DOCUMENT RESUME

ED 275 059 EA 018 909

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TITLE Curriculum Development within a Mastery Learning Framework.
PUB DATE Apr 86
NOTE 24p.; Paper presented at the Annual Meeting of the American Educational Research Association (67th, San Francisco, CA, April 16-20, 1986).
PUB TYPE Reports - Descriptive (141) -- Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Cooperative Planning; *Curriculum Development; Educational Innovation; Educational Theories; Elementary Education; Evaluation Methods; Instructional Improvement; Learning Processes; *Learning Theories; Long Range Planning; *Mastery Learning; *Minimum Competencies; Program Improvement; Student Needs; Teaching Methods
IDENTIFIERS New Jersey

ABSTRACT

This paper analyzes mastery learning as an alternative to curriculum planning and discusses implementation of the strategy in a prekindergarten through eighth-grade school district in Red Bank, New Jersey. The paper briefly describes district schools and circumstances affecting the school board's decision to implement mastery learning; discusses program assumptions; and reviews how curriculum tools ensure increasing congruence among curricular, instructional, student, and organizational outcomes. Curriculum is defined to include all consciously-written plans influencing student outcomes. Assumptions about the learner, teacher, purpose of schooling, and nature of knowledge are explicated. Mastery learning assumes that students become similar to one another in learning ability under favorable conditions. Because most children master the curriculum, reform aspires toward a unified curriculum. Knowledge is transmitted in small increments. The structure of knowledge lends coherence (Piaget 1970); therefore, students apply learned generalizations to diverse contexts. The study presents a model developed at Red Bank with incremental instructional units and a "generic" cycle with corrective activities. As student achievement increases, revised unit objectives accommodate those entering grade levels with more of the skills necessary for mastery. Curriculum committees link budgets with improved student outcomes; personnel policies are reviewed for congruency with goals. Nineteen references are appended. (CJH)

Curriculum Development Within A Mastery Learning Framework

Paper Presented at
Annual Meeting of

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION
San Francisco, CA
April, 1986

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Introduction

In this paper I will discuss one alternative to curriculum planning developed to help structure and implement a program of mastery learning in Red Bank, New Jersey. To provide a context for this discussion, I will first describe Red Bank Schools briefly and provide a background for the school board's decision to implement mastery learning. Second, I will discuss some of the assumptions underlying mastery learning as practiced in Red Bank. Third, I will describe some "tools of the trade" used to develop curriculum for mastery. Last, I will review how the tools of curriculum are used within the school year to insure that there is increasing congruence between curricular, instructional, student, and organizational outcomes.

Red Bank Schools

Red Bank Boro Schools is a Pre-kindergarden through eighth grade school district serving 850 students in a coastal community of 16,000 in Central New Jersey about an hour and a half commuting distance from New York City. The Primary School serves students who are three year old through grade four in self-contained classrooms; the Middle School has self-contained classrooms for grades five and six, and a departmentalized structure for grades seven and eight. Sixty five percent of our students are black, thirty percent white, and five percent hispanic or oriental; forty five percent are on free or reduced lunch, which indicates they come from impoverished households. The New Jersey State Department of Education classifies Red Bank as urban.

For a number of years before the implementation of mastery

learning, Red Bank student achievement was dismal. Students graduating from the school system in 1979 averaged one to two years below grade level on the Metropolitan Achievement Test. Such poor achievement had been the norm in the school system for a number of years, despite the best efforts of the teachers and administration to improve. In 1979, the superintendent convinced the board that the level of student achievement was unacceptable and that the concept of "mastery learning" offered great promise for raising achievement. After one year of extensive inservice for teachers and administrators, the mastery learning program began implementation in 1980, and by 1984 a written course of study was in place in all subject areas at all grade levels. As measured by standardized achievement tests, Red Bank Boro students are now scoring significantly above the national average at all grade levels and in all subject areas. Before discussing the specifics of developing a course of study in this mastery learning system, I will examine some of the assumptions on which mastery learning is based.

Definition of Curriculum

Any system of curriculum development ultimately rests on a series of assumptions about the role of curriculum, the learner, the teacher, the purpose of schooling, and the nature of knowledge.

