols, rules, and the like. For example, the symbol for "dollar" is \$. This knowledge is social knowledge, true by convention only, and for convenience. There is nothing to discover about this type of knowledge; it can be learned only by rote, from other people.

Higher forms of knowledge are formed by the inquiry and problem-solving skills (described in the next section), either by individuals or by the culture at large. That is, knowledge of trends and sequences is developed by examining data, and forming a hypothesis related to the perceived pattern. Extensive research has been done on analyzing and classifying knowledge at progressively higher levels of complexity. Information is important to knowledge, and constitutes its foundation, but only when interpreted by hypothesis does information become knowledge. Of course, not every individual has to create all knowledge; books are one way to represent a culture's collective wisdom.

Knowledge is subject to change. Lower-level conventional knowledge may be changed by mutual consent (the symbol for "dollar" was recently changed from \$ to \$). Higher-level knowledge is changed as information is discovered which challenges a previous interpretation. In this process the facts are salvaged and re-used, but the knowledge they supported is replaced by new knowledge.

Inquiry and Problem-Solving Skills

These are the reasoning skills, many of which have been traditionally ignored in the school curriculum. Examples of these processes are

observation, evaluating information for its relevance to a particular situation, organizing information, comparing and contrasting, formulating and testing hypotheses, making graphs and charts, and writing reports. These skills have recently commanded attention as "higher-order cognitive processes", or "higher-order thinking skills." The model used here for these skills is one of input - processing - output. This model provides a useful scheme for understanding such skills and attending to them.

The processes themselves produce knowledge from new information. When people formulate, test, and revise hypotheses, the result is knowledge of some type. That knowledge may be changed with new information, but the reasoning processes involved in creating the knowledge remain constant.

Psychomotor Skills

Examples of psychomotor skills abound in physical education: skipping, kicking a ball skillfully, catching and throwing. They play a part in other curricula as well, in handwriting, for example, or using a microscope properly, or playing a flute, or handling a paint brush.

Values

Many educators are uncomfortable with the notion of "teaching" values, and would maintain that values do not properly belong in the curriculum. But students do learn values in the school environment, in the classroom, on the playground, and in the cafeteria and hallways. For example, as a culture we value the dignity of the individual, and teach a respect for property rights and for free speech. Some values, such as honesty or respect for other people's work, pervade an entire school and transcend particular curriculum areas. They affect behavior not only in classrooms, but in the corridors, the lunchroom, and the principal's office. The activity of identifying such pervasive values, and examining behavior and practices in this light, can be a unifying and exhilarating activity for a school staff.

In the teaching of U.S. History, teachers emphasize the values on which this country was built, and encourage students to preserve them. It would

¹ See the Appendix for this classification.

be a rare community that did not want its children to understand and maintain those values. In science courses ecological balance is an important concept, and teachers try to instill a sensitivity to that balance.

In short, the curriculum is full of values, many of them embedded in our development as a nation. And many of these values start in the elementary classroom where children are not permitted to destroy one another's work, and are encouraged to respect the opinions of others.

Sometimes values conflict with one another and produce disharmony. For example, an individual might find himself caught between honesty and loyalty to a friend, a society might experience conflict between economic growth and preservation of its forests or waterways. Such situations produce moral dilemmas and provide rich material for classroom discussions.

Values cannot be reduced to knowledge; values are judgments involving "shoulds", whereas knowledge simply tells us what is. However, increased knowledge may cause people to change their minds about a particular course of action. For example, knowing that a certain practice is destroying the rain forest and knowing how essential it is to maintain the ecological balance may cause people to disapprove of the practice. But it is the valuing of that balance, not the new knowledge, that creates the judgment.

In short, then, values are an important part of the curriculum, and play an important role in the classroom. It is a mistake to believe that teachers don't or shouldn't teach values. What is important is that educators acknowledge the role of values in the curriculum, and be clear about which values they are teaching.

Social Skills

For many students, school is an individual, independent experience. Desks are arranged singly in rows, and students are discouraged from talking with one another. Yet in other areas of their lives, people work and associate with others, and they must develop the skills to do so effectively. Such skills are very important for students in their family,

community and adult vocational lives. These skills are therefore important in the education of all students.

Examples of these social skills are listening carefully to others, summarizing group discussions, proposing alternative strategies, drawing out reluctant group members, and energizing others. These skills are developed in the context of group work; indeed, the success of such group work often depends on their mastery. In addition, there is mounting evidence that for many types of content in the school curriculum, students learn most effectively when they work together in a structured manner.²

Summary: Objectives can be classified into five categories. These are: knowledge, inquiry and problem-solving skills, psychomotor skills, values and social skills. Objectives may be set at any cognitive level the professionals choose to set them.

Organizing Objectives into Units

Objectives in an outcome-based curriculum are organized into instructional units, with closely related objectives clustered together. Units of instruction are so designed as to follow the natural breaks in the subject matter. For example, a third grade mathematics curriculum will include objectives in numeration, addition, subtraction, multiplication, perhaps division, fractions, measurement, geometry, estimation, problem-solving, time, money, and others. In an outcome-based program, objectives concerned with estimating and problem-solving may be embedded into each of the other units, so estimation and problem-solving involving addition are included in the unit on addition, for example. And the unit on addition could also include adding money.

This is a departure from the traditional practice of organizing objectives by strand of the curriculum, with the responsibility for clustering objectives and creating instructional units left to the classroom teacher.

² This instructional technique is called cooperative learning, and is discussed more fully in the booklet in this series "Teaching for Mastery."

Length of Units

Most teachers in outcome-based schools find that instructional units of two or three weeks are ideal. It is long enough to "get our teeth into it", yet short enough to allow careful monitoring of student learning. Moreover, in a three-week (on average) unit, there is time to do formative testing and re-teaching if necessary. It is not enough to learn in June that the students did not learn what was taught in September. Teachers need to know sooner, so they can do something about it.

It is important to remember, however, that a period of time specified for an instructional unit can only be approximate; a teacher must be able to adjust the time allowed for a unit to accommodate the needs of different students. Some students need more time to learn than others; indeed, it is one of the strengths of outcome-based education that it recognizes such variation in student learning and provides for the learning of all students. When the curriculum planners designate three weeks for a unit, what they mean is that, *on the average*, it takes students three weeks to learn it.

Some students, or groups of students, will master the material in less time than that, and can either move to the next unit or delve into some enrichment material. Other students, or groups of students, will need four weeks to master the same material, or will need greater instructional time per day for the same three weeks to achieve the same level of mastery.

Prerequisite Units

The mastery of some content depends on mastery of certain other content. For example, a teacher would never offer instruction in the writing of paragraphs to students who could not construct a sentence. Similarly, the teacher would not teach the division algorithm to students who could not regroup in subtraction. In organizing units of instruction, curriculum planners must pay special attention to identifying these prerequisites.

Some curriculum areas have tighter prerequisite relationships than others. Mathematics is probably the tightest; it is simply hard to

understand addition with regrouping without solid mastery of the concept of place value.

On the other hand, in the concept curricula - social studies, science, literature, for instance - the instructional sequence can be looser. Although a teacher works for mastery, the consequences of non-mastery are different than they are in a skill curriculum such as mathematics or beginning reading. If some students don't master the material on the Revolutionary War they need more time or a different approach, but the whole class can go on to the next unit - the Westward Movement, for instance - without leaving some students behind.

Summary: Instruction in an outcome-based program is organized into units, each lasting about three weeks, with careful attention to their sequence, especially where prerequisite skills and knowledge are involved.

Specificity of Objectives

When they are designing units, educators must determine how detailed the objectives should be. They may find a general rule of thumb to be helpful; if an objective is to be assessed, it should be specified as a separate objective. In an outcome-based curriculum, the objectives serve as the focus for instruction and then for assessment; teachers assess so they can know whether the students have mastered the curriculum. Therefore, if an objective is important enough to test for, it is important enough to define separately.

