Close-Up #16

Integrated Curriculum

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Introduction

The integrated curriculum is a great gift to experienced teachers. It's like getting a new pair of lenses that make teaching a lot more exciting and help us look forward into the next century. It is helping students take control of their own learning.

- M. Markus, media specialist, quoted in Shoemaker, September 1991, p. 797

I'm learning more in this course, and I'm doing better than I used to do when social studies and English were taught separately.

- Student, quoted in Oster 1993, p. 28

This teacher and student express an increasingly widespread enthusiasm for curriculum integration. While not necessarily a new way of looking at teaching, curriculum integration has received a great deal of attention in educational settings. Based both in research and teachers’ own anecdotal records of success, educational journals are reporting many examples of teachers who link subject areas and provide meaningful learning experiences that develop skills and knowledge, while leading to an understanding of conceptual relationships.
Definitions

Integrated curriculum, interdisciplinary teaching, thematic teaching, synergistic teaching... When attempting to define integrated curriculum, it is also necessary to look at related terms. Several definitions are offered here. As this paper is narrowed to K-12 integrated curriculum, definitions from vocational and higher education are not included, although there is a growing interest in both of those areas in the interdisciplinary, integrated curriculum. The reader interested in specifics about interdisciplinary work in those fields is invited to consult the General References at the end of this report.

A basic definition is offered by Humphreys (Humphreys, Post, and Ellis 1981) when he states, "An integrated study is one in which children broadly explore knowledge in various subjects related to certain aspects of their environment" (p. 11). He sees links among the humanities, communication arts, natural sciences, mathematics, social studies, music, and art. Skills and knowledge are developed and applied in more than one area of study. In keeping with this thematic definition, Shoemaker defines an integrated curriculum as

...education that is organized in such a way that it cuts across subject-matter lines, bringing together various aspects of the curriculum into meaningful association to focus upon broad areas of study. It views learning and teaching in a holistic way and reflects the real world, which is interactive. (1989, p. 5)

Within this framework there are varied levels of integration, as illustrated by Palmer (1991, p. 59), who describes the following practices:

- Developing cross-curriculum subobjectives within a given curriculum guide
- Developing model lessons that include cross-curricular activities and assessments
- Developing enrichment or enhancement activities with a cross-curricular focus including suggestions for cross-curricular "contacts" following each objective
- Developing assessment activities that are cross-curricular in nature
- Including sample planning wheels in all curriculum guides.

Further description is provided by Glatthorn (1994, pp. 164-165).

Dressel's definition goes beyond the linking of subject areas to the creation of new models for understanding the world:

In the integrative curriculum, the planned learning experiences not only provide the learners with a unified view of commonly held knowledge (by learning the models, systems, and structures of the culture) but also motivate and develop learners' power to perceive new relationships and thus to create new models, systems, and structures. (1958, pp. 3-25)
Another term that is often used synonymously with integrated curriculum is *interdisciplinary curriculum*. Interdisciplinary curriculum is defined in the *Dictionary of Education* as "a curriculum organization which cuts across subject-matter lines to focus upon comprehensive life problems or broad based areas of study that brings together the various segments of the curriculum into meaningful association" (Good 1973). The similarity between this definition and those of integrated curriculum is clear. Jacobs defines interdisciplinary as "a knowledge view and curricular approach that consciously applies methodology and language from more than one discipline to examine a central theme, issue, problem, topic, or experience" (1989, p. 8). This view is supported by Everett, who defines interdisciplinary curriculum as one that "combines several school subjects into one active project since that is how children encounter subjects in the real world-combined in one activity."

These definitions support the view that integrated curriculum is an educational approach that prepares children for lifelong learning. There is a strong belief among those who support curriculum integration that schools must look at education as a process for developing abilities required by life in the twenty-first century, rather than discrete, departmentalized subject matter. In general, all of the definitions of integrated curriculum or interdisciplinary curriculum include:

- A combination of subjects
- An emphasis on projects
- Sources that go beyond textbooks
- Relationships among concepts
- Thematic units as organizing principles
- Flexible schedules
- Flexible student groupings.