I hold a broad definition of curriculum which reflects a cultural perspective (Sarasson, 1971). Specifically, a curriculum is a set of written plans which guide and direct formal and informal organizational regularities toward desirable student outcomes. A curriculum is an organizational plan where conscious decisions are justified in terms of what is the best way to achieve good for

students and society. This definition of curriculum encompasses the school's schedule, the budget, student placement criteria, the Board's policy, personnel choices, administrative procedures and organization, as well as courses of study, as these are all written plans which are designed to promote student outcomes. The schools' or district's curriculum then is not just a course outline, a list of objectives, or a system of evaluation; rather curriculum encompasses all of these areas and more as it relates to the culture of the school and the conscious written intentions which govern the cultural regularities and outcomes of those who manage and deliver instruction and other services. (See Footnote 1.)

I emphasize both concepts of "written" and "conscious" as important aspects of curriculum for a number of reasons. Conscious decisions come from gearing practice toward outcomes and revising practice on the basis of results. It also comes from the idea that teachers, administrators, superintendents know, or at least have guesses about, what helps to produce particular outcomes. What is conscious can be written, what gets written gets remembered, and what gets remembered can be changed; developing, implementing and evaluating change brings new consciousness. Thus, the cycle of curriculum development brings us to new understandings, and new theories of how to produce better outcomes for students. The process pits value statements about what is good for students and society against the student outcomes and the conscious written plans and procedures of the organization. The role of curriculum then is to produce congruence between value statements about what is good and necessary, an organization which puts those statements into action,

and evidence that the intended outcomes took place.

I hold these assumptions about curriculum and its functions which are not necessarily inherent in assumptions about any curricular system, such as mastery learning. These statements do provide a platform on which we can build our assumptions about the learner, the purpose of schooling, the teacher and the nature of knowledge.

Assumptions

The Learner

Mastery learning assumes that "Most students become very similar with regard to learning ability, rate of learning, and motivation for further learning -- when provided with favorable learning conditions" (Bloom, 1976). I believe there are two corollaries to this assumption - almost all children can master the curriculum of the school, and students are more similar than they are different.

Bloom's first assumption is supported in his book and I will not attempt to summarize his findings here. However, Bloom's research emphasizes that if schools could provide conditions which resemble one-on-one tutoring, then all children could master the school's curriculum (Bloom, 1984). A cultural view of curriculum reinforces using the school's plans and organization as tools to promote valued outcomes.

The first corollary -- almost all children can master the curriculum of the school -- is being thrust upon us as more and more school age children graduate from high school. If most children spend 12 years of their life in school, then we should have as a societal goal successful completion of the curriculum. To assume otherwise is

to condemn children to years of failure, and the future of our society to dealing with the results of those failures.

The next corollary -- that students are more similar than they are different -- is exactly the opposite of prevailing educational assumptions of the previous decades. During the late 60's and 70's we assumed that children were more different than similar and created "individualized" learning systems to address these differences. However, research showed that individulized learning did not appear to be significantly better than other more traditional methods of education. While individualization was widely proclaimed, our schools generally delivered instruction to groups. Individualized instruction was actually implemented, not with individuals, but with small groups where students were assumed to have similar abilities and needs within the groups, and we assumed that students were significantly different between groups. In primary schools, typical practice had three groups for reading; in secondary schools, students were grouped into tracks and treated differently based on their "ability group".

However, recent research (Oates, 1985) indicates that the assumptions about similarities within groups and differences between groups is not supported. Further, the tracking practices in schools lead to differential expectations of students which is particularly damaging to students in the lower groups while not promoting achievement for students in the higher groups. Thus, research now appears to point toward the assumption that students are more similar than different, so individualized instruction and/or tracking may not be appropriate ways to insure, from a school's organizational standpoint, that all students can master the curriculum. Recent

reform efforts have also pointed the way toward a unified curriculum appropriate for all students (Adler, 1984; Roberts, 1984) and away from a differentiated or "shopping mall" course of study. Underlying this direction is the assumption that students are more similar than they are different.

Assumption About the Purpose of Schooling

Mastery learning, as a generic practice, is silent on the purpose of schooling and the intents of education. Rather proponents of mastery learning assume that the purpose of schooling is known, that the outcomes of schooling have been defined, and that they are both "good" and "appropriate". Mastery learning provides a set of assumptions and a vehicle for getting to predefined outcomes. For example, in a recent book of papers on mastery learning, there was little if any talk about appropriate outcomes for schools or subject matter disciplines (Levine, D, 1985). Indeed, it is my opinion that mastery learning fails to the extent that outcomes are unconsciously chosen, unconsciously practiced, and unconsciously continued. To be valid from a content perspective, outcomes need to be justified with a rationale and based upon the structure of knowledge generated by particular academic disciplines (See Moffett (1968) in reading/language arts or Schwab (1962) in science. More explanation about a rational is given in later sectons.)

