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ABSTRACT

This monograph examines the need for appropriate curriculum materials to meet the needs of special education students within the structure of both regular education and special education classes and within the context of current education reform efforts. After an introduction and a section identifying curriculum needs a section presents general considerations concerning: regular class instruction, core curriculum, special curriculum, the learning disability profile, attitudes and expectations, remediation, and teacher tasks. Curriculum considerations are discussed next. These include access to information, increasing comprehension, complexity of information, teaching and learning strategies, assessment and evaluation strategies, and framework/adoption decisions. Recommendations for material development include the following: all written curriculum materials should be recorded on audio tape; materials should provide for different levels of complexity and for altered representations; materials should provide for concrete student experiences; appropriate teaching strategies should be discussed in teacher manuals and specific learning strategies in student manuals; student assessment should be curriculum-based, frequent, content and process focused, varied, and interactive; and state framework and adoption committees should include representation from special education. A model curriculum continuum for special education students and sample assessment procedures are appended. Includes 85 references. (DB)

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CRITICAL STEP IN CURRICULUM REFORM

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CRITICAL STEP IN CURRICULUM REFORM

Regular Education Materials and Special Needs Students

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Resources in Special Education
Sacramento, California

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CRITICAL STEP IN CURRICULUM REFORM

Regular Education Materials and Special Needs Students

Presented to the California Curriculum Development and Supplemental Materials Commission

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CRITICAL STEP IN CURRICULUM REFORM

Regular Education Materials and Special Needs Students

EXECUTIVE SUMMARY

■ **NEED** Many special education students can successfully learn the core curriculum in regular and special classes if curriculum information is accessible and understandable. Improved, altered, adapted, and supplemented student materials will result in reasonable levels of success for both special education students and other low achieving students. Teacher manuals and guides can assist teachers in improving curriculum materials which in turn will result in improved student performance.

Students with learning difficulties face several problems when they attempt to learn new information or skills. These problems can be reduced by improving curriculum materials and teaching strategies. Improved access to written information and to specific learning strategies can help students overcome difficulties with comprehension, memory, and other cognitive functions.

■ **ACCESS** Access to information can be improved by changing the medium (e.g., printed text) and the complexity (e.g., density) of curriculum materials. The medium can be changed by the use of audio tapes and multimodal forms of presentation. The complexity of materials can be changed by methods, such as, altered representations, greater elaboration, reduction in the number of concepts, frequent student feedback, direct instruction, and concrete experiences.

■ **STRATEGIES** Relatively new teaching and learning strategies have been demonstrated to be effective with special education students. Teaching strategies are methods that improve the delivery of instruction, such as having students work cooperatively (e.g., cooperative learning). Learning strategies (e.g., mnemonics) teach students how to learn. Both types of strategies are appropriate for inclusion in student materials and teacher manuals.

■ **ASSESSMENT** Student assessment can be designed so that it enhances the instruction of special and low achieving students. Effective and meaningful assessment guides instructional decisions and action, provides feedback, measures process and content, and allows for student interaction. Curriculum-based assessment is an especially valuable feature of good instruction and, with other innovative assessment practices, should be included in texts and manuals.

■ **RECOMMENDATIONS** Curriculum materials are critical elements in the success or failure of special education and other low achieving students. The following recommendations are designed to improve regular education instructional materials for special students.

- 1) All written curriculum materials should be recorded on audio tape, and multimodal means of learning should be provided.
- 2) Materials should provide for different levels of complexity and for altered representations.
- 3) Materials should provide for concrete student experiences.
- 4) Materials should include clear descriptions of the goals, objectives, and expected outcomes for each unit of instruction.
- 5) Appropriate teaching strategies should be included in teacher manuals and, specific learning strategies should be included in student materials.
- 6) Teacher manuals should include suggestions about how to assist students who have poor academic skills, how materials might be adapted, and suggestions for supplementary materials.
- 7) Student assessment should be curriculum-based, frequent, content and process focused, varied, and interactive.
- 8) State framework and adoption committees should include representation from special education.

INTRODUCTION

After years of drifting toward a separate, parallel educational system, there is a growing consensus among educators and parents that special education students, to the greatest degree possible, should be taught in the mainstream of education. In order to successfully accomplish this task, the content of the regular curriculum needs to be accessible and understandable to special education students, and these students need to achieve reasonable levels of success in that curriculum. Students whose physical, developmental, or behavioral conditions persist in limiting them from participation in regular classrooms or on regular school sites also need the opportunity to acquire the knowledge and skills held to be important for the general population of students.

Special education students represent a wide variety of physical, learning, and emotional conditions. In California, over 470,000 pupils receive special education instruction. Some, such as those who are health impaired (13,305 pupils) or speech impaired (120,950 pupils), may have little or no problem with existing curriculum materials and instructional delivery. However, some students with health impairments and speech impairments and most other students with handicapped (336,258 pupils) lack success with the curriculum as it is presently conceived and/or presented. (Statistics from *California Pupil Count*, Dec. 1, 1990). This paper examines the need for appropriate curriculum materials to meet the needs of special education students within the structure of both regular education and special education classes and within the context of current educational reform. It identifies the research and conceptual basis of student needs, and it makes specific recommendations related to both the content and design of curriculum materials and the frameworks and selection criteria used to guide the creation and adoption of materials.

CURRICULUM NEEDS

It has been common practice for special education research to focus on student characteristics, special teaching methods, and specialized teaching materials. This paper examines student needs and their relationship to regular education curriculum materials. The aim of the paper is to determine what changes in curriculum materials could lead to greater student success. The term "materials" as used here; includes written, auditory, and visual presentations of subject matter content, teacher manuals, and prescribed student activities. Materials always represent an implicit statement about teaching methods and often contain explicit descriptions of teaching methods (teacher's manuals). Materials are key determiners of the content and process of instruction and, therefore, critical elements in the success or failure of special needs students. Curriculum materials with certain features are effective with students with diverse learning skills and abilities. Many of these features add to the effectiveness of materials for all students. Curriculum materials which provide the following ten characteristics serve the needs of special education students:

- access to information
- clearly identified concepts and steps
- concrete experiences and opportunities to generalize
- suggestions for adapted use of materials
- strategies for flexible pacing, grouping, and segmenting
- learning strategies
- repertoire of appropriate teaching strategies
- information that allows for altered representations
- range of assessment methods
- appropriate support materials with reduced complexity

GENERAL CONSIDERATIONS

In order to succeed in the core curriculum, special education students need appropriate materials and instruction delivered in an effective manner. The general considerations include: the right to be included in the mainstream of education, the adoption of the core and other curriculums, the attitudes and expectations implied by adopted materials, remedial instruction, the learning profile of low achievers, and the instructional tasks of teachers.