Objectives may be developed at any level of detail; if broad, they may be broken down into many sub-objectives. Deciding on the proper level of specificity is a matter for professional discussion and consensus.

In the book, *Evaluation to Improve Learning*, Benjamin Bloom *et al* illustrate this point by means of a *task analysis* for teaching the skill of telling time to the nearest minute. They identify 23 sub-skills, each of which must be mastered before a student can successfully read a clock to the nearest minute. For instructional purposes, such a detailed analysis may be helpful; it provides a teacher with every checkpoint along the way.

However, such a listing is far too detailed for curriculum planning. If educators were to subject every skill in the curriculum to such detailed scrutiny, they would never get to the teaching. And in addition, while a high level of detail would be appropriate for some purposes (special-education students at the primary level) it would be overkill for others (review for advanced intermediate students.)

Summary: In general, for the purposes of curriculum planning, an objective should be explicitly defined if it is important enough to test for.

Elements of an Objective

Outcome-based education requires that objectives be stated very clearly, and, unless they are self-evident, that indicators be defined.

An instructional objective consists of two parts: content and performance. First, it is about something - the Civil War, or simultaneous equations, or the rules of basketball, or the works of Shakespeare. That is the content. Specifying the content is the first step in writing objectives, and a list of the topics to be covered in a course can provide a crude first outline of the course.

But this is only the beginning. The second part is the performance. The planners must then decide what it is that they want students to do with that content - that is, define the performance goal. Do they want the students to know something specific about the content? Be able to solve problems? Make a graph? Field a ball? Write an essay?

Often it is lack of clarity at this stage that produces confusion in schools, and leaves teachers open to accusations of favoritism among students at report-card time. If teachers state simply that the class is going to "do *Hamlet*", their test questions will reflect many things that one can "do" with *Hamlet*, and a given student will reflect his or her understanding of the "thing" the questions happen to emphasize. By not specifying in advance just what the students would be expected to learn from "doing *Hamlet*", the test questions can appear to the students to have been pulled from thin air.

The first step in clarifying any performance requirement is to identify categories. Is it knowledge? inquiry and problem solving skill? psychomotor skill? social skill? value? (The approximate balance of objectives drawn from these several categories may have been decided during the process of setting the educational goals or the program goals.)

The performance part of an objective is always expressed by a verb, e.g., to demonstrate, to solve, to dribble. This indicates that students are asked to *do something*. Moreover, the verb itself is an indicator of the type of objective it is. The verb selected will usually show clearly which major category of objective is represented.

A difficulty arises here, since some performances are not *visible*. It is possible for someone to possess a deep understanding of a principle or law and keep it entirely to himself. Knowledge by itself is invisible. And since many of the objectives educators have for students fall into the category of knowledge, it is essential that appropriate techniques be used to assess such knowledge. For example, if a teacher wants students to know the causes of the Civil War they must demonstrate that knowledge somehow, perhaps in a test constructed for the purpose, which could include items that ask students to match words with definitions, to complete sentences, to answer multiple-choice questions or to write essays.

For some of the objectives in the values domain, the indicators are fairly crude. For example, in order to assess whether a group of students not only can read but like to read, teachers can keep track of the number of books each checks out from the library. Littering around the school grounds is an indicator of respect for property, or lack of it. Other indicators are more direct, and may apply to individuals as well as to groups. For example, a teacher can ask students to write essays on the conflict between economic growth and environmental quality.

³ See pp 51-55 for discussion of the development of educational goals and program goals.

Some of the other categories are easier. For example, with the psychomotor skills, such as dribbling a ball, students can simply be asked to demonstrate the skill. The question of how well they dribble the ball must still be addressed (that is considered in section 5 below under Assessment and Standards of Mastery). Similarly, for the inquiry and problem-solving skills, teachers can usually ask students to do what the objective requires. If it is interpreting a graph, they can be asked some questions about it; if it is constructing a graph, teachers can provide the data, and ask students to portray it graphically. With the social skills teachers can observe the behavior of the students while they are working in their groups.

Summary: An objective has two distinct parts - the content and the performance - and it is the performance which must be assessed. Furthermore, since some performances are invisible, some objectives must be assessed using indicators of performance, such as answering certain questions correctly.

4

THE QUALITY OF THE OBJECTIVES

An outcome-based program requires that educators be clear about their curriculum goals and objectives. But clarity about the curriculum is not enough. How will the planners know that it is good? How, when they have finished their work in designing a curriculum, will they know that they have produced a document of quality, one which will be of use to themselves and their colleagues, one which will help their students grow?

Two issues are involved here. One is the quality of the objectives themselves. The second is their relationship to one another.

Analyzing and Improving the Quality of the Objectives

By organizing the curriculum into sequenced units of instruction, and by articulating each of the instructional objectives, coded to the correct category of content, the planners are in a position to examine the curriculum in a manner not previously possible.

The first step in the process is to decide whether each objective represents knowledge, inquiry and problem-solving skills, values, psychomotor skills or social skills, and then assess the array and balance of the objectives being considered. Such an analysis might reveal, for example, that at a certain grade level or in a certain program area most of the knowledge objectives were low-level conventional ones, that there were very few inquiry and problem-solving objectives, and that there were no objectives at all in the values domain. The committee might also discover that while they have certain goals in the area of social skills,

such objectives have not been articulated, and thus will probably not be a focus of instruction.

Such an analysis can provide committee with the information they need for a systematic upgrading of the curriculum. They might decide, for example, to increase the knowledge level of the curriculum to include more knowledge of trends and sequences, causes and effects, or static and dynamic relationships. They can incorporate more objectives in the areas of information processing and reasoning, for example, or articulate the objectives in the values realm. And if they plan to include cooperative learning in the classroom, they might want to articulate some objectives in the area of social skills.

Summary: the first step in analyzing the quality of the objectives is to clarify the objectives by category and then carefully study the array that has been assembled.

Curriculum Integration

Few topics in curriculum design are as exciting as those related to curriculum integration. The basic ideas are not complex. Many educators have noted the disadvantages, for both students and teachers, of a fragmented curriculum, where the student's day is chopped up as their attention is shifted from "reading", to "health", to "language", to "art", to "mathematics", as though those subjects were entirely unrelated in their content. It is a particularly ironic situation at the elementary level, where the students are with the same teacher for much of the day, and where the divisions of the day are to a large extent amenable to conscious planning.

In daily life, a person does not acquire knowledge or identify a problem as requiring skill in "science", or "language arts", or "economics." It is just knowledge, or just a problem. Only in school are knowledge and skills fragmented, and treated one subject at a time. Why not, many educators ask, design learning activities which span several subjects, and which simultaneously meet curriculum objectives in each of them?

Does outcome-based education make such integration harder or easier? In itself, it does neither. Outcome-based education simply requires that educators be clear about their objectives, that they assess student achievement of them, that they monitor student progress in attaining them, and that they teach for mastery. How the objectives relate to one another, in both the curriculum and in the instructional process, is always a matter for professional decision. However, the fact that outcome-based education requires the professional staff to be clear about their student learning objectives makes it easier to think about curriculum integration, and easier to know when it has been achieved.

A curriculum could probably never achieve total integration because of those areas that require the development of skills. Mathematics, or at least arithmetic, is a tool, and it is hard to imagine how one might teach students about equivalent fractions in the context of a larger topic. They may need to know about equivalent fractions in order to solve larger problems, but they also need specific instruction in that skill. The same can be said of beginning reading, which demands direct and focused instruction to ensure student success. Most successful efforts at curriculum integration leave skill-development instruction in reading, language, and mathematics out of the mix.