Assumption about the Nature of Knowledge

Mastery learning programs also put into practice a set of assumptions about the nature of knowledge. Mastery learning programs assume that knowledge can be transmitted in small increments that lead to progressive understanding. It assumes that people will know that

they know, and that others will be able to determine that they know. My father, a man of many sayings, used this quote often as I was progressing through college. "Freshmen don't know, and don't know that they don't know -- spurn them. Sophomores don't know, and know that they don't know -- pity them. Juniors know, and don't know that they know -- honor them. Seniors know, and know that they know -- reverence them." Mastery learning programs assume that knowledge taught in school is of the type that everyone, given appropriate conditions, can get to be a "senior". This is in contrast to the mystic (or a stockbroker) who receives his knowledge through divine revelation. Well, perhaps everyone needs to pass a mastery test when they visit Saint Peter whether mystic, stockbroker, or educator.

The second assumption about the nature of knowledge is that it has a structure which lends coherence, and "knowability". (See Piaget, 1969, 1970, Schwab, 1964a & 1964b, Green, 1973.) This structure of knowledge then allows generalization from the finite knowledge presented in school to the infinite situations encountered in the world beyond school. Thus the knowledge (the tools) we acquire in school have some use for our continued learning. For now, however, let's leave the esoteric realm of epistemology to St. Peter and continue our discussion.

Assumptions About the Teacher's Role

Given that we can know, the teacher has a responsibility to assist students in gaining knowledge and understanding. Thus, in mastery learning programs the teacher has a partial responsibility in insuring that all students master the curriculum of the school by providing the appropriate learning conditions - the appropriate classroom culture.

Squires, et.al(1983) suggest that where teachers plan for appropriate instruction, manage the classroom well, and provide students with instructional opportunities, that students are more likely to master the curriculum of the school. The teacher then must be conscious of not only subject matter knowledge and structure, the developmental level of students, but also the effects of the particular classroom culture on the student, and the teacher's conscious use of classroom rules, rituals and routines to effect students' outcomes. The teacher must be a reflective observer and inquirer in order to constantly refine how the course of study, the instruction, the perjorative and objective evaluations are effecting student outcomes. (Green, 1973). Such reflection then must be integrated into the planning processes of the school. The school administration, including the central office, also contribute to both the culture of the classroom and the school (Squires, et.al., 1983).

Tools of the Trade

Given the definition of curriculum and the above assumptions about mastery learning programs, I will describe some of the tools we have developed in Red Bank to develop both a course of study for the school district and a "curriculum" in a cultural/organizational sense of the word. First, I will describe the instructional model used to teach units of instruction in Red Bank. Next, I will describe how district standards were justified for each subject area. Lastly, I will describe a system for managing, changing and evaluating the curriculum so that the curriculum is maintained, made more conscious, and improved during the yearly cycle of school.

Instructional Model

A unit is the term we use in Red Bank to denote a series of instructional lessons of 30 to 60 minutes in length, over a period of two to four weeks. A unit can also be defined as a chapter in a text book, or a major grade which a teacher puts in the grade book. We have chosen to define a unit in this way as we have found that it is a common way in which teachers already describe their instruction. The instructional cycle is at the heart of our mastery learning program and contains the following steps:

Instructional Model for Mastery Learning

Introduction 1-2 Days	Mental Set Activities - Provide motivation State the Objective in Children's Terms Provide a Rationale for Learning
Instruction 5-8 Days	Input - Whole Class Direct Instruction Guided Practice - Students Practice With Help Independent Practice - Practice Without Help
Assessment	Formative Test - Used for grouping students
3-4 days	Extension Activities - Horizontal enrichment activities for those who pass the formative assessment.
	Corrective Activities - Reteaching for those who did not understand the first time.
Mastery Assessment 1 Day	Taken by all students, usually at the same time, to determine mastery, grades count.

All units in all subject matter are taught using this "generic" cycle of mastery learning. The cycle also adheres to the traditional notion of mastery that students are given two chances to understand the unit's objectives; if students don't pass the formative test, corrective activities are provided using different materials and different instructional strategies. Grouping students in this way also allows time for those who grasp the unit's objectives easily, to

move on to enrichment activities. Because grouping is done after instruction, rather than before, groups remain flexible and based on need, rather than grouping based on more global, and less precise measures of ability and/or achievement.