Regular Class Instruction

Federal legislation (Public Law 94-142), national priorities (Will, 1986), state reform (Campbell, 1988), and current research (Stein et al., 1989) all point in the direction of educating more handicapped students in general education settings. The success of this movement, in part, depends on providing special education students with appropriate core related materials. Improvements of these materials can benefit a wide range of students at risk of school failure.

California is far from accomplishing the goal of appropriate regular class placement for its handicapped population. California places more students in separate classes or facilities than many other states. For instance, it is more likely that a special education student in California will be placed in a separate setting than a similar student in Oregon (Danielson and Bellamy, 1989). If the state is to improve the retention of special education students in regular classes, the adopted materials and their supplements must include provisions to accommodate a broader range of student differences.

Core Curriculum

The adoption of core curriculum is both a national trend (Bennet, 1988; Shanker, 1987) and a key element in California's education reform movement. In this movement the core curriculum is to be made available to all students, including the handicapped. In California, special education programs have begun the implementation of the reform (Campbell, 1988; Marin County Superintendent of Schools, 1988; Task Force on General Education/Special Education Interface, 1988; Weil, 1989). State adopted materials, however, are needed in order to make the reform a reality.

Bigge (1988) has identified a full range of curricula needed for all categories of special students (Table 1.). A similar curriculum organization is described by San Diego City Unified School District and is included in Appendix A. Those levels that most directly relate to regular education curriculum are those identified as "identical," "parallel," and "lower grade." The core curriculum is clearly relevant at these levels, while at other levels it has varying degrees of appropriateness.

If core curriculum is the basic instruction for all students, then materials must reflect this in ways that the curriculum can be understood by handicapped students with varying levels of skill and ability. A broader range of student skills must be accommodated in regular classes in California and regular materials must be designed to assist in this task. Special classes, when needed, must also have materials that reflect, as much as possible, the concepts contained in the state frameworks; and appropriate materials are needed for this task.

Table 1. Curriculum Component Options for Students in Special Education

CURRICULUM COMPONENT	DESCRIPTION
Regular Education	
Regular education curriculum	Regular curriculum, receiving no special education or without special education related services
Special Education	
Identical curriculum	Regular education curriculum, meeting the same standards and expectations at same complexities as students not in special education, but receiving special education and/or related services.
Parallel curriculum	Regular education curriculum, using regular education objectives, meeting the objectives at reduced levels of complexity and receiving special education and/or related services.
Lower grade level curriculum	Lower grade-level curriculum, using lower grade-level objectives, receiving special education and/or related services.
Practical academic curriculum	Different but related to regular education curriculum, using different but related objectives derived by substituting skills and knowledges enroute to the regular education objectives (or other similar objectives), receiving special education and/or related services.
Life management curriculum	Unique curriculum with unique objectives stemming from student needs for intensive preparation for participation in major life areas rather than from regular education curriculum and objectives, receiving special education and/or related services. Disability-specific curriculum—such as augmentative and alternative communication training or orientation and mobility instruction.
Other curriculum	Diffused curriculum such as career education, curriculum resulting from specially funded services in addition to special education, other curriculum that does not fit other components, receiving special education and related services.

From *Curriculum-Based Instruction For Special Education Students* (p 13) J. Bigge, 1988, Mt. View, CA: Mayfield Publishing Co.
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Special Curriculum

In addition to the core curriculum, special needs students often need instruction in knowledge and skills that are “taken for granted” in regular education programs. Instruction in the transition from school-to-work is needed if many handicapped students are to succeed in after-graduation, competitive and supported employment. Parallel lifeskills and vocational curricula are a necessary part of special education special-day-class programs; functional, self help, and independent living curricula are an equally necessary part of the program for students with severe and profound disabilities (Campbell, 1988; O'Neill, 1988). Materials are required for each of these instructional areas

Research findings suggest that there are a great many similarities between students with learning disabilities and other students with low achievement (Moran, 1984; Wilson, 1985; Ysseldyke et al., 1982). This has led to a debate about whether or not there are actual differences between the students in both groups (Ceci and Baker, 1989; Jenkins et al., 1988). However, there is no debating the fact that both groups experience significant failure in school and very possibly for similar reasons.

When combined, students with learning disabilities and students who are "at risk" because of low achievement constitute 15 percent, or more, of the student population in California. Because of their similar or identical learning characteristics, it is clear that curriculum improvements for one group of students will benefit the other. Changes in curriculum materials and delivery approaches suggested by research in special education are likely to improve instruction for other low achieving students.

A profile of those students identified as learning disabled (266,602 students, *California Pupil Count, Dec. 1, 1990*) provides essential information for those who guide, design and select curriculum materials for all low achievers. Nearly 50 percent of students with learning disabilities have achievement scores that fall in the lowest five percent on the composite score on standardized tests; nearly all (94%) fall within the lowest 20% in achievement scores. Reading scores are equally low (Stone, Cundick, and Swanson, 1988). Common learning problems for these students relate to scope, sequence, and presentation of information and include such features as focus, rate, complexity, density, and organization (Gast, 1987; Federal Register, 1989). Other learning difficulties such as poor memory, short attention span, and limited learning strategies are some of the vexing problems confronting the classroom teacher. This profile is consistent with what is known about most other low achieving students (Jenkins et al., 1988).