Several authors have gone beyond a single definition of curriculum integration to a continuum of integration. Fogarty has described ten levels of curricula integration (1991). The following chart summarizes some of her work. The reader who is interested in a more complete explanation is referred to Fogarty's book, *The Mindful School.*
This work has been supported by others involved with the implementation of curriculum integration (Jacobs 1989; Shoemaker 1989). These differentiations may move from two teachers teaching the same topic but in their own separate classes (e.g., both English and history teachers teaching about the same period of history), to team design of thematic units, to interdisciplinary courses or thematic units, to a fully

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fragmented</td>
<td>Separate and distinct disciplines</td>
<td>Clear and discrete view of a discipline</td>
<td>Connections are not made clear for students; less transfer of learning</td>
</tr>
<tr>
<td>Connected</td>
<td>Topics within a discipline are connected</td>
<td>Key concepts are connected, leading to the review, reconceptualization and assimilation of ideas within a discipline</td>
<td>Disciplines are not related; content focus remains within the discipline</td>
</tr>
<tr>
<td>Nested</td>
<td>Social, thinking, and content skills are targeted within a subject area</td>
<td>Gives attention to several areas at once, leading to enriched and enhanced learning</td>
<td>Students may be confused and lose sight of the main concepts of the activity or lesson</td>
</tr>
<tr>
<td>Seeded</td>
<td>Similar ideas are taught in concert, although subjects are separate</td>
<td>Facilitates transfer of learning across content areas</td>
<td>Requires ongoing collaboration and flexibility, as teachers have less autonomy in sequencing curricula</td>
</tr>
<tr>
<td>Shared</td>
<td>Team planning and/or teaching that involves two disciplines focuses on shared concepts, skills or attitudes</td>
<td>Shared instructional experiences; with two teachers on a team it is less difficult to collaborate</td>
<td>Requires time, flexibility, commitment and compensation</td>
</tr>
<tr>
<td>Webbed</td>
<td>Thematic teaching, using a theme as a base for instruction in many disciplines</td>
<td>Motivating for students, helps students see connections between ideas</td>
<td>Themes must be carefully and thoughtfully selected to be meaningful, with relevant and rigorous content</td>
</tr>
<tr>
<td>Threaded</td>
<td>Thinking skills, social skills, multiple intelligences, and study skills are &quot;threaded&quot; throughout the disciplines</td>
<td>Students learn how they are learning, facilitating future transfer of learning</td>
<td>Disciplines remain separate</td>
</tr>
<tr>
<td>Integrated</td>
<td>Priorities that overlap multiple disciplines are examined for common skills, concepts, and attitudes.</td>
<td>Encourages students to see interconnectedness and interrelationships among disciplines, students are motivated as they see these connections</td>
<td>Requires interdepartmental teams with common planning and teaching time</td>
</tr>
<tr>
<td>Integrated</td>
<td>Learner integrates by viewing all learning through the perspective of one area of interest</td>
<td>Integration takes place within the learner</td>
<td>May narrow the focus of the learner</td>
</tr>
<tr>
<td>Networked</td>
<td>Learner directs the integration process through selection of a network of experts and resources</td>
<td>Pro-active, with learner stimulated by new information, skills or concepts</td>
<td>Learner can be spread too thin, efforts become ineffective</td>
</tr>
</tbody>
</table>
integrated curriculum, which is also referred to as synergistic teaching. Bonds, Cox, and Gantt-Bonds (1993) write:

Synergistic teaching goes beyond the blurring of subject area lines to "a process of teaching whereby all the school subjects are related and taught in such a manner that they are almost inseparable. What is learned and applied in one area of the curriculum is related and used to reinforce, provide repetition, and expand the knowledge and skills learned in other curriculum areas. This process of synergistic teaching allows the student to quickly perceive the relationships between learning in all curriculum areas and its application throughout each of the school subjects.... Synergistic teaching does more than integrate; it presents content and skills in such a manner that nearly all learning takes on new dimensions, meaning, and relevance because a connection is discerned between skills and content that transcends curriculum lines. In a synergistic classroom, simultaneous teaching of concepts and skills without regard to curriculum areas would have a greater effect that the sum of learning skills and concepts in individual subject areas.