The units are the basis of the curriculum of the school and we work hard at making sure that all students master each unit. The reward structure of the district has students and teachers working together against public standards contained in the mastery assessment, rather than the teacher devising the test "against" the student. Thus the formal and informal norms of the organization are created by the regularities of the instructional cycle and the public nature of the mastery assessments. We arehelping to create a school culture where student success and mastery are the norms.

A Course of Study

A course of study encompasses ten to twenty units and their objectives across the eight grade levels in our system. Thus a course of study, instruction and evaluation (formative and mastery tests) are tightly linked. Instruction and evaluation also have close ties from the data generated by the mastery and formative tests. In this way, we have a written and consciously designed course of study, a model to deliver instruction and information on whether we have accomplished our objectives.

District Standards

To choose units and their objectives, criteria are needed. District standards provide those criteria in a written document which outlines the major content areas appropriate for specific subject areas, a justification as to why these content areas have been chosen

generally taken from content area experts, and supporting research which provides data on which a judgement can be based (Squires, 1984) For example, in Red Bank, the Reading/Language Arts Curriculum Committee proposed seven different content areas: Reading; Literature; Writing; Listening and Speaking; Rhetoric, Logic and Thinking Skills; Media Production and Analysis; and Study Skills. The committee wrote a justification for each of these areas giving reasons why it is important for students to spend time learning this content. Research was also cited. For example, the committee suggested a "process approach" to writing based on research in the teaching and learning of writing skills (Braddock, R. et.al., 1963). We expect these rationales for each subject area to have a life of ten years, as the general structure of particular subject areas change slowly and research results do not accumulate rapidly.

The district standards provide us with a way to judge the balance within a particular curriculum area and index objectives/units to see that all areas specified in the district standards are actually addressed in the courses of study. For example, New Jersey recently mandated a high school proficiency test which includes a writing sample. Rather than create a new "writing program" to address this mandate, we looked at the objectives in Reading/Language Arts which addressed writing and asked ourselves whether the several units which included writing at each grade level were enough. We also looked at the list of units and objectives in other subject areas to see if writing was included. On the basis of this data, staff recommended changes in units across subject areas where we could address writing better.

District standards should represent an overlap of content, concepts and skills in district instructional materials (such as text books), standardized and state tests, content area experts' structure, internal assessment measures, a child's developmental level, and community expectations.

I believe that it is incumbent on each local board of education to clearly and publicly state the district standards for each subject area and to ask superintendents for evidence that students are mastering the content, concepts and skills specified in the district standards. In this way we can make sure that all students are mastering the courses of study in the school.

Management Systems

If we don't keep track, it may not happen. Not surprisingly, what we keep track of is what we as an organization value not in the abstract, but in the concrete. A management system fits into the definition of curriculum as "written plans which effect outcomes."

In Red Bank, we ask teachers to use a classroom list of their students with the scores of mastery and formative tests. As students progress through the curriculum as a class, (remember the assumption about students being more similar than different), record keeping is relatively simple. Principals (really, their secretaries) record when teachers have completed the units and the number of students who mastered or failed the unit. Scores of the mastery tests are sent home with the more traditional report card that uses letter grades for each subject area.

The capability to manage data on a classroom and school level will determine the complexity and the coordination of any

instructional system. Let's try some arithmetic. Fifteen units x Five subject areas x Five Classes per grade level x Five grade levels in a school yields 1,875 pieces of information per year that the principal is responsible for collecting, reporting, and making sense of in Red Bank. Contrast this with an individualized system of instruction with the same number of units and subject areas but now the principal is faced with 25 students in a class. The original 1,875 pieces of information is multiplied by 25 students per class to total 46,875 pieces of information which has to be handled, and more importantly, made sense of, yearly. That much data will be too much to improve anyone's consciousness or to effect the regularities of a school. The design of management systems, even if they are computer assisted, needs to be done with an eye as to whether the data will be used to improve everyday practice in the school.

Other Tools

If curriculum is viewed as the written plans of a school system which help promote student outcomes, then written budgets, written policy manuals, written labor agreements, written board agendas, written job descriptions, represent other tools of curriculum development, not separate facets of the same organization. In fact, these written plans have a great impact on curriculum development and on the everyday regularities which form the culture of the school.

Textbooks In Red Bank, textbooks are used to achieve the objectives of instruction, but not to dictate the objectives of instruction. Multiple textbooks are usually used at each grade level where they present the best information or instructional sequence for students. We don't adopt a "textbook series"; we adopt a series of

unit objectives supported by a rationale for a subject area. Textbooks are used to support, but not to direct, the courses of study. In this way, we maintain local control over the content and sequence of the courses of study.

Time to Plan Let's return to the management numbers for a moment and view them from a teacher's perspective who wants to improve student performance on the units of instruction at a particular grade level. There are 5 subject areas with 15 units in each subject area totalling 75 units per grade level. If the teacher wanted to spend 40 minutes reviewing student results for each unit that would take 75 planning periods out of the 180 (one per day) which she is allowed through the negotiated labor agreement. Given these figures, it is probably not a reasonable assumption that the results of all units will receive 40 minutes of consideration. This has nothing to do with the design of the course of study, but has everything to do with labor agreements and the length and structure of the school day. What is reasonable to expect, and what happens at Red Bank, is that teachers spend the time as they are correcting the mastery assessments, making informal, and, at times subconscious, decisions about how their students actually did on the unit, but the unit itself will not change as a result of this knowledge because we have not found the way to use this knowledge to change our written plans for succeeding years. This is a result of the other written plans, such as labor contracts and the structure of the school day which interfere with the ability of the organization to learn from its experience.

Budgets and Curriculum Maintenance Budget allocation procedures are also important curricular documents as they are written

plans for how institutional energy will be spent in the coming year. Yet there is little done to tie budget procedures to valued student outcomes or important staff planning time which would increase those outcomes. For example, in Red Bank we recently discovered that just as buildings are maintained, courses of study also need to be maintained. If there are 5 subject areas per grade level and 15 units per subject area and we have 8 grade levels in the district, then there are 600 units in our curriculum. If the units remain five years, which has been our experience, before they need to be revised, then we need to revise 120 units as a district per year. If unit revision takes 20 hours for one unit, as has been our experience, then the institution needs to provide for 2,400 hours of unit revision time. At $10 per hour that amounts to $24,000 per year to maintain five courses of study over eight grade levels. Monies such as these need to be reflected in the district budget.

District Personnel Policies If curriculum maintenance is a priority, then district personnel policies need to support the 2,400 hours needed. Currently in Red Bank, we complete most of this curriculum maintenance over the summer. If people worked five days a week for five hours a day for five weeks in the summer, approximately 20 people would be needed to fill those positions. In Red Bank, that is about a third of the teaching staff. Eventually, we may get these positions written into the labor agreement with the teachers so we could make curriculum maintenance an integral and regular part of the culture of the district.

What I am suggesting is that we must begin to use the tools that the organization provides to encourage and support student

outcomes in ways that discourage viewing curriculum as an unconnected description of a good but mostly fictitious course of study. This means using organizational tools, such as budget procedures and personnel policies to build toward the work that will support student outcomes.

A Calendar for the Use of Curriculum Tools

Units and Courses of Study

The school year provides a cycle to use these curriculum tools. We begin the year in September with unit objectives for all subject areas at all grade levels passed out to teachers. The teachers meet in grade level groups to determine approximately when they, as a grade level, will complete each unit. This is turned into the office, where the secretary records the information for the school. As each teacher finishes a unit, information is turned in on the students performance on formative and mastery tests. At the end of the year all teachers are expected to have completed the units in order to provide all students with the opportunity to master the unit objectives which provide the prerequisite skills for the next year's work. Teachers are evaluated on whether they have completed the units because completion of the units is part of their job description.

In the spring of each year, each grade level is given the opportunity to revise, delete, or refine grade level objectives in all subject areas, provided that the revisions or deletions are consistent with district standards, provide for an appropriate scope and sequence across grade levels, and are agreed to by most everyone at that grade level. (Remember that each grade level resides in only one school.) For example, the first grade deleted over the last three years units

on shapes, colors, and a phonics unit on initial sounds because these are now being covered at the Kindergarten level. Revisions were also made across grade levels to include more writing experiences in Reading/Language Arts, Science and Social Studies because of a state-wide high school proficiency test focusing a re-examinaton of how an whese writing was taught. The curriculum supervisor provides the quality control function by helping teachers talk through issues involved with changes and formally approving the changes. Once the changes are in place, they remain for the next year. Yearly revision of all objectives keeps the course of study and the unit objectives fresh and flexible. As our student acheivement has improved, the unit objectives have gotten more complex and difficult as students entering the grade levels have more of the prerequisite skills necessary for mastery. The curriculum, in terms of a written course of study, evolves gradually as the consciousness of teachers evolve as they deepen their understanding of the subject matter structure, instructional techniques, and their own professional roles.