Attitudes and Expectations

Special education students and low achieving students have a rightful place in the mainstream of education. The right of the low achiever is well established and the right of students with disabilities was clearly established in 1975 (Public Law 94-142). However, curriculum materials often do not include provisions for these students. The exclusion of these students from adopted material adds to the erroneous perception that these student are not a legitimate part of regular education and are not entitled to instruction in the core curriculum.

Teachers are guided by the resources that they have available to them. Materials that recognize and anticipate the needs of special students are likely to prepare teachers to meet those needs. Materials that include considerations for the needs of special students are likely to establish the expectation that such students are a normal part of regular education. To do otherwise perpetuates the notion that special students are to be excluded from the curriculum (Wang, Peverly, and Catalano, 1987).

Remediation

Explicit recognition that there are students in most classes who have a legitimate right to be there and who also have limited reading, writing, cognitive, and learning abilities can lead to improved instruction. A remediation program that removes students from regular class activities is one, but not necessarily the most appropriate response. Slavin (1989) reports that remedial or special education “rarely accelerates students enough to enable them to catch up with their classmates” (p. 46). Time spent fruitlessly trying to catch up with peers in basic skills can rob low achieving students of other essential learning opportunities (Ceci and Baker, 1989; Smith, 1988). On the other hand, regular class curriculum materials and strategies designed to meet the diverse needs of these students can provide essential learning experiences.

The use of lower grade level materials is another common remedial procedure that can be inappropriate when those materials do not address the core objectives of the student’s grade level. Many students with low academic skills are capable of understanding the concepts at the students’ age/grade level. The acceptance of the principle of core curriculum demands that students are given the opportunity to achieve the goals and objectives that are appropriate for their current grade. Appropriate materials help to make this possible.

Teacher Tasks

An examination of the tasks of teaching can help to clarify the role of curriculum materials in the instructional process and how materials fail special students. While materials are designed and written for students, the essential purpose of materials is to support teachers who are responsible for instruction. The following are essential teaching tasks (Thousand, 1988):

- 1) Make information and skills accessible to students with varying backgrounds, learning styles, and abilities
- 2) Make information understandable using a variety of examples, explanations, demonstrations, and representations
- 3) Identify, define, and control the complexity of the concepts to be taught
- 4) Employ teaching strategies and promote learning strategies that assist students to understand content and master skills
- 5) Evaluate performance in order to assess growth and promote learning

In the case of special and low achieving students, materials fail to provide teachers with the support that they need to provide effective instruction. Assuming that teachers have the appropriate content expertise and process skills, the materials they have available to them should, in some way, extend their ability to complete instructional tasks. Materials should compliment or supplement teacher knowledge and skills. What if materials actually create a barrier between the student and success? That is, in fact, the situation for many special and low achieving students.

The following section examines curriculum considerations that can improve instructional materials for special and low achieving students. Improved materials should result in greater success for all students in regular classes and reduce the need for separate instruction.

CURRICULUM CONSIDERATIONS

Five essential teaching tasks have particular relevance for special students. These tasks involve key elements in the process of instruction and include (1) providing access to information, (2) assuring comprehension, (3) adjusting the complexity of information, (4) employing teaching and learning strategies, and (5) using evaluation information. Curriculum materials are essential resources that effect the way teachers perform each of these tasks. The curriculum considerations that follow are organized around the major teaching tasks.

Access to Information

Special education students experience two common barriers to the access of curriculum information. Both the medium (e.g., printed text) and the complexity (e.g., density) of materials can make it difficult or impossible for students to learn. Modifications, adaptations, or substitutions of materials can greatly improve student success. This task has traditionally been the teacher's responsibility; however, publishers have helped to create the problem and share in the responsibility to improve the situation. Publishers must make materials more accessible to special education students, and this can be accomplished without changing the goals or the quality of instruction.

ACCESS: MEDIUM OF INSTRUCTION

The success of special students increases as their access to information increases (Torgesen, 1989). Skill limitations, such as reading disability and second language acquisition, and physical limitations, such as visual impairment, reduce access to printed information. To limit information to a single medium (e.g., print) is to deny access to those who struggle with this medium.

In the field of the visually impaired, the procedure used to mediate this problem is called sensory substitution (Scadden, 1987). If material cannot be understood in a visual form, the information is provided through some other sensory mode such as auditory display methods like audiotape or voice synthesis (Bigge, 1988; Hallenbeck, 1974; Wood, 1989). The rather simple requirement of having publishers provide professionally prepared audiotapes of all adopted text materials would provide information access to a significant number of special education, low reading level, and bilingual students.

In addition to audio products, there are forms of visual non-print displays that are helpful to students with learning disabilities. Models, graphic aids, films, filmstrips, videotapes, videodisks, and computer simulations are some of the non-print modes of instruction that allow special students to participate as informed members of regular classes (Carnine, 1989; Panyan et al., 1988; Smith, 1988). Increasing the number of ways information is presented assures better access and improves student understanding and memory retention (Torgesen, 1989; Chi and Ceci, 1987).

ACCESS: TEXTBOOK INSTRUCTION

Different students learn in different ways. Students with learning disabilities and other low achieving students represent a wide variety of learning styles and learning dysfunctions. Both groups of students have in common that they are inefficient and ineffective learners within the existing instructional system.

Central to this condition is the dominance of textbook instruction. There is nothing inherently wrong with this condition if texts accommodated a wide variety of learning styles and encouraged a variety of teaching practices. Research suggests that there are ways that texts could be written and designed that would better serve a diverse student population. Two ways are discussed: the form of exposition and multimodal approaches.

FORM OF EXPOSITION

Textbook instruction and textbook/lecture instruction have been found to be dominant teaching methods in skill building (i.e., reading) and cognitive curriculums (e.g., social studies, science). In reading, the *California English-Language Arts Framework* (1987) reports that "...teachers in elementary school classrooms use more than 90% of their reading instruction time for basal reading programs; therefore, the content of textbooks and related instructional materials are critical" (p. 41).