Background

It is taken for granted, apparently, that in time students will see for themselves how things fit together. Unfortunately, the reality of the situation is that they tend to learn what we teach. If we teach connectedness and integration, they learn that. If we teach separation and discontinuity, that is what they learn. To suppose otherwise would be incongruous. (Humphreys 1981, p. xi).

The subject of curriculum integration has been under discussion off and on for the last half-century, with a resurgence occurring over the past decade. The "explosion" of knowledge, the increase of state mandates related to myriad issues, fragmented teaching schedules, concerns about curriculum relevancy, and a lack of connections and relationships among disciplines have all been cited as reasons for a move towards an integrated curriculum (Jacobs 1989). Almost every teacher has experienced the feeling that "there just isn't enough time to get it all in" or "the school day just isn't long enough for all that I'm supposed to do; it seems that every year there are more things added to the curriculum." This feeling of frustration is one of the motivations behind development of an integrated curriculum. Teachers see this as part of the solution to the requirements that pull teachers in different ways.

These forces in contemporary schools are reinforced by Benjamin (1989, pp. 8-16), when he cites the trends towards global interdependence and the interconnectedness of complex systems, the increase in pace and complexity of the twenty-first century, the expanding body of knowledge, and the need for workers to have the ability to draw from many fields and solve problems that involve interrelated factors.
Each of these trends is relevant to the discussion of integrated curriculum, as schools move away from teaching isolated facts toward a more constructivist view of learning, which values in-depth knowledge of subjects. This view finds its basis in the work of Piaget, Dewey, Bruner, and others who hold a holistic view of learning. Each of these theorists is concerned with children having an understanding of concepts and underlying structures. Proponents of the progressive education movement of the 1930s advocated an integrated curriculum, sometimes identified as the "core curriculum" (Vars 1987). The movement towards integrated curriculum is a move away from memorization and recitation of isolated facts and figures to more meaningful concepts and the connections between concepts. The twenty-first century requirement for a flexible use of knowledge goes beyond a superficial understanding of multiple isolated events to insights developed by learning that is connected or integrated. Perkins advocates teaching for transfer and thoughtful learning when he states:

A concern with connecting things up, with integrating ideas, within and across subject matters, and with elements of out-of-school life, inherently is a concern with understanding in a broader and a deeper sense. Accordingly there is a natural alliance between those making a special effort to teach for understanding and those making a special effort toward integrative education (1991, p.7).

This view supports the notion of curriculum integration as a way of making education more meaningful. Concerns about national achievement levels and high dropout rates have put the spotlight on any educational change that can lead to increased student success. In addition to the realization that curriculum integration may be an effective element in making education both manage able and relevant, there is a body of research related to how children learn that supports curriculum integration. Cromwell (1989) looks at how the brain processes and organizes information. The brain organizes new knowledge on the basis of previous experiences and the meaning that has developed from those experiences. The brain processes many things at the same time, and holistic experiences are recalled quickly and easily. "The human brain," writes Shoemaker, "actively seeks patterns and searches for meaning through these patterns" (p. 13).

This research is supported by Caine and Caine (1991) when they connect neuropsychology and educational methodologies and state that the search for meaning and patterns is a basic process in the human brain. In fact, the brain may resist learning fragmented facts that are presented in isolation. Learning is believed to occur faster and more thoroughly when it is presented in meaningful contexts, with an experiential component. Of course, every brain–every student–is unique. While the search for patterns and context may be universal, every learner will have his/her own learning style. To meet these diverse needs means providing choices for students.

Put to use in the classroom, the brain research points toward interdisciplinary learning, thematic teaching, experiential education, and teaching that is responsive to student learning styles. These finding are summarized by Shoemaker (1991, pp. 793–797).

The current movement toward an integrated curriculum, then, has its basis in learning theorists who advocate a constructivist view of learning. There is a body of brain
research that supports the notion that learning is best accomplished when information is presented in meaningful, connected patterns. This includes interdisciplinary studies that link multiple curricular areas. There are many examples in the literature of such efforts by K-12 teachers, as well as those teachers involved in vocational education and higher education.

Another rationale for curriculum integration finds its basis in the commonsense wisdom of teachers, who are coping with an increased body of knowledge, large classes, and many mandates related to everything from drug awareness to AIDS to bus safety. When all of these requirements are added to the traditional body of knowledge for which teachers feel responsible, integration is seen as one way to meet both the needs of the students and the requirements of the state. The integration of curricular areas and concepts allows teachers to assist students as they prepare for the next century.

Finally, the movement toward a global economy and international connections, as well as the rapid changes in technology, are pushing education toward integration. The ability to make connections, to solve problems by looking at multiple perspectives, and to incorporate information from different fields, will be an essential ingredient for success in the future.

An enduring argument for integration is that it represents a way to avoid the fragmented and irrelevant acquisition of isolated facts, transforming knowledge into personally useful tools for learning new information (Lipson, et al. 1993, p. 252).

Nature of the Research Literature

The research related to curriculum integration is centered around three major categories, which overlap to some extent. The largest body of reports are descriptions of thematic units or other types of integrated curricula that the authors have actually used in their classrooms, or that an observer has documented. Most of these resources are listed in the General References section of this report. Most of these articles are grade specific and integrate two or three content areas. Some include actual lesson plans, while others are more descriptive. Some also include the teachers' perceptions of the effect of the integrated curriculum. Others include comparisons, either a comparison of two classes taught differently the same year or two classes taught in consecutive years.

The sources listed in the Key References section of this report fall into several categories. Fifty-three documents were reviewed for this report, many of which consider multiple aspects of curriculum integration. An initial look at the literature included eight resources that offer definitions of curriculum integration or interdisciplinary curriculum. These references include many variations on the term, including those that look at integration on a continuum. Definitions came from this writers' own observations, as well as from conversations with teachers and curriculum developers.
Three resources consider the issue of curriculum integration from a historical perspective, looking at the core curriculum movement and other educational innovations. This perspective tends to look at the middle or junior high school as a place where innovations were designed to meet the many needs of the young adolescent. Beyond a historical look at curriculum integration, eight articles discuss why this is an important part of education. These articles include those that cite brain research and its relation to learning, as well as those articles that describe current and future educational and societal conditions that require an integrated perspective.

Thirteen articles describe in part or whole the impact of an integrated curriculum on achievement and attitude. These articles span the grades, from primary through high school. Teachers' attitudes and perceptions are also considered in these references. The other area of research of great interest to teachers is the literature on how to establish an integrated curriculum. Ten resources present information about ways in which curriculum integration has effectively been put into practice.

Many resources describe examples from classrooms in which the curriculum has been integrated. Thirteen examples from elementary school were considered, along with eleven from middle or high school. These examples include those that looked at the curriculum as a whole and those that focused on specific areas, such as writing.

While not reviewed for this report, the reader may want to pursue the literature on curricular integration in vocational education and higher education. For that reason four references are included about vocational education and two are included that relate specifically to higher education.

Many of the articles are written by classroom teachers or by researchers who have spent time in a specific classroom. For this reason, there are a multitude of examples included in these references. While most are not spelled out in detail, they serve as a snapshot of what goes on in the classroom on a daily basis.

**Research Findings**

Research findings on the topic of curriculum integration fall into three majors divisions. There are a minority of research reports documenting comparison studies that were designed to determine the effectiveness of an integrated curriculum on content learning and attitude. There are also a large number of reports on how to implement an integrated curriculum successfully. These reports are frequently written by teachers or researchers who have been involved in programs they believe to be successful at enhancing learning. The largest body of information about curriculum integration describes teachers' experiences in the form of descriptions of thematic units they have taught or collaborations with other teachers. It is the conviction of these writers that an integrated curriculum meets the needs of their students, although they have not conducted a specific study to document this. The General References section of this paper includes citations of examples from elementary, secondary, and vocational school, as well as higher education.
Even those research reports that document the effect of an integrated curriculum, when compared with a more traditional, subject-bound curriculum, have involved small numbers of students. It is very difficult to determine all of the variables that come into play when looking at student achievement. For these reasons, the findings emerging from these studies should be regarded as provisional rather than definite conclusions based on research. It is necessary to keep in mind that a multitude of factors come into play when one considers the success or failure of a program, a class, a school year or a unit. Despite these difficulties, the data reported support the implementation of an integrated curriculum in both elementary and secondary schools.

**EFFECT ON CONTENT KNOWLEDGE**

Research reviewed for this report indicates no detrimental effects on learning when students are involved in an integrated curriculum. The areas of integration included: 1) art, mathematics, and reading; 2) writing across the curriculum; 3) history, science, and mathematics; 4) history and literature; 5) integrated humanities; 6) health and reading; 7) areas of mathematics; 8) social studies, health, and the arts; 9) physical education, the arts, health, and literature; and 10) science, social studies, health, and the arts (Aschbacher 1991; Edgerton 1990; Greene 1991; MacIver 1990; Shoemaker 1991; Vars 1965; Vye 1990; Williams 1991).

Vars (1965) summarized five major research studies and reported that in middle school programs that adhered to block time and core programs—both forerunners of the current integrated curriculum discussion—there was no loss of learning of subject matter and that, overall, students in the integrated programs did as well or better than students in separate-subject programs. The fact that teachers who plan and teach together have the same expectations across subject areas is a factor in the overall performance of the students.

The Humanitas program, an interdisciplinary, thematic, team-based approach to high school humanities in Los Angeles (Aschbacher 1991) has been compared to 16 other schools which are more traditional in their approach. Performance-based assessments; surveys of teachers, students, and administrators; classroom observations; teacher and student interviews; analysis of assignments and examinations; analysis of portfolios; records of student attendance; records of discipline incidents; and records of college-oriented behavior and standardized tests were all considered in this research, making it one of the most thorough explorations of curriculum integration.

The findings show that the Humanitas program has a statistically significant effect on writing and content knowledge, even after students have been enrolled for only one year. The largest gains were shown in conceptual understanding. The control groups of students made no gains in conceptual understanding during the same timeframe.

Students in the Humanitas program stay in school longer, work harder (by objective measures and their own report), and like school better. The expectations are higher in
this interdisciplinary program, and the students are involved in more complex
discussions that require them to make connections between content areas and the real
world. These same expectations hold true for the students' written work, as students
may be asked to write an essay that includes a discussion of the beliefs of more than
one culture and the way those beliefs are influenced by cultural factors and values. The
students are to include perspectives from art history, literature, and social institutions
and make links to their own lives.

While the evaluation of the Humanitas project involved large numbers of students and
a control group, there are also many smaller-scale studies reporting positive
achievement outcomes for students who participate in an integrated curriculum.
Levitan (1991) reports that a change from a literature-based language arts program to a
science-literature-based program for sixth graders resulted in achievement increases for
the majority of the students. Similar results are reported by Willett (1992) in a study of
87 fifth graders. Integrating the study of math with art resulted in higher posttest scores
than those students who were taught mathematical concepts in isolation by the regular
classroom teacher. "The data indicate that the integration of art activities into
mathematics and reading can enhance the learning of specific concepts" (Levitan,
1991, p. 12). Similar results were reported by Friend (1984) in a study of mathematics
and science integration with seventh grade students.

These findings seem very logical when one considers the work of Schmidt (1983), who
found that in integrated language arts classrooms the amount of time spent in art and
literature is more than double the amount of time spent on these subjects in classrooms
where integration is not a priority.

**EFFECT ON ATTITUDE**

There is a small body of research related to the impact of an integrated curriculum on
student attitudes. MacIver (1990) found that integrated program students developed
team spirit and improved their attitudes and work habits. This was attributed, in part, to
the fact that teachers met in teams and were able to quickly recognize and deal with a
student's problem. Vars (1965) also reports that motivation for learning is increased
when students work on "real" problems-a common element in integrated programs.
When students are actively involved in planning their learning and in making choices,
they are more motivated, reducing behavior problems. Jacobs (1989) also reports that
an integrated curriculum is associated with better student self-direction, higher
attendance, higher levels of homework completion, and better attitudes toward school.
Students are engaged in their learning as they make connections across disciplines and
with the world outside the classroom.

Students are not the only ones who respond favorably to the learning experiences that
are part of an integrated curriculum. In a study of an integrated mathematics
curriculum, Edgerton (1990) found that after one year 83 percent of the teachers
involved preferred to continue with the integrated program rather than return to the
traditional curriculum. MacIver (1990) found that teachers appreciate the social
support of working together and feel that they are able to teach more effectively when

they integrate across subjects and courses. They discover new interests and teaching techniques that revitalize their teaching.

When teachers who participated in the Mid-California Science Improvement Program were interviewed by an independent evaluator, the findings indicated a dramatic increase in science instruction time and comfort with science teaching. The teachers involved in this program taught year-long themes, with a blend of science, language arts, social studies, mathematics, and fine arts. Improvements were noted in student attitudes, teacher attitudes, and student achievement. These findings were consistent for both gifted and "educationally disadvantaged" students (Greene 1991).

RESEARCH ON IMPLEMENTATION

The research findings related to implementation have several common elements. One factor that comes through loud and clear is that curriculum integration takes time. Common planning time is needed to allow teachers to select themes, explore resources, discuss student learning styles and needs, and coordinate teaching schedules. Broad strands, such as community, change, or systems have been found to be effective thematic organizers (Shoemaker 1991). Based on an extensive review of the literature and discussions with teachers, Shoemaker lists the following as essential components of an integrated curriculum:

- **Core skills and processes.** These include basic skills, such as reading and mathematics, as well as social skills and problem solving.
- **Curriculum strands and themes.** These are the organizing principles around which the curriculum is built. They are broad-e.g., Human Societies-and integrate content from multiple areas.
- **Major themes.** Each curriculum strand is further divided into major themes, e.g., Environments or Diversity.
- **Questions.** Questions are used to further define major themes and focus activities.
- **Unit development.** From the major theme and the questions, knowledge, and skills related to the concepts, teachers plan activities that will lead to the development of knowledge and skills which will answer the questions. Teachers also collect resources and develop actual lesson plans and assessment strategies.
- **Evaluation.** Through an assessment of student progress the unit is evaluated.

When considering Shoemaker's essential components, teachers give broad definitions to her terms. For example, major themes may be drawn from existing structures within a school, such as works of literature or cross-subject areas.

Successful efforts toward integration tend to include the above elements or a variation. Palmer (1991) suggests that teachers and curriculum supervisors work together to identify common goals, objectives, skills, and themes. From these lists, the teachers work together to find appropriate connections to content areas. For example, research skills may be a part of science, math, music, language arts, and social studies. From this discussion, teachers devise plans for teaching. Any plan takes time, empowered
teachers, flexible schedules, and teams whose members are able to work together (Brandt 1991).

Just as curriculum integration changes the way instruction looks, it may also lead to a change in assessment strategies. As students are involved in "real" tasks, teachers find that they need to design performance assessments that give a true picture of student understanding of concepts.

When beginning an implementation plan, Jacobs's experience has led her to identify four steps that are integral to success (1991, p. 27). They are:

1. Conduct action research to learn about current resources and best practices.
2. Develop a proposal for integration.
3. Implement and monitor the pilot program, with continual assessment of students and the program.
4. Adopt a program and continue to assess.

SUMMARY OF RESEARCH FINDINGS

The findings support the positive effects of curriculum integration. Lipson (1993) summarizes the following findings:

- Integrated curriculum helps students apply skills.
- An integrated knowledge base leads to faster retrieval of information.
- Multiple perspectives lead to a more integrated knowledge base.
- Integrated curriculum encourages depth and breadth in learning.
- Integrated curriculum promotes positive attitudes in students.
- Integrated curriculum provides for more quality time for curriculum exploration.

Recommendations

Factors that need to be considered in an integrated curriculum are (Gehrke 1991; Jacobs 1989; Lipson 1993; MacIver 1990):

- Common definitions of terms (such as theme, strand, or outcome)
- Available resources
- Flexibility in scheduling
- Support services
- Subjects and concepts that will be integrated
- Links between integration and broader outcomes
- Curricular scope and sequence
- How evaluation will occur
- Parent and community support
- Themes that promote the transfer of learning and connections
- Team planning time that is used to exchange information about content, students, special areas of teacher expertise, and teaching methods.
When teachers select themes, it is important that they avoid themes of convenience that have no meaningful, larger concepts. While an individual teacher may or may not have expertise in each content area, members of teacher teams are able to work together to find connections that cut across single content areas (Lipson 1993). Themes that promote the linking of concepts and lead to deeper understanding are more effective. A theme is more than a series of activities; it is a way to facilitate student learning and understanding of conceptual connections. Activities that are arbitrarily connected are not helpful (Brophy and Alleman 1991). Thus, an integrated curriculum is a means, not the end result. Poorly designed units do not achieve this end of deeper understanding and thorough learning.

Each of these elements needs to be considered as teachers look at curriculum integration. It is necessary for each school to determine the best procedure to meet the needs of the particular student body. A secondary school may face different constraints than an elementary school. Rather than move from a traditional, subject-specific curriculum to an integrated curriculum in one sudden sweep, schools find more success when they make gradual changes, making sure that everyone involved feels a sense of ownership of and commitment to the changes.

Some areas may lend themselves more naturally to integration, such as math and science or language arts and social studies. However, as reported above, there have been very successful efforts in nontraditional alliances, e.g., art and math. As teachers are more and more involved in integration, they find that they see connections that they had not seen initially. As teachers see these connections and develop learning experiences and assessments built around the connections, students also understand them. This understanding leads to more successful learning.

**Areas for Further Research**

An integrated curriculum may not address a logical sequence within a discipline such as mathematics. Further research into the effect of this will be needed if teachers are to look at the role of sequence in curriculum selection decisions. It may be that sequence decisions currently held are more a product of textbooks than actual necessity for understanding. When the curriculum is based on broad concepts linked in thematic units, students may acquire knowledge in very different ways, making the traditional sequence less meaningful. This is an area that has not been fully explored in the research on integrated curriculum.

Another implication, cited by Humphreys (1981), revolves around assessment of student learning. If themes are guided, in part, by student and teacher interest, there will be less consistency of experience than many teachers currently strive for. This may impact performance on standardized tests and require alternative methods of assessing student understanding of essential concepts.

Teachers who are not provided with adequate inservice or time to thoughtfully develop an integrated curriculum may go to an unstructured, "a little of everything" approach (Jacobs 1989), rather than a truly integrated approach to learning. This does not facilitate the kinds of understanding and achievement that integrated programs
discussed in this report have documented. Best practices for initial and ongoing inservice training need to be explored more fully.

A related issue is the extent to which preservice teachers are prepared to teach in settings that are committed to curriculum integration.

A final word of caution is for the teacher who feels that this must be an all-or-nothing scenario. There may well be instances in which curriculum integration is not the most appropriate way to go. A careful examination of successfully integrated programs may suggest the extent to which integration can or should be implemented.

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