Some educators maintain that students must acquire knowledge and skill in different curricular areas before they are in a position to relate them to one another, or to use those skills to solve more advanced problems. These educators fear that if teachers develop units which integrate several disciplines, some critical knowledge or skills will fall through the cracks, and not be taught. However, it can also be argued that at even the initial levels (e.g., kindergarten) some subjects (e.g., science and art, or even reading and language) are more effectively taught in an integrated manner.

Outcome-based schools often use a combination of both approaches. Most types of content do require direct teaching, and no responsible teacher would ever leave them to chance. The great advantage of specifying curriculum objectives by subject area is that it provides the best assurance that nothing is left out. However, just because objectives are specified separately by subject area does not imply that they must necessarily be taught separately.

Integration is possible in two ways: integration (or possibly only coordination) of the knowledge, and integration of the skills. These will be described briefly below.

Integration of Knowledge

After specifying curriculum objectives of different types (knowledge, inquiry and problem-solving skills, psychomotor skills, social skills, and values) in different curriculum areas (reading, language, mathematics, social studies, science, art, music, physical education) it may be observed that there is some overlap in the knowledge content that can be used to create integrated units. The possibility of such overlap might be a reason for selecting some of the topics in the first place. For example, a science curriculum might include a unit on simple machines during the same year that the students are learning about early civilizations in social studies. Such overlapping topics might encourage the teacher to explore how certain peoples solved their technological problems using the machines available to them at that time.

Similarly, many high schools schedule the course in American history during the same year that most students are learning about American literature in English class. The literature of a period provides a window on its social history, and conversely, knowledge of history provides a context for literature.

Such coordination of topics is more powerful when the teachers involved coordinate their instruction, and explicitly point out the connections to students. Therefore, such coordination can be facilitated by arranging common planning time for the teachers involved, and by establishing expectations that such instructional coordination will be achieved.

Integration of Skills

Inquiry skills, problem-solving skills, and social skills transcend the subject areas of the curriculum, and can serve as a rich basis for integration. Problem-solving skills require for their use some type of content; it makes no sense to talk about "organizing information" without some type of information to organize. On the other hand, once students have learned to organize information, teachers can assume that skill and

provide students opportunities to apply it without additional new instruction. Thus, in the third grade curriculum students might be classifying quadrilaterals in math, parts of speech in language, and birds in science. A teacher might make an instructional decision to take a broader look at the skill of classifying, and to apply that skill to each area.

Similarly, social skills may be included in the curriculum at many points, and can build on one another. But since they require student interaction, they do imply certain types of instructional approaches. For example, if a school or district is committed to helping students develop social skills, opportunities must be provided for group work, and instruction must be provided in the skills needed for such work to be successful. And once the instruction has been offered, the skills must be maintained by providing additional opportunities for application of the skills to new situations.

To achieve integration of both knowledge and skills, outcome-based schools customarily follow the initial specifications of the curriculum. It is only a committee has defined what they want to achieve overall that they can consider how to tie the different elements together. And while individual teachers can coordinate or integrate the objectives of the curriculum together as an instructional activity, such integration may also be organized in advance as part of curriculum planning.

Once the scope and sequence is established for each major discipline, grade-level teams can identify common elements from the various subjects in each of the content categories of the curriculum. They can then create integrated instructional units tying together those similar elements. In addition, if they know that a certain skill, such as making graphs, has been taught in one area of the curriculum (for example math), they can then build in applications of such skills in other areas of the curriculum (for example, science and social studies.)

Summary: Some integration of instruction in knowledge and skills enriches teaching in both areas and reflects the realities of the world students live in.

5

ASSESSMENT AND STANDARDS OF MASTERY

"Assessment" means checking to see whether the students, after initial instruction, have learned the content of the curriculum. "Standards of mastery" means how well they have learned it. In an outcome-based curriculum, because of the alignment between objectives and assessment, the design of the assessment system is considered a part of curriculum planning. This is in contrast to programs in which testing is left entirely to each teacher.

Alignment with instruction.

In an outcome-based program, Not only is assessment aligned to the objectives, but instruction is aligned to both. That is, the curriculum consists of the learning objectives, to which teachers direct both their instruction and their tools for assessment.

In outcome-based education, assessment is of great importance. If an objective is important enough to specify as a learner outcome, the teachers want to know whether the students have learned it. This is not always easy to determine. For example, an objective may be knowing the events leading up to the Civil War. A teacher could never test for all of them and any test can at best cover only a part of such a large subject. However, any objective that is defined in the curriculum should be included in the assessment procedure. The reverse is also true: any item assessed should have been taught.

Some educators will object to this provision. They argue that by including high-level test items they learn which of their students are able to apply their knowledge to new situations. This is true. But students are not born

knowing how to apply knowledge to new situations. If such application is an instructional objective, then it should be identified as one, and specifically taught.

Consider for a moment the consequences of *not* teaching students to apply knowledge to new situations, and then testing for such skill. Some students, compared with their classmates, will indeed excel in this skill. Who are they? They are those students who are either exceptionally gifted, and able to create such new knowledge themselves, or those from home environments in which children are directly or indirectly taught such higher-level skills.

In any event, the results of a test that includes items for which no instruction has been provided, tells nothing about what the students have learned in school. It only indicates which students are exceptionally capable, or which students are fortunate enough to participate in educational experiences outside of school. In other words, such a practice only identifies those students who are very smart, or those who have, in effect, a private tutor at home.

This matching, or aligning of assessment with teaching is *not*, as some educators fear, "teaching to the test." Indeed, the reverse is true: the teachers are not "teaching to the test" but rather "testing what is taught." And both the teaching and the testing are mandated by the objectives defined in the curriculum.

Summary: In an outcome-based program, assessment is part of curriculum planning, and is designed to cover all objectives that are important enough to specify. Likewise, all objectives addressed by a test should have been taught.

Normative and Criterion-referenced Assessment

Most schools are not short of assessment information. Many states require state-administered tests at various points in each student's career, typically at the fourth, eighth, and eleventh grades. The results of such tests may provide useful information for a school district's program evaluation and program planning, but are of little or no use for a

teacher's instructional planning. Thus, such tests should not be considered to be part of a district's outcome-based assessment.

Why not? First, a standardized test administered by a state agency is not likely to be aligned at all well to a district's curriculum. The results of such tests can be made to yield profiles of students' knowledge and skills, if one is prepared to dig deeply enough, into each student's response to each item. But unless the knowledge or skill represented by the item has been part of the district's curriculum, and fairly recently, the fact that a student answered correctly, or incorrectly, says little about his or her mastery of the curriculum. And in order for school staff to determine whether such items are aligned, they must go through a detailed process of item and curriculum matching.

Second, even if there should be total alignment between a district's curriculum and a standardized test, such tests are administered too infrequently to be of use to teachers. It is not timely information. Suppose one learns in December (from a test administered in October) that certain students had not mastered a curriculum objective that was taught the previous year? So what? The information comes to hand too late: the student may have been struggling with new material that depended on understanding the earlier content. In order for assessment to be useful in instructional planning, it must be immediate.

Third, the information yielded by standardized tests is almost exclusively of a normative nature, whereas assessment in an outcome-based program is entirely of a criterion-referenced nature. What is the difference, and why is this difference important?

In *norm-referenced* assessment, the goal is to measure students **against** one another. When an individual student scores at the 51st percentile, it means that he or she has received a score higher than 50 percent of the people who have taken the test. For some purposes this information is useful. On the other hand, it tells a teacher nothing about which items the student answered incorrectly or did not answer at all, or whether the student ever received instruction in them.

A norm-referenced assessment can also tell school personnel that their average fourth grade reading scores are at the 53rd percentile, or that 57

percent of their eighth grade students scored above the 50th percentile in mathematics. Again, this information may be useful for broad program planning and evaluation. It does not, however, assist in instructional planning at the classroom level.