There are similar findings in science and social studies. Penick and Yager (1986) report that "over 90% of all science teachers use a textbook 95% of the time" (p. 428). In social studies, Woodward, Elliott, and Nagel (1986) found that the dominance of the textbook method that was reported in the 1970s continues in the 1980s. Shepherd and Regan (1982) added to the concern about over-reliance on texts the warning that social studies texts are likely to have the highest reading levels of all subject areas. Some of the positive features of social studies texts (Polloway et al., 1989) can include the aesthetic features, resource and reference materials, the introduction of content-related terms, and the reduction of teacher preparation time. Negative features of social studies texts can include complex language, the introduction of too many concepts too quickly, a lack of sufficient organizational aids such as subheadings, inadequate accommodations for special learners in the teacher's guide, and superficial and disconnected coverage of topics.

The implications of these findings for special students goes beyond the problem of reading. It suggests that the only legitimate learner is a textbook learner. It also suggests that the selection of any particular textbook may adversely effect the learning of large numbers of students. The teacher's over-reliance on any particular method will result in problems for those students who do not learn by that method (Wood, 1989).

There are a number of ways that text materials can be written or designed to address the existing problems associated with teacher overreliance and to acknowledge that, for many teachers, materials guide instruction. One text strategy is to include different forms of exposition within the same content area. For instance, there are a variety of approaches to social studies (e.g., reflective inquiry, problem solving, developing values, understanding facts and trends). Different learners are more comfortable with different forms of exposition and will succeed at different rates depending on the approach that is taken. Texts tend to follow a single approach, and, while consistency within the text is desirable, alternate approaches can be included in the text or in the teacher's manual.

MULTIMODAL APPROACHES

Research in both social studies and science indicates that there is very limited use of hands-on activities at the elementary school level. One strategy to

improve this situation is to use textbooks that incorporate and require multimodal instructional experiences. Materials that make it possible for all students to participate in learning in some active way are likely to create positive learning experiences for all. Instructional methods that have proven to be effective include inquiry, visual displays, problem solving, simulations, real world scenarios, role playing, and physical manipulations. The multimodal approach is recommended in the *California English-Language Arts Framework* (1987) and needs to be aggressively represented in text and supplementary materials in all subject areas.

ACCESS: ADAPTED MATERIALS

Some special education students need modest adaptations of standard text materials (Hoover, 1987; Scruggs et al., 1985). These modifications may include adaptations in pace, depth, complexity, and coverage. Publishers can assist teachers in this process by providing clear goals and objectives and by making suggestions for adaptations. Goals and objectives should be cited for each learning unit (Gast, 1987). This allows teachers to identify expected outcomes which, in turn, permits teachers to select the most important and appropriate information to achieve learning objectives (Bigge, 1988).

Teacher's manuals should contain specific suggestions on how materials might be adapted for low achieving students. Table 2 provides an example of an adaptation guide that was developed by Hoover (1987). Adaptations and modifications should consider readability, vocabulary level, comprehensions, and study skills (Wood, 1989). Adaptations should seek simplicity rather than dilution. Reduction in quantity and complexity, for instance, need not reduce the quality or the degree of elaboration in material.

Table 2. **Curriculum Adaptation Guide**

Content

- Is the student capable of reading the material used for learning the content or completing the task?
- Has the student mastered previous objectives and skills needed to complete the task?
- Does the student have sufficient background knowledge and experience to complete the task?

Instructional Strategies

- How long does the student attend to the task at hand?
- Does the strategy selected for learning a task generate student participation in the learning activity?
- To what extent does the student learn through use of the selected strategy?

Instructional Setting (one or more may apply to a specific situation)

- To what extent is the student able to work independently?
- To what extent is the student able to work in small groups?
- To what extent is the student able to work in a large group?
- To what extent is the student capable of working cooperatively with one or two other students?

Student Behaviors

- To what extent is the student capable of managing his or her own behavior while completing the assigned task?
- To what extent does the student exhibit appropriate behavior while completing the assigned task?
- Does the student have the self-control necessary to complete the assigned task?

From "Preparing special educators for mainstreaming" by J. J. Hoover, 1987 *Teacher Education and Special Education* 10, 2, pp 58-64. Copyright by Special Press. Reprinted by permission.

ACCESS: LEVELS OF MATERIALS

Some special education students require more than adapted texts. Alternative or supplementary materials are needed to serve students with limited cognitive skills. These students are found in both regular and special classes and require materials that parallel regular materials, but at a reduced level of difficulty (Table 1). For example, in the content areas (e.g., social studies, science, literature), special students who are enrolled in the sixth grade require materials that have sixth grade goals and objectives but are delivered with reduced levels of complexity and more explicit elaboration (Dyck and Sundbye, 1988).

What are needed are state adopted texts that follow the goals and objectives of the state's frameworks at each grade level but that deliver concepts and skills at a level of complexity more appropriate for students with limited cognitive skills. If even one such adoption was approved at each level and for each subject area, publishers would be encouraged to produce comprehensive programs with quality materials. The challenge would be to produce materials that (1) respond to current criticisms (i.e., encyclopedic content in social studies), (2) deliver content with more simplicity, and (3) avoid the error of dilution. This can be accomplished by covering fewer items of information and by providing greater depth and elaboration. Currently, teachers fill this need with a scattered array of supplemental materials; the result is a crazy quilt of unrelated and disjointed materials in special education.

Many special education students also need instruction that is outside the core curriculum but is important for success in life (Campbell, 1988; Polloway et al., 1989). A transition from school-to-work curriculum is essential if these students are to become independent and productive workers. Additionally, there is the need for self help, independent living, functional life skills, and social and vocational skill curriculums. While these curriculum needs may continue to be outside the state's adoption process, there is the need to legitimize their place within the overall school curriculum — perhaps to establish frameworks for their guidance and to make provisions for the materials that they require.

Increasing Comprehension

Research generally favors the use of direct instruction with students with low achievement skills (Crawford, 1989; Larrivee, 1989; Mercer and Mercer, 1989). This procedure is characterized by highly structured, teacher-directed, mastery learning strategies. It commonly employs a demonstration-prompt-practice format, includes multiple opportunities for student response, and uses positive reinforcement and student feedback. Curriculum materials that support this process are considered to be more effective with low achieving and special students.

Lloyd (1988) provides a list of practices that have been found to be effective with those who otherwise fail in school. He reports that instruction is most successful when it includes the following: (1) goal direction with clear correspondence with terminal objectives, (2) opportunities for frequent student response, (3) learning provided in small units, (4) practice closely monitored, (5) strategies provided so that students can perform necessary tasks, and (6) supported independent learning. Materials need to support or allow for these practices. Two features in instruction are particularly important for students who have low

academic or limited cognitive skills. One is related to the presentation of information and refers to the ability of a teacher to make a variety of representations of a single idea, concept, or step. The second feature is the degree of complexity of the information, direction, or response involved in instruction.

ALTERED REPRESENTATIONS

Studies of comparative educational programs provide dramatic evidence that students with a wide range of abilities and skills can be taught in large, regular class settings without ability grouping or student segregation (Lewis, 1989; Stigler and Perry, 1988; Lewis, 1989). These studies suggest that individualization can be accomplished by increasing the depth and variety of instruction around key concepts. In this way, content integrity is maintained, the depth of understanding is increased, and the generalization of learning assured. Alternate ways of grouping, positive use of "mistakes," and use of group support are strategies that improve learning by all students and should be considered in teacher's manuals and in the structure of materials.

Thousand (1988) says that unless a teacher can systematically alter representations of knowledge, concepts, and skills for learners who do not initially understand the information, the teacher is more "presenter" than "teacher." Altered representations does not mean the shift from one form of presentation to another, such as providing an example followed by workbook activity. It means that the teacher provides examples with enough elaboration and variation that all students within a classroom understand the information before the teacher moves to another step in the instruction.

This requires that the teacher (1) thoroughly understands the subject, (2) has a variety of ways to lead students to an understanding of the content, and (3) takes the time to check student comprehension.

Curriculum materials can assist teachers to provide altered representations. Materials that provide in-depth coverage versus superficial coverage can be written to provide learners with a variety of ways of arriving at an understanding of information, concepts, or skills. Material can be made less complex but more complete. In this way, information becomes understandable to a more diverse student population.

Complexity of Information

If students with limited skills or abilities are to receive effective instruction, teachers need to know what important concepts are to be taught and have materials that address those concepts simply and unambiguously. This requires that instructional materials have specific goals, objectives, and expected outcomes. Concepts need to be clearly stated, and texts need to identify what is essential for a basic understanding of a given subject. Both the teacher and the text must bring interest and excitement to the subject. Bennet (1988) observed that, "Too often, publishers have responded to states' myriad and conflicting demands by producing encyclopedic but lifeless texts" (p. 28). He quotes Shanker as having found most history textbooks "mere catalogues of factual material about the past, not sagas peopled with heroic and remarkable individuals engaged in exciting and monumental tasks" (p. 28). Such textbooks guarantee failure for students with learning difficulties.

CONCRETE LEARNING

Learning for students with disabilities starts with concrete, applied information. These students need many teacher-directed and student-involved explanations, examples, demonstrations, and applications (Thousand, 1988). Concrete learning, once established, moves to the level of abstract understandings which, in turn, results in new applications and generalizations. These operations are not necessarily linear, they can interact in a variety of ways, but all are essential to learning. In addition to instruction that includes all three operations, active student involvement is essential to the success of special students. Teachers need materials that assist them in actively engaging special students in each operation (Polloway et al., 1989).

Teaching & Learning Strategies

A number of effective teaching and learning strategies have been developed in the last few years. The teaching strategies involve students working with each other in cooperative or tutorial activities. These methods have been widely used in both regular and special education classes. Learning strategies, on the other hand, have been more widely accepted in special education. Learning strategies are designed to provide low achieving students with essential learning skills.

TEACHING STRATEGIES

Several teaching strategies that involve student grouping have been found to be effective with students with learning disabilities. Small group methods, such as cooperative learning, dyads, coaching, and peer tutoring, are among the more well researched and promising procedures (Larrivee, 1989; Putnam, et al., 1989; Villa and Thousand, 1988). These procedures serve two purposes: they improve the effectiveness of instruction (Maheady, 1988; Slavin and Madden, 1989) and they reduce student isolation (Slavin et al., 1989).

Some state adopted curriculum programs include references to cooperative learning and indicate points in the text where the strategy is appropriate. This teaching strategy requires a considerable amount of teacher planning. Publishers could assist teachers by giving brief, but specific, suggestions as to what materials might be used to achieve specific outcomes. Other group methods, such as dyads, are also appropriate for inclusion in teacher manuals.

LEARNING (COGNITIVE) STRATEGIES

Relatively new methods have been developed that teach students how to learn. Most low achieving students use inefficient learning strategies while "good" students use efficient methods. By studying both groups of learners, researchers have identified learning strategies that can help low achieving students improve their academic performance (Freund, 1988; Mastropieri, 1988; Simmonds et al., 1989; Smith, 1989; Swanson, 1989; Pressley et al., 1989; Zigmond and Leinhardt, 1988). Strategies assist students to learn, to solve problems, and to complete tasks without assistance (Deshler and Schumaker, 1984). The term "learning strategies," as commonly used, can refer to two different types of procedures. It can refer to a complete plan that incorporates a set of learning tactics or to any one of a number of discrete learning techniques. An example of a

complete plan is one designed by Derry (1989) for increasing verbal learning (Table 3). Other plans have been developed by Deshler and Schumaker (1984, 1986) and Palincsar (1986). These procedures often require comprehensive training.

Table 3. Tactics for Learning Verbal Information

Category	Examples	Some Conditions of Use	Strengths or Weaknesses
Attentional Focusing Simple focusing	Highlighting Underlining	Structured, easy materials Good readers	No emphasis on importance or conceptual relations of ideas
Structured Focusing	Looking for headings, topic sentences Teacher-directed signaling	Poor readers Difficult but considerate materials	Efficient, but may not promote active elaboration, deep thinking
Schema Building	Use of story grammars, theory schemas Networking	Poor text structure Goal is to encourage active comprehension	Inefficient, but develops higher-order thinking skills
Idea Elaboration	Some types of self-questioning Imagery	Goal is to comprehend and remember specific ideas.	Powerful, easy to combine. Difficult for some students unassisted. Will not ensure focus on what is important.

From "Putting learning strategies to work" by Sharon J. Derry, 1988.. *Educational Leadership*, 46, 4, 4-6. Reprinted by permission.

Many discrete learning tactics are described in current special education literature. Strategies, such as mnemonic instruction (Mastropieri et al., 1988), self questioning (Griffey et al., 1988), student questions (Freund, 1988), text comprehension (Paris and Oha, 1989), elaboration (Pressley et al., 1987; Weinstein et al., 1989), note and test taking (Marshak, 1984), and others (Smith and Smith, 1989) are effective with low achieving students. Such strategies, when appropriate for the subject matter, should be a part of standard curriculum materials.

In their review of research, Stein et al., (1989) found that three conditions improve the success rate of learning strategies. Poor learners require explicit instruction in how and when to use strategies and in how to monitor their performance. Students also learn and remember best those strategies that are integrated with regular classroom instruction. And finally, students are more successful when instruction is given by reciprocal teaching (Campione, 1989; Palincsar and Brown, 1984) and in heterogeneous, cooperative group settings.

While learning strategies can be taught in isolation from regular curriculum materials, both memory and transfer of learning are significantly improved when the strategies are taught within the regular curriculum and with students representing a heterogeneity of abilities (Swanson, 1989). Although it may not be appropriate to include complete strategy plans within regular education materials, discrete strategies are easily accommodated in teacher manuals and student materials.

Assessment and Evaluation Strategies

Assessment can play an important role in student achievement and program improvement. It can assist teachers with instructional diagnosis, planning, and monitoring, and can provide data useful in program evaluation. Assessment information can provide either a static or dynamic view of instructional progress and can have a significant impact on instructional practice. Unfortunately, the impact of assessment is not always positive (Campione, 1989; Meisels, 1989; Wiggins, 1989).

Traditional assessment often does nothing more than confirm the poor skill level of special education students. A parent's poignant observation highlights this point, "I already know that my son is a slow student. Why does the school need to constantly prove it to me by failing him over and over again?" Typical end-of-chapter tests provide teachers very little information that can help them assist students reach a higher level of success.

A number of researchers and authors have raised even broader questions about the validity and appropriateness of current achievement tests, text tests, and teacher-made tests. Shriner and Salvia (1988), and Good III and Salvia (1988) have challenged the validity of commercial tests that are used to judge student achievement. These researchers have determined that commercial tests often do not measure the curriculum that is taught.

General education writers, also voice serious concerns about current assessment practices and propose solutions that could lead to significant improvements in curriculum assessment. Haney and Madaus (1989) and Witt et al. (1988) call for teachers to select different types and combinations of assessments to serve specific instructional purposes. Rodgers (1989) questions the use of standard testing practices to make judgements about the outcomes of unique curriculum experiences (Appendix B). Wolf (1989) pushes for "reflective self-evaluation" and offers portfolio assessment as an alternative to standardized assessment.

Research information and critical reviews provide evidence about the desirable features in curriculum assessment. A summary of important features is provided in Table 4.

Table 4. **Key Features in Effective Assessment**

Solves decision-making problems	Provides frequent feedback	Measures process and content
Evaluates a variety of cognitive skills	Allows for student interaction	Leads to instructional action

The publishers of curriculum materials have the opportunity to provide assessment materials and strategies that are clearly superior to their previous efforts and to those of achievement test publishers. Those who develop curriculum frameworks and approve adoption lists have the opportunity to request more appropriate assessment measures and procedures.

ASSESSMENT: INDIVIDUAL PERFORMANCE

There are testing materials and procedures that can improve the instruction of special education students. Assessment is a widely accepted procedure in special education and when tied to clear instructional goals and directly related to the content and expected outcomes of instruction, it can be very helpful for individual and group planning and evaluation (Fuchs et al., 1989). Assessment can provide diagnostic, monitoring, and outcome information as well as provide an understanding of the dynamics of individual learning (Rodgers, 1989; Wiggins, 1989).

Curriculum-based assessment is believed to be the most accurate and useful information to collect on special students (Shinn et al., 1988). There are a variety of methods for collecting this type of data (Shinn et al., 1989); however, common to all is the need for a direct relationship between the data collected and instructional interventions. This close tie between assessment information and instructional goals is essential "to facilitate constructive adaptations of educational programs" (Glaser, 1988, p. 330).

Many times assessment information is relatively easy to collect and monitor. Shinn and Tindal (1988) report that research has shown that in the basic skills a simple rate count of words correctly read, spelled, or written is nearly as accurate as standardized test results and has the advantage of providing continual feedback within the context of instruction. There are similar findings in math (Shinn and Tindal, 1988).

ASSESSMENT: CURRICULUM REFORM

Raizen and Kaser (1989) believe that assessment performs an important role in curriculum change. They note that "assessment can be a powerful tool for reform, since changing the nature of assessment can lead to changing the nature of instruction" (p. 720). Currently, tests are accused of assessing "primarily factual recall and rote problem solving" (Raizen and Kaser, 1989, p. 720). Instruction is guided, in part, by measured outcomes, and to this extent instruction is determined by the tests that are used.

Raizen and Kaser (1989) have provided a set of questions (Table 5) as an aid in the selection of curriculum-related test materials. The same questions can be applied in the review of curriculum material. Publishers' approach to assessment is likely to mirror their approach to instruction.

Decisions on the selection and adoption of curriculum materials need to include considerations about assessment strategies and materials. Assessment practices reflect authors' and publishers' attitudes about learning and ultimately shape the way that students are instructed. Assessment has serious consequences for all students and is a critical element in the success of special students.

Table 5. Questions to Ask About Tests

Here are some questions that the National Center for Improving Science Education suggests that teachers and administrators ask when they evaluate the quality of a science test:

- 1) Are there problems that require students to think about and analyze situations?
- 2) Does the test feature sets of problems that call for more than one step in arriving at a solution?
- 3) Are problems with more than one correct solution included?
- 4) Are there opportunities for students to use their own data and create their own problems?
- 5) Are the students encouraged to use a variety of approaches to solve a problem?
- 6) Are there assessment exercises that encourage students to estimate their answers and to check their results?
- 7) Is the science information given in the story problem and elicited in the answer correct?
- 8) Is there opportunity for assessing skills (both in the use of science tools and in science thinking) through some exercises that call for hands-on activities?
- 9) Are there exercises included in the overall assessment strategy that need to be carried out over time?
- 10) Are there problems with purposely missing or mistaken information that ask students to find errors or critique the way the problem is set up?
- 11) Are there opportunities for students to make up their own questions, problems or designs?

From "Assessing science learning in elementary school: Why, what and how?" S. A. Raizen & J. S. Kaser. 1989. *Phi Delta Kappan*, 70, 9, 718-722. Reprinted by permission.

Framework and Adoption Decisions

At the present time, the creation of state curriculum frameworks and the selection of curriculum materials for state adoptions are made without the active participation of special education personnel or parents. This means that the needs of special education students are not formally represented and special education is out of the curriculum-information loop. At the same time, special education is expected to implement the core curriculum and to follow the state frameworks.

In order to assure that the needs of special education students are considered in the formulation of state frameworks and in the selection of approved curriculum the following recommendations are made:

- Representation of special education on both framework and adoption committees.
- Frameworks should include acknowledgment of the needs of students with low skills.
- Approved adoptions should include materials that have fewer objectives and greater elaboration.
- Materials selection criteria should give credit for programs that have appropriate supplementary "trade books."
- Selection criteria should give greater credit for appropriate teaching, learning, and assessment strategies.

SUMMARY

Special education is currently moving away from a separate education system and attempting to become a more aligned and integrated part of regular education. This change, together with the adoption of the core curriculum, has brought about the need to examine the curriculum materials that are used in regular education. Curriculum materials, in part, determine the success or failure of special education students.

In many core curriculum areas textbooks are the dominant method of instruction. The printed word is the medium of instruction, and the structure of information is formal and complex. This severely limits the access to information for students who have poor academic skills or cognitive difficulties.

There are many ways to improve, alter, or adapt materials so as to increase student access. Written materials should be available in auditory as well as written form, materials should provide for multimodal means for learning, and they should present information at different levels of complexity.

Curriculum materials tend to present information in a single representation. Because students differ in the way they learn, numerous representations may be needed in order to teach a subject or concept. Materials are a resource for teachers and students and need to be diverse enough to serve a wide range of experiential backgrounds.

In recent years a number of teaching and learning strategies have been successfully tested in regular and special education. Teaching strategies, such as cooperative learning should be included in publishers' recommendations for teaching methods. Learning strategies, such as mnemonics, can greatly assist students who have inefficient approaches to learning, and these strategies should be incorporated within the exercises recommended in curriculum materials. Both teaching and learning strategies require teacher planning and instruction time; therefore, the more specific their description within the materials, the more likely they will be used.

There is widespread criticism of current assessment practices. If textbooks are the medium of instruction, assessment shapes the content. Assessment, properly designed and used, can benefit special education students. Such assessment needs to be curriculum-based, frequent, focused on content and process, varied, and interactive. The overriding feature of effective assessment is its usefulness in improving instruction.

The absence of special education participation in state-level curriculum framework and materials decisions may be a legacy of years of separation between regular and special education. Active participation is necessary if special students are to receive appropriate materials in regular classes and in the core curriculum. Both the curriculum frameworks and the criteria for materials selection should include provisions that assure the success of special education students.

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CURRICULUM CONTINUUM SERVING SPECIAL EDUCATION STUDENTS K-12

FUNCTIONAL SKILLS	APPLIED SKILLS	REGULAR EDUCATION SKILLS		REGULAR EDUCATION
		PARALLEL	IDENTICAL	
COURSE NUMBERS 7005-7195	COURSE NUMBERS 7205-7395	COURSE NUMBERS 7405-7595	COURSE NUMBERS 7605-7795	ALL COURSE NUMBERS except 7000 SERIES
Emphasis on Critical Functional Skills	Emphasis on Academics and Daily/Independent Living Skills	Emphasis on General Education with Curriculum Modified	Emphasis on General Education With Delivery and/or Response Systems Modified	Emphasis on General Education as Specified in Senate Bill 813
Course content mastery assessed through the IEP process	Course content mastery assessed through ESPOs*	Content mastery assessed through ESPOs/or Proficiencies		
Elective credit for graduation (9-12)		Basic subject and course requirements for graduation (9-12)		
Graduation indicated by letter of recognition		Graduation indicated by diploma		
SUPPORT SERVICES				
Emphasis on Support to Special Education Student in Any Curriculum				
Possible elective credit for graduation (9-12) COURSE NUMBERS 7805-7995				
Content Mastery Assessed through ESPOs or IEP Process				

* ESPOs - Expected Student Performance Outcomes

APPENDIX B

SOME SAMPLE ASSESSMENT PROCEDURES

For the past three years I have directed the Alternative Assessment Project at the University of Connecticut, Storrs. Our staff has worked with more than 100 teachers in the Connecticut communities of Hartford, West Hartford, Ellington, and Farmington. An earlier assessment project, conducted with Chris Stevenson of the University of Vermont, involved approximately 60 teachers from a number of school districts in Vermont. Some of the assessment procedures developed by teachers who participated in these projects are briefly described below.

✓ A TEACHER of combined class of fifth- and sixth-graders placed a tape recorder in a quiet corner of her room. During a unit on Native Americans, each child was expected to record his or her responses each week to the following questions: What three things did you like best about the unit on Indians? What didn't you like about the unit, and why? Do you think that learning about Indians is important? Why or why not? Do you have any suggestions about how to teach this unit next year?

✓ BEFORE STARTING a unit on plants and trees, a third-grade teacher divided his class into "cooperative learning groups" of three or four children each. He asked each group to discuss and then to record on a chart what its members knew about key words related to the unit (e.g., *leaf, stem, bark, trunk, pollution, soil*). The charts were displayed in the classroom and periodically reviewed. At the conclusion of the unit, the teacher repeated this procedure, and each group compared its two charts.