The typical five year course of study revision cycle is not used here because the written plans (the course of study) do not keep pace with changes made in instructional practice. On the other hand, the district standards are revised once every seven to ten years. Revision of district standards at that interval is necessary to keep them in tune with the scope and sequence of units, and to keep pace with changes in structure of the subject area fields themselves.

Revision of units is influenced by results of formative and mastery tests. When students do poorly in mastery and formative tests, revision of the units, or a review of assumpt_ s about

students' entry level skills may be necessary. Such a review may lead to changes in scope and sequence at several grade levels. Standardized tests also influence the yearly review of unit objectives. Results of standardized testing are scrutinized for patterns of student achievement which suggest the need for unit revision. For example, if students in third grade don't score well as a group in geometry and measurement, then teachers will review the units where geometry and measurement are taught, and make recommendations for revisions.

Unit revision generally takes place during the summer, where the recommendations of grade levels are given priority, and teachers work on revision of units. The amount of time needed for maintaining courses of study was discussed earlier.

Budget

As stated earlier, if we define curriculum as any written plan which promotes student learning, budget preparation and implementation is a key element of any curriulum development process. Budgets are expended on a cycle which is congruent with the beginning and end of the instructional year. However, budgets are developed beginning in October for the succeeding fiscal year. Developing a budget is a statement of what is valued to produce student outcomes. In many ways, a budget reveals a part of how people think student outcomes are achieved. For example, the number and configuration of personnel represent a plan to produce student outcomes. Class sizes and amount of support services, are reflected in allocations for personnel. Instructional materials and equipment also represent an "idea in practice" about how student outcomes are enhanced. At present, the

general budget making processes in most school districts are largely "unconscious" attempts to produce student outcomes, as the underlying assumptions or theoretical framework on which the decisions are made are not discussed as part of the decision making process. In part, this is because the problem of making a budget is not conceptualized as a way to enhance student outcomes and there may be little input from teachers and/or building level administration.

In order to make the budget development process more closely linked to student outcomes in Red Bank, we have assigned subject area curriculum committees in the district a certain amount of money to spend to improve student outcomes. The committees meet, use the data from unit mastery tests, unit revision recommendations, standardized tests, and their own teaching experience to develop a budget to define and improve priority areas. While this is a small example of what could be done in budget development, we believe it is one step down the road.

Personnel Policy

Personnel policy is another facet of curriculum developent which represents written plans and procedures for increasing student outcomes. Job descriptions need to include key elements which will help increase student outcomes such as: statements that teachers will complete the courses of study at their grade level, that they will use instrucional methods which promote student achievement, that they will maintain an orderly classroom environment which is conducive to learning. Most personnel policies do include such statements, however, they are not consciously used within the context of personnel evaluation and classroom observation cycles by administration to

improve student outcomes. Some personnel policies may actually inhibit students attaining desired outcomes, such as policies which require long periods of time between classroom observations and teacher-principal conferences, or teacher-school board contracts which provide little time to plan, revise, or renew instruction, units, or courses or study. Most existing teacher contracts, provide time almost exclusively for delivery of services, but little for planning how, by what means, and why services will be delivered to students in order to produce student outcomes. Such personnel matters needs to be reviewed on a regular basis to determine how the policies support or interfere with the attaining student outcomes.

Summary

In this paper I have discussed one alternative to curriculum planning called "mastery learning". A definition of curriculum was proposed which includes all conscious written plans which influence student outcomes, including courses of study, budgets, and personnel policy. Assumptions about the learner, the teacher, the purpose of schooling, and the nature of knowledge were examined given this definition of curriculum. Various procedures and tools were discussed to provide examples of how mastery learning in one school district helps to promote student outcomes.

Footnotes

Footnote 1 See Sarason, 1971 for a discussion of school culture and Rutter et al. for a discussion of ecological (or cultural) variables effecting student outcomes in more and less effective high schools in inner city London. Also see Squires et al. for a discussion of how school processes - regular everyday occurrences - have been correlated with schools which produce high student achievement, less violence and vandalism, and better attendance. Resnick & Resnick, 1985, that curriculum and evaluation play the largest role in shaping what is demanded of the schools.

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