Since the goal of norm-referenced assessment is to measure students against one another, the test makers deliberately do not align the tests tightly with curriculum content. The reason for this is that if the third grade test covered only the content that is typically taught to all third graders, students' scores would be clustered together, and there is even a possibility that all the students who took the test would make a perfect score. If that happened, the main goal of the test, that of ranking students against one another, could not be achieved. In order to avoid that, a few items from a more advanced curriculum are always included, to provide an adequate spread of scores.

In *criterion-referenced assessment*, on the other hand, the goal is to assess each student's mastery of specific knowledge and skills which have been designated as objectives in the curriculum. The goal of outcome-based education in general is to cause every student to master those objectives. One of the maxims of an outcome-based program is that "Everyone can get an 'A'; it just takes some people a little longer than others."

Summary: Standardized tests (normative assessment) measure students against one another, and groups of students against other groups in a way that is useful for the purposes of general program planning and evaluation, but is too highly aggregated for individual evaluation; criterion-referenced assessment, as used in outcome-based programs, measures individual students' learning against the specific objectives set forth in the school's curriculum.

Formative and Summative Assessment

Assessment of student progress may also be divided according to whether or not testing is used as an integral part of the instructional process. This question highlights the distinction between *summative assessment* and *formative assessment*.

Summative assessment is the kind that most adult Americans are familiar with, and it occurs at the end of instruction of a unit or course. Such test may be given only once, or twice, or four times per year. The purpose of summative testing is to assign grades and award credit; such a test *summarizes* the results of the work that has been covered.

Formative assessment, on the other hand, is performed earlier in any program of instruction. The first test is usually administered, at the end of the initial unit of instruction. Furthermore, assessment continues at frequent intervals. The reason for testing frequently is simply this: the purpose of formative assessment is *diagnostic*; it provides teachers and students with information about the students' progress in learning up to that point. The purpose of formative assessment is not to assign a grade, but rather to provide guidance for further instruction.

Such an assessment test provides essential information for planning the next steps in the instructional process. If numerous students have not mastered a certain objective, the teacher must attend to that fact before moving on to the next unit, particularly if success in the current unit is prerequisite to success in the next. This requirement for re-teaching is one of the essential characteristics that distinguish outcome-based instruction from traditional classroom practice.¹

The distinction between formative and summative assessment was illustrated by Benjamin Bloom² in an analogy linking the two kinds of tests to a thermometer and a thermostat respectively. Both measure the temperature. But a thermostat, unlike a thermometer, uses the information to do something: it cuts off the furnace, or turns on a fan. Similarly, a formative test, unlike a summative one, guides a teacher toward additional instruction in the area(s) identified as requiring further attention.

¹ Correctives are fully described in the booklet in this series "Teaching for Mastery."

² Evaluating Student Learning, 1981

An outcome-based program uses both formative and summative assessment, both of them aligned to the curriculum objectives.³ Formative assessments are administered towards the end of an instructional unit, and provide the specific information needed for focused re-teaching. Summative assessments are administered after several instructional units, and provide information for a grade.

Summary: Summative assessment focuses on the subject-matter that the teacher has covered, and yields a grade. Formative assessment is diagnostic and provides guidance for further instruction.

Categories of Assessment

Assessment may be broadly grouped into two categories: *supply* and *select*. In a supply assessment, the student is asked to do something (ride a bicycle, write an essay or paper, complete a sentence, do a project, work in a group.) In a selection assessment, the student is asked to select from available options the best response (matching, multiple-choice).

In addition, assessment may be categorized according to whether it is done using paper and pencil, or whether other techniques (teacher observation, student performance) are used. These different categories of assessments may be summarized in this way:

	paper/pencil	non-paper/pencil
supply	short-answer essay making graphs	group behavior performance
select	matching multiple-choice	choosing the right tools

Formal assessment must be *appropriate to the objectives* in the curriculum. If an objective in the psycho-motor domain specifies that

students will demonstrate that they can dribble a ball a certain distance, it would make no sense to ask them to write an essay on the history of basketball. For objectives in the psycho-motor domain in general, paper/pencil tests are not appropriate, nor are they appropriate for some other categories of objectives. For example, an objective in the area of social skills might focus on the skill of listening to other group members. Teacher observation of student behavior during group work will probably provide the best information regarding student performance of that skill.

Alternatives to paper/pencil tests are required in other areas as well, for example values. Some of them are rather crude, and serve as proxies for the values themselves. Thus, the amount of graffiti on school walls is a measure of respect (or lack of it) for school property, and reports of stealing among students indicate little respect for personal property.

Other obvious alternatives to paper/pencil tests which can be used for assessment are projects, papers or essays, and lab reports, and teacher observation of student behavior. In the area of inquiry and problem-solving skills, short-answer tests are sometimes effective. For example, the skill of interpreting a graph may be assessed by questions on a test, even though the skill of making the graph itself cannot be. Many objectives in the area of inquiry skills are best assessed by judging the products of student work. For example, whether or not students can write a well-structured paragraph can only be assessed by asking them to write one.

A note of caution must be sounded. Whenever an assessment is used in which students supply answers rather than select them, criteria must be established for judging the results. That is, if students are to turn in their lab notebooks for assessment, they should know when they start the term how the notebooks should be organized, what they should include, and any other items that are included in the objectives. The assessment criteria must be clean enough so that two independent judges, using the criteria, would agree on whether or not they had been met.

Similar guidelines must be established for appraising essays. When reading essays from a class of students, the teacher must determine in advance what points are being assessed, and make sure that the students

³ The booklet in this series "Teaching for Mastery" explains the placement of formative and summative assessment in the mastery learning model.

understand them. For example, if it is an essay relating to an event in history, the criteria might consist of identifying certain causal relationships, plus certain indicators of paragraph organization.

Summary: Assessment may be broadly grouped in two ways, by whether students are asked to supply answers, or select them; and whether the test uses paper-and-pencil or some other technique. Any assessment measure must be appropriate to the objective.

Standards of Mastery

How good is good enough? How well do the students have to know the material in order to qualify as having "mastered" it? With a few obvious exceptions, this is a somewhat arbitrary matter, for whatever the level decided upon, (for example, 80 percent) the argument could be made that a point or two, or even five, below is so close as to be considered good enough. There are times, however, when it is truly a curriculum matter, when professional judgment is clear as to the appropriate level of mastery. An example: in learning to count to ten, 80 percent is not good enough; nothing short of 100 percent will do.

A school or a district can establish a blanket mastery level to apply to all units in the curriculum except the few cases like counting to ten. There are advantages to such a practice, mostly having to do with convenience. If mastery is set at 70 percent, or 75 percent, or 80 percent, conversations with students and their parents are much easier than if the mastery level is different for different program areas, different courses, or different units.

As to deciding on the *standard of mastery*, a general rule might prove helpful: the standard should be high enough to assume that a student who has attained that level *can expect to be successful in the next unit in the curriculum*. Such a criterion is essential in those curricular areas with tight prerequisite relationships, such as mathematics, or foreign language, but the same approach is useful even in those conceptual areas of science or social studies, in which the concepts build to an appreciable extent on one another.

In an outcome-based instructional program, not only is the standard of mastery established as part of the curriculum planning process, but, once set, it is *the same for all students*. This practice sets outcome-based education apart from other programs. Many students have had the experience of discovering that different teachers teaching the same course graded "harder" or "easier", so "Algebra I" from Mrs. Jones was not, in effect, the same course as from Mr. Brown. Or worse, they have discovered that teachers are not always consistent even among the students within a single class as to their standards of grading. One of the important contributions of the outcome-based-education concept is the tightening and standardizing of the assessment system.

James Block⁴, in his research on mastery learning, has concluded that the optimal standard of mastery on formative tests is about 85 percent. He found that as the standard of mastery on the formative test was raised, those on the summative tests increased as well, but if the standard was set at above 85 percent, students began to feel frustrated and therefore began to dislike the subject.

Summary: The same standards of mastery can be set for almost all subject units in a curriculum, the optimal standard appears to be between 80 percent and 85 percent considered to be the optimal standard. Whatever standard is chosen should be the same for all students.

⁴ University of California, Santa Clara

6

INSTRUCTIONAL MATERIALS FOR OUTCOME-BASED EDUCATION

Instructional materials are the third part of the curriculum structure; together with the *objectives* and the *assessments*, they comprise the curriculum of an outcome-based program. Instructional materials are anything the teacher uses to teach the curriculum, and students use to learn it, including texts, workbooks, library materials, maps and globes, films and filmstrips.

Some curriculum theorists believe the importance of instructional materials have been exaggerated; these people perceive the curriculum to be the objectives defined in the teachers' guide, the materials merely supporting the teaching of those objectives, and used sparingly. Others, acknowledging the importance of instructional materials, bemoan what they perceive as over-reliance on such materials by teachers. Still others speak as though the materials *are* the curriculum, and argue that "if it's not in the textbook, it won't get taught."

In an outcome-based program, the practice lies somewhere between these extreme positions. If the planners of the program can be clear about the role of materials in the instructional program, these materials can vastly enhance the power of the program.

The Role of Instructional Materials

In the day-to-day operation of the classroom, instructional materials can perform any one of three distinct, though related, functions.

Information for Students

Primarily, they can be simply a source of information for students. In some subjects, and at some levels, students may do a substantial amount of reading from library books and other sources, and they may use films and tapes, but in the basic skill areas, and at the elementary level, a very high percentage of student time is spent with textbooks.

The Core of a Program

Some so-called textbooks, particularly at the elementary level, are far more than simple textbooks but are instead linch-pins of whole programs. Most basal reading and mathematics series are published with many component parts: the text, workbooks, supplemental readers or problem sets, teacher's resource books, placement tests, criterion mastery tests, computer monitoring systems, and letters to parents. These programs are intended to provide everything a teacher needs in a given subject, including an overarching structure, broken down into units of instruction arranged in sequence. In short, integrated instructional materials of this kind provide an entire curriculum.

Instructional Support

Many basal programs also provide enormous instructional support for classroom teachers. In the past, the teacher's edition of a textbook was the one with the answers printed in red in the margin. Today, teachers' editions are far more elaborate. Most are printed in a size larger than the pupil book, and provide wide margins with teaching suggestions, discussion questions, and other material to supplement every page in the students' book. The teachers' editions of even secondary level textbooks have become far more comprehensive instructionally in recent years, and offer considerable support for teachers.

These programs fill a genuine need. Not all teachers have equally strong preparation in all curriculum areas, particularly at the elementary level where teachers plan and teach in as many as eight or nine different subjects every day. It is true that the depth of knowledge required for the elementary level is not great in any of those areas, but not all teachers are able to create an instructional program of high quality in all of them.

In addition, such instructional materials, if they are of high quality, are a convenience to any teacher. Although some teachers might organize the content of their courses as well, and invent instructional activities as useful as those in a typical ready-made program, not all teachers can do so, and for all of them the great benefit is that the work has been done. It is not necessary for every teacher to spend the many hours required to think up activities for every day of instruction in every curriculum area. In addition, the use of the same instructional materials in the different schools in a district provides some district-wide consistency to the program.

The same kind of consistency can be achieved by means of a district-wide curriculum guide developed by a district's staff if it, too, is of high quality and is used throughout the district. However, all too frequently a district's curriculum guide is used only by the teachers who developed it; it sits unused on the shelves of their colleagues.

Summary: Instructional materials are crucial to the success of any instructional program. At their simplest they provide basic information to students; more elaborate materials are the equivalent of whole curricula and in addition provide support structures for teachers.

Selecting Instructional Materials¹

Three considerations must be kept in mind in selecting instructional materials for an outcome-based program. They are: 1) the staff and community must be involved to ensure commitment to and ownership of the resulting recommendations; 2) the materials themselves must be of high quality so that good results can be obtained when students work with them; and 3) the materials must be consistent with the stated goals of the program and with the requirements of outcome-based education for clear objectives and assessments. Only this last requirement refers specifically to the mandates of outcome-based education; the others are

¹ See "The Manual of Textbook Adoption" published by Outcomes Associates for a complete process of selecting instructional materials.

needed in any good instructional planning, and will be discussed only briefly here.

Staff and community involvement

One of the planning systems that is widely used during the pre-implementation phase of an outcome-based program mandates extensive participation of the professional staff and the community in the curriculum planning process. This includes all phases of curriculum planning: the development of educational and program goals, the planning of courses and units, the integration of the curriculum, and the selecting of instructional materials.

The need for involvement of staff and community cannot be overemphasized. Materials affect a teacher's life on a daily basis. If an item is of poor quality or is difficult to use, student achievement will suffer, and teachers will struggle for as long as the item is in service. Even if the materials are of good quality, if a number of teachers believe that the decision was made without their participation, or over their objections, they may not make the necessary commitment to ensure success.

Care must be taken, therefore, in the design of the selection process and its timing within the curriculum planning process to ensure that all the affected staff are appropriately represented, and that procedures are established for adequate feedback and communication. Such procedures will typically include representation on selection committees for each school and grade level, written guidelines for reporting to school staffs, and regular reports to the administrative team.

Some of the same considerations apply to community involvement. Members of the community are not affected in the same way as the teaching staff by the quality of the instructional materials; they do not have to work with them every day. However, it is important that the citizens, tax-payers and parents have confidence in the materials in use in the schools, and that they believe that the materials reflect the goals of the community. Furthermore, these people must be meaningfully involved in the selection; it is essential that their involvement be for more than a simple-rubber stamp approval of decisions already made.

Quality of the materials

With over 20 basal reading series to choose from, and a similar number of programs in the other basic skill areas, how is a district to select the best for its own students? Often the decision is based primarily on the persuasiveness of the sales representative, or the quality of the photographs or some other consideration irrelevant to student learning.

It is essential that members of a selection committee be clear about what it is they are looking for in instructional materials. They need tight criteria that can serve to eliminate some materials from consideration. They need to know not only what it is they want from their materials, but how they would recognize it if they saw it.

How are such criteria developed?

Criteria should come from two major sources: program goals developed in the district, which reflect community expectations and goals, and recent research in the discipline under consideration. And these criteria should be developed long before a single book is evaluated by a committee to eliminate premature preference by committee members.

The development of program goals is discussed more fully in a later section of this chapter. Generally speaking, the program goals provide an informal roadmap to a discipline, that defines where the district wants to go. The program goals are determined by asking such questions as "Why do we want students to learn mathematics? or social studies?" "What do we want them to learn from it?"

The answers to these questions are typically broad and general. They might include, in mathematics, a statement about the requirement that students be proficient at problem solving, or applications of computation to everyday situations. In social studies, the statements might refer to the need for citizens to accept political responsibility in a democratic society, or an understanding of the historical trends that affected the country's development. Broad program goals such as these can provide some guidance to a selection committee in its work. After translating such goals into selection criteria the committee would quickly rule out a

mathematics program that included very little problem solving, or a social studies book that included no history.

These program goals are so broad, however, that even after such goals are applied to them, most of the materials under consideration will still be in the running. More help is needed by the selection committee. This can often come from recent educational research. One typical program goal states that the instructional processes used and supported by the materials reflect current knowledge about how students learn the discipline under consideration. This goal makes possible the articulation of very specific selection criteria which can truly serve as a tool for selecting or eliminating materials.

More is known today than ten years ago about how students acquire knowledge and skill in the various subject areas. Some of the new information seems fairly obvious (e.g., students understand a story better when they have adequate background knowledge of the story's setting), but this research can provide useful handles with which to grapple with the evaluation of materials. Not all reading texts provide information to students (or direct teachers to do so) regarding the background information necessary to understand a reading selection.

Similar research is available about many aspects of an instructional program; some of it is specific to a particular discipline, while some applies to instruction in general. This information must be collected and then translated into tight criteria. Collecting this information is no small task. And once collected, translating it into a form with which to evaluate materials is another important step. The criteria must be tight, and should include checklists that are specific enough so that several independent readers would agree as to whether or not a given textbook, for example, meets the requirements.

By following these steps in the selection of materials, a selection committee can be sure that only good materials will be recommended for adoption. In this process, it should be noted that there is no place for presentations by sales representatives of the publishing companies. Such presentations could possibly assist a committee in answering specific questions, but the purpose of a formal presentation, from the publisher's standpoint, is not to be informative but to sell books. Such presentations

tend to distract committee members from their main responsibility of evaluating materials against specific criteria.

Alignment of Materials with Objectives

The principal element of outcome-based education that must be reflected in instructional materials is that of *alignment*. That is, the materials must support the objectives of the program. The identified objectives must be teachable using the materials provided. In addition, the various components of the program - the text, the worksheets, the study guides, etc. - should be aligned with one another.

Some text materials (particularly basal texts at the elementary level, but to some extent at the secondary level as well) embody total instructional programs. That is, a textbook and matching ancillary materials provide all the necessary components: objectives, student text material, and mastery tests. This situation produces a chicken-and-egg problem for a staff implementing an outcome-based program. If they take all of the steps they should properly take to design their curriculum, and emerge from the process with educational goals, program goals, specifications, courses, units, objectives, and tests, and then set about to locate instructional materials, they might find some materials that meet all their criteria, but are not organized in a satisfactory way. For example, in the case of junior high science, instead of teaching life science one year, physical science the next year, and earth science the next, the materials might integrate these three subjects so as to provide some instruction in all three fields each year. Or, even if the subject is organized in the manner preferred by the committee, the way the objectives are listed in the material (and tested on the mastery tests) might differ significantly from what the committee wants. The committee then faces a dilemma: should it stick with its own organization of the curriculum and with its own objectives and tests, and recommend adoption of materials that are not completely aligned? The consequence of this choice would be to condemn teachers to improvising every day - to have to locate the sections in the text which support the objectives they must teach. This can be done, but it is extremely inconvenient and time-consuming for teachers.

Alternatively, the committee could abandon its own work, and accept as its curriculum the organization, the objectives, and the tests provided with the materials they are recommending. If it elects this course of action, the committee must acknowledge that it may have spent an appreciable amount of time in useless work. This is a demoralizing thought. Also, since this time is rarely donated, abandonment means wasting money as well.

A typical outcome-based school takes a position between the these two extremes, and adopts a procedure which constitutes, in effect, a dialogue between the development of the curriculum and the selection of materials. The dialogue is carried on against the background provided by the program goals. These program goals will have been developed by a district; they are the vehicle through which a staff's and community's expectations for its schools in each of the major disciplines is expressed, taking into account results of current research. After the program goals have been adopted, they will have been translated into selection criteria. Then, once the criteria are developed, the process of materials selection can begin.

At the point in the process when the materials have been selected, the dialogue between course and unit outline on the one hand, and materials organization on the other, can take place. For example, The committee might find two texts which meet the criteria for junior high science, but one organizes the content as discrete disciplines while another integrates them. Unless the program goals have specified one organization or the other, the committee may make a choice between them.

After having decided which is the superior organization, detailed course and unit planning can proceed. Such planning can reflect the organization and selection of the precise learning objectives developed in the recommended materials.

Summary: In the selection of instructional materials a committee should 1) involve staff and community in the decisions, 2) be clear about their goals and about the criteria to be applied, and 3) be sure that the materials, the stated objectives and the assessments are aligned.

7

STEPS IN DEVELOPING AN OUTCOME-BASED CURRICULUM

As in all areas of outcome-based education, it is important to work from an overall plan when developing the curriculum. Such a plan might specify, for example, that a district start its curriculum development with mathematics, then take up language and reading, then science and social studies, art and music, over a period of, say, five years. Or a district might decide to design an integrated curriculum starting with kindergarten and moving into the rest of the grades one year at a time.

Most districts take one curriculum area at a time and then do whatever integrating they can and want to do later. For that pattern, there are a number of steps that must be taken to create an outcome-based curriculum.

Developing Educational Goals

The developing of educational goals is the first of these steps. This is a job for those at the top of the institution: the Superintendent and the Board of Directors, with recommendations from the staff and the community. Educational goals address the type of learning environment that should prevail in the schools, the types of opportunities available to students, the balance between different types of programs, and other broad concerns. The educational goals set the tone for the future development of curriculum.

A district's educational goals are a reflection of its beliefs about the purposes of education. Debates about purposes, which have engaged the minds of philosophers, scholars, statesmen, the military, and the public at large, as well as professional educators, are not unique to the twentieth

century. They have been part of the educational scene since the first schools.

Until recently, the issues facing curriculum planners were relatively simple: how to select and prepare the elite students for the university and to offer vocational training for the others. This orientation reflected the earlier European concept of education as an experience to be enjoyed only by the intellectually talented or socially privileged. To the extent that The United States inherited this tradition, the American curriculum has reflected that orientation. We still see remnants of this approach to schooling and the purposes of education in some current instructional practices. For example, grading on a curve announces to students that only a small percentage of students can excel.

During the twentieth century, educational goals, as expressed in school programs and curricular offerings, have broadened considerably and have become increasingly democratic. The results of scientific studies of learning, the success of psychological testing, and the effectiveness of vocational curricula developed to meet the manpower needs of the first World War had a great influence on the schools of education and the public schools. Into the void left by the collapse of faith in the traditional disciplines came activity analyses, social projections, studies of children of all ages, and techniques for investigating learning. All of this was new and caused a re-thinking of the school curriculum.

* For schools and districts preparing educational goals today, it is imperative that they be futuristic, since today's students will live most of their adult lives in the 21st century. Committees and educators must consider the type of world their students will inherit, the skills needed for future learning and successful employment, and the consequences of the new information age.

Summary: Step #1 in developing an outcome-based curriculum is developing educational goals. These reflect the broad concerns of a community and its school administration as to the general purposes of education.

Developing Program Goals

Program Goals are the broad outcomes that will be attained from study in each of the several disciplines; these goals may be in the area of knowledge, inquiry and problem-solving skills, values, psychomotor skills or group skills. In most cases, program goals reflect several of these domains.

Five factors must be considered when developing program goals: district philosophy and policies as reflected in the district's educational goals, requirements in the several curricular areas that graduates of the district's schools will encounter, community expectations and perceptions of need, the balance of different types of outcomes within the curriculum areas, and the results of recent research on curriculum and instruction. These considerations will be discussed individually.

The District's Educational Goals.

The impact of a district's educational goals may span several curricular areas. For example, if a district has identified problem-solving strategies as an educational goal, then it will be the responsibility of curriculum planners in each curricular area to be sure that students receive instruction in problem-solving in each of them as appropriate. Problem-solving situations can easily be created in mathematics, in science, in English, in social studies. Having such an educational goal will ensure that one of the program goals in each appropriate area will relate to problem-solving.

The same could be said for many other possible educational goals. Thus, if a district had identified computer literacy as an educational goal, it could be worked into virtually every curricular area, from word processing in English, data analysis in science and social studies, to programming and computing in mathematics.

Current Requirements for Graduates

American society's needs for workers' skills in various areas gradually change and evolve, and so do the entrance requirements of institutions of

higher learning. It is the responsibility of schools to stay abreast of these changing demands and to be responsive in their curricula.

One way to address this issue is to systematically survey employers in an area to learn their entry-level skill requirements. Some of these cannot be accommodated by a typical high school, but many can, and should be addressed by its curriculum.

In addition to particular knowledge and skills many employers are interested in workers' attitudes toward their jobs, their punctuality, and their ability to persevere in a task. Such attitudes and dispositions, while not spelled out explicitly in the course curriculum, do to some extent mirror the environment of a school, and can be influenced by a school's practices and expectations.

In the view of many observers, students in our schools today will work in jobs and indeed in professions that do not exist at present. There are many indications that as a society we have embarked on a period of major change that is possibly more far-reaching and certainly more rapid, than the transition from an agricultural to an industrial society in the last century. As we move from the industrial to the information age, there will be a premium on intellectual flexibility and adaptability.

Few people would want to predict what knowledge and skills will be important to adults of 2025, yet it is important to recognize that many of those adults of tomorrow are in our schools today. Moreover, most people remember very little in detail of what they learned in school. Therefore, many people would place at the top of the list of requirements on adults the skills and knowledge that emphasize one's continuing status as a learner.

Community Expectations and Perceptions.

Communities differ profoundly from one another. Schools serving an agricultural community will have different requirements than will those in a fishing or logging area, or in an industrial area, or in Silicon Valley.

Some of these differences may actually be more apparent than real. Agriculture, industry, fishing, and logging are changing with the rest of

the world. Agriculture has become "agri-business", more like business than farming, with an increased reliance on computer technology. Similar changes have occurred in other industries; as they approach the twenty-first century they become more like one another, sharing many characteristics of the information age.

However, communities *feel* themselves to be different from one another, and they certainly do have very distinct histories. These feelings of uniqueness must be respected in the process established for curriculum planning. Members of a community need the opportunity to express their aspirations for their children in the matter of content of the curriculum.

Balance among Types of Objectives

Most curriculum areas can contain within them elements of knowledge, inquiry and problem-solving skills, values, psychomotor skills and social skills. However, unless good balance is an explicit aim of the planners, some sets of program goals they produce will be one-sided and thin. For example, many social studies curricula focus exclusively on the learning of facts, and completely ignore inquiry and problem solving (how has the role of the monarchy changed through the course of history?) or values (is economic growth worth the loss of the rain forest?).

Research in Curriculum and Instruction

In the profession of education, as in any other profession, knowledge advances. Research is constantly being conducted into how children learn, which are the most effective ways of teaching skills or concepts, and indeed, which skills and concepts are most worth teaching. Results of this research are published in education journals, and must be considered by professionals in their development of program goals.

Summary: Step #2 in developing an outcome-based curriculum is developing program goals. In this work, these factors must be considered: the district's already expressed broad educational goals, current requirements in the job market and college for high school graduates, the community's expectations and perceptions, the balance of types of objectives, and current research.

Developing the Specifications

Specifications are major characteristics of a school system that must be considered before curriculum planning proper can begin. Most are expressed as questions to be answered. Some are established as part of general district policy and practice. Others must be considered at the time each curriculum area is addressed.

Uniformity Across the District

Do all schools within the district use the same curriculum in a specific area, or do different schools make independent decisions? For example, is "Algebra I" the same course, using the same materials, with the same unit tests, in all schools in the district?

Program Organization

How many units of instruction shall there be? A district may establish a district-wide standard stating that all courses will be organized into 12 or 15 units, or it might decide that such questions were a matter for curriculum planning in each area. Is the *sequence* of units mandated, or can it vary?

Program Structure

Is this a grade-level curriculum (in which differences among students are accommodated by enrichment or by different strands), or is it a non-graded curriculum through which students move at different rates? Which graduation requirements are satisfied by which of the courses in this program? When?

Organization of Instructional Time

Outcome-based education requires that the school provide additional time to learn for those students who need it, either as part of the regular instructional program or as part of a support system. Will this be provided as part of the regular program, thereby affecting the curriculum, or by some other means?

Enrichment or Extension

Do all students complete all of this curriculum? Are there opportunities for enrichment or extension? If so, are they embedded as objectives sprinkled throughout the units? Are there enrichment or extension units which students may complete in their entirety?

Integration

Is this course or program area free-standing in the curriculum, or is it integrated with other areas? Is the content of different curricular areas coordinated? For example, is literature in the English curriculum selected so as to coordinate with the historical period being studied in social studies? Or has a single unit been created which integrates the objectives of both the English and the social studies curricula simultaneously?

Depth

Is this curriculum a "once-over-lightly" of a wide range of material, or is it an in-depth study of a less extensive range of material?

Final or External Outcomes

Are specific outcomes established, either internally or externally, which must be reached by this curriculum? For example, are there state guidelines as to the content of the curriculum, with state tests to go with them? Or does the District offer students the opportunity to attempt the Advance Placement or International Baccalaureate exams? If so, the students must be adequately prepared to be successful on them.

Summary: Step #3 in developing an outcome-based curriculum is defining specifications. These are: uniformity, program organization, program structure, organization of instructional time, enrichment and extension, depth, and final or external outcomes.

Planning Courses

As used here, the word "course" means a collection of content that is best studied together, usually in a one-year period. Thus, a course could be a year's science in the elementary school, or "Biology I".

A program area usually consists of several related courses. Thus, in mathematics, a planning committee might specify that the curriculum will consist of Basic Math (up to Algebra, and subdivided into 7 or 8 courses, since it would take most students 7 or 8 years to complete it), Algebra I, Geometry, Algebra II, Trigonometry, Math Analysis, Calculus, Consumer Math, Business Math, and Math Applications. In this manner, the committee can specify all the courses that they will offer in a school within the context of any discipline.

The planning group can be creative about it if they wish, and define the disciplines differently, including literature not with English, for example, but with the Arts, on the grounds that it reflects creative effort, or even with Social Studies, with the argument that literature provides a window into the social history of a period.

How a committee defines the courses within a curriculum will reflect partly the educational goals of the district, and partly the program goals developed for that area. There is no single correct way of doing it, and there is plenty of room for flexibility. As with everything else, however, there are trade-offs. The more unusual and experimental a school's curriculum becomes, the more explaining will have to be done to the community and to other individuals and institutions, employers, vocational colleges, and universities. In addition, the more unusual the curriculum is, the more difficult it becomes to identify instructional materials.

Summary: Step #4 in developing an outcome-based curriculum is planning courses.

Establishing Units

Once the courses have been decided upon, the themes for the units must be established. For example, if it has been decided during the development of the specifications that there will be 12 units in every course, and that the 6th and 12th units will be review and synthesis units, then, for a course in U.S. History, the topics of the remaining 10 units must be set. One might be called "Early Exploration", another might be "Life in Colonial America"; another "The Revolutionary Period", and so on.

What constitutes a unit will depend on how many there are, and roughly how long they are intended to last. The content of a unit will also be determined by the nature of the subject. It is possible, for example, that the units in Algebra I might be of slightly different lengths because of the natural breaks in the content. In addition, if some units are prerequisite to other units, those relationships should be identified at this point.

It is at this stage in the planning that a course in one curriculum area may be coordinated with a course in another curriculum area. English and history provide a good example. Teachers might choose to teach a unit in English on "Persuasion and the Political Essay" at a time to coincide with the scheduling of a unit in history on the American Revolution or the Civil War.

The optimal time to select instructional materials is after the general course content has been decided. By then, the professional staff will also have decided, taking into account the results of recent research in the area, community expectations, and student characteristics, what the general framework of the course will be. From these they can develop criteria for materials selection, collect available materials, and evaluate them against those criteria.

At this point, the dialogue described on pages 43-50 between the selection committee and the materials can take place. The general goals have been stated, the specific courses are decided, and further course development will be best accomplished with specific materials in hand.

Summary: Step #5 in developing and outcome-based curriculum is the selecting of instructional materials and the establishing of units.

Planning Units in Detail

The final step in developing an outcome-based curriculum is detailed planning of each unit. It is during this step that the objectives, the standard of mastery, and the methods of assessment are defined for each unit. It is the activities in this stage that most people think of when they "write curriculum."

Objectives may be articulated in any or all of the five categories of knowledge, inquiry and problem-solving skills, values, social skills and psychomotor skills. In addition, the methods of assessment, the assessments themselves, and the standards of mastery must be established. If the method of assessment is any other than a paper/pencil objective test, criteria for scoring or assessing the essay, paper, project, or activity, must also be defined.

If educational goals and program goals have been worked out consistently, if materials have been selected which respect current knowledge of the teaching and learning process in each curriculum area, if the specifications have been developed with care, if the process for curriculum development and materials selection has involved members of the professional staff and community, the final step in curriculum development is not difficult. Because of the importance of alignment of materials to objectives, if instructional materials reflect the district's program goals and recent research, much of the course organization and detailed unit planning will have been done by the publishers of the materials. The articulation of the objectives will consist of selecting from those provided, and adding others (for example, from the domain of inquiry and problem-solving skills, or social skills, or values) if necessary.

If, however, the committee has decided to develop its own units and tests to assess mastery of those units, the objectives must be written and the tests must be constructed at this stage. Three types of tests will be needed: placement tests (for a skill curriculum, to assess student skills in

summative tests (covering the content of several units.) The objectives may be written from any of the content areas (knowledge, inquiry, problem-solving skills, social skills, psychomotor skills, or values) should reflect the balance specified in the program goals.

Constructing tests for use in an outcome-based program is a process: 1) clarifying the objective to be tested, 2) selecting the appropriate general method of assessing it, (for example, a paper/pencil test, observation, or student project) and 3) writing (or selecting from a bank) suitable items or methods. Suitability, as referred to in (3) is that the objective and the item are aligned as to intent of the objective and conditions (if any) are attached.

Summary: Step # 6 in developing an outcome-based curriculum: developing detailed units, including objectives, identified material materials or procedures for assessment of student learning.

APPENDIX

Classification System for the School Curriculum¹

Knowledge

- G1 Simple Generalizations
- G2 Principles and Laws
- K1 Conventions: names, nomenclature, symbols
- K2 Conventions: rules, standardized processes, definitions
- K3 Properties, parts, characteristics, features, elements, dimensions.
- K4 Trends, sequences, patterns
- K5 Similarities and differences, classifications
- K6 Contexts, locations, orientations
- K7 Operations, functions
- K8 Cause and effect relationships
- K9 Criteria or standards
- K10 Non cause-effect relationships

Inquiry and Problem-solving Skills

- P1 Input (Acquiring information)
 - 11 Viewing
 - 12 Hearing
 - 13 Feeling (tactile)
 - 14 Smelling
 - 15 Tasting
 - 16 Using sense extenders
 - 17 Using internal sensors of emotion
- P2 Input verification (insuring validity and adequacy)

Re Tri-County Goal Development Project, Portland, Oregon, see Iserbyt, C. "Back to Basics Reform Or...Skinnerian International Curriculum," pp 37-38 "Federally-funded Goals Collection Blatantly Declares What Will Take Place in Next Twenty Years"; also for info on use of materyp2 learning for international curriculum. Copyright 1985.

* 1 The knowledge and inquiry and problem-solving skills sections of this taxonomy were first developed by the Tri-County Goal Development Project, Portland, Oregon.

- 21 Evaluating authoritativeness of sources
- 22 Evaluating logical consistence and accuracy
- 23 Evaluating relevancy to desired learning purpose
- 24 Evaluating adequacy for acting or deciding

P3 Preprocessing (organizing information)

- 31 Labeling, numbering, naming, coding
- 32 Recording, listing
- 33 Classifying, selecting according to criteria
- 34 Ordering, sequencing, finding patterns
- 35 Manipulating, arranging, computing, transforming
- 36 Estimating
- 37 Summarizing, abstracting

P4 Interpreting Information (drawing meaning from data)

- 41 Decoding verbal and non-verbal symbols
- 42 Inferring, interpolating, extrapolating
- 43 Analyzing
- 44 Associating, relating, equating
- 45 Comparing, contrasting, discriminating
- 46 Synthesizing
- 47 Testing against standards or criteria
- 48 Generalizing

P5 Using Information to Produce New Information

- 51 Theorizing, predicting
- 52 Formulating hypotheses
- 53 Testing hypotheses
- 54 Revising hypotheses

P6 Acting on the Basis of Information

- 61 Reacting
- 62 Making decisions
- 63 Solving problems
- 64 Restructuring values

- 65 Restructuring behavior
- 66 Encoding symbols prior to communication
- 67 Creating on the basis of knowledge and process

P7 Communicating Information

- 71 Vocalizing (non-verbal)
- 72 Gesturing, moving
- 73 Touching
- 74 Speaking
- 75 Writing
- 76 Using art media (drawing, sculpting, etc.)
- 77 Dramatizing
- 78 Singing, playing instruments
- 79 Dancing

Psychomotor Skills

- A. Foot-eye coordination
- B. Hand-eye coordination
- C. Rhythm
- D. Balance, flexibility, agility

Values (examples)

V1 Personal Values

- 11 Punctuality
- 12 Perseverance
- 13 Neatness
- 14 Pride in work

V2 Interpersonal Values

- 21 Loyalty
- 22 Trustworthiness
- 23 Honesty

V3 Social Rights

- 31 Respect for life
- 32 Respect for dignity of others
- 33 Respect for property
- 34 Freedom of speech
- 35 Freedom of assembly
- 36 Privacy
- 37 Fairness
- 38 Patriotism

V4 Environmental Values

- 41 Preservation of resources
- 42 Respect for animal life
- 43 Quality of life

V5 Aesthetics

- 51 Structure and form in literature
- 52 Expression in art, music
- 53 Elegance in mathematics
- 54 Simplicity in science

Social Skills**S1 Group Formation and Procedures**

- 11 Moving into the group
- 12 Staying with the group
- 13 Using quiet voices
- 14 Keeping hands and feet to self
- 15 Taking turns talking
- 16 Energizing the group when energy is low by suggesting new ideas, being enthusiastic, using humor, etc.

S2 Support of Group Members

- 21 Looking at the speaker
- 22 Using others' names
- 23 Avoiding "put-downs"
- 24 Expressing support and acceptance through eye contact, enthusiasm, praise, seeking others' ideas, etc.
- 25 Criticizing ideas, not people

S3 Task Orientation

- 31 Giving direction to the group by:
 - a. stating or re-stating the purpose
 - b. stating or calling attention to time limits
 - c. suggesting working procedures
- 32 Seeking elaboration by asking other members to relate the material being learned to earlier material and to other things they know.
- 33 Seeking clever ways to remember the important facts and concepts by using drawings, mental pictures, or other memory aids.
- 34 Summarizing orally what has just been read or discussed. (P37)
- 35 Extending other members' ideas by adding further information or implications. (P42)
- 36 Probing by asking questions that lead to deeper understanding or analysis. (P43)
- 37 Producing a number of plausible answers from which to choose an alternative. (P52)
- 38 Testing reality by checking the group's work with the instructor or with other examples of reality. (P53)

S4 Communication

- 41 Asking for help or clarification of what is being done or said in the group.
- 42 Offering to explain or clarify.
- 43 Paraphrasing or clarify other members' contributions.
- 44 Correcting a members' summary.