✓ A TEACHER of a combined class of third- and fourth-graders divided her fourth-graders into small groups. As third-graders the previous year, these students had taken a geography/geology field trip as part of their science curriculum. Now each group of fourth-graders was to make a presentation to this year's third-graders about what they might see on the same trip, what they would learn, what would be most important, and so on.

✓ A FOURTH-GRADE teacher took her class on a field trip to explore the local community. During the trip, the teacher took several photographs of significant objects: an old bar, a garbage dump, an abandoned road, an ancient plow. Later

in the week, she divided the class into small groups and gave each group a tape recorder. The teacher showed her slides from the field trip slowly, giving the groups time to discuss and then record what they thought was most important about each of them. Later, the groups shared their recordings with one another.

✓ A SIXTH-GRADE teacher gave groups of students packets of cards. The cards contained simple drawings of items associated with Native Americans: homes, masks, forms of transportation, animals, and so on. He asked his students to sort the cards as they saw fit. Then he asked the students to explain why they had sorted them in that fashion.

✓ A THIRD-GRADE teacher whose class had just completed a unit on trees asked small groups of children to write and illustrate stories that would "teach first-graders in our school about trees." The third-graders eventually read their stories to the first-graders and discussed the stories with them. Later, they shared their experiences with their third-grade classmates. Much of the "teaching" of first-graders was tape-recorded, as well.

✓ AT THE conclusion of a unit on Native Americans, a fifth-grade teacher showed individual children two pictures: one, of an Indian in full ceremonial dress; the other, of an Indian dressed in jeans and a T-shirt. In both cases the child was asked, "Who is this person? What can you tell me about him? What does he do? Where does he live? Would you like to know him? Why?"

✓ A SIXTH-GRADE science teacher enlisted the aid of his students' parents, asking them to write down what their children said in response to the probe, "Tell me about your science studies." The responses were collected over a 10-week period.

✓ A HIGH school teacher conducted a unit on sex-role stereotyping. Later, the teacher showed individual students pictures and cartoons that depicted some form of stereotyping and asked the students to "tell me about what you see."

In these and other ways, teachers can gain a better understanding of how well the presented curriculum and the experienced curriculum correspond — and of ways to improve the match. — VR

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Activity 1. List on a worksheet all the subjects generally taught at your grade level (i.e., mathematics, language arts, reading, science, social studies, art, physical education, and so on). Allow space for children's comments under each item. Ask the children to:

- circle, check, or otherwise indicate the subject that they enjoy the most;
- circle, check, or otherwise indicate the subject that they think is most important;
- circle, check, or otherwise indicate the subject that they think is most difficult; and
- circle, check, or otherwise indicate the subject that they think is most interesting.

Activity 2. Ask the children to keep an informal log of the most important and most interesting things that happen in their social studies classes during a given period of time (perhaps three or four weeks). Give the children a few minutes at the end of each day to jot down their ideas.

Activity 3. Choose three children at random (perhaps every seventh or eighth child on your roster, depending on the total number of children in your class) and conduct informal, individual, open-ended interviews with each of them. Assure each child that this is not a test—that "I just want to talk with you about some of the things that we've been learning in class. There are no right or wrong answers; I just want to see what you think." Write up each child's responses as thoroughly as possible.

Activity 4. Choose a passage from your social studies textbook that is similar to the following sample passage.

Ancient Ghana was located about 500 miles northwest of where the country of Ghana is today. Long trains of camels from the north and the east passed through ancient Ghana. Gold and salt were traded there. These valuable goods or products were brought to the markets in the capital city, Kumasi. Some of the goods that the gold and salt were traded for came from as far away as Spain.

Read the passage with or to a few children. Ask them to tell in their *own* words what was read. Then ask them to imagine that they are teaching a younger child about ancient Ghana. What have they learned that is important enough to share with a younger child?

Activity 5. Choose an illustration from your social studies textbook, e.g., a photograph of two black Ghanaian gold miners — broad-chested,

wearing helmets with seachlights — operating a drill in cramped quarters underground. Ask, "What is happening in this picture? Tell me about it."

Activity 6. Choose an unusual custom or ritual practiced regularly by a culture different from our own and described in either the social studies textbook or in supplementary materials that you use in your classroom. For example, read with or to a child a passage describing a Northwest Indian potlatch ceremony, in which an Indian chief burns his own canoes and destroys many other prized possessions in order to 'defeat' a rival.

Ask the child to tell in his or her own words what has just been read or heard. Then ask the child to imagine that he or she is teaching a younger child about this custom. What has the student learned that is important enough to share with a younger child?

Activity 7. As part of an interview, ask each child, "What are the most important things you have learned in social studies this year?" Alternatively, you might ask, "If you were to choose three things you learned in social studies this year to teach to other children your age, what would they be? Why?"

Activity 8. Ask a group of teachers — e.g., half a dozen fifth-grade teachers who follow the same social studies curriculum — to list the topics or themes that they emphasize most in their teaching. (The teachers should not refer to curriculum guides, textbooks, and so on; this exercise is intended to call forth only their personal reflections or perceptions.) Write each topic on a separate card, and ask each teacher to sort the cards into two categories: "most important" and "least important." Then ask a group of students from each teacher's class to sort the cards into the same two categories. Compare the outcomes.

Activity 9. Ask the same group of teachers to sort the topic or theme cards into two categories: "topics I've taught most effectively" and "topics I've taught least effectively." Then ask a group of students from each teacher's class to sort the cards into two categories: "topics that my teacher taught most effectively" and "topics that my teacher taught least effectively." Compare the outcomes.

Activity 10. Take snapshots of children in your class involved in a variety of activities: working in small groups, working in a large group, taking part in a field trip, constructing models, completing assignments in workbooks, taking tests, receiving report cards. Choose those activities that you feel might be especially revealing. Ask children to sort the snapshots into such categories as like/dislike, important/unimportant, and so on.