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ABSTRACT

This report describes the development and field test of "Make It Happen!," a school-based approach to integrating technology into the middle school curriculum. This activity, conducted between October 1989 and May 1991, constituted Phase II of a 5-year study of technology integration for mildly handicapped students in four middle schools in Massachusetts. "Make It Happen!" supports teams of content area and special education teachers in designing and implementing an interdisciplinary, inquiry-based curriculum unit that integrates technology in multiple ways. Seven principles form the backbone of the approach; they affirm that it: (1) guides schools in producing curriculum that responds to the dramatic developmental changes in adolescence; (2) engages teachers themselves in an inquiry process; (3) reflects the assumption that inquiry-based learning benefits all students, including those with special needs; (4) promotes change concurrently at the organizational, curriculum, and instructional levels; (5) involves all sectors of the school community in developing the curriculum; (6) makes ongoing communication and collaboration a priority; and (7) identifies specific tasks required during each phase and provides guidance over an extended period of time. Key organizational components of the approach include overall leadership by the principal; ongoing guidance by a strong facilitator; decision making by a site-based management team; and curriculum design, implementation, and evaluation by an interdisciplinary team of teachers. The instructional core of the unit is a model of inquiry learning called the I-Search in which students pose questions, gather and integrate information from varied sources, and write both about their inquiry process and what they have learned. Appendices contain questionnaires used in administering the program and a list of activities carried out to disseminate program findings. (Includes approximately 70 references) (JDD)

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EXECUTIVE SUMMARY

BACKGROUND RESEARCH

The report describes the development and field test of **MAKE IT HAPPEN!**, a school-based approach to integrating technology into the middle school curriculum. Development of the approach began in October, 1989. The field test took place between March, 1990 and May, 1991. This activity constituted the second phase of a five-year study of technology integration, funded by the U.S. Department of Education, Office of Special Education Programs. The first phase was an intensive, three-year study of the technology integration process for mildly handicapped students in four middle schools in Massachusetts. The findings of that research formed the basis for the design of **MAKE IT HAPPEN!**, a school-based approach that supports teams of content area and special education teachers in designing and implementing an interdisciplinary, inquiry-based curriculum unit that integrates technology in multiple ways.

OVERVIEW OF **MAKE IT HAPPEN!**

Seven principles form the backbone of the approach. The approach:

- guides schools in producing curriculum that responds to the dramatic developmental changes in adolescence
- engages teachers themselves in an inquiry process
- reflects the assumption that inquiry-based learning benefits all students, including those with special needs
- promotes change concurrently at the organizational, curriculum, and instructional levels
- involves all sectors of the school community in developing the curriculum
- makes ongoing communication and collaboration a priority
- identifies specific tasks required during each phase and provides guidance over an extended period of time

The school-based approach promotes change simultaneously at the organizational, curriculum, and instructional levels. Key organizational components of the approach include overall leadership by the principal, ongoing guidance by a strong facilitator, decision making by a site-based management team (MIH Team), and curriculum design, implementation, and evaluation by an interdisciplinary team of teachers. The curriculum focuses on inquiry learning within an interdisciplinary, thematic unit. The instructional core of the unit is a particular model of inquiry learning: the I-Search. Within an overarching theme, students pose questions, gather and integrate information from varied sources, and write both about their inquiry process and what they have learned. This type of inquiry fosters learning in both normally achieving students and special education students in mainstream classes. Throughout the four stages of an I-Search unit, students use a wide variety of technology applications to help them pose questions, gather, organize, and analyze information, and produce reports and projects. **MAKE IT HAPPEN!** guides schools through the development of an interdisciplinary, I-Search unit. Overall, the intervention includes start-up, curriculum design, curriculum implementation, evaluation, and expansion.

FIELD-TEST METHODOLOGY

The field test of **MAKE IT HAPPEN!** had several objectives: to determine whether the approach could promote successful technology integration, to guide the revision of key elements of the approach and of support materials, and to revise the findings and conceptual framework resulting from the earlier research phase. Four sites participated. These included a small urban center in Massachusetts, an affluent suburb near Boston, a small New Hampshire town near the urban center of Nashua, and a suburb of New York City located on Long Island. The sites varied in their experience with technology use, interdisciplinary instruction, and in the ways they were serving students with

special [illegible]ds. Data collection procedures included conducting interviews with teachers and administrators, observing classes, attending both formal and informal meetings throughout the field test, collecting planning documents, and gathering feedback from participants on ways to strengthen the implementation manuals. We administered the Stages of Concern Questionnaire to determine participants' reactions to the innovation at three distinct points in time. We tailored data collection activities to the specific schedules and implementation activities of the individual sites.

We developed implementation case studies for each site, in order to identify the extent to whic' sites implemented the key components of **MAKE IT HAPPEN!** and to determine the variables that hindered or promoted implementation within each site. We also used the cases to identify positive and negative outcomes at the student, teacher, and organization levels. We analyzed the feedback forms that participants filled out, which suggested revisions for each chapter in the manual.

RESULTS

Extent of Implementation Across Sites

To some degree, every site carried out all of the major steps of the **MAKE IT HAPPEN!** approach. Principals, teachers, and other administrators participated in start-up tasks, interdisciplinary teams designed I-Search units, teachers implemented the units and integrated a variety of technology applications into instruction, and participants held an evaluation retreat. Sites were also fairly consistent in carrying out specific tasks within the major innovation phases. For example, as recommended, principals or delegates recruited participants and planned student schedules for the implementation year, ensuring that special needs students were in mainstream classes. There were some recommended tasks that only some or none of the sites carried out. For example,

none of the principals developed a budget for the innovation or communicated about the project with parents. Despite the strong recommendation that teachers be provided common planning time, only one team was scheduled to meet on a regular basis, whereas the other three teams were given very limited or no common planning time. Sites did not use most of the monitoring tools provided in the manual for the principal, MIH Team or teachers.

Variability in Implementation

Within this broad outline, a unique combination of factors shaped the progress of the intervention in each of the four sites. In the suburban Boston site, for example, the interdisciplinary team was large--five teachers--and the group was hampered by a lack of several critical factors: planning time, leadership, and curriculum flexibility. In addition, there was ongoing tension between the need to cover content and foster individual student inquiry. The rural New Hampshire team consisted of a smaller group of teachers, with fewer curriculum constraints, and a facilitator from a nearby college who knew the school and understood inquiry learning. The New York team was already a part of an interdisciplinary team prior to the innovation and had a facilitator--a computer specialist--within the district who could provide strong leadership in curriculum design and technology integration.

Outcomes

Students. There was evidence across all four sites of students acquiring and expanding their content knowledge, carrying out the I-Search process and developing a positive attitude and self-concept. Teachers and students reported in all sites that students, both normally achieving and those with special needs, developed search skills, used a variety of information sources and technology applications when investigating their questions, and used new information gathering methods, particularly

interviews. Teachers reported that all students, including those with special needs, collaborated effectively with one another and enhanced their appreciation for the value of cooperative inquiry. Students in all four sites used word processing to write and edit their reports.

Teachers. None of the participating teachers had used the I-Search process previously, and all reported that they now appreciate the approach as a result of planning and carrying out an inquiry unit. The I-Search process served as a catalyst for active teaching practices such as group brainstorming, cooperative learning, journal writing, and field trips. Teachers appreciated the expanded abilities of their special needs students, as well as their own role in facilitating inquiry for all students. In every site, at least one teacher changed his or her role in some way and enhanced his or her leadership potential.

Organization. Changes at the organizational level such as revised schedules, regrouping of students, expanded access to technology and technical assistance, and new roles and relationships for teachers were the direct result of schools supporting teachers' curriculum reform efforts.

Evidence for positive student, teacher, and organizational outcomes from the four sites supports the potential of **MAKE IT HAPPEN!** to promote successful technology integration. Two of the sites evaluated their implementation as highly successful and have begun to plan expansion of the program for the coming year. In the two sites that were less successful and where teachers felt they did not yet have the conditions for interdisciplinary instruction, teachers nevertheless planned to continue the I-Search approach in their individual classrooms. Across the four sites, four factors that contribute to successful implementation emerged with dramatic clarity: the presence of a strong facilitator, ongoing communication and collaboration among

teachers, curriculum flexibility, and an understanding of inquiry-based learning.

IMPLICATIONS AND RECOMMENDATIONS

The **MAKE IT HAPPEN!** approach has been revised as a result of the field test, to reflect our recommendations for the specific roles to be played by the principal, facilitator, interdisciplinary team, administrators, and specialists. For example, field test results suggest that while principals play a critical role during start-up, it may be unrealistic to expect them to engage in much ongoing monitoring. The facilitator emerged from the field test as even more critical than the principal to the success of the approach. A strong facilitator must have the knowledge and the power within the organization to mediate between teachers and administrators, provide instructional leadership in the curriculum design process, organize and document the implementation process, and motivate and support teachers throughout. Field test results also point to the need for administrators and teachers to carefully assess the demands of the **MAKE IT HAPPEN!** approach (e.g., common planning time, curriculum flexibility, strong facilitator) prior to making a commitment to carrying it out.

In the field test version, the **MAKE IT HAPPEN!** manual was designed so that all teachers and administrators received the entire manual. It has been revised to include several different components: a program overview for teachers and administrators, an I-Search book for teachers, and a facilitator's manual, which includes all specific procedures for start-up, curriculum design, implementation, evaluation, and expansion of the approach.

Finally, the field test has contributed to a revision of our original definition of successful technology integration to stress that the process is driven not by technology, but by a vision of effective curriculum and instruction for all middle

school students. Technology is one of the many tools that teachers can use when carrying out inquiry-based learning to enhance instruction for mildly handicapped students in mainstream settings. The underlying conceptual framework of this work as it continues, and the findings from Phase I, have been revised to emphasize the centrality of good curriculum and instruction in technology integration.

DISSEMINATION PLAN

The project has been disseminating information throughout the five years, through conference presentations, workshops, and publications. The approach will continue to be disseminated by means of comprehensive training programs, supported by the revised **MAKE IT HAPPEN!** materials, to a number of school districts that have requested assistance from EDC.

CHAPTER 1: INTRODUCTION

OVERVIEW OF PHASE II

Over the past two years (October, 1989 through September, 1991), Education Development Center, Inc. (EDC) has developed and field-tested **MAKE IT HAPPEN!**, a school-based approach to integrating technology into the middle school curriculum. This activity constituted the second phase of a five-year study of technology integration at the middle school level, funded by the U.S. Department of Education, Office of Special Education Programs. **MAKE IT HAPPEN!** engages content area and special education teachers in a two-year intervention. They design and then implement an interdisciplinary, inquiry-based curriculum unit that integrates technology in multiple ways, appropriate to the curriculum goals and student needs identified for that school. The instructional model at the heart of the intervention is the "I-Search"--a research process in which students investigate individual, personally engaging questions within a compelling class topic. Central to the **MAKE IT HAPPEN!** approach is the forming of a school-based planning team that includes two or more classroom teachers, a special education teacher, the principal, a computer specialist, reading specialists, librarians, and others who can provide direction and support, particularly in the early stages of the project. The team ensures that teachers have the planning time, course scheduling flexibility, and computer resources needed to design and implement a new curriculum unit. An onsite facilitator guides practitioners through the process.

The field test was conducted in four middle schools: two in Massachusetts, one in New Hampshire, and one in New York. The three objectives of the field test were to:

- document the variation in how four diverse middle schools implement the approach and use the guiding materials provided in the program manuals

- document the outcomes for teachers, students, and the school-based teams
- revise and strengthen the approach and the support materials based on field-test results

Our overall mission was to develop an approach to technology integration that would enable middle school teachers to construct a strong, inquiry-oriented curriculum for young adolescents, drawing on the special strengths that technology can offer the teaching and learning process.

BACKGROUND: PHASE I FINDINGS

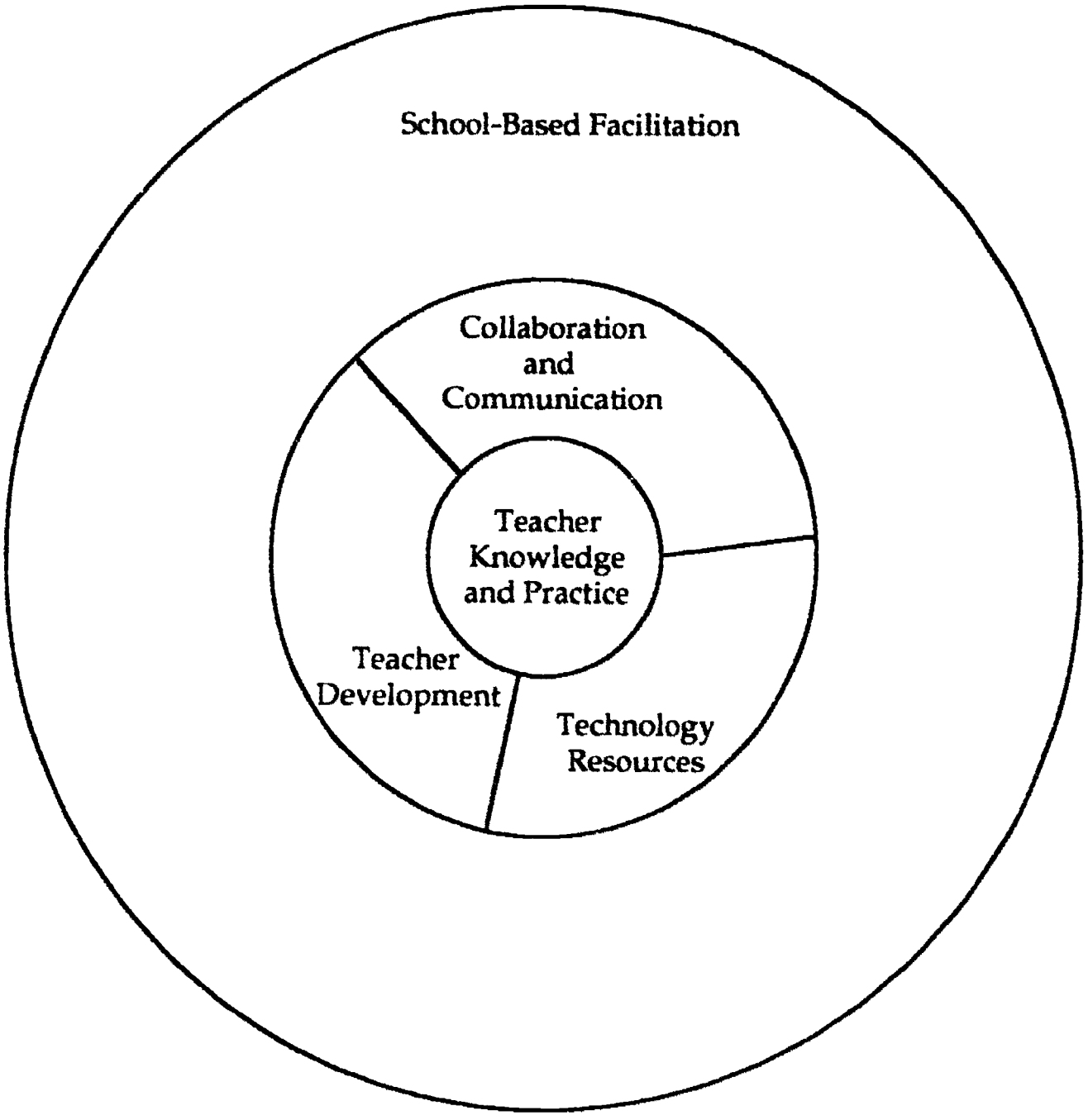
EDC's approach is based on three years of research conducted earlier by EDC in collaboration with Technical Education Research Centers (TERC). The purpose of Phase I (October, 1986 through September, 1989) was to expand our knowledge of the classroom practices and organizational supports that create successful computer-supported learning experiences for special needs students.

We carried out the three-year, Phase I study by immersing ourselves in the classroom and organizational life of four middle schools in eastern Massachusetts. During the first two-and-one-half of the three years, we studied the history and ongoing organizational context of computer use and followed teachers' evolving use of computers with special needs students in classrooms and resource rooms. We tracked teachers' interactions with computer specialists and with one another, described conditions of access and scheduling that strengthened or hindered teachers' use of computers, and documented administrative actions and decisions that either supported or constrained teachers' use of computers with special needs students.

Our research methods were descriptive and ethnographic, reflecting our goal to understand the technology integration

Figure 1
PHASE 1

CONCEPTUAL FRAMEWORK FOR INTEGRATING TECHNOLOGY



process and describe the linkages among variables that emerged as being critical. We did not start out with a set of a priori variables to be investigated (Morocco and Zorfass, 1988). The intensive use of classroom observation, interviews, and document collection reflected the naturalistic perspective of the project (Herriot and Firestone, 1983; Lincoln, 1985; and Patton, 1980). Also consistent with that perspective, we drew extensively on recent developments in qualitative analysis in the analysis and verification of data (Erickson, 1986; Greene et al., 1987; Miles and Huberman, 1984) and the use of case studies for synthesizing data gathered from multiple sources.

The last six months of Phase I were spent analyzing and synthesizing data within sites in the form of case studies, and formulating a set of assertions across the four sites about what supports successful technology integration. The project defined successful technology integration as follows:

> Successful technology integration occurs when teachers use applications of technology in a sustained way to promote and support special needs students' progress and participation in mainstream learning.

The assertions are grouped within a conceptual framework (see Figure 1) that places teacher knowledge and practice at the center of the technology integration process. Assertions about how the larger school and organizational context can support technology integration fall under the categories of technology resources, teacher development, communication and collaboration, and school-based facilitation. The 16 assertions from Phase I are listed in Figure 2 and are discussed with supportive case material in the Final Report of Phase I (October 31, 1989). A number of articles for teachers and administrators draw on case material from Phase I (Persky, 1990; Remz, Persky, and Zorfass, 1990; Zorfass and Remz, in press; Remz, in press; Storeygard,

Figure 2

EDC/TERC TECHNOLOGY INTEGRATION PROJECT

PHASE I FINDINGS

Teacher Knowledge and Practice

1. In order to improve the way technology is used with special needs students, teachers need to gradually acquire and/or draw on and integrate knowledge about:

   - special needs students' strengths and needs
   - the potential contribution technology can make to special needs students' learning
   - curriculum content
   - instructional strategies
   - assessment strategies
   - hardware and software

2. In order to promote successful technology integration with special needs students, it is critical for the teacher to be actively involved with students' use of software, regardless of the type of software.

3. When teachers engage with others in ongoing reflection about their instructional use of technology, they are more likely to critically evaluate their practice and redesign instruction to better meet student needs and curriculum goals.

Technology Resources

4. Someone needs to be responsible for ensuring that hardware is kept in good working condition and that technical problems are solved.

5. When there is some mechanism for narrowing down their choices of software, teachers are more likely to try integrating technology into their classes.

Teacher Development

6. When novice computer users have someone to whom they can turn for knowledge about computers as well as emotional support and reassurance, they are more likely to begin integrating technology into the curriculum.

7. In-service workshops can contribute to teachers' acquisition of knowledge, but are insufficient in helping teachers use this knowledge in their work with students. Teachers best learn to integrate technology successfully through ongoing school-based support and structures for collaboration and communication.

Collaboration and Communication

8. When two people work together collaboratively to try out software, technology use tends to be more successful.

9. Regular, ongoing communication between regular and special educators who teach the same students often facilitates successful technology integration if the focus of the communication is on curriculum goals, instructional strategies, and students needs.

School-based Facilitation

10. When decisions about hardware acquisition, hardware allocation, and scheduling focus primarily on curriculum goals and teach experience and expertise, they are more likely to lead to successful technology integration than when they focus exclusively on issues of equity and access.

11. Once a technology-related decision is made, it is unlikely to be implemented unless someone who is committed to the decision determines what steps must be taken and ensures that the next step happens at each point in the implementation process.

12. Once a technology-related decision is made, administrators and teachers need to communicate directly with each other during implementation to determine whether the decision is working or needs to be revised.

13. In order to support teacher development, administrators must put structures in place so teachers can communicate and collaborate on a regular basis.

14. When administrators vary expectations according to teachers' individual needs, interest, and abilities and give teachers choices about how and when to implement technology-related curricula, successful technology integration across classrooms is more likely to occur.

15. In order for successful technology integration to occur beyond individual classrooms, administrators need to

    - have a vision of the value and potential of the computer in meeting students' instructional needs and curriculum goals; and
    - understand that integrated technology use implies instructional and organizational changes.

16. When there are policies and procedures that promote links between special and regular education programs, then it is more likely that technology-related curriculum planning and implementation will meet the needs of special needs students.

LeBaron, and Shippen, 1991; Storeygard, Russell, and Zuman, 1989-90; Zorfass, Remz, and Persky, 1991, and, Zorfass and Persky, 1991).

DESIGN OF THE INTERVENTION

In developing an approach to technology integration for diverse learners, EDC staff was guided by the findings from the three-year Phase I study and also by several other areas of theory and research related to middle school education. These include:

- the consistent finding of research on organizational change that most innovations in schools take time and require strong organizational support (Berman and McLaughlin, 1978; and Hord et al., 1987)
- the emphasis in national educational reform efforts on going beyond basic skills to "advanced skills" of inquiry, problem solving, reasoning, reading comprehension and communication for all students (A Nation at Risk: the Imperative for Educational Reform, National Science Board Commission, 1983)
- current "constructivist" learning theories that view students as active learners who continually construct and reconstruct their understanding of the world. Constructivist theory contrasts with the view that students are passive receivers of knowledge and that their learning develops from the sequential acquisition of skills and bits of information (Eylon and Linn, 1988; Linn, 1987; Novak, 1988; Poplin, 1988; Resnick, 1983; and Smith, 1989)
- middle school reforms, specifically those that emphasize the importance of collaboration among teachers and argue for interdisciplinary thematic instruction (Beane, 1990; Carnegie Council on Adolescent Development, 1989; Epstein and MacIver, 1990; Jacobs, 1989; and Lipsitz, 1984)

EDC's approach responds to these themes by guiding teachers to design interdisciplinary curriculum units that engage both regular and special needs students in an active inquiry process, and by guiding school-based teams to provide teachers with the time, resources, and support they need in order to carry out that

process. In this approach, decisions about how best to use technology and what it can do for students are embedded in larger questions of curriculum and instruction. In their curriculum design process, for example, teachers work through a progression of questions, such as: "What theme or topic can organize a curriculum unit in mathematics and social studies? What overarching questions could help organize and guide students' research within a common topic such as the human body? What instructional approaches and activities will help students become immersed in the topic and develop questions they want to investigate further? What modifications need to be made in instructional approaches and activities to meet the needs of students with learning difficulties?" Questions about technology use become embedded in those larger questions, for example: "What resources are available to familiarize students with the human systems? What technology-based resources (videodiscs, databases, films) are available? What print resources could be used? Which are most appropriate to unit goals? What resources are most useful for students with special learning needs?" Clearly, teachers have to work through several layers of curriculum planning before they can address questions about technology.

This approach assumes that middle school teachers, with support, can make complex curriculum design decisions that take into account their learning goals for students, their students' developmental needs (e.g., for collaborative learning, for linking academic learning with personal questions), the variety of resources available (including technology), and the range of special learning needs in the classroom.

EDC'S EVOLVING PERSPECTIVE ON TECHNOLOGY INTEGRATION: THE CENTRALITY OF CURRICULUM

Developing and field-testing this approach required EDC staff to shift their perspective on technology during Phase II. The computer and its applications were at the foreground of our

vision and formed the starting point of our inquiry in Phase I. During that time, we focused on all the ways that teachers were using technology with diverse learners in the classrooms and resource rooms in the four middle schools we were studying, then interviewed teachers about how their computer-based activities linked with their curriculum goals and their ideas about effective instruction for students with diverse learning needs. In contrast, as the questions above suggest, issues of curriculum and instruction formed the starting point for our work with teachers and administrators in Phase II. Essentially, in Phase II, conversations about technology use for special needs students took place within an ongoing larger conversation about what constitutes good education for all students in middle schools and how to bring it about. This shift from a primary focus on technology to a primary focus on curriculum and instruction--"good education"--characterizes not only EDC's work, but also several multi-year technology integration projects in different parts of the country. For example, a symposium at the 1991 Annual Meeting of the American Educational Research Association focused on curriculum integration to meet the needs of diverse learners (Birman, et al., 1991).

OVERVIEW OF THIS REPORT

The remainder of this report describes Phase II of the Technology Integration Project. Chapter 2 describes **MAKE IT HAPPEN!**, including its guiding principles, the organizational, curricular and instructional components, and the five phases of the intervention. Chapter 3 describes the research sites and data-gathering methods. Chapter 4 describes the results, including the extent to which the teams in the four schools were able to implement the approach, and the outcomes for teachers, students, and the school. Chapter 5 discusses the implications and recommendations of the field test, and Chapter 6 describes how the approach will be disseminated to other schools and school districts around the country.

CHAPTER 2: OVERVIEW OF MAKE IT HAPPEN!

GUIDING PRINCIPLES

In the fall of 1989, the challenge facing the EDC Technology Integration Project team was clear: develop a school-based approach that builds on the results of the three-year research effort, promotes deep and lasting change in schools, and furthers current initiatives for school reform, especially at the middle school level. As a preliminary step, EDC articulated a set of seven principles that would form the backbone of the approach.

1. The approach must guide schools in producing curriculum and instruction that responds to the dramatic developmental changes of early adolescence. The Center for Early Adolescence (Hill, 1980) and a body of other researchers (Beane, 1990; George, 1990; and Lipsitz, 1984) have identified three important areas of developmental change: physical, intellectual, and social change. Physical changes in adolescents occur more rapidly than at any other stage except infancy. With the advent of formal operations, the intellectual capacity of adolescents shifts toward thinking in more abstract and complex ways. Socially, young adolescents develop an expanded sense of self and an increased ability to interact with others. As they negotiate home and school environments and interact with peers, adolescents engage in issues of attachment (relationships to parents); autonomy (self-initiated activity and confidence to undertake challenges); sexuality; intimacy (deep friendships, altruism); achievement (industry, productivity); and identity (developing a sense of self).

Given these changes, the challenge for middle school educators is to channel the adolescents' capacity for active, engaged thinking; draw on their developing abilities to work and cooperate with peers; help them become independent learners by developing a sense of autonomy as they learn and apply learning

strategies; build on their natural curiosity and genuine desire to know about themselves and the world around them; and help them develop a positive sense of their own worth by engaging in and completing worthwhile work. Consistent with this challenge, **MAKE IT HAPPEN!** guides school-based teams to develop curriculum that has active, inquiry learning at its heart.

2. ***The approach must engage teachers themselves in an inquiry process, in which they are seeking and acquiring new knowledge and understanding of their subject area and students.*** In their recent writings, Fosnot (1989), Lester and Onore (1990), and Stevenson (1986) have argued that teachers cannot design inquiry-based curriculum for students unless the teachers themselves have been engaged in inquiry learning as part of the curriculum design process. **MAKE IT HAPPEN!** draws teachers into the inquiry process as they plan and carry out a curriculum unit and learn alongside their students. The approach engages teachers in inquiry by encouraging them to pose and answer questions such as these: "What different perspectives, inquiry tools, and concepts can mathematics and social studies each bring to this topic? Who in our school needs to participate in making this decision about how we will use computers in this unit? and How can I help ensure success for each of my students?"

3. ***The approach must reflect the assumption that active, inquiry learning benefits all students, including those with diverse learning styles and needs.*** Educators agree that the ultimate outcome of education is for all students to be literate in all areas of language arts, contributing members of their communities, productive workers, responsible citizens who can think critically, good problem solvers, and life-long learners (Anderson et al., 1984; Lloyd-Jones and Lunsford, 1989; U.S. Department of Education, 1986). They disagree, however, as to how to achieve these goals for all students. Inquiry-oriented, holistic, and integrative instruction is often advocated for verbal, normally achieving students (Palinscar and Brown, 1986)

and bottom-up, skills-based instruction is typically espoused for at-risk students and students with special needs (Brown, 1987). Yet, it is these latter groups of students who, even more than their higher achieving counterparts, need to be actively engaged as learners, searching for answers to questions that are personally meaningful, drawing on their previous knowledge and experience, developing new understanding by linking old and new information, and experiencing the enhanced self-esteem that results from contributing their unique talents to a group effort (Hopfenberg, Levin, Meister, and Rogers, 1990).

In the EDC model, teachers embark on the curriculum design process with the shared vision that an inquiry-based curriculum unit can respond to the special strengths and needs of all students. The approach encompasses a wide variety of planning tools and instructional strategies to help teachers be successful in that mainstreaming goal.

4. The approach must promote change concurrently at the organizational, curriculum, and instructional levels. The impetus for technology/curriculum innovation can begin with teachers, department heads, specialists, or administrators. But regardless of who first initiates change, early events will have a ripple effect. The following story illustrates this point. Sally, an English teacher, became excited about integrating word processing into writing instruction. At the end of the first semester, her students had acquired keyboarding skills and were composing fluently on the machine. Other teachers began to take notice. Soon Sally realized that going to the computer lab, even twice a week during her allotted time, didn't provide her students with the amount of time on the computer that they needed for sustained writing. She wanted the writing process to drive computer use rather than computer availability dictating when students wrote. Also, with other teachers following her lead, it was becoming increasingly difficult to arrange for lab time she had originally negotiated. Going to the computer coordinator and

principal, Sally eloquently pleaded her case for a bank of computers in her room. An instructional innovation had become an organizational-level issue--the acquisition and allocation of resources.

MAKE IT HAPPEN! is a school-based approach not only because it encompasses the organizational context, curriculum, and instruction, but also because it anticipates and facilitates interaction among all three levels.

*5. **The approach must engage representatives from all sectors of the school community--students, teachers, administrators, specialists--in the curriculum development process.*** Many individuals and groups have key roles to play in school-based innovation--*the principal, a facilitator, other administrators and specialists, and teachers.* No one person is totally responsible for making technology integration happen effectively. The principal assumes the role of instructional leader and possesses the power in the school to make the innovation happen; the facilitator has the expertise to guide a school-based team through the planning, design, and implementation process; the teachers design the curriculum unit and monitor its implementation; students freshly create new knowledge through their individual and collaborative inquiry processes; and parents and others within the community support and, depending on the unit topic, may directly contribute to the learning process. **MAKE IT HAPPEN!** explicitly involves all these key players.

*6. **The approach must make ongoing communication and collaboration among all key players an essential feature of the innovation.*** Single individuals rarely possess all the knowledge that is critical in this kind of innovation--knowledge of several content areas, special needs learners, curriculum design processes, instructional strategies, technology applications, and organizational support. As a result, participants need regular and frequent contact that enables them to "distribute" this

knowledge across all of the key participants (Kinnaman, 1990). Further, the curriculum can be richer with research possibilities for students, and more warmly "owned" by the school, if it reflects many people's ideas. Close communication is also essential if several teachers and specialists are to coordinate their work with students over several weeks or months.

An appropriate subtitle for **MAKE IT HAPPEN!** might be "Meetings Make It Happen!" Administrators, specialists, and teachers must have ample opportunity to discuss issues during site-based management team meetings. Teachers must meet regularly to design the curriculum, monitor it, and evaluate it. But good communication also requires more than formal meetings. Active administrative support fosters open communication, and the planning tools and strategies contained in the manual guide teachers through several layers of decision-making.

7. The approach must be "developmental"--identifying the specific tasks required during each phase of innovation, and providing guidance over a substantial time period. Technology integration is a complex process that requires change over an extended period of time (Morocco and Zorfass, 1988; Polin, 1991; and Stearns, 1991). It takes time for members of a school community to acquire new knowledge through talking with one another, reading, attending ongoing workshops, trying out new practices, observing each other, and reflecting. It takes time for administrators to establish new structures and mechanisms that allow for establishing training programs, developing cooperative teams of teachers, and forming a site-based management team. It takes time for practitioners to break out of the isolation that typifies schools (Carnegie Council, 1989) and to engage in the mentoring, peer coaching, and collaborative planning required in school-based change. Finally, it takes time to pilot a program with a small group of "pioneer teachers" and then allow them to emerge as leaders to motivate and support others. EDC's approach has a carefully developed sequence of

steps that allows the technology integration process to unfold over two school years and offers tools and guidelines for managing the change process at each phase.

Overall, these principles reflect a cognitive or "constructivist" learning perspective--a view that learning is a process of constructing and reconstructing our understanding or "world view" (Eylon and Linn, 1988; Linn, 1987; Novak, 1988; Poplin, 1988; and Resnick, 1983). The learner, whether adult or child, interacts with and makes sense of new information from people, books, and other materials within the environment (Lester and Onore, 1990; and Wiske, 1990). Talking and learning with other individuals encourages the learner to construct new concepts (Bybee et al., 1989). Or, as articulated in the Holmes Report (1990), "Learning emerges best from an active process of constructing public and private meaning in a community of discourse." This contrasts with the view that students are passive receivers of knowledge and that their learning develops from the sequential acquisition of skills and bits of information (Novak, 1988; and Smith, 1989).

The EDC approach assumes a constructivist view of how students learn, how teachers develop professionally, and how the school develops and changes as an organization or system. The approach guides administrators in creating an organizational environment that fosters, facilitates, and prizes this type of learning on the part of teachers. Teachers, in turn, are guided to "construct" an inquiry-based curriculum that provides the fertile context for students to construct knowledge as they explore questions of their own choosing.

DESCRIPTION OF COMPONENTS

Each of the three components of the approach--organization, curriculum, and instruction--has a set of key elements as shown in Figure 3. While the EDC school-based approach does not have a "top-down" emphasis, we begin with the organizational component as a way of setting the context for the curriculum and instructional components.

Organization

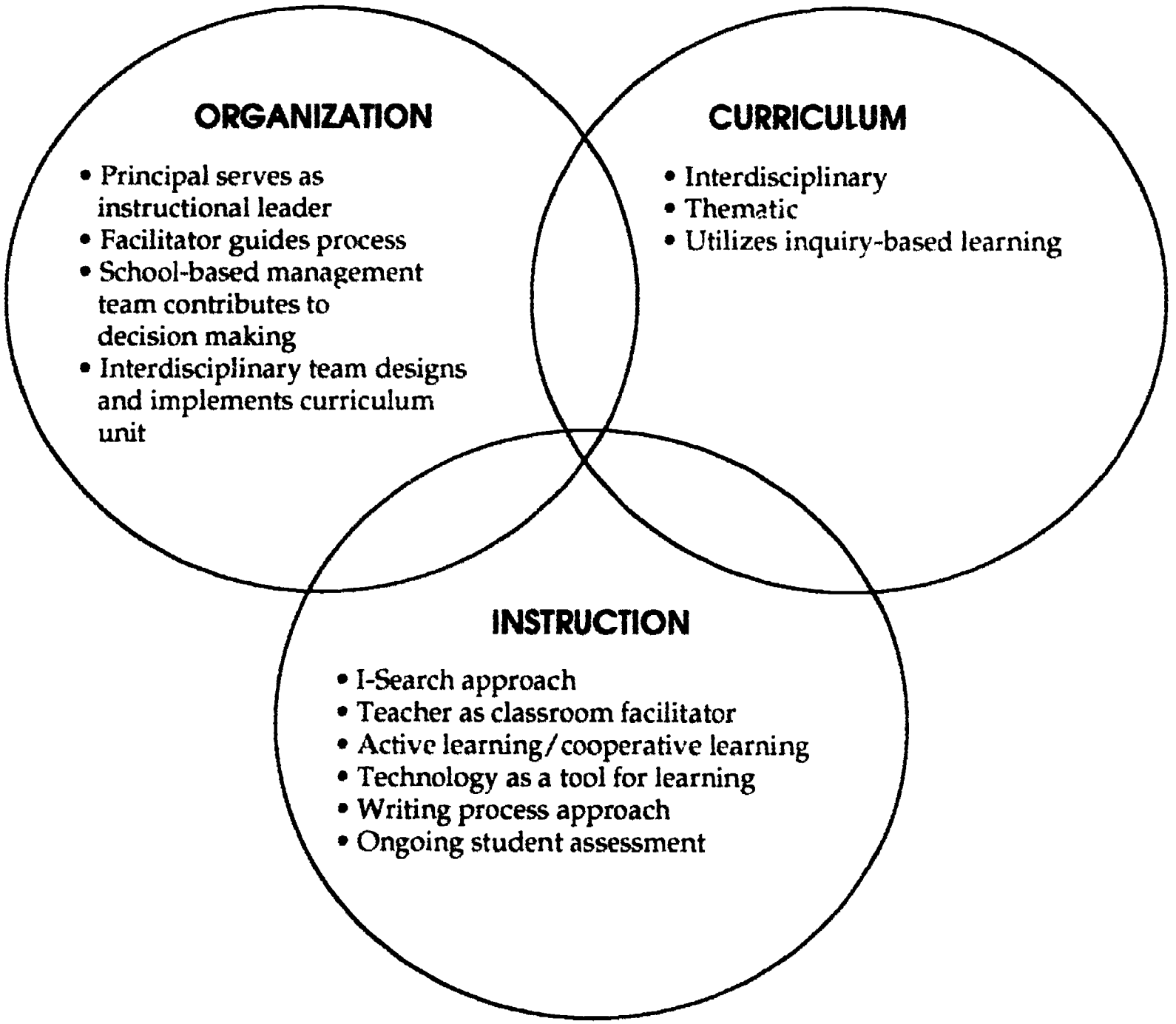
Many of the key features below resonate with the dominant themes of school reform in general, and middle school reform in particular, while they reflect our own research results. There are four key elements within this component.

1. ***The principal assumes overall leadership.*** School change literature describes the myriad aspects of the principal's role in change (Merenbloom, 1990; Smith and Andrews, 1989; Smith and Piele, 1989; and Acheson and Smith, 1986). Given the complex and far-reaching character of technology integration as defined in the EDC approach, the principal needs to play an active role in launching and monitoring the innovation as it unfolds. The principal is responsible for setting and articulating school-wide goals, fostering the spirit of inquiry for staff and students, motivating staff to work toward a common purpose, providing the resources needed to support technology use, and fostering collegial relationships (Ruck, 1986; and Weber, 1987).

2. ***A strong facilitator guides the process.*** Given the nature of the principal's job (i.e., managing all aspects of the school's program), it is likely that someone else needs to take on the critical role of guiding the project on a day-to-day basis. The facilitator needs a broad base of knowledge about curriculum design, inquiry-based learning, and technology applications. He or she must be able to make this innovation a top priority,

Figure 3

COMPONENTS/ELEMENTS WITHIN THE SCHOOL-BASED APPROACH



because large portions of time will be allocated to training and curriculum design, as well as implementing, monitoring, and evaluating the unit (Hord et al., 1987). The facilitator must have a flexible schedule to be readily accessible for teachers, not only to guide them in conceptualizing, but also to take care of the many minute details that need attention. As long as he or she meets these criteria, the facilitator may be a team leader, computer coordinator, department head, or assistant principal (Zorfass, Persky, and Remz, 1990).

3. ***A site-based management team shares decision-making.*** One of the frequently-cited ills of education is that teachers and other staff are not empowered to make decisions that directly affect their everyday professional lives (Acheson and Smith, 1986). In **MAKE IT HAPPEN!**, a site-based management team (called the MIH Team for **MAKE IT HAPPEN!**) shares the project leadership, and includes the principal, facilitator, other administrators and specialists, and the teachers who will be designing and teaching the curriculum unit. Together they create an alliance for shared leadership, addressing emerging issues, determining who needs to take responsibility for the next step, and closely monitoring the process so that change can be initiated, sustained, and diffused across the school. Due to the expanded use of technology in the curriculum, the site-based management team must address issues such as access to computer labs, placement of computers in classrooms, and purchasing additional hardware and software.

4. ***An interdisciplinary team of teachers designs the curriculum.*** The middle school reform movement has sent out a clarion call for schools to restructure themselves to create interdisciplinary teams of teachers. The vision is for these teachers to share responsibility for the same students, and meet regularly during a common planning time to discuss ways in which they could better promote the intellectual, physical, and social development of their students (Carnegie Council on Adolescent Development, 1989; George, 1990; and Lipsitz, 1984). The Carnegie report also

recommends that teachers should have the power to determine the scope and sequence of study. The **MAKE IT HAPPEN!** model responds to these initiatives by recommending the formation of an interdisciplinary team that includes at least two, if not more, content area teachers. The Regular Education Initiative in the special education community argues that mainstreaming students with special needs into regular classrooms produces benefits for all students (Will, 1986). Therefore, a resource room teacher is also a member of the interdisciplinary team and a critical player in the design and, potentially, co-teaching of a curriculum unit suited to students' needs.

Too often, the curriculum process in schools is nonexistent or curtailed, and rarely includes an open dialogue for teachers so that they can contribute to, modify, and create knowledge as part of the process (Lester and Onore, 1990). In **MAKE IT HAPPEN!** teachers are guided to construct the curriculum, beginning with design, continuing with implementation, including ongoing evaluation and revision, and culminating in mentoring a new team of teachers as they undertake the curriculum change process.

Curriculum

The school-based team develops a curriculum that is interdisciplinary, thematic, and inquiry-based to respond to the diverse developmental needs of adolescents.

1. ***The curriculum is interdisciplinary.*** Jacobs (1989) defines interdisciplinary instruction as "a knowledge view and curriculum approach that consciously applies methodology and language from more than one discipline to examine a central theme, issue, problem, topic, or experience" (page 8). Consistent with a constructivist perspective, one goal of interdisciplinary curriculum is to provide less fragmented instruction. Instead of being inundated with bits and pieces of information in each separate content area, students have continuous opportunities to

learn for understanding (Holmes Report, 1989), interrelate and grapple with concepts that span several disciplines (Carnegie Council on Adolescent Development, 1989). In such an environment, students can begin to actively internalize a range of perspectives that will serve them in the larger world (Jacobs, 1989).

2. ***The curriculum is organized thematically.*** Beane (1990a) recommends "thematic units whose organizing centers are drawn from the intersecting concerns of typical early adolescence and issues in the larger world" (p. 3). For example, a curriculum theme such as "interdependence" connects the social concern of global interdependence with a typical early adolescent concern of finding a place within a group (Beane, 1990b, p. 39). In a thematic approach, students confront themes, problems to be solved, or clusters of subjects, and learn to inquire, associate, and synthesize ideas (Carnegie Council on Adolescent Development, 1989).

3. ***The curriculum promotes inquiry learning.*** Thematic units provide an excellent context for inquiry-based instruction. Inquiry-based units capture the spirit of adolescent inquisitiveness that accompanies growing intellectual abilities. The adolescent is able to gather information; weigh and challenge the reliability of evidence; draw conclusions; make judgments; recognize the viewpoint or voice behind the words, pictures, or ideas presented; see relationships between ideas; and ask "what-if" and "suppose-that" questions (Hill, 1980).

Inquiry-based learning resonates with the adolescent's growing awareness that in real life we encounter problems and situations, gather data from all of our resources, and generate solutions (Alexander and George, 1981; and Jacobs, 1989). Inquiry-based learning actively engages learners as they construct knowledge. Adolescents can express their boundless physical energy through using resources outside the classroom and school--going to the

library, interviewing people, taking surveys, and directly observing phenomenon (California Department of Education, 1987). As active participants in the learning process, students tabulate data from surveys, interpret data, evaluate the consequences of decisions, formulate hypotheses, listen to the ideas of others, construct models, artistically display ideas, and write reports (Beane, 1990). Technology can serve as a highly motivating medium through which many of these knowledge-constructing activities are accomplished.

Inquiry-based learning lends itself to culminating "projects." Current work in "situated cognition" (Brown, Collins and Guguid, 1989) and on "anchored instruction" (Bransford, et al., 1990) and the concept of "exhibitions" in Brown University's Coalition of Essential Schools share that theme. A shared assumption of all of these efforts is that students are more likely to activate the knowledge and strategies they need for solving a problem if they have learned them in real, problem-solving contexts (Bransford, et al., 1990). Projects allow students to draw on the most important ideas, concepts, and skills gained from their studies; focus on more complex, higher order thinking, link information, and take responsibility for self-management. The products of learning can be immediate, tangible, meaningful, and convincing (California Department of Education, 1987). There are many ways in which technology can be used in culminating projects--for example, creating multimedia presentations, or producing polished reports including charts and other graphics.

Instruction

MAKE IT HAPPEN! draws on a particular instructional model for inquiry learning, and integrates a host of instructional strategies that support inquiry learning.

1. An "I-Search" approach underlies the instructional process. Drawing on the work of Ken Macrorie (1988), EDC recommends that

teachers integrate technology into an I-Search unit centered on a particular theme. In an I-Search unit, students engage in a "meaning-making" process, where they pose a question that intrigues them, gather information, integrate information to build concepts and generate ideas about what they are learning, refine their thinking, and write both about how they have carried out their investigation and what they have learned. One of the most powerful versions of the I-Search, and the one advocated in the EDC approach, is one in which students explore individual topics within a common, overarching topic.

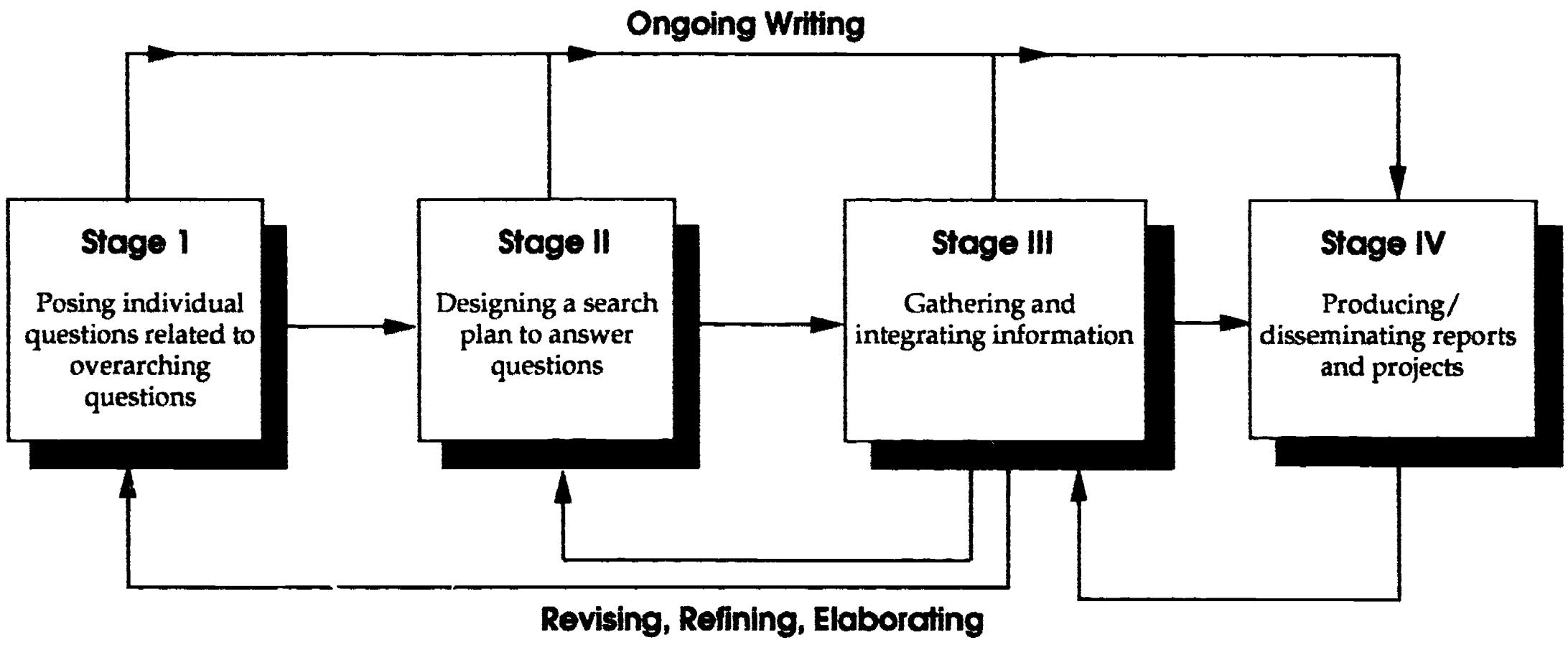
Drawing heavily on Ken Macrorie's instructional approach for carrying out an I-Search, we have broken down the search process into four instructional stages as shown in Figure 4. In an I-Search unit, teachers guide students through

- posing individual questions that relate to a set of overarching questions (Stage I)
- designing a search plan to answer the individual questions that draws on varied materials and resources (Stage II)
- gathering and integrating information (Stage III)
- producing and disseminating reports (individual I-Search reports) and (group) projects (Stage IV)

As the arrows along the bottom of Figure 4 show, these four stages are not linear, but interactive. The process by which someone builds knowledge, refines thinking, and generates meaning has an iterative or recursive quality. For example, as students gather and integrate information, they are likely to revise or refine their research questions and/or their search plans; as students write drafts of their report, they may come across gaps that require them to return to data gathering to find the missing information.

Figure 4

I-SEARCH PROCESS: FOUR INSTRUCTIONAL STAGES



Also, as represented by the arrows across the top of Figure 4, in each stage, students are engaged in numerous writing activities which contribute to their unfolding search. The final I-Search paper includes five sections: My Questions, My Search Plan, What I Have Learned, What This Means to Me, and References (see Figure 5). Using a word processor, students write and revise sections of the paper throughout the search process. For example, the questions they develop in the posing questions stage become an initial draft of the questions section of the report; the search plan they develop provides the framework for the search description section; and the knowledge they are gaining in the information gathering and integrating phase supplies critical information for the section that tells what they have found through their search.

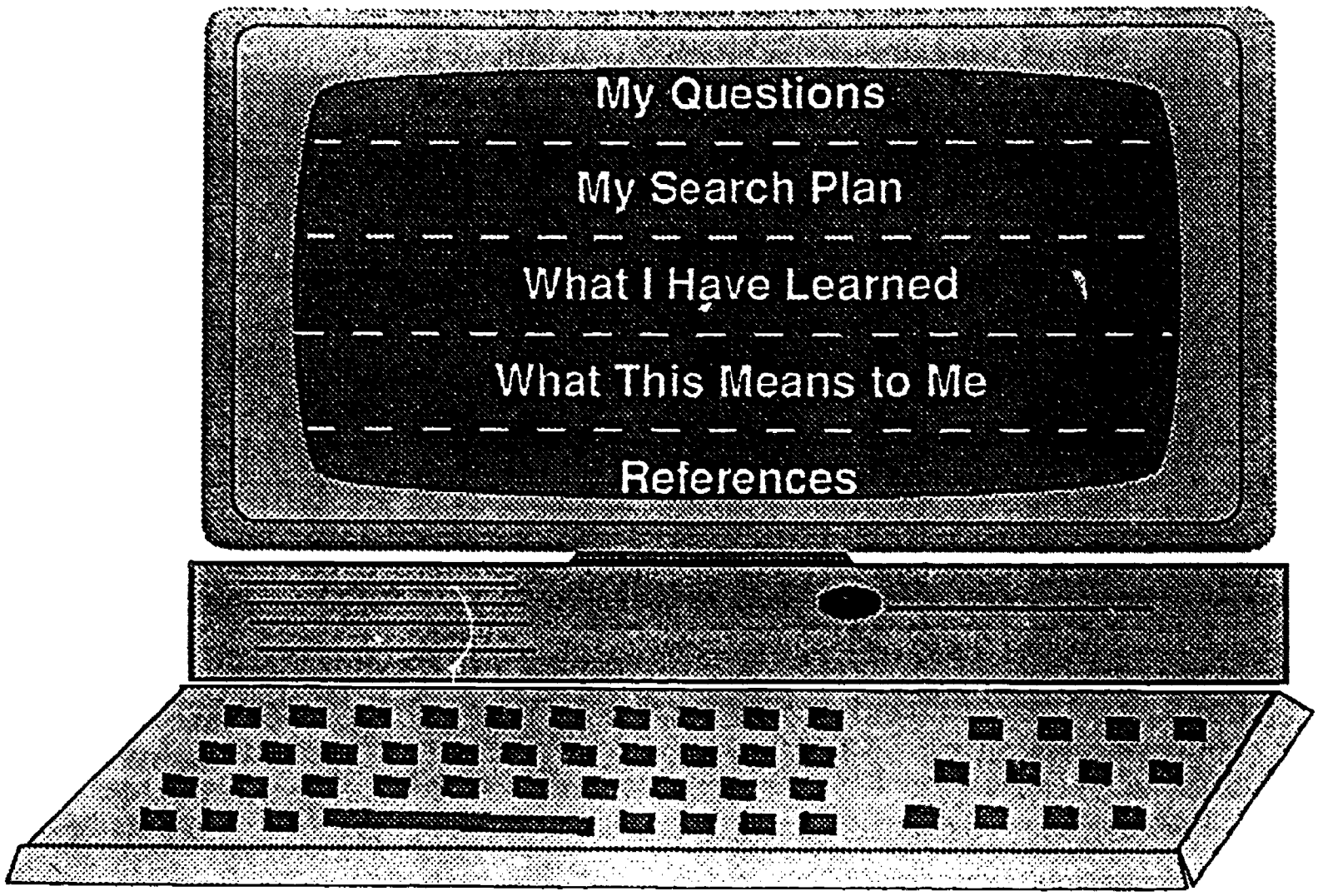
2. ***Several key instructional approaches support the I-Search process.*** These include: teacher as facilitator, active learning, cooperative learning, use of technology applications, writing process, and ongoing student assessment.

Teacher as Facilitator

"Teaching through guided inquiry is to strike a productive balance between providing thoughtful guidance and freedom for students to investigate their own ideas" (Wiske, 1990, p. 12). What propels teachers in inquiry-based instruction is not that they view themselves as the ones to dispense knowledge, but rather that they see their role as one of helping, guiding, and supporting students to construct meaning. As a facilitator, a teacher's energies are directed toward determining how learning might best occur, observing how students are progressing, and intervening as needed. More specifically, the teacher carefully selects materials, structures learning activities, supports and extends student decisions on directions for learning, challenges and encourages students, responds to students' meaning-making

Figure 5

REPORT OUTLINE



attempts, and reflects on their teaching and their students' learning (Lester and Onore, 1990).

In an I-Search unit, the teacher engages in many practices to facilitate learning. She begins every instructional activity by setting the context, that is, drawing on students' prior knowledge, setting a purpose for the activity, and clearly identifying expectations. She ends every activity by relating what has been done back to the I-Search process. She carefully determines how best to group students, taking into account the purpose of an activity, students' academic strengths and weaknesses, and social factors. She models aspects of the inquiry process. For example, a teacher might conduct a mock interview to model ways to ask probing follow-up questions. This provides direct strategy instruction; for example, in how to extract information from a videotape (Zorfass, 1991).

Active Learning

The underlying premise in active learning is that students learn, or construct knowledge, by doing. They learn from seeking answers to questions that have stimulated their imaginations. As active learners, students are involved intellectually and physically in varied learning tasks with different levels of direction, guidance, and feedback from their teachers (California Department of Education, 1987). In an I-Search unit, students become immersed in the topic through interviewing, watching and reacting to videos, participating in a simulation, listening to music, and so on. They gather information by interviewing, conducting surveys, observing, using videodiscs, and so on. The incorporation of technology in this process can further stimulate students' thinking, motivate them to intensify their search by providing alternative sources and formats of information, and help them analyze information. The process of pulling together information is an active and constructive one.

Cooperative Learning

Cooperative learning involves interdependence among students. The goal is for every student to have a role or task and to be held accountable for completing the task. Within this context, students are free to draw upon their own creativity and the strengths of their teammates. A positive outcome reported by teachers is the building of strong social skills and respect for others (Johnson and Johnson, 1987; Jones, 1990; Slavin, R., 1987; and Tyrrell, 1990).

In an I-Search unit, students engage in cooperative learning in meaningful ways. For example, they may work together to generate interview questions; they may share information about a common topic; they may engage in peer conferencing as part of drafting reports; they may work together using a desktop publishing program to create a newsletter; or they may produce an audio-visual project based on what they have learned.

Technology as a Tool

Educational researchers have identified the potential of the computer and related technologies to help students pose and solve problems, access and organize information, construct knowledge, collaborate and cooperate with peers, and articulately communicate ideas in writing (Pea and Sheingold, 1987; Schwartz, 1989; and Weir, 1989). Power On! (1988) reported that simulation programs are effective in teaching principles in the physical and social sciences; microcomputer-based laboratories are effective in helping students grasp complex concepts and master analytical techniques; data base management programs are effective in helping students process and organize information; and word processors are effective in easing the physical requirements of writing and revising. Laser-disc technology, specifically videodisc and CD-ROM platforms, provide a non-linear and interactive source for gathering information. Telecommunications

networks enable students to learn from and share information with sources and people in distant places. During the I-Search process, teachers and students use a variety of promising technology applications. For example, computer programs such as simulations and pre-formed data bases contain content-related information that students can use to gather information. Tool software such as word processors, data bases, and graphing software can help students and teachers organize, analyze, interrelate, and convey information. Students can also use word processors, graphics programs and desktop publishing to facilitate the writing process, from prewriting through producing the final research report. Figure 6 shows ways in which a variety of technology applications can be integrated into the four stages of an I-Search process.

Process Writing

"Learning involves the ability to put an idea into your own words" (Britton, 1983; and Britton, 1970). Students write continuously throughout the I-Search process. They keep journals to help them think about what they are reading, focus on information that intrigues them, and connect the different kinds of information they are gathering. In contrast with the traditional "read the passage and answer given questions" activity, the emphasis is on creating knowledge, rather than on mastering information others have identified as important. Students also use the journal to describe how an interview went, or how they stumbled on a helpful article, or how their search questions have changed. In writing these entries they "step back" to observe and think about themselves as researchers.

Some of the students' individual writing becomes "public" and stimulates other students' thinking. For example, as students begin formulating personal search questions that interest them, they tack them on the class bulletin board. This growing array of questions can stimulate those students who are still trying to

Figure 6

Integrating Technology into the Search Process

	STAGE I	STAGE II	STAGE III	STAGE IV
Technology Applications that:				
Contain Data/ Information Relevant to Question (e.g., simulations, database files, videodiscs)	X		X	
Help to Organize, Analyze & Relate Information (e.g., database programs, timeline software, graphing software, word processing)	X	X	X	X
Help to Produce Reports & Projects (e.g., word processing, graphics programs, desktop publishing, multimedia)	X	X	X	X

narrow their focus. One student's summary of an interview might stimulate another student to revise his or her questions for an upcoming interview on a similar topic. Group writing strategies can stimulate thinking and link students' individual searches. For example, the teacher might use a graphic organizer such as a web to cluster information students are gathering and show how different pieces of information are related within the overarching curriculum topic.

By the time students are ready to draft their I-Search reports, they have revised their questions many times, integrated many sources of information, used a variety of technology applications, and developed fluency in expressing their ideas in the first person and in their own individual way--their own voice. By expressing themselves in first person, rather than prematurely in "researchese," students lay the groundwork for an eventual transition to using more formal, discipline-specific discourse.

This pervasive use of writing is consistent with the emphasis in the I-Search model on students' actively constructing knowledge in a community of learners. Writing pushes us to select words, remember previous ideas and experiences, express emerging understanding, focus on what we think is important, make connections between previous ideas and new information, and raise questions. In all of these ways, writing is an active, constructive meaning making process (Britton, 1970; Mayher, Kester,and Pradl, 1983).

Ongoing Assessment

Teachers embed assessment in ongoing instruction (Martinez and Lipson, 1989; Wolf, 1989). For example, writing is a primary vehicle for ongoing assessment, with students' portfolios providing a concrete, tangible focus for teacher and student together to talk about how the inquiry process is going (Wolf,

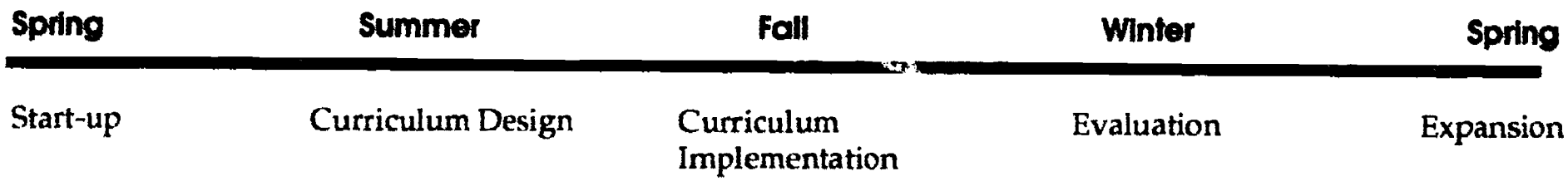
1989), and to co-construct plans to guide and support each student's individual development within the larger group endeavor. A student's writing gives the teacher a window into the student's individual thinking and learning process at key points in the I-Search. This ongoing assessment is particularly critical for students with special needs, who may need additional support in formulating questions, organizing a search, extracting information from reading or interview material, and linking and integrating ideas. Writing strategies that are fairly easy for students can yield critical diagnostic information. Students' written and oral formulation of their questions helps the teacher know early in the process whether their questions are "researchable"; that is, are they focused enough to be manageable and yet broad enough to yield a rich search?

In addition to monitoring the students' writing, the teacher closely observes how students are interacting during cooperative work, how well they are able to set and accomplish tasks, and how they make sense of what they are learning as they share knowledge with other students and teachers.

PROCESS

Figure 7 shows the **MAKE IT HAPPEN!** timeline which takes into account the naturally occurring peaks and valleys in the academic year. The process includes five phases. The **start-up** phase begins in the spring to allow for planning and scheduling needed for interdisciplinary teaming. **Curriculum design** ideally takes place during the summer, when teachers are freed from heavy professional responsibilities. The subsequent school year is devoted to **curriculum implementation** (fall and/or winter), **program evaluation** (winter), and **expansion of the program** to other groups of teachers (spring).

Figure 7
MAKE IT HAPPEN! Process



Start-up

Taking a strong leadership role, the principal begins to create the organizational context needed to support change. The principal oversees the innovation process, although in some cases, he or she may do this through a delegate. The delegate must be someone who shares the principal's enthusiasm and is willing to devote the needed time and energy to the innovation.

There are a variety of ways schools can recruit volunteers to participate as members of the MIH Team. For example, there can be meetings to share information, memos, or visits to other schools. The key people who are needed for the team include:

- the facilitator who will provide ongoing technical assistance, training, and support to the teachers
- other administrators, coordinators, or specialists, who will be involved in decisions about curriculum, training, resources, and technology
- an interdisciplinary team of teachers composed of two or more content area teachers and a resource room teacher who will design and implement the unit

Once the MIH Team is formed, the facilitator arranges regularly-scheduled meetings in order to give the team members opportunities to develop a shared vision of the expected outcomes in terms of curriculum and instruction, team collaboration, and organizational support. The team addresses questions such as:

- **Curriculum and Instruction.** What kind of curriculum and instruction do we want for our students (regular and special education)? What do we mean by inquiry-based learning? How is inquiry-based learning embodied in the I-Search process? What role does technology play? What would be a worthwhile topic for an interdisciplinary curriculum unit?

- **Team Collaboration.** How can we work together as a team? What is the role of the resource room teacher? Will teachers co-teach or teach in a parallel fashion? What will contribute to effective, ongoing communication? What mechanisms can we establish to resolve conflicts?

- **Organizational Support.** What will be the role of the principal (or delegate)? What is the role of the facilitator? How will the MIH Team function as a decision-making team? How can we establish a system of communication with the faculty, district, and community?

During this time, whoever is responsible for the budget needs to earmark funds for line items such as equipment, materials, training, and release time. The administrator who takes charge of scheduling needs to guarantee that the teachers on the interdisciplinary team have common preparation time and share the same students the following school year. The team must consider issues such as access to computers and the acquisition of additional software. Finally, the members of the MIH Team need to reach agreement about the time, location, and funding of the curriculum design process.

MAKE IT HAPPEN! integrates multiple innovations that focus on interdisciplinary curriculum design and implementation, inquiry-based learning, technology use, and mainstreaming. The organizational conditions of each school will dictate where energy and attention needs to be focused during start-up. For example, if a school is forming interdisciplinary teams where none existed before, then a considerable amount of time may need to be devoted to team building. If teachers are not yet comfortable with particular technology applications, then time and resources must be set aside for training and ongoing support. If teachers were breaking new instructional ground by initiating active, inquiry-based learning, then time would need to be devoted to understanding what this means for teachers and students. Start-up must give all team members a chance to sort out the elements of the innovation--which ones are familiar and

which represent change. They must also understand what each of the new elements mean to them personally, for their students, and for the school.

Curriculum Design

MAKE IT HAPPEN! guides the interdisciplinary team of teachers through a curriculum design process. The goal is for teachers, with assistance from the facilitator, to construct the curriculum, drawing on the materials, methods, and tools included in the manual. Once the team has selected an interdisciplinary thematic topic, then they engage in the following four tasks:

- Identifying specific curriculum objectives within the overall curriculum topic. The objectives fall within three categories: content area knowledge, carrying out the I-Search process, and developing effective search behaviors and attitudes (see selected examples of objectives within the last two categories in Figure 8). This step requires considerable effort. Accustomed to following textbook scope and sequence charts, many teachers find it a challenge to think through what learning is essential.

- Designing a sequence of activities that engage students in a search process by (1) becoming immersed in the topic and posing individually meaningful questions; (2) developing a search plan to find information that answers those questions; (3) gathering and integrating information; (4) drafting of the final I-Search paper and sharing information with classmates and other audiences.

- Identifying materials and resources and linking them with the major objectives and activities of the unit. These include technology applications, experts in the school and community, reference materials, media, periodicals, public documents, maps, data bases, books, and primary source materials.

- Developing strategies such as bulletin boards, student journals, student portfolios, on-line report outlines, that can help students and teachers gather and share information in an organized way, stay focused, and assess ongoing progress within a unit that is being taught across multiple classrooms.

Figure 8

SELECTED CURRICULUM OBJECTIVES

Carrying Out the I-Search Process

- Identify prior knowledge and experiences relevant to curriculum topic
- Pose personally meaningful questions related to the overarching concepts
- Become familiar with I-Search format
- Devise a search plan using a variety of materials and resources in a logical sequence
- Extract relevant information and record it in an organized format
- Revise search plan as needed
- Summarize information from different sources
- Use computer applications to locate and organize information
- Produce drafts of report
- Extract relevant information from report to contribute to a group project

Developing Effective Search Behaviors and Attitudes

- Persevere in unearthing new information and constructing knowledge
- Be flexible in altering search strategies
- Reflect on changes in one's own thinking
- Take ownership for learning and contributing to the group process
- Give and draw on feedback, reactions, and suggestions to revise writing
- Share materials and resources with others
- Collaborate in assembling resources and pooling information
- Develop a sense of competence and confidence in one's writing abilities
- Take pride in a finished product that communicates information to others
- Acknowledge the work and contribution others make to a task or project

Teachers will carry out these tasks in an interactive, recursive way, rather than as a set of linear steps. For example, while teachers need to begin with clear objectives, those objectives are inevitably refined, revised, and become more meaningful as teachers design specific learning activities.

Curriculum Implementation

The essential tasks during the curriculum implementation phase are to implement the unit and also monitor it in order to make mid-course corrections as needed at the instructional, curriculum, and organizational levels. In reflecting on what is happening, teachers pose their own inquiry questions about the interdisciplinary unit. At the instructional level, they reflect on such questions as: Are the activities stimulating students to process information actively and pose personally-meaningful questions? Is technology enhancing the inquiry process? Which students need additional support? Are cooperative learning activities stimulating a real exchange of ideas?

At the curriculum level, the teachers look at the evolving program and ask: Is the unit actually using the different perspectives and tools of each discipline? Are those interdisciplinary links obvious to students? Are we coordinating instruction across our classrooms? Are we using technology in meaningful ways? Reflecting on the organizational level, teachers ask: Do we have the time we need for ongoing planning and problem solving? Do we have enough access to computers to make the technology applications worthwhile? Given the relatively short duration of the unit (6-10 weeks), problems need to be identified and solved quickly, if teachers are to meet their objectives.

Evaluation

Although ongoing evaluation takes place throughout the implementation phase, **MAKE IT HAPPEN!** recommends that teachers set aside time to evaluate the unit formally after it is concluded. This enables them to decide how to improve the new round of implementation for themselves and formulate recommendations to smooth the path for a new team to follow in their footsteps.

The evaluation process involves five steps:

- *Step 1.* Teachers pose specific evaluation questions within these categories:

  - How well did we meet the needs of all students, including the mainstreamed special needs students?

  - How well did we carry out our instructional application of the I-Search process?

  - How well did we grow professionally and collaborate as a team?

- *Step 2.* Teachers develop a plan for gathering information to answer their questions.

- *Step 3.* Teachers collect and evaluate the information they have collected.

- *Step 4.* Analyzing the information, teachers formulate practical recommendations for themselves and others.

- *Step 5.* The team disseminates recommendations to others in the school, district, and community.

MAKE IT HAPPEN! encourages the MIH team to plan a retreat in order to take the time for reflection that effective evaluation requires. Away from professional pressures, teachers can appreciate more fully all the levels of accomplishment of the team and the students, celebrate the completion of a demanding new effort, and think realistically about how they would like the program to grow and change in the coming year. They can also think about the additional "public relations" work the program

needs in order to enjoy its continued supported by school staff, parents, and the community.

Expansion

Michael Fullan's (1991) characterization of change as a journey--"a process of redoing and rethinking"--sets the context for expanding **MAKE IT HAPPEN!** throughout a school. Expansion allows the MIH Team to *rethink* curriculum design, instruction, and shared decision making and then to *redo* by setting new goals based on what the first-round team has learned during implementation. The expansion process begins with the MIH Team reflecting on why it is important for their school to expand **MAKE IT HAPPEN!**. This then leads the team to identify possible expansion routes such as:

- widening student participation
- deepening and strengthening the inquiry process
- expanding technology use

Regardless of how ambitious an expansion route a school has chosen to take, **MAKE IT HAPPEN!** guides schools through a process of

- setting specific long- and short-term goals
- identifying key players (teachers and administrators) for second-round implementation
- creating structures to ensure successful collaboration
- developing an implementation plan
- engaging in ongoing evaluation

This is not a lock-step approach, but a recursive one that is tailored to a school's needs.

CHAPTER 3: FIELD-TEST METHODOLOGY

OBJECTIVES

The field test had two major objectives. The first objective was to study the implementation process of **MAKE IT HAPPEN!** in four diverse middle schools. Our goal was to understand if each school implemented the approach as intended. Did the schools engage in the major phases of start-up, curriculum design, curriculum implementation, curriculum evaluation, and expansion? What was the experience like for students, teachers, and administrators based on contextual factors of the school? Did participants use the tools, procedures, and resources included in the **MAKE IT HAPPEN!** manual? In what ways were these materials useful, relevant, and beneficial?

The second objective was to begin to address the long-range question: Does **MAKE IT HAPPEN!** help promote successful technology integration in schools? Although the field test was designed as a formative evaluation that could contribute to revision, rather than as a summative evaluation or test of the effectiveness of a completed program, the issue of impact was still critical. Even in its field-test version, our goal was to gather evidence that **MAKE IT HAPPEN!** could meet the following three main objectives:

- to help middle school students with diverse learning needs develop as learners and thinkers by engaging in inquiry-based learning using a variety of tools and materials, including technology applications
- to promote teacher development by guiding an interdisciplinary team of teachers (composed of special and regular education teachers) to learn about and then collaboratively design, implement, and evaluate an inquiry-based, interdisciplinary curriculum unit

- to promote the types of organizational-level change that supports and facilitates teachers' efforts to design and implement curricula to meet the needs of diverse learners

In summary, the overall purpose of the field test was to

- determine if the approach has the potential to promote successful technology integration in middle schools
- revise the key elements of the approach
- revise the manual that embodies the approach
- revise the Phase I findings and conceptual framework

SAMPLE

Four middle schools in Massachusetts, New Hampshire, and New York participated in Phase II. The sites were chosen because of their variability in the following areas: demographics of the community, school population, organizational structure within the school, current technology use, experience with interdisciplinary teams and inquiry-based learning, and mainstreaming policies. The field-test sites (all pseudonyms) are described below.

Sites/Participants

Riverton, MA

Riverton is a small urban center (population 25,355), located approximately 35 miles west of Boston. It is a growing middle-class community, moving away from its original industrial base. Riverton has two middle schools, one that houses only the eighth grade, and one that houses the sixth and seventh grades. Our project worked in the latter school, with a seventh grade team.

Riverton was the only site that continued with the project from Phase I. The middle school was a good candidate to field-test the approach because teachers were ripe for change after Phase I. We had worked with both the writing specialist and the language arts teacher previously. While Riverton did not have a history of either interdisciplinary teams or inquiry-based learning, several of the teachers had recently become technology users and were interested in broadening their use of computers. The school has two computer labs housing IBM PC Jrs. There are some computers in classrooms; three were placed in English classrooms as a direct result of Riverton's participation in Phase I of the project.

The school serves 575 students, and is organized into clusters in which students are tracked into four ability levels. Almost all of the students with special needs are placed at the lowest ability level, but several are integrated into the three higher levels as well. Resource rooms also serve these students. The clusters do not function as interdisciplinary teams--there is no common planning time or flexible scheduling; teachers simply share the same students.

The **MAKE IT HAPPEN!** team in this school consisted of the principal, the K-12 computer coordinator, and four teachers: language arts, social studies, a writing specialist, and a resource room teacher. The principal determined which teachers would participate in this project, and chose the language arts and social studies teachers specifically because they were good friends and were likely to work well together. He was also careful to choose teachers who were not the "technology buffs" in the school. The principal saw this program as a way of helping novices become more comfortable with technology. The language arts teacher and writing specialist had some experience and were fairly comfortable with word processing, but neither the resource room teacher nor the social studies teacher were confident technology users.

The class implementing the unit, consisting of 14 students, was the lowest of the four ability levels in that cluster. In the language arts class, the language arts and resource room teachers were engaged in team teaching for the second year. The writing specialist also worked in the classroom with this team as well as with the social studies teacher.

Brookdale, MA

Brookdale is an affluent suburb located 15 miles west of Boston. Its population of slightly more than 25,000 is quite stable and consists primarily of white, highly educated professionals. The town's only middle school serves over 600 students in grades six through eight. Five percent of these students are minorities, bused to the school from the inner city.

The school is organized by departments, with no interdisciplinary teams. English and social studies form a combined department. Brookdale's participation in the field test enabled this middle school to conduct its own "mini-experiment" in heterogeneous grouping. The school was quickly moving in that direction, and in fact had recently eliminated som acks. Administrators anticipated that by the following year, grade eight would be grouped completely heterogeneously. The eighth grade class that would implement this unit was handpicked, and included both special education and Level 2 and 3 students (Level 1, the highest-level students, were not represented in the class).

Brookdale Middle School houses a computer lab with approximately 24 Macintosh computers. The lab operates on a sign-up schedule, and there is one computer aide available. Computers are also found in the library/media center, as well as in resource rooms. The school's technology director was regarded as a leader in educational technology use in the state. He left the district just as the project began, however, and was not replaced.

The team in this school consisted of five teachers--more than in any other field-test site. The English and social studies teachers each teamed with a different reading specialist during the year of implementation. The resource room teacher played a pivotal role during the process, making herself available to be in class for most sessions throughout the unit. Unlike other sites, several of the teachers on the team in Brookdale were experienced curriculum developers and reviewers.

Freetown, NH

Freetown is a small New Hampshire town within easy commuting distance to Nashua, a major urban center in the state. The last 10 years have seen Freetown's population grow from 8,000 to nearly 12,000. It is a middle-class community that is largely white.

Freetown has one middle school, serving 450 students in grades six through eight, 86 of whom have been identified as having special needs. Some of these receive direct instruction in a resource room; others have their performances monitored by the special education teacher regularly, but students receive no specialized instruction. The school is organized by departments although there are no "official" department heads--one teacher tends to emerge as leader without being formally designated as such. There are no interdisciplinary teams in existence.

The school's decade-old 10/10 program, in which certain classes consist of 10 regular education and 10 special needs students, is considered a hallmark mainstreaming effort in Freetown. This is the one area of the school in which formal teaming takes place, as special education staff team-teach with selected English, mathematics, social studies, and science teachers for the full year. The special needs students are responsible for achieving the goals of the mainstream curriculum, and receive additional

support from special education teachers (resource room teachers and aides) who are in the class with them.

The school houses a single computer lab with 32 Apple computers. There are additional single computers scattered throughout the school, in the resource room, the library, and nine classrooms. For three months each year the students are required to take a course focusing on word processing, constructing databases and spreadsheets, and programming in BASIC.

The team implementing **MAKE IT HAPPEN!** consisted of a language arts teacher, a mathematics teacher, and the resource room teacher, who teams with both of these content-area teachers as part of the 10/10 program. The principal thought the project could expand his teachers' use of technology, promote research skills, and bring teachers together. He also hoped the project would pave the way for several upcoming initiatives on cooperative learning, teaming, and interdisciplinary instruction.

The facilitator in Freetown was a special education professor from a nearby state college. She contacted EDC during the time that field sites were being chosen (winter, 1990) and established a relationship between the principal and EDC. She was to be on sabbatical the following academic year (1990-1991), and had a connection to Freetown Middle School--her husband had been the Director of Special Education there several years earlier.

The resource room teacher had been included in the preliminary discussions of the project and she, in turn, recruited the language arts and math teachers. Both content-area teachers had been a part of the 10/10 program in the past but had not collaborated with one another previously.

As in Brookdale, the class of students taking part in the unit was handpicked for this project. It consisted of 10 mainstream and 10 special needs students.

Easton, NY

Easton is a suburb of New York City, located on Long Island. It is an upper-middle class community; sections of it are quite affluent. Easton's largely white population is just over 6,000, a slight decline over the past ten years.

Easton Middle School serves 841 students in grades six through eight. The school has many administrators (there were three assistant principals when the project began). The team implementing the unit in this school was already an interdisciplinary team, with common preparation time and shared students. They were able to meet on a daily basis.

Easton was the only site to implement the curriculum with more than one class; **MAKE IT HAPPEN! was implemented** with all four seventh grade classes--a total of 95 students. The team consisted of the English teacher, the science teacher, the social studies teacher (whose participation was limited by design), the resource room teacher, and the librarian.

Easton's facilitator was the computer coordinator for the district. The coordinator's connection with EDC paved the way for the participation of the school in the field test and for her role as facilitator. Easton's principal delegated tasks to various other administrators, who were minimally involved once the start-up phase was over.

DATA COLLECTION

Data collection procedures included interviewing all participants; observing in classrooms, at MIH Team meetings, and during informal meetings; and administering the Stages of Concern Questionnaire (Research and Development Center for Teacher Education, the University of Texas at Austin, 1974). We also collected information from participants about their reactions to

the approach and materials by collecting the feedback forms that were included in the manual. Figure 9 shows a timeline of data collection procedures.

Interviews

During the start-up phase of the project, we conducted interviews with all participating teachers and members of the MIH Team. We interviewed the principal of each school even if the principal had delegated the lead role on the project to another administrator. As appropriate, we interviewed department heads, special education directors, and directors of curriculum/ instruction. These interviews were meant to gather baseline data about participants' experiences with curriculum design, collaborative planning, interdisciplinary teaching, technology use, and mainstreaming. Interviews were tape-recorded with participants' permission, and summaries were written and distributed among EDC staff.

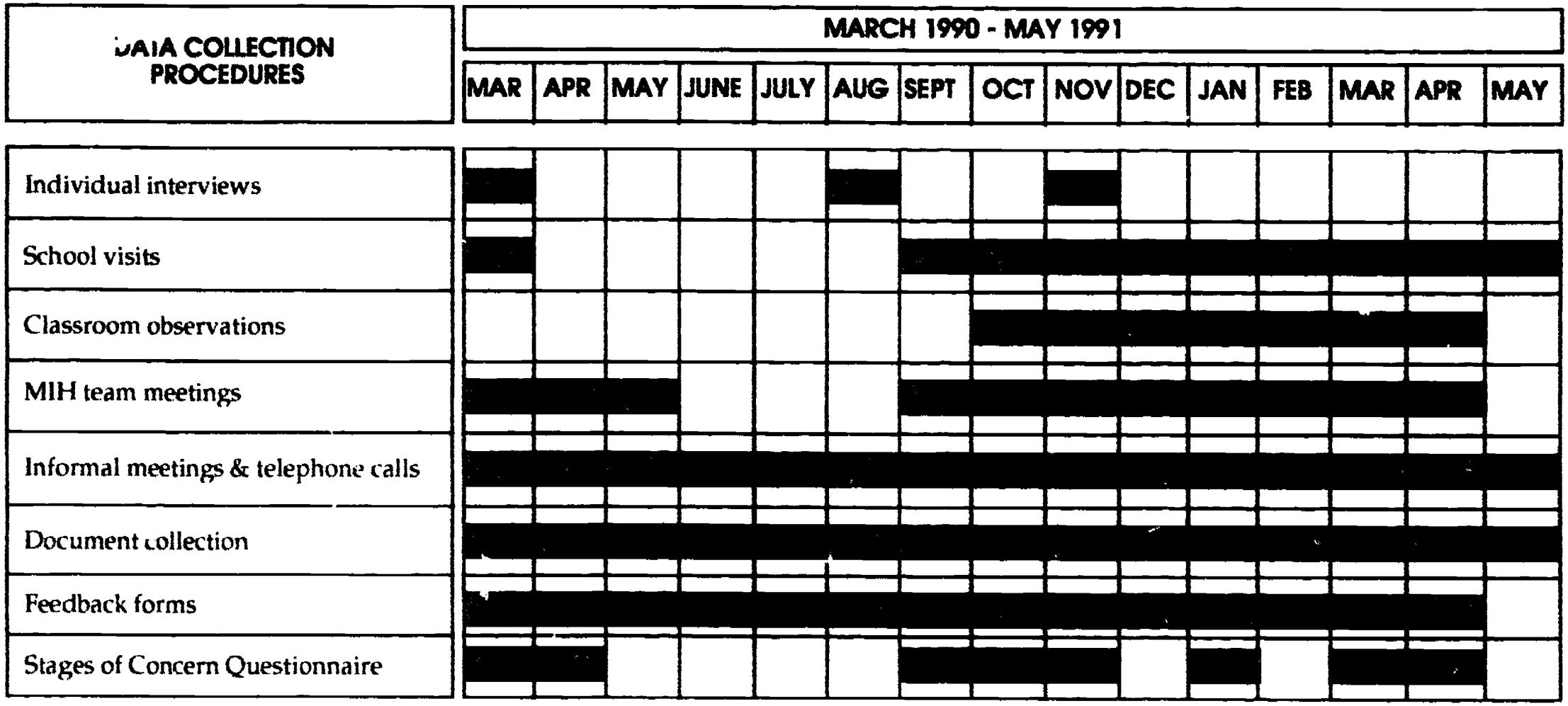
Observations

From the spring of 1990 to the spring of 1991, we carried out intensive observations in the two Massachusetts sites, Riverton and Brookdale. We observed in classrooms and computer labs on at least a weekly basis (and on most occasions more often than this), attended MIH Team meetings, the curriculum design institute, the retreats, and participated in informal meetings and conversations.

Given the distance, our observations in Easton, NY and Freetown, NH were less frequent than the two Massachusetts sites. In Easton however, we observed the entire week-long curriculum design process, attended MIH Team meetings, and observed in classrooms for a full day during the implementation of the unit. In Freetown, we visited the school during one **MAKE IT HAPPEN!** start-up meeting, during implementation of the unit (three

Figure 9

DATA COLLECTION TIMELINE



times), and during the retreat.

All visits to and communications with field-site participants were summarized in field notes, which were circulated among ELC staff and discussed at staff meetings. Teachers videotaped certain classroom activities at our request. They tried to capture introductory lessons or kickoff activities on videotape, as well as such activities as guest speakers or students using innovative technology. Videotapes were also made in lieu of classroom visitations to the New York and New Hampshire sites. In all instances, school equipment was used and either teachers or facilitators handled the actual videotaping. The facilitator in New Hampshire tape recorded all MIH Team meetings as well as the curriculum design process.

The Stages of Concern Questionnaire

In order to measure changes in teachers' perceptions of the innovation at different points in time, we used the Stages of Concern Questionnaire (Research and Development Center for Teacher Education, the University of Texas at Austin, 1974 [see Appendix A]. The Stages of Concern questionnaire measures change in seven areas:

- Awareness: these statements reflect the participant's level of general awareness of the innovation
- Informational: these statements reflect how much information the participant is interested in obtaining about the innovation
- Personal: these statements reflect the personal concerns a participant may be feeling regarding the innovation
- Management: these statements reflect concerns regarding day-to-day management of the innovation
- Consequence: these statements reflect concerns regarding possible consequences of the innovation

- Collaboration: these statements reflect a participant's possible concerns regarding collaboration with others during the innovation

- Refocusing: these statements reflect the degree to which a participant is concerned with issues of refocusing after the innovation is complete

The 35-item questionnaire was administered at three different points in time: during start-up when the school agreed to participate in the project; post-curriculum design; and post implementation. Each member of the team (including principal, facilitator, and any administrator who was going to be a part of the innovation) completed a questionnaire during the start-up period. However, as the school moved from start-up to curriculum design and implementation, we found that, gradually, the principal and other administrators were no longer involved enough in the project and thus no longer answered the questionnaire. In most cases, only the teachers answered it for the final two points in time. The earliest start-up point for a school was March 1990, and the last completion of implementation was April 1991. However, the actual time period during which we measured change was less than one year for any individual site.

Feedback on Approach and Materials

In the field-test version of the **MAKE IT HAPPEN!** manual, EDC included feedback forms for participants to fill out (see Appendix B). These forms asked for reactions and suggestions for improving the manual. Throughout the year of implementation, we collected these forms regularly. As another source of data, after the field test concluded, EDC held a cross-site meeting for participants from all four sites. Held at EDC at the end of May 1991, the purpose of the meeting was to elicit further feedback from principals, facilitators, and teachers and to ask them to provide us with suggestions for strengthening the manual. We felt that interaction among participants who had shared the experience of implementing this approach would yield valuable information. In fact, the meeting was highly productive.

EDC'S ROLE IN THE FIELD SITES

Because the field test was designed as a formative evaluation, rather than a formal summative evaluation, we deemed it both appropriate and productive to concurrently document field-test activities and provide technical assistance when needed. This meant that our documentation included careful accounts of both our interactions with participants and of how they responded to and acted on our suggestions. These documented interactions provided EDC staff with additional insights into the problems found in different sites and into strategies that could be helpful. We did not assume that the approach or support materials were sufficiently refined to "stand on their own" at this stage. We believed a more active technical assistance role on EDC's part would contribute to our understanding and refinement of the approach.

Our roles in the field sites varied because of a number of factors: location of the site and our accessibility to it, the strength of the facilitator (e.g., in New Hampshire and New York the facilitators were more experienced and had a strong understanding of the approach and an established relationship with EDC), and the amount of technical assistance needed. There were occasions when "crisis intervention" was needed, such as when communication broke down between teachers. At those times we did our best to mediate the situation at hand without dictating solutions. We encouraged participants to work things out in a way that would be most beneficial for the students, and helped redirect energies toward making mid-course corrections. Below we describe our activities by site.

Riverton, MA

In this site we encouraged the facilitator to lead the initial start-up MIH meetings. We spoke with him by phone prior to each meeting to ensure that he was clear on the agenda items for the

meeting. Before the curriculum design workshop began, we met with him to ensure that he was clear on the procedures for the workshop and to give him specific suggestions for running the workshop based on our prior experience with the two other sites, Easton and Freetown, which had already undergone curriculum design.

Although the facilitator officially began each day of the workshop, because of demands on his time he could not be present the entire time. Thus, the EDC staff provided a great deal of technical assistance at the workshop, clarifying procedures in the manual, answering questions, offering suggestions, keeping teachers on track, and guiding the discussion throughout the workshop.

Once Riverton moved on to the implementation phase of the project, the facilitator no longer played an active role mostly because of competing demands on his time. This "gap" in the process caused EDC staff to take on a more active and interventionist role than previously anticipated. We took responsibility for leading the weekly MIH Team meetings, even though the principal and facilitator were present at all meetings. By taking on this role, EDC learned more about the critical importance of a strong facilitator (see results section).

We observed regularly in both the social studies and language arts classrooms, and met with teachers to help plan upcoming activities and be actively involved in resolving conflict.

The formal evaluation retreat took place six weeks after completion of the unit. The teachers nominated the writing specialist to lead this retreat. We attended a planning meeting prior to the event in order to explain the evaluation process and make specific suggestions for preparatory work to be done before the retreat. At the retreat itself we took more of a back-seat role; however, we were participants in the conversation.

Brookdale, MA

Brookdale's start-up phase was held later than any other site. We led several meetings at the school designed to impart general information about the project. These meetings culminated in the school agreeing to participate and recruiting of participants.

Prior to curriculum design, EDC staff met with the resource room teacher who agreed to be the facilitator. During this time, EDC staff provided the facilitator with an overview of the approach, reviewed specific procedures, suggested strategies for leading a group, and lent emotional support. Although the resource room teacher took the lead during the workshop, we provided suggestions for redirection when needed. By the end of the fourth day of curriculum design, teachers felt uncertain about the flow of the early unit activities. At one teacher's request, we met with the facilitator and this teacher to help them map out a sequence of activities. We reviewed the activities discussed thus far, clarified them, and revised the lesson plan form. EDC assumed responsibility for producing the revised list of curriculum objectives, the revised lesson plans, the flowcharts, and the student monitoring tools because teachers had so little available time. Again, the implications of these EDC "interventions" in terms of the facilitator's role are discussed in the results section.

We continued to offer support and technical assistance during the teachers' implementation of the unit. For example, prior to the regular team meetings, we occasionally spoke with the facilitator to offer suggestions for the agenda. We also attended the team meetings and answered questions or clarified issues as needs arose. As in Riverton, we made suggestions for redirection or revision. At various points when critical difficulties arose, we had additional phone conversations with the facilitator to provide support and help her resolve the issues at hand. Once again, we did not mandate specific solutions to the sites but

helped redirect energies to finding solutions that would benefit students.

Freetown, NH

Because of the availability of a strong facilitator in Freetown, we provided much less technical assistance. During the start-up phase, we participated in a number of preliminary meetings to explain our project. Beyond this point, however, the facilitator led the team through the entire process from curriculum design (which we did not attend) through evaluation (where we were present). We did meet once with the facilitator prior to the curriculum design workshop in order to assuage her anxiety and to offer specific suggestions based on our experience in New York, which had just completed their curriculum design. We communicated with the facilitator following each workshop session to find out how things were going and to be available to provide assistance.

Easton, NY

EDC traveled to Easton on a number of occasions: to meet with administrators and teachers to recruit the school to participate, and to attend the curriculum design workshop that took place over five consecutive days. Here we provided assistance to the teachers and to the facilitator who was leading the workshop by clarifying points, giving the facilitator suggestions for how to proceed, and helping the teachers design activities.

DATA ANALYSIS

General Approach

The approach in Phase II was one of intensive formative research that was designed to provide detailed and ongoing feedback on how **MAKE IT HAPPEN!** was being carried out and how the materials would

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be modified and improved in future work. The plan was to observe the implementation of the **MAKE IT HAPPEN!** approach as it was being carried out in school settings and to describe and analyze what happened. Feedback from site participants was part of the process at every step. In fact, because of differences across our four sites in how they scheduled their piloting of the **MAKE IT HAPPEN!** materials, we were able to obtain feedback from some sites on drafts of chapters from the **MAKE IT HAPPEN!** manual and make revisions that were incorporated in the drafts that were used by later sites. Thus the work was truly formative, and the **MAKE IT HAPPEN!** manual continued to evolve and improve as a results of the feedback obtained throughout the Phase II process.

Methods of Data Analysis

We engaged in data analysis within and across the four sites while **MAKE IT HAPPEN!** was in the process of being implemented and after the field test concluded. For each site, we developed a case study of implementation, drawing on and integrating a variety of data sources (e.g., interviews, observations, and documents). The cases took the form of either a written summary or an oral one (that was audiotaped and later transcribed). For consistency of format, we used the major phases of **MAKE IT HAPPEN!** (i.e., start-up, curriculum design, curriculum implementation, curriculum evaluation, and expansion) to organize and tell the story.

By analyzing the cases, we were able to determine which steps of the implementation process were carried out, by whom, and when. In addition, we determined how sites were similar and how they differed. Further analysis focused on variables that hindered or promoted implementation within each site.

The analysis that led to identifying outcomes involved several steps. First, for each site, we generated a list of outcomes, both positive and negative. Then examining the list of outcomes

across sites, we sorted them into the categories of organizational-level, teacher, and student outcomes. We allowed subcategories under each heading to emerge from analyzing the data. Figure 10 lists these categories.

A third step involved analyzing the feedback forms, listing, and then comparing comments and recommendations made about each chapter and sections within chapters.

Figure 10
OUTCOMES

STUDENT OUTCOMES

- to acquire/expand content area knowledge
- to effectively carry out the search processes (e.g., posing meaningful questions, developing and following a search plan that involved using a variety of materials and methods, expressing what you learned to others)
- to develop a positive attitude and self-concept (e.g., being motivated, feeling a sense of pride in accomplished work)

TEACHER OUTCOMES

- to acquire/expand knowledge/skills in the areas of inquiry-based learning, curriculum design, instructional strategies, materials, assessment of student needs, technology use
- to apply new knowledge/skills to classroom practice by using active teaching practices that facilitate inquiry-based learning for students
- to strengthen communication and collaboration among special and regular education teachers and among content area teachers
- to change the teacher's role by taking on new responsibilities outside of the classroom

ORGANIZATIONAL-LEVEL OUTCOMES

- to change roles and responsibilities of administrators so they are more supportive of curriculum innovation
- to provide technical assistance to teachers
- to develop organizational structures that promote teaming, collaboration, interdisciplinary instruction, mainstreaming, and site-based management
- to acquire and allocate resources that will enhance student learning
- to modify curricula in ways that create an environment for inquiry-based learning

CHAPTER 4: RESULTS

INTRODUCTION

This chapter presents the results of our analysis. It first discusses ways in which the four field sites implemented **MAKE IT HAPPEN!** and then discusses the outcomes at the student, teacher, and organizational levels. It concludes by identifying key factors that promote successful technology integration.

IMPLEMENTATION

This section addresses two questions:

1. Overall, to what extent did the sites implement **MAKE IT HAPPEN!**?
2. How did schools vary in their implementation of **MAKE IT HAPPEN!**?

Extent of Implementation Across Sites

As described earlier ir Chapter 2, **MAKE IT HAPPEN!** is a complex innovation that has an evolving series of steps: start-up, curriculum design, curriculum implementation, curriculum evaluation, and expansion. Each step asks some or all of the key players (e.g., the principal, the facilitator, the interdisciplinary team of teachers, other key administrators) to carry out a series of tasks.

Down the left-hand column of Figure 11, we have listed each of the major tasks identified in the **MAKE IT HAPPEN!** manual, as well as the specific steps within those tasks[1]. To the right, within

[1] We have not included the step "Expansion" since we have not been able to follow the program through this step.

Figure 11

Implementation Outcomes

	Brookdale, MA	Freetown, NH	Riverton, MA	Easton, NY
Start-up				
Principal:				
Recruits participants	✔	✔	✔	✔
Does budget	no	no	no	no
Communicates with others	no	no	no	no
Schedules:				
• students	✔	✔	✔	✔
• common prep time for teachers	no	no	no (by teacher choice)	✔
Arranges MIH Team meetings	no	✔	✔	no (facilitator does this)
MIH Team:				
Discusses vision	no	✔ (occurs in conjunction with curriculum design)	no	minimal
Discusses curriculum				
• topic	no	✔	✔	✔
• logistics	✔	✔	✔	✔
Discusses technology	no	no	✔	✔
Plans curriculum design workshop	✔	✔	✔	✔

	Brookdale, MA	Freetown, NH	Riverton, MA	Easton, NY
Curriculum Design				
Teachers:				
Refine unit theme	✔	✔	✔	✔
Identify objectives	✔	✔	✔	✔
Select materials			no	✔
• technology	✔	✔	✔	✔
• other	✔	✔		
Design Building Block Activities				
• bulletin board	✔	✔	✔	✔
• portfolio	✔	✔	✔	✔
• journal	✔	✔	✔	✔
• computer template	✔	✔	✔	✔
Design activities	limited	limited	no	✔
• Activity write-ups	✔ (for Phase I) (EDC did this)	✔	✔	✔
• Flow charts	✔	✔	✔	✔
Plan for introducing unit to students	no	no	no	no
Develop action plan for implementation				

Figure 11

Implementation Outcomes

	Brookdale, MA	Freetown, NH	Riverton, MA	Easton, NY
Curriculum Implementation				
Teachers:				
Carry out curriculum plans	✔ (planned as they went along)	✔ (refined plans as they went along)	✔ (planned as they went along)	✔ (refined plans as they went along)
Meet regularly	✔ (every 6th day)	✔ (met during lunch, after school, talked on phone)	no	✔ (met 4 out of 5 days)
Use monitoring tools	no	no	no	partially (filled out by facilitator)
MIH Team:				
Meets regularly	no	no	✔	✔
Uses monitoring tools	no	no	no	no
Principal:				
Uses monitoring tools	no	no	no	no

	Brookdale, MA	Freetown, NH	Riverton, MA	Easton, MA
Curriculum Evaluation				
MIH Team:				
Prepares for retreat				
Identifies questions	✔	✔	✔	✔
Gathers info/ uses tools				
1. students	✔	✔	✔	✔
2. professional growth	✔	✔	✔	✔
3. curriculum objectives	no	no	no	no
Holds retreat				
analyzes data	✔	✔	✔	✔
forms recommendations	✔	✔	no	✔
celebrates/rewards	✔ / (EDC-made)	✔ / ✔	✔ / no	✔ / no
Disseminates information	✔ (written recommendation given to principal)	✔ (teachers presented at faculty meeting)	no	✔ (teachers presented to PTA, English department)

the column for each site, we indicate whether or not the sites implemented these tasks.

Every site carried out, to some degree, every one of the major steps of **MAKE IT HAPPEN!**. In every site

- principals, teachers, and other administrators participated in start-up tasks
- an interdisciplinary team of teachers (which included a special education teacher) designed an I-Search curriculum unit that spanned multiple classrooms (see Figure 12)
- teachers implemented the I-Search unit and integrated a variety of technology applications into the unit (see Figure 12)
- participants held an evaluation retreat

As Figure 11 shows, the sites were fairly consistent when it came to carrying out specific tasks within each step. For example, during start-up, every principal or another key player recruited participants; every principal planned the schedule for students for the following year; and every MIH Team planned for the upcoming curriculum design workshop. However, none of the principals (or delegates) developed a budget or took the initiative to communicate with parents. During curriculum design, every team identified objectives, selected materials, designed building block strategies, designed some activities, and planned how to introduce the unit to students. However, no one developed an action plan for the curriculum implementation process.

During curriculum implementation, every team of teachers planned activities or revised earlier instructional plans as the unit progressed. Teams in two of the sites worked within the structure of common preparation periods; in a third site, teachers carved out meeting time on their own; and in the fourth site, teachers had no time at all. There was little or no use

Figure 12
THEMATIC I-SEARCH UNITS BY SITE

Site	Unit Theme	Disciplines Involved	Technology Used
Brookdale	Africa: Dispelling the Myth of the Dark Continent	English/social studies	MacPaint; Inspiration; MacWrite; Filmstrips; Videos
Freetown	Freetown: Back to the Future	English/mathematics	Decisions, Decisions; Timeliner; MECC Graph; Videos
Riverton	Race and Culture	English/social studies	Easywriter; Groliers CD ROM Encyclopedia; Filmstrips; Videos
Easton	The Human Body	English/science/social studies	Appleworks; The Human Body Pump; Inner Body Works; Life and Death; CD ROM Magazine Index; Filmstrips, Videos

across the schools of the manual's monitoring tools by the principal, MIH Team, or teachers. During curriculum evaluation, all teams held a retreat; however, only three teams took the next step of disseminating the results of the retreat.

Variability in Implementation

Although this broad survey presents a fairly uniform picture of implementation across the sites, a large amount of variability did exist. For example, over the course of the year, sites differed in when they carried out each step, as shown in Figure 13. In this section, we present four case studies, one for each site, to illustrate variability in implementation. At the end of each case, we identify a constellation of key features or factors that promoted or hindered the implementation process in that site.

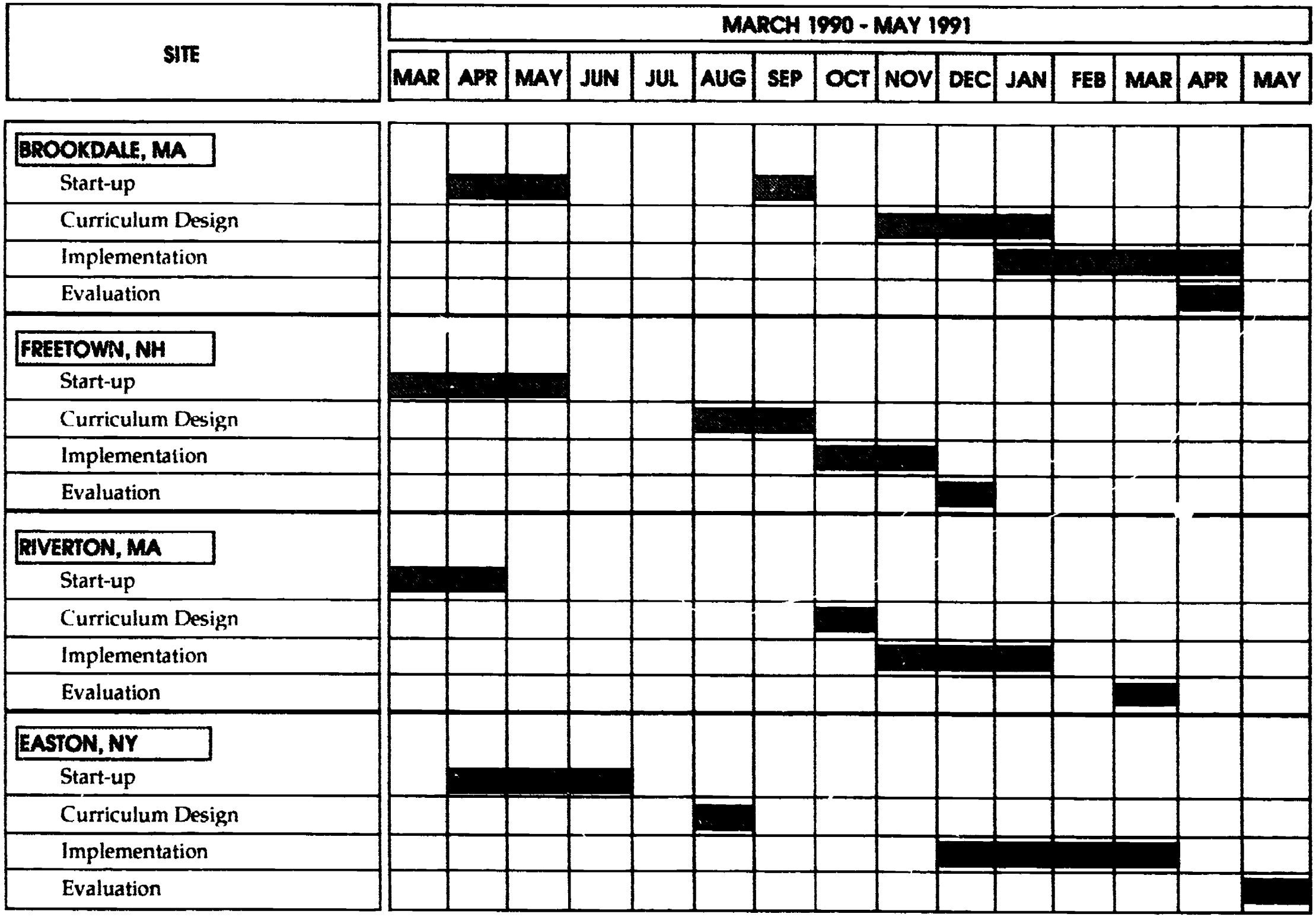
Brookdale, MA

In Brookdale, an affluent suburb of Boston, parents take an active role in the business of schooling. The principal, the English/social studies department chairperson, and the school's director of special education agreed to participate in the field test primarily because they saw it as an entry into heterogenous grouping, an initiative the school would soon implement. This is a controversial topic in the town, with both parents and administrators concerned about how well students of different abilities will fare when grouped together.

The lengthy start-up process in Brookdale began in the spring of 1990 and extended into the fall. Because of various external factors (e.g., possible budget cuts, reduction in teaching staff, the death of one teacher's spouse), the principal and teachers spent most of the time deciding whether or not to participate. By the time the school finally decided to go forward, there was little time left to address the big issues of curriculum,

Figure 13

IMPLEMENTATION TIMELINE



inquiry-based learning, or technology before plunging into curriculum design.

The principal delegated responsibility for overseeing **MAKE IT HAPPEN!** to Mimi, the English/social studies department chair. He said that Mimi was the logical choice because of her expertise in curriculum design. But he also noted that Mimi was not a strong advocate for the program. She told us her primary interest was in promoting heterogenous instruction. She, in turn, delegated the job of facilitator to Kim, the resource room teacher. Kim reluctantly accepted this role at the urging of other teachers. They said, "This is about helping special education students in the mainstream and you can help us keep this focus and meet that goal." The role of facilitator posed a particular challenge for Kim, who had never held such a leadership position. This challenge was compounded by Kim's full-time teaching schedule. Also, she was just beginning to expand her understanding of inquiry-based learning/teaching and how technology could be used to support this.

The principal arranged for the teachers to have four release days in November and December to design the curriculum. The team consisted of

- Heidi, the social studies teacher
- Ben, the reading teacher who teamed with Heidi
- Phil, the English teacher
- Amanda, the reading teacher who teamed with Phil
- Kim, the resource room teacher

Mimi attended the first day of curriculum design. She had already determined the unit's topic: "Africa: Dispelling the Myth of the Dark Continent." She had success teaching this unit to the highest-track students and wanted to try it out with a class that included special needs students. To comply with the

need to link English and social studies in interdisciplinary instruction, Mimi directed the English teacher to use Things Fall Apart by Chinua Achebe, a novel set in pre-colonial Africa. She said the social studies teacher would be responsible for the traditional topics covered in the Africa unit (e.g., kingdoms and habitats).

These mandates created consternation among the five teachers. Key issues were raised during the curriculum planning sessions but were never fully addressed, including the following:

- If we are responsible for teaching the same specific content to all students, how do we work in the I-Search?
- Is there flexibility in the unit's content?
- How do we link the book to the social studies content?
- How can special needs students get through this book, which is difficult to read?
- If we develop specific strategies to aid the special needs students (e.g., tape-recording the book or reading it aloud), are we supporting or coddling them?

Mimi worked with the teachers to identify objectives and brainstorm Stage I activities, most of which focused on how to make the book accessible to students with poor reading abilities (e.g., start at the end and have a flashback, tape-record the book, read sections aloud in class) and how to immerse students in the topic of Africa (e.g., make a puzzle, introduce foods). After Mimi left to attend to other duties, the teachers continued the process on their own. However, the unresolved issues kept surfacing about the value of the book, the need to cover content, and ways to help special needs students feel successful. Frustration mounted when the teachers realized that even if they wanted to make some basic changes such as eliminating the book, these decisions were beyond their control. By the time the four days ended, the teachers had a set of plans that took them only

through Stages I and II of the I-Search unit.

Although the teachers intended to spend eight weeks on the unit, in actuality it took 11 weeks. Most of the time was spent on Stage I (immersing students in the topic) because it took six weeks to read the book in the English class and Heidi needed time to cover required content about Africa in social studies.

During implementation, four of the five teachers met for an hour every sixth day to continue planning the unit. They had no common preparation time but were able to carve out some time in the school's six-day cycle. Ben, the reading teacher who teamed with the social studies teacher, was not free during that time. As a result, he lacked opportunities to contribute his ideas and was always playing "catch-up." The challenge of covering content while encouraging student inquiry was one source of tension. When teachers were nearing the end of Stage I, they questioned whether students would to be able to pick a topic for investigation. Most of the Stage I activities in the English and social studies classes concentrated on content, not on immersing students in the topic to prompt personally meaningful questions. However, with help from the teachers, each student was able to identify several relevant questions. Some of the students did become invested in the search process, especially if they had chosen concrete topics. But the actual information gathering and report writing was hurried to make sure that the unit ended on time. In each of the three days devoted to the writing process, students had to write one section of the report, have a peer edit that section, and then make needed revisions.

The teachers knew early on that they had insufficient planning time. The English/reading teachers wanted to meet with the social studies teacher to review the unit's content, as they felt unable to make interdisciplinary links without being grounded in the content. But limited time demanded that developing the next week's plan be the higher priority. They also said they needed

some time to share feelings about the students, the hurdles of interdisciplinary instruction, and the lack of organizational support. The teachers also wanted the principal and Mimi to know what was happening, to appreciate the problems of interdisciplinary work, and to help them find solutions.

The teachers discussed their successes and challenges at the after-school retreat held in April, starting with the students. The English/reading teachers were delighted with the writing quality and the students' statements about the value of the I-Search process. In contrast, the social studies team was disappointed with the conceptual knowledge conveyed in the reports. However, what the team did agree on was that an interdisciplinary unit could not be taught without common, daily preparation periods. They recognized that instruction involving five teachers was thwarted unless they met on an ongoing basis.

Some of the retreat's discussion focused on the role of the facilitator. They agreed that the facilitator should not be one of the teachers but rather someone with the power and influence to effect change. Weighing the project overall, the social studies and English teachers both said that they would do an I-Search again, now that they knew what was involved. However, without common planning time and organizational-level support, they would do it in their own classrooms, not as part of an interdisciplinary team.

Critical features at the Brookdale site were as follows:

- The interdisciplinary team consisted of five teachers: two teams of two teachers (social studies/reading; English/ reading) and the resource room teacher. The teaming of content-area teachers with a reading teacher was a new innovation undergoing a trial year.

- This large team of teachers had little time for ongoing communication. One meeting every sixth day, without one of the reading teachers, made it difficult to plan, solve problems, and share knowledge. The English

teacher never felt in command of the social studies content, and plans for upcoming activities were never fully delineated.

- Teachers worked under inflexible curriculum mandates (i.e., using Things Fall Apart in English, covering specific topics in social studies). This created tension between covering content and engaging in an inquiry process.

- The principal delegated leadership to the chairperson who, in turn, delegated responsibility to the resource room teacher who had a tight teaching schedule, and little power within the school.

- There was a lack of wholehearted interest and enthusiasm by the teachers. They felt "pushed" into the field test by the principal who actually had another agenda--to pilot heterogeneous grouping.

Freetown, NH

Freetown is a rural community in New Hampshire, a state that adheres to its motto "Live free or die." During start-up, the principal, the facilitator (Laurie, an associate professor of special education from a local college who was on sabbatical), and the teachers discussed the advantages and disadvantages of the project. By doing so, they developed a shared sense of why they wanted to participate: to introduce inquiry-based learning into classrooms with an even mix of 10 special needs and 10 normally achieving students. This 10/10 program had existed for a decade. Nelly, the resource room teacher, took responsibility for recruiting two of her friends and respected colleagues--Caroline, a mathematics teacher, and Bob, a language arts teacher--to work with her and Laurie, the facilitator, on the project. The principal said he would only offer his school as a test site if teachers wholeheartedly wanted to participate.

Most of the MIH Team start-up meetings concentrated on finding a meaningful and motivating curriculum topic to link language arts and mathematics. By the time school ended in June, the teachers were committed to a general theme: the history of their mill

town. Looking ahead, they knew that they needed to refine their ideas during the summer. During the summer, Nelly (resource room) and the principal handpicked 10 special needs students and 10 normally achieving students for the pilot class. The principal arranged the following year's schedule for the following year so that Bob (language arts) and Caroline (mathematics) would have back-to-back periods; in addition, Caroline would be free during language arts, with the computer lab available at that time. Unfortunately, the school's schedule made common preparation time impossible.

The curriculum design process took place at Nelly's house in the afternoons and evenings of late August and September. The teachers titled their unit "Freetown: Back to the Future." The underlying goal was to give students a chance to predict the future based on appreciating the past and understanding the present (in terms of the town's housing, economy, and population). The outstanding characteristic of this group's design process was a willingness to explore new ideas together. Their process was a constructive, interactive one: They returned to earlier ideas to refine and clarify them.

For example, although the teachers began by identifying objectives for their students, they revised these goals many times as they better understood the I-Search process. They monitored themselves by asking, "What does this mean? In what direction are we heading? Are we clear about what we are doing?" The facilitator helped them to see the big picture when they felt unsure of themselves. She tape-recorded each meeting so they didn't forget what had occurred. She kept in contact with the principal and gave teachers emotional support.

But what seemed to clinch the teachers' understanding of inquiry-based learning is that each decided to do a mini-I-Search related to the unit. For example, Nelly investigated Freetown's various architectural styles, creating a videotaped essay. The video

images were woven into the unit introduction that was presented to students.

The teachers implemented the unit in October and November to ensure seasonal weather for class field trips exploring the town. Excursions to the town hall, town library, and newspaper office helped immerse students in the unit and prompted relevant I-Search questions (e.g., "How did the Elm Street Cemetery come to be?" and "What was a typical work day like in the year 1916?"). During the unit, teachers helped students gather information from interviews, historical documents, newspapers, and books. Whenever the students became lost or confused, the teachers helped them see the "big picture," just as Laurie had done for them.

The teachers found that when students were engaged in individual searches, they required individual help--special needs students and normally achieving students alike. Teachers drove students to interviews and helped them integrate ideas, see connections between pieces of information, interpret data, and express ideas clearly in the I-Search paper. While the lack of common planning time was definitely a hindrance, teachers found ways to overcome this hurdle. They sought each other out over lunch, met after school, and talked on the telephone at night. Their conversations focused on keeping each other informed of students' progress, planning future activities, and finding ways to help students.

The unit ended with a celebration. Each student read a section of his or her report and received a certificate. Just before refreshments were served, one of the students (with special needs) stood up and said, "On behalf of the class, I want to thank the teachers. This was the best unit ever."

The teachers took the retreat seriously. Even though Laurie could not attend the retreat planning meeting, the three

participating teachers, Nelly, Caroline, and Bob, identified key questions to address and located relevant information. The retreat, which Laurie attended all day and the principal attended briefly, focused on how students progressed through the unit, how the team worked together, and how to improve the unit. The teachers indicated that after conducting one pilot I-Search, they now knew what was involved and felt ready and able to repeat the process. They even said they wanted to continue to collaborate because sharing ideas and offering mutual support had actually enhanced their teaching.

Critical factors at the Freetown site were as follows:

- The teachers had access to Laurie, a facilitator who was knowledgeable about and an advocate for inquiry-based learning. She created an environment where the teachers became inquirers themselves, demystifying each step of the curriculum design process. Laurie also kept the group organized.

- The participating teachers, who were good friends and colleagues prior to and during the innovation, sought each other out to engage in ongoing communication throughout implementation.

- The teachers were unconstrained by curriculum mandates and felt they had permission to develop a unit linking language arts and mathematics.

Riverton, MA

Riverton is an urban center located approximately 50 miles southwest of Boston. The principal wanted to participate in the project in hopes of moving the school toward interdisciplinary instruction and heterogeneous grouping. George, the computer coordinator who became the facilitator, wanted to see more technology used at the middle school.

During start-up (spring of 1990), the MIH Team held its prescribed number of meetings. The principal made all of the arrangements by finding convenient times and places, freeing the teachers so all could be present, and sending out memos as reminders. He, George, and the teachers participated in all meetings, with the director of special education attending the first and second meetings only. George, the facilitator, led the meetings, while another teacher took notes. Much time was devoted to discussing scheduling and logistical issues. The principal took each emerging concern seriously and deliberated with teachers to find workable solutions. Some discussion focused on the curriculum topic and "colonization" was suggested. There was little talk of the I-Search process and what it meant for teachers or students, even though EDC tried to foster this discussion.

The curriculum design workshop was originally scheduled for the spring of 1990, but because of circumstances at EDC, it was moved to the fall. The principal released the teachers for three days during one week and two days during the next. The teachers--Helen (social studies), Tracy (language arts), Eleanor (resource room), and Tim (writing specialist)--met in the high school to be near George, the facilitator. Because George was obligated to teach computer courses at the high school, he planned to be at the curriculum design workshop during free periods and other spare time. In reality, however, his teaching duties prevented him from spending much time with the teachers. Without the facilitator's ongoing presence, EDC became responsible for clarifying and explaining the process.

On the first day of curriculum design, the teachers reopened the discussion about a topic for the unit. The criteria they used to evaluate possible selections were (1) What were the required topics in the social studies curriculum? (2) What would be interesting to students? and (3) What topics had a variety of accessible resources? They finally settled on the overall theme

of "Race and Culture." The next step was to articulate three overarching questions and identify the big ideas for students to develop. This proved to be a difficult task. Although the teachers spent some time discussing objectives, they did not specify the fundamental concepts they wanted students to gain.

This beginning did not bode well for designing Stage I activities (immersing students in the topic so they will pose personally meaningful questions). The teachers carried out this step in a perfunctory way. After briefly discussing the activity descriptions in the manual, they then used the flowcharts in the manual to choose activities and to identify which teachers would be responsible for each. The teachers finished designing the Stage I activities in less than an hour. They proceeded in this manner through the rest of the curriculum design process, spending an hour or so on designing each stage of the unit. They completed the curriculum design process in two and one-half days, using the final half day to begin preparing bulletin boards.

Soon after the unit started, the teachers complained that they felt unprepared, that they did not know what was happening in each other's classrooms, and that the students were confused. During the summer, when the principal had called the teachers to ask if they wanted common preparation time, they said it would not be necessary. Now they voiced regret for this hasty decision. To promote some linkages across content areas, Tracy, the language arts teacher, visited Helen's social studies classroom. By doing so, Tracy realized that she and Helen had different teaching styles. Helen and Tracy both agreed that the students were unclear about the topic. They realized this was the result of the teachers' inability to crystallize their own ideas. As a result, some of the students' search questions were unfocused or too narrow (e.g., "Why do Chinese people use chopsticks?") and not personally meaningful.

The teachers valiantly tried to hold the unit together in spite

of the lack of interdisciplinary coordination. Working with Tracy (language arts) and Helen (social studies), Tim (writing specialist) tried to be the "glue" that held the unit together. But the unit came unglued nonetheless. The principal, in constant touch with all the teachers, saw what was happening and faced the issue squarely with the teachers and facilitator. At a regular team meeting, they decided that too many factors were working against them: They had no common preparation time, no detailed plans, and they were feeling tense and hostile.

To salvage the unit for the students' sake, they decided that Helen and Tim would complete the unit in the social studies class; Tracy would drop out until the end, when students would write their reports. The principal sanctioned this decision, supporting the teachers for what they had done. He tried to ease the "agony of defeat" by letting his teachers know that he was proud of them for trying. "You don't know if something will work," he told them, "until you try it. We'll learn from this experience and know better the next time."

At the retreat, held seven weeks after the unit ended, all of the issues that hindered its implementation came forth. Teachers were insightful, honest, and open. They respected the principal for giving them a day to reflect and appreciated that he was interested enough to learn from their joint experiences.

The features that played a critical role in Riverton were as follows:

- The project lacked a strong facilitator who understood the I-Search model and the **MAKE IT HAPPEN!** approach. The facilitator was not available to work consistently with teachers.
- The writing specialist, who in some ways became the facilitator, did not really understand the I-Search process. EDC staff assisted by providing information and explanations, but the lack of internal support outweighed EDC's efforts.

- Teachers had no common preparation periods.

- The principal actively monitored the implementation process and was willing to help teachers find a solution to their problems. However, the solution to lack of coordination and communication was disbanding the unit's interdisciplinary link.

Easton, NY

Easton is an affluent suburb located on Long Island, New York. To recruit participants, the facilitator, the principal, and an assistant principal sent a memo about the innovation to the school's interdisciplinary teams (which had existed for two years). The memo asked for a team to volunteer to participate. The self-selected team included Chuck, a language arts teacher; Ruth, a social studies teacher; Lisa, a science teacher; Molly, a resource room teacher; and Janet, a media specialist.

Sharon, the K-12 computer coordinator who served as the facilitator, organized the recommended number of MIH Team meetings during start-up. A full cadre of people attended these meetings: In addition to Sharon and the teachers, the assistant principals and director of special education came whenever possible. More than one meeting was spent discussing the curriculum topic, which changed several times. For example, an early choice of westward expansion later shifted to the Civil War. The one topic not fully discussed was the I-Search process. Teachers later said that at this early point in the innovation, they did not have enough knowledge about I-Search to discuss it in any depth.

The curriculum design workshop took place over five consecutive days in August. Sharon took the lead with EDC providing technical support. All team teachers attended; however, Chuck, the language arts teacher, missed the first two days. Molly, the resource room teacher, tried hard to be integral to the team but

her ideas and suggestions were met with resistance; some teachers were unaccustomed to input from special education.

On the first day, as teachers began discussing major concepts related to the Civil War, it became apparent that Ruth, the social studies teacher, was distressed. As a second-year teacher, under the department head's scrutiny, she felt she must adhere to the mandated curriculum and had qualms about replacing it with an I-Search unit. In the ensuing discussion, the team decided to shift the unit to science. Lisa, the science teacher, was excited about doing an I-Search unit on the human body. With the team's help, she identified three overarching questions to guide the unit theme: How does each body system work? How do the body systems interact with one another? What happens when there are breakdowns in any of the systems? These questions provided the unit with a strong and clear framework.

Teachers worked diligently throughout the curriculum design week. Sharon, the facilitator, kept them on task, explaining procedures and making sure the teachers used all of the manual's tools. She set up four computers for teachers to write their activity descriptions and demonstrated a variety of relevant technology applications. By the end of the week, teachers had a completely documented curriculum unit that included objectives, lists of materials, descriptions of building block strategies, flowcharts, and activity descriptions. Each day, Sharon photoccpied each teacher's completed work and distributed it to them the next day. The unit cover page listed issues that had emerged during the week and needed the administrators' attention. For example, the teachers wanted to know if it was permissible not to use the science textbook daily, if unit tests issued by the science department could be modified, or if the computer lab schedule could be changed to accommodate teachers' needs. When school began in the fall, Sharon arranged for a meeting with administrators to answer the teachers' questions.

The teachers used their common preparation periods to discuss students' needs and plan for the unit, which they did not begin to implement until after Christmas break. Sharon later commented that this fall planning time allowed them to become a stronger team. Molly, the resource room teacher, regularly attended meetings and gradually became an integrated member of the team. When it was time for the unit to begin, the team felt ready.

The students found the curriculum topic "The Human Body" relevant and motivating. Their questions were personally meaningful. For example, a student who had recently lost her father to cancer did an I-Search to better understand the cause and course of the disease. Another student asked the question "How does the mother's body change when a baby is growing inside?" Students wanted to know about dreams, the brain, and, especially, reproduction. Janet, the media specialist, was thoroughly integrated into the unit. Students used a variety of resources to gather information with her help. Ruth, the social studies teacher, contributed by focusing current events on health issues and arranging to bring doctors and nurses into the school for students to interview.

An issue that emerged during the unit's early stages concerned a teacher that the others felt was not "pulling his weight" as he failed to carry out agreed-upon tasks or instructional activities. This raised organizational-level issues about administrator supervision. Sharon, feeling it was not her role to supervise instruction, involved the principal and assistant principal. With their input and with pressure from his peers, the teacher in question made a turnabout. He became more invested in the I-Search process, eventually becoming a leading I-Search advocate. He later made a presentation to his department trying to "sell" the approach.

The principal, assistant principal, and district-level administrators joined the teachers and facilitator for the

retreat. Not only did they discuss their experiences, but they thought ahead to further expansion. They planned to do the unit again and wanted to help another school team do so. Sharon began thinking about how she could pass on the mantle of facilitator.

The constellation of critical factors in this site were as follows:

- The facilitator had a strong background in technology, special education, and curriculum design. Her flexible schedule allowed her to interact regularly with the teachers. She was a strong leader during the curriculum design process and was a key player in monitoring its implementation.

- Already part of an interdisciplinary team prior to the innovation, the teachers had a common preparation period daily. However, the addition of the resource room teacher gave everyone on the team time for face-to-face communication, not just the content-area teachers.

- When issues arose about modifying the curriculum, administrators gave teachers "permission" to vary what was taught, how it was taught, and what materials would be used.

OUTCOMES

Figure 14 presents an overview of major outcomes at the student, teacher, and organizational levels. Our analysis process drew on administrator, teacher, and student reports (verbal and written), field notes, and work samples.

Student Outcomes

Across all sites, we see evidence of student outcomes related to acquiring/expanding content knowledge, carrying out the I-Search process, and developing a positive attitude and self-concept. In terms of acquiring/expanding knowledge, teachers in two of the sites were especially pleased with students' acquisition of knowledge. In Easton, students learned about the body systems,

Figure 14

STUDENT OUTCOMES (1)

	Brookdale	Freetown	Riverton	Easton
Acquiring/ Expanding Content Knowledge	In their evaluation, the social studies/reading teachers viewed the students' I-Search reports as lacking depth in content area knowledge.	The mathematics teacher reported that students better appreciated the value of mathematics when they saw it applied to real-life situations. The teachers reported that students acquired information about aspects of community life and that this information became the topic of discussion at home (e.g., information about tax bills).	The social studies teacher felt that students developed an understanding of the differences between race and culture. However, she said that when students' questions were too narrowly focused (e.g., "Why do the Chinese use chopsticks?") the reports lacked depth.	In evaluating the I-Search reports for content, the science teacher felt that many of the reports contained solid information that answered the questions the student posed.
Effectively Carrying Out the Search Process	Statements by some students in their I-Search reports indicated that they became invested in their chosen topic. Students used books, videos, interviews, filmstrips, and magazines to gather information. Some students used a software program, *Inspiration*, to help them organize information and relate ideas prior to drafting their reports. The English/reading teachers commented that they were pleased with student writing: It was clear, well-organized, and interesting. In particular, they felt the students did a good job of using leads that captured the reader's interest.	Students used community resources, interviews, and a book that chronicled the town's history. By working together in cooperative groups, students helped each other generate questions for interviews. Teachers reported that students needed help in integrating information gathered from various sources. After the unit ended, several students carried over the I-Search process when investigating a topic for the Science and History Fairs (one student who had been in the field-test group was the winner of the History Fair).	Students used books, a CD-ROM encyclopedia, interviews, and brochures to gather information.	In the first section of the I-Search report, student explanations of why they chose their question indicate that the questions were motivated by a personal interest. Students used books, computer simulations, interviews, filmstrips, videos, newspapers, and magazines to gather information. The media specialist reported that many students sharpened or expanded their library search skills. Many became more accustomed to using the technology applications, such as the CD-ROM.

STUDENT OUTCOMES (2)

	Brookdale	Freetown	Riverton	Easton
Developing Positive Attitudes	In their I-Search reports, students commented on the value of helping each other in contrast to competing against others. Teachers commented that when students' questions were personally meaningful, they were highly motivated to seek answers.	In their I-Search reports, students talked about the value of going beyond books to gather information. In particular, many said that interviews were important sources of information. Others mentioned the importance of keeping a journal of the search process and staying organized. One special needs student, whom the teachers described as withdrawn and insecure, interviewed many residents of his housing development for his report. The teachers affectionately dubbed him "The King of I-Search."	In their I-Search reports, students wrote that they have found out that there are different ways to gather information. A special needs student placed in the social studies class specifically for this unit was highly successful, and the teachers reported that he was very proud of his work. The social studies teacher determined that he could remain in the mainstream after the unit ended.	In their I-Search reports, students frequently noted that they learned that there were a variety of ways to gather information. Teachers reported that many students were highly motivated to complete their searches and were proud of the work they accomplished.

TEACHER OUTCOMES (1)

	Brookdale	Freetown	Riverton	Easton
Acquire/ Expand Knowledge and Skills	Teachers reported that they better understood the I-Search process after using it with students. Teachers continually reevaluated students' needs based on ongoing evaluation. They often regrouped students for cooperative work according to their revised understanding of students' abilities. The language arts/reading teachers felt insecure in their knowledge of social studies content and, therefore, said that they had difficulty making interdisciplinary links. The reading teacher (who teamed with the language arts teacher) reported that she has a better sense of what some students' abilities are by observing how they carried out the I-Search process. Teachers learned about materials that can be obtained at a resource center at a local college. Teachers learned about *Inspiration*, a software program that helps students create semantic maps.	Teachers carried out individual searches to better understand what it feels like to do a search. After seeing how students reacted to the unit, the mathematics teacher said that she "will never teach the same way again," meaning that she plans to use strategies that allow students to be active learners. The mathematics teacher learned to use a particular software program so she, rather than the computer teacher, could work directly with students in the computer lab. The language arts teacher realized that there were a number of discrete skills (interviewing, note taking) that the students needed to apply to the research process. He reported that next year he would include a series of mini-lessons in the curriculum to prepare students for doing an I-Search. Teachers reported that they were somewhat confused during the curriculum design process. Because of this, they had a better sense of the students' confusion and difficulty at various phases in the search process. Some of the strategies that they developed in order to clear up the students' confusion were based on things the facilitator had said or done to clarify the process for the teachers. After the unit concluded, the teachers reported that they realized that all students, not just special needs students, require individual help when doing an I-Search.	After the unit concluded, the social studies and language arts teacher both said that they now understood the I-Search process and would be interested in using it again, but individually rather than in an interdisciplinary unit. After the unit concluded, teachers reported that they now understood the importance of finding a meaningful, concrete, and motivating curriculum topic as the context for the I-Search unit. They realized that lack of clarity about the unit topic had an impact on the quality of students' questions. The social studies teacher said she was exposed to new ideas about immersing students in the topic by using a variety of activities that take students outside of the classroom. Teachers learned about the CD-ROM encyclopedia. After using it within the unit, they discussed its advantages and disadvantages in terms of its motivational power, what kind of information it provided to students, and what skills students need to use it appropriately. The social studies teacher realized that one of the special education students placed in her class for the unit had the ability to remain in the mainstream after the unit ended. The social studies teacher became more familiar with—although not proficient in—word processing.	The teachers were exposed to and learned how to use a variety of software applications (mainly simulations). The teachers learned more about the abilities and weaknesses of special needs students by talking with the resource room teacher on a regular basis. The language arts teacher reported that he has learned more about the writing process, in particular helping students to write leads.

TEACHER OUTCOMES (2)

	Brookdale	Freetown	Riverton	Easton
Apply Knowledge/ Skills in Classroom Practice	To immerse students in Stage I of the unit, teachers had special needs students survey classmates using a video camera and then report findings to the class. Social studies and language arts teachers used cooperative learning strategies to help students generate ideas and share information. Teachers had students brainstorm ideas and do semantic webbing to interrelate ideas. Teachers on the team agreed that one special needs student could do the I-Search report using art as an alternative format to narrative.	Teachers took students on field trips to immerse them in the unit theme. The language arts teacher used cooperative learning in a variety of situations (e.g., having students help each other generate research questions). The mathematics teacher became involved in helping students write reports during language arts class. The mathematics teacher integrated all mathematics instruction into the content of the unit, rarely using the textbook.	In Stage I, the social studies and writing teachers took students on field trips in the community and carried out experiential learning activities (e.g., cooking, playing cricket). Journal writing was done in the social studies class in addition to the language arts class. However, the social studies teacher was not that familiar with the technique and students' journal entries were of limited value.	[Note: No field notes exist that document classroom activity.]
Change in Role	As facilitator, the resource room teacher took a lead in curriculum design for mainstream instruction.	Among the three teachers, the resource room teacher took a leadership role. She made arrangements and took responsibility for gathering materials. The mathematics teacher became a trainer, joining EDC as a facilitator for a conference in Indiana focusing on interdisciplinary curriculum design.	The writing teacher, traveling between the language arts and social studies classes, became the instructional leader.	The K-12 computer coordinator led the curriculum design workshop. The language arts teacher became a "backup" facilitator, and made a presentation to the English department about using the I-Search process. The media specialist became an integral part of the team, helping to design the curriculum unit and assuming teaching responsibility for part of the unit. The resource room teacher reported that she became more of a consultant to the teachers rather than being responsible for the students in the resource room.

TEACHER OUTCOMES (3)

	Brookdale	Freetown	Riverton	Easton
Strengthen Communication and Collaboration	Issues about curriculum, instruction, and student expectations came to the fore during the curriculum design workshop, but were unresolved. Teachers report that after completing the unit, they better understood what it takes to implement interdisciplinary instruction. They realized that common preparation time is the most crucial factor. The resource room teacher attended many sessions of the language art and social studies classrooms, but her participation in instruction was limited. More than one teacher evaluated student reports, with the social studies teacher giving a grade for content and the language arts teacher grading process. Teachers said that they were disappointed in colleagues who did not carry out tasks for which they volunteered (e.g., arranging for interviews, taking students to the town library).	To overcome the hurdle of no common planning time, teachers met during lunchtime and after school, and talked frequently on the telephone at night. Teachers reported learning new teaching strategies by observing each other in the classroom. Teachers worked together to ensure students were successful during the unit. For example, they found ways to help students gather information.	Teachers reported that lack of common preparation time hindered their ability to communicate on an ongoing basis. This lack of communication eventually led to disbanding the interdisciplinary aspect of the unit while in progress. Both the language arts and social studies teachers worked more closely with the writing teacher. Whereas previously they worked on a lesson-by-lesson basis, in this project they collaborated continously during an eight-week unit.	During common preparation periods, teachers refined plans, evaluated activities, and discussed student progress. The resource room teacher occasionally assisted in the mainstream social studies class. The social studies teacher linked current events to health issues and arranged for interviews. The resource room teacher reported feeling that, over time, she was more valued as a member of the team.

ORGANIZATIONAL-LEVEL OUTCOMES (1)

	Brookdale	Freetown	Riverton	Easton
Changes in Roles/ Responsibilities	The chairperson of the English/social studies department became the overseer of the program that involved special needs students (responsibility delegated by the principal). The resource room teacher reluctantly became the facilitator for the project.	The facilitator was an associate professor from a local college who was on sabbatical. This provided "free" outside consulting.	The principal closely followed the curriculum design and implementation process by attending MIH Team meetings and by talking frequently with the participants. However, when difficulties emerged, he did not have "repair strategies" to solve problems. The K-12 computer coordinator, housed in the high school, volunteered to be the facilitator for this middle school curriculum project. The writing teacher, who teams with both the language arts and social studies teacher, became the "instructional leader."	As facilitator, the K-12 coordinator became involved in (1) curriculum design and implementation and (2) issues concerning the supervision of teachers.
Technical Assistance Provided to Teachers	Chairperson helped teachers identify objectives for unit. Principal taught lesson in computer lab to introduce students to semantic mapping software *(Inspiration)*. The art teacher instructed students in the use of *MacDraw II*.	The facilitator helped teachers understand the meaning of inquiry-based learning and helped them understand what was involved in the curriculum design process. The facilitator documented plans and distributed them to teachers.	The K-12 coordinator, in the role of facilitator, recommended software to teachers and arranged for the CD-ROM encyclopedia to be brought to the middle school from the high school. The writing teacher tried to help teachers understand inquiry-based learning. However, this was of limited value because of his own lack of knowledge about the I-Search process.	The facilitator showed teachers how to use technology applications. The facilitator led teachers through the curriculum design process. The assistant principal became involved in supervising one of the teachers who was not carrying his weight on the team. The facilitator helped the resource room teacher learn how to use the Apple computer in her room. The facilitator documented plans and distributed them to the teachers. The facilitator distilled what was important from the manual and helped teachers understand what a task involved and how to do it.

ORGANIZATIONAL-LEVEL OUTCOMES (2)

	Brookdale	Freetown	Riverton	Easton
Changes in Organizational Structures	Two teams of teachers—social studies/reading and language arts/reading, plus the resource room teacher—became a five-person team. Principal scheduled students with different learning abilities into a heterogeneous class.	In scheduling classes, the principal assigned the language arts and mathematics teachers back-to-back periods. He assigned the mathematics teacher a free period during the language arts period (she often used this time to travel with the class to the language arts period). The team of teachers volunteered to be an interdisciplinary team for the following year.	The principal helped to create and support the site-based management team meetings attended regularly by the facilitator, teachers, and principal.	The principal gave the resource room teacher a free period that coincided with the team's common preparation period so that she could attend planning meetings.
Acquisition and Allocation of Resources	Teachers brought resources into school from local college. Teachers were dismayed to find out that resources existed within the school, but no one told them what was available.	The principal found money in a tight budget to purchase new software for the unit.	A CD-ROM encyclopedia was borrowed from the high school for the project.	Teachers and students on the interdisciplinary team placed heavy demands on school library services and faculty. The media specialist ordered new materials for the school library based on the types of resources students were asking for within the unit. The assistant principal modified the computer lab schedule to allow the interdisciplinary team to have consistent access during the unit.

ORGANIZATIONAL-LEVEL OUTCOMES (3)

	Brookdale	Freetown	Riverton	Easton
Curriculum Modification	A curriculum unit previously used with the highest-track students became the framework for the unit of the heterogeneous class. A novel usually read in social studies became part of the language arts curriculum to foster interdisciplinary links. However, Stage I was elongated because it took so long to read the novel.	Teachers selected a novel curriculum topic that accommodated both language arts and mathematics content.		Department heads allowed the science and social studies teachers to modify the department exams. Administrators gave the science teacher permission to deviate from the daily use of a textbook. The curriculum for the "modified" (lowest-track) class was changed to be closer to high-level tracks so that all 95 students on the team could participate in the unit.

how the systems interacted, and what happened when a body system breaks down. Their individual questions focused on topics such as the changes in woman's body during pregnancy, the psychology of dreams, cancer, and the functioning of the heart. In Freetown, within the context of studying the history of their town, students learned to apply mathematics skills (calculating the mean, median, range, percentages, and fractions).

Teachers and students in all sites recognized that students developed search skills and processes. Students used a variety of materials and new methods. For example, in every site students used interviews as a way of gathering information, a new technique for most students. In their I-Search reports, students made statements that indicated they valued using new and different information sources. In many cases, students enjoyed using materials and resources other than books to gather information. Several students mentioned that they had never known that this was possible.

> I-Search has been a good opportunity for me. I liked leaving the classroom and going into the community to do my research. I met and interviewed important people. They were experts. A the museum I had the chance to "try it myself," not just read about it in books. These things showed me how fast I could learn just by asking questions and trying it. And I was happy when everyone was so willing to help me. [Student from Freetown, NH]
>
> This research taught me how to do a report an easier and more creative way. Books aren't your only source. You could interview people or go to a place that might have information. This means to me that I didn't have to use all books. I went and talked to someone about their life and was surprised that she would share something like that with me. [Student from Freetown, NH]

In terms of developing a positive attitude and self-concept, many students commented that they felt proud of their achievements.

> It was very important to me that I finish this project. I tried very hard. It's been a month or two and all the questions that I wanted answered have been answered. For example, I wanted to know if you could live without a part of the digestive system. YOU CAN! This project was very important to me in a lot of ways. I learned how to be patient and keep looking for my answer. There was a lot of work put into this and I never thought I would ever get done with this project. But the teachers kept trying to make me work and I did. I have FINISHED my I-SEARCH project. [Student from Easton, NY]

This project helped some students discover more about their own learning styles and work habits.

> I learned that next time I will be more organized and not wait until the last minute to write the report. Some of the facts I forgot because I waited so long and didn't write in my journal. I think I will respect people that helped me more, but I still have a long way to go with responsibility and organizational skills. [Student from Freetown, NH]

> One thing I learned about myself was that I lacked discipline in writing in my journal every day. Also I must get rid of my bad habit of procrastination. [Student from Freetown, NH]

The cooperative spirit was something teachers commented on frequently. Many of the student reports included statements that indicated students realized that peers could offer support and information.

> The things I learned that meant the most to me ranged from responsibility to using the library. I learned that I couldn't fool around during class and I would have to research at home as well as in class. If someone found a book or a reference for me they gave it to me. They didn't keep it or hide it trying to lessen my chance in receiving a good grade. I had to also pace myself. Our class acted like a family by coming together in helping each other through the research. The class also acted like a tree, the limbs were the topics we researched, the trunk was what we had to dispel: Africa the Dark Continent. The soil and the nutrients were the teachers helping us grow in knowledge. [Student from Brookdale, MA]

In one site, students added sections to their reports thanking their classmates for helping them and for sharing information. Several students even dedicated their reports to classmates who were particularly supportive.

Teacher Outcomes

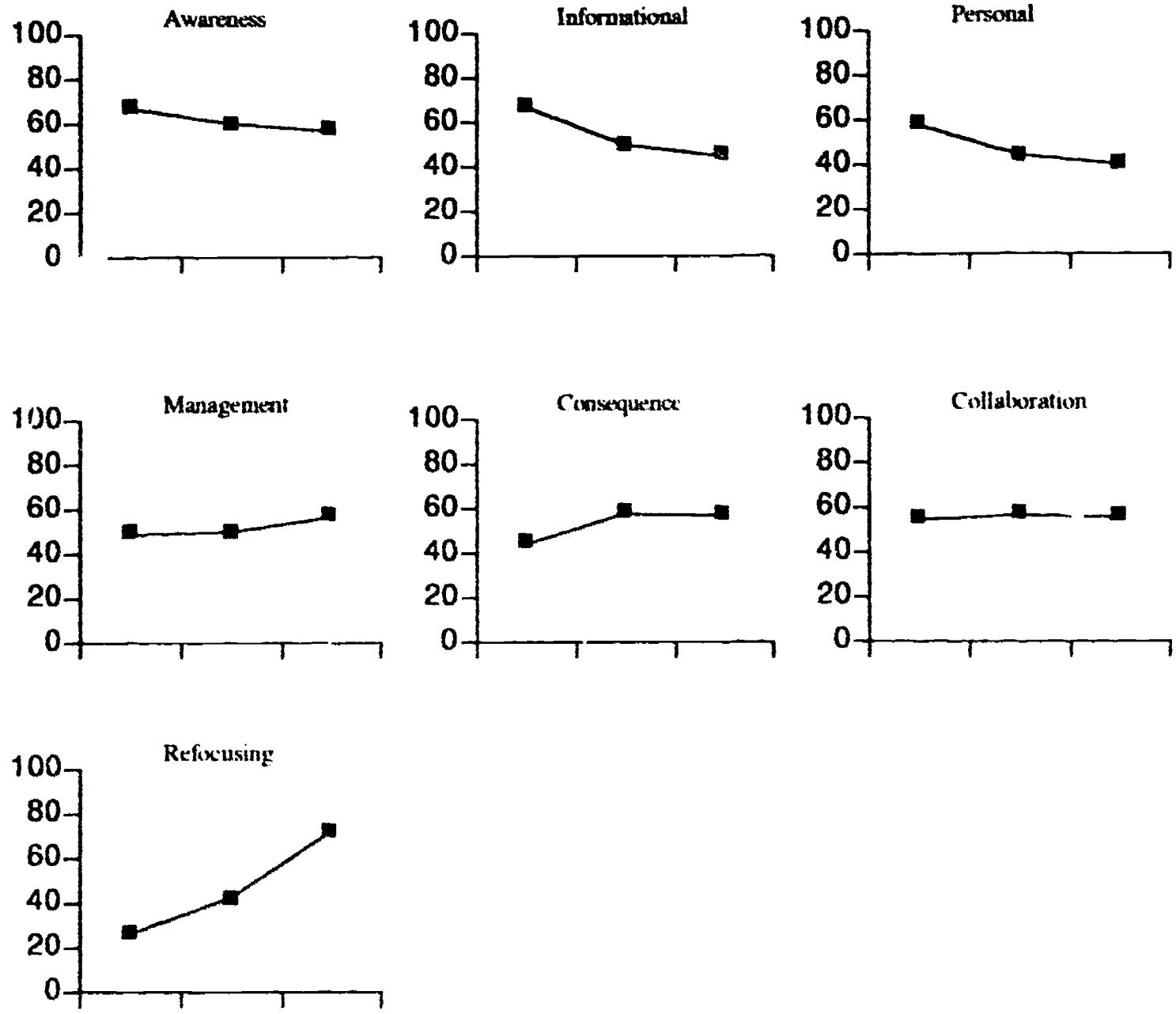
None of the teachers in the study knew about or had used an I-Search process to promote inquiry-based learning prior to implementing **MAKE IT HAPPEN!**. The ways in which the teachers accepted this innovation are consistent with findings from other studies of teacher change (Hord, et al., 1987). During start-up, teachers' concerns focused on becoming aware of the innovation, wanting information, and on personal areas such as, "How will this affect my routine." These concerns gradually decreased over time while other concerns about management, consequence to students, and possibilities for improvement, modification and revision emerged as the innovation evolved. Concerns about collaboration seemed to remain constant over the time span of the innovation. Figure 15 summarizes the teachers' concerns determined by responses to the Stages of Concern (Hall, et al., 1973) at three points (start-up, mid-way, and finish).

Every teacher learned about doing an I-Search through reading the manual and having students carry out a search for the first time. Most teachers reported that the experience of doing a search is what helped them truly understand what an inquiry process involves. The Freetown teachers prepared themselves for instruction by actually carrying out a mini-search.

In every school, teachers learned about new software that could enhance inquiry-based learning. Some teachers became skilled in operating the software. For example, in Easton, the science teacher learned about and used simulations; in Freetown, the mathematics teachers learned about and used software programs that produced timelines and surveys; in Brookdale, the principal

FIGURE 15

STAGES OF CONCERN



Stage	Start-up	Mid-way	Finish	Sig. of change
Awareness	67	60	57	
Informational	67	50	45	* p < .05
Personal	58	44	40	* p < .05
Management	49	50	57	
Consequence	45	58	57	
Collaboration	55	57	56	
Refocusing	26	42	72	* p < .05

introduced teachers to the software program Inspiration; and in Riverton, teachers used a CD-ROM encyclopedia for the first time.

In every class, teachers said that they learned more about students' learning processes and abilities. They observed what students could and could not do in terms of gathering and integrating information. Many teachers were taken by surprise by the accomplishments of special needs students. In Easton, the resource room teacher said that one of her students became the "star" of the class. In Freetown, the teachers said that they realized how much individual attention special needs students needed, but that they weren't the only ones. During their retreat, the Freetown teachers said that they realized that all students needed teachers to serve as facilitators in inquiry learning, regardless of student ability. The responses of teachers from all four sites on the Stages of Concern Questionnaire indicated that they thought increasingly about ways to improve their implementation, tailor it to particular students' needs, and reflect on their experience. Hord, et al. (1987) define this as "refocusing."

Teachers in every school used a variety of active teaching practices that flowed from the context of the unit. Based on what teachers have said about their teaching practices in the past, it seems as if the I-Search unit served as a catalyst for introducing or promoting the use of active teaching practices. For example, all teams immersed students in the topic, often using field trips, brainstorming activities, and cooperative learning experiences to do so. On every team, students used journals to record their search experience and keep notes.

Teachers in all four sites realized the importance of collaboration. In Easton and Freetown, teachers met regularly to talk about the instructional process and students. The teachers reported that being able to talk to colleagues was highly worthwhile. Not only were they stimulated by new ideas, but they

shared concerns. In the two sites where there was little opportunity to communicate and where tension resulted from not having time to meet face-to-face, teachers talked about how important this was and how the absence of meeting time had a negative effect on implementation.

In every site, at least one teacher changed his or role in some way. Most of the time, this involved disseminating information to others. Fullan (1991) asserts that one reason reform in schools works is because te. .ers see that they have responsibility for improving the entire school through dissemination efforts. Some teachers emerged as organizers and planners, indicating that they had the potential to take on the role of facilitator in the future.

Organizational-Level Outcomes

At every site there was some change at the organizational level that supported teachers' efforts at curriculum reform. Often these changes focused on changing schedules, making sure teachers had access to computers or the library or providing teachers with technical assistance. In Easton, the facilitator changed her role in such a way as to provide ongoing assistance to the teachers. Prior to implementation, her domain was technology. However, to support technology integration, she became intimately involved in the curriculum design and implementation process.

CONCLUSION

In these concluding remarks, we address two questions:

- Does the field test provide evidence that **MAKE IT HAPPEN!** has the potential to promote successful technology integration?
- What have we learned from the field test about what supports or contributes to successful implementation that needs to be emphasized in the approach?

Does **MAKE IT HAPPEN!** Have the Potential to Promote Successful Technology Integration?

The consistency of evidence from the four field sites convinces us that **MAKE IT HAPPEN!** has the potential to promote successful technology integration in middle schools. Two of the sites, Easton and Freetown, evaluated their implementation as being highly successful. They were extremely pleased with student outcomes, teachers had a sense of efficacy, and the administrators were pleased that they had been able to support the teachers.

One sign of success is planning for expansion. At the all-day cross-site meeting held at EDC, practitioners from Easton and Freetown discussed their plans for expansion. In Easton they intend to involve another interdisciplinary team next year while the initial team will do another I-Search. The media specialist is planning to use the I-Search in a separate course she teaches. In Freetown, the teachers are planning to keep the I-Search unit as a permanent part of the curriculum. The original team intends to expand by including a science teacher.

Even in the two schools where the participants did not view the implementation as being highly successful, participants felt that they learned a great deal from their experience. Fullan (1991) describes change as a process of redoing and rethinking. The practitioners in Brookdale and Riverton were willing to redo based on rethinking. They were impressed with the potential of the I-Search process in classrooms. In these two sites, the individual teachers in social studies and language arts have said that in the next school year, they intend to do an I-Search and use technology as a part of the process. They realize that while they do not presently have conditions that make interdisciplinary instruction viable, they can still implement inquiry-based instruction in their individual classes.

What Supports or Contributes to Successful Implementation?

Looking across the four sites, we can identify four factors that contribute to successful implementation:

- presence of a strong facilitator
- ongoing communication and collaboration among teachers
- curriculum flexibility
- understanding of inquiry-based learning

None of these factors operate in isolation, but rather dynamically interact with one another to promote success.

Facilitator

We see a stark contrast between the two sites that had strong facilitators and those that did not. What the facilitators offered in Easton and Freetown was an understanding of the I-Search process, an ability to organize and orient the teachers, and skills in working with a group. Both facilitators were members of the group, but were not one of the teachers. This distance gave them the ability to be objective, to help identify issues from another perspective. In Easton, Sharon had a flexible schedule that allowed her to attend meetings, see administrators when necessary, round up materials, and keep tabs on what was happening. In the more informal setting of Freetown, Laurie was heavily involved at the outset and less so once the teachers took ownership over the curriculum design process. However, there were times that, as an outsider, she could approach the principal about an issue that needed his attention.

Communication and Collaboration

In the two sites that did not have time to discuss content, activities, and students, teachers lost touch with one another,

felt as if they were on "earth that was shifting under their feet," and became frustrated. However, in Easton, teachers had built-in common planning time. In Freetown, teachers made the time to talk to one another. What is interesting is that in both cases, teachers used the time to focus on what they were teaching, to coordinate instruction across classrooms, and to talk about how students were doing and who needed help.

Curriculum Flexibility

For all schools involved in the field test, bringing inquiry-based instruction into the curriculum was a departure from the norm. For some it was more of a departure from a traditional curriculum than for others. However, what helped teachers was the "permission" they felt they had from administrators to make these changes. In bringing the I-Search into classrooms, teachers were using new materials, new behaviors and practices, and new beliefs. In Brookdale, the chairperson gave teachers permission to use new materials and some new practices (those that would sustain special needs students within a heterogeneous class). However, teachers never had the time and assistance to rethink the curriculum and develop new beliefs and understandings about how the inquiry process could help students develop content knowledge. In Easton, administrators sanctioned the types of curriculum changes that gave teachers a chance to test out new theories and practices.

Understanding Inquiry-based Learning

Probably the most powerful experience for the teachers in Freetown was to engage in a search themselves. Laurie, their facilitator, not only encouraged this type of learning, but helped teachers to see the features of inquiry-based learning. None of the other sites had this chance to develop knowledge prior to carrying out the unit. They developed expertise by taking a risk and doing an I-Search unit with students. However, once teachers had the initial experience, they commented about how much they learned and how this would affect future teaching.

CHAPTER 5: IMPLICATIONS AND RECOMMENDATIONS

INTRODUCTION

The results described in Chapter 4 have implications for

- revising **MAKE IT HAPPEN!**, the school-based approach
- revising the manual that embodies **MAKE IT HAPPEN!**
- revising the Phase I findings about what promotes successful technology integration and the conceptual framework

REVISING THE APPROACH

The results of the field test have implications for determining which components or elements of the approach are essential in guiding schools through the technology integration process. We have organized this discussion under two headings: (1) key participants and (2) steps in the process.

Key Participants

In the field-test version of **MAKE IT HAPPEN!**, the key participants included:

- the principal
- the facilitator
- an interdisciplinary team of teachers
- other administrators and specialists (e.g., from regular education, special education, media, etc.)

In revising the approach, all of the these key players will still be involved in the process. However, the extent of their involvement will be revised as discussed below.

The Principal

In the field-test version, the principal was asked to be a prominent player throughout the entire implementation process. During start-up, he or she had responsibility for recruiting participants, developing a budget, scheduling students and teachers, sharing information with parents, the staff, and district-level personnel, and organizing MIH Team meetings. During curriculum implementation, the principal was given responsibility for monitoring the instructional process. The principal was also involved in preparing for and attending the retreat.

The field test results indicate that the principal still needs to be involved, but only at particular times to carry out specific tasks. During start-up, the principal needs to ensure that the decision to implement **MAKE IT HAPPEN!** is made carefully, on the basis of what the program emphasizes. Another critical task is for the principal or a delegate to formulate a schedule that permits teachers to have common preparation periods and ensures that the participating teachers share the same students. The field test showed that it is unrealistic to expect principals to have the time to engage in ongoing monitoring. Except for Ned, the principal in Riverton, principals lessened their involvement once the program was underway. This seemed to have a negligible effect on implementation, although the teachers in Freetown and Brookdale said that they wanted the principal to be more aware of what was going on and to praise their hard work. Even though Ned monitored the process and kept in touch with the teachers, when he became aware of the tension and hostility, he was unable to offer a solution because of his lack of knowledge about the curriculum. What he was able to do was to make sure that teachers openly discussed critical issues. He supported their decision to continue the unit without the interdisciplinary links.

The Facilitator

The field test results indicated that it was important to have someone designated as facilitator from the very beginning of the project. The facilitator is the key person who provides technical assistance to the team of teachers, especially during the curriculum design and implementation process. Laurie in Freetown and Sharon in Easton helped teachers understand what inquiry-based learning involved and how to proceed through each step of curriculum design. The facilitator is the intermediary between the teachers and the administrators. Sharon, and to a lesser degree Laurie, sought out the principal and other administrators when they were needed for advice or permission. Lieberman and Saxl (1991) assert that innovations need a facilitator, someone who understands the school culture and who can negotiate between teachers and administrators.

The facilitator must have a knowledge/understanding of inquiry-based learning, team leadership abilities (e.g., process skills, skills in resolving conflict), and a working knowledge of technology. This person needs to be a motivator--someone who can move many people along--and an organizer (e.g., who documents plans, schedules meetings, and gathers materials). The facilitator needs to have power within the school to effect change and a flexible schedule so that he or she can be on call or available as needed to provide assistance to teachers.

Interdisciplinary Team of Teachers

The field-test version of the approach recommends that two content area (language arts and social studies) teachers and a resource room teacher form the interdisciplinary team. Two of the sites, Riverton and Brookdale, adhered to this recommend-ation. The other two sites included language arts and mathematics (in Freetown) and language arts and science (in

Easton), with limited involvement from social studies. A language arts/English teacher seems to be a needed constant, given that students apply so many language arts skills in the search and report writing process.

The field test results have shown that it does not matter which content area teachers join together for interdisciplinary instruction. Rather, what is critical is the ability of two content area teachers to form meaningful links between disciplines in a way that allows them to create a relevant, motivating, and worthwhile interdisciplinary unit.

Although the approach recommended that the team include three teachers (two content and one resource room teacher), the teams in Brookdale and Easton both consisted of five teachers. While Easton had a successful implementation experience, Brookdale did not. What differentiates these sites is that the teachers on the Easton team had common preparation time. Everyone was freed up during the first period of each day. In Brookdale, four out of the five teachers met only every sixth day and this created considerable tension.

Easton was the only site to include the media specialist on the team. Her contribution throughout the entire process was heralded by the entire team, as well as the administrators. The approach needs to emphasize the importance of drawing in librarians and media specialists who have rich knowledge of materials and resources.

Other Administrators and Specialists

MAKE IT HAPPEN! calls for the involvement of the other administrators and specialists, such as the director of special education, the computer specialist, assistant principals, or curriculum coordinators to be members of the MIH Team. These MIH Team meetings are to take place throughout implementation.

The field test results revealed that it was important to involve relevant administrators and specialists primarily during start-up, when participants discussed aspects of curriculum and instruction. Teachers and administrators who had control over the curriculum needed to discuss what inquiry-based instruction involved and what it looked like in the classroom; what themes or topics lent themselves to an I-Search unit; and what aspects of the existing curriculum could be modified. After start-up, once there was consensus and a shared vision about some of these issues, it seems that it is less important for ongoing involvement of the other administrators. However, that does not mean that they cannot provide technical assistance and emotional support on an as-needed basis. For example, the Brookdale teachers said that they would have liked Mimi, the Chairperson, to offered suggestions about materials and resources to enhance the unit. The teachers in Freetown wanted the principal to recognize their struggles and praise their work.

Steps in the Process

The steps in **MAKE IT HAPPEN!** include start-up, curriculum design, curriculum implementation, curriculum evaluation, and expansion. The field test results revealed that it was important to include all of these steps. Each one was a necessary piece of the total program and allowed for the innovation to continue beyond the pilot round. However, modifications within each step are needed that involve emphasizing certain tasks and deleting others. For example, during start-up what needs to be emphasized is that the MIH Team must reach an understanding about the I-Search process--what it means for the teaching and learning process. Also, selecting a curriculum topic is not something that can be done superficially. It needs the input of teachers and administrators.

Monitoring during implementation can be scaled down. The existing approach is excessive and unrealistic. If teachers have common preparation time in which to truly engage in a dialogue about instruction and students, then emerging issues can be handled as they arise. When larger issues do surface, the facilitator can bring together teachers and administrators to discuss and resolve them.

One important finding of the field test was the need for a step prior to start-up. This is a time when a school learns about **MAKE IT HAPPEN!**, assesses the school context, and determines if there is an appropriate fit between the innovation and current school priorities. The field test results indicate that there were certain contextual factors that needed to be in place or could be set in motion prior to a school's deciding to move ahead. These include:

- having common planning time for the interdisciplinary team of teachers
- being able to modify the curriculum in ways that support an inquiry-based I-Search unit
- having someone who can serve as a facilitator who meets the criteria listed above

While these fundamental prerequisites may pare down the number of schools that actually implement **MAKE IT HAPPEN!**, they may also ensure that more schools undertaking implementation are successful.

REVISING THE MANUAL

The existing manual had two volumes. One volume included information and procedures for each step of the process, with sections for the principal, the MIH Team, and the teachers. The second volume was titled "Curriculum Supplement." This included all of the materials the teachers needed to carry out the

curriculum design process. It contained information, tools, and resources to help teachers identify curriculum objectives, select materials, design building block strategies, and design activities. The Table of Contents for the two volumes appears in Appendix C.

The impetus for revising the format of the manual comes from two sources. First, participants in the field test evaluated every chapter as well as sections within chapters using evaluation forms. Overall, the evaluations indicated that the manual, in its present form, was not user friendly: it was too massive, too overwhelming. Participants noted that there was an overabundance of information to process and too many tools to review and use. They recommended streamlining the manual. Heeding this advice, we will be scaling down the manual drawing on what we have learned from the field test in terms of who are the critical players and what aspects of the process need to be emphasized as critical.

Plan for Revision

The revised manual will have three components as shown in Figure 16:

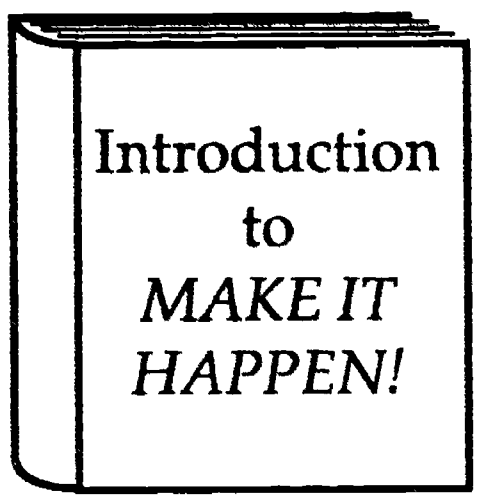
- Program Overview
- The Teacher's Guide to Developing an I-Search Unit
- Facilitator's Guide

Program Overview

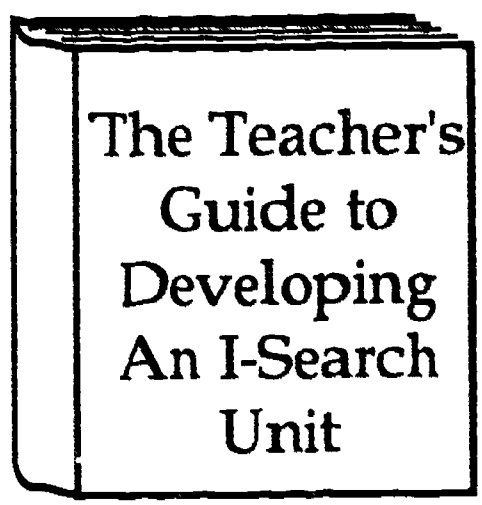
This program overview is the "commercial" for our school-based approach. There will be one version of the overview for the principal and facilitator and a slightly different one for teachers. The purpose of the overview is to introduce potential schools to the approach, give them an understanding of inquiry-

Figure 16

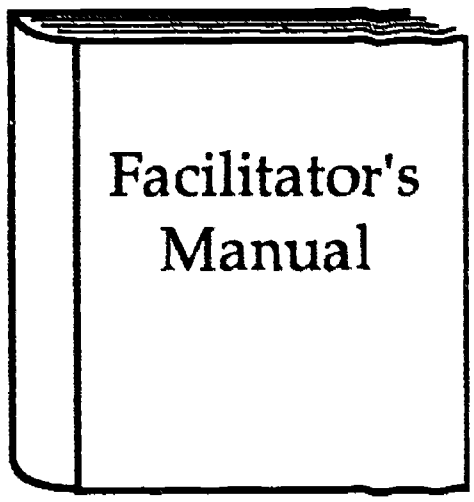
Components of *MAKE IT HAPPEN!*



2 Versions < For Principals/Facilitator
For Teachers



For Teachers



For the Facilitator

based learning and the I-Search process, help them to determine if there is a match between **MAKE IT HAPPEN!** and their needs, and help them understand the prerequisite for such an approach (that is, common preparation time, curriculum flexibility, and the role of facilitator). The major headings in the table of contents for this component include:

- Features and Benefits of **MAKE IT HAPPEN!**
- Is **MAKE IT HAPPEN!** right for you?
- Ways to Prepare for **MAKE IT HAPPEN!**

We envision that schools can have access to this component of the manual prior to committing themselves to undertaking the innovation. It will serve as a strong starting point for discussion within a school and will help schools begin to prepare for the change process.

The Teacher's Guide to Developing an I-Search Unit

After all four sites concluded the field test, EDC held a one-day, cross-site meeting for participants. In discussing ways to revise the manual, participants strongly advised us to include explicit information about the I-Search process. They felt that what we provided in the field-test version was insufficient, too scattered throughout the materials, and did not appear soon enough in the manual. This advice is excellent. Ultimately, the change we want to bring about in schools is at the curriculum and instructional levels. Everyone involved in this change effort needs to understand what it involves, its implications, and how it meshes with current instruction.

In this component, we will

- provide an explanation of the I-Search process
- use case materials from the field sites to illustrate how interdisciplinary teams carried out I-Search units
- include a student I-Search paper
- include the classroom close-ups of the fictitious immigration unit (currently in the Curriculum Supplement)
- provide an explanation of what the curriculum design process involves and give examples from the field test.

The audience for this component is mostly teachers. However, we are contemplating the development of a more succinct version of this component for administrators.

Facilitator's Manual

The original version of the manual did not include a facilitator's manual. All of the procedures were included in the sections designated for the **MAKE IT HAPPEN!** Team or for the teachers. In the cross-site meeting, practitioners said that the facilitator was the conduit for information, translating what was in the manual into practice.

In the revised version, all of the procedures will be included in the facilitator's manual. The manual will be organized by chapter according to the steps within the process: start-up, curriculum design, curriculum implementation, curriculum evaluation, and expansion. Each chapter will include all of the resources and tools needed to carry out the tasks within that step (and many of these are being pared down as described above). The facilitator will distribute materials and tools as needed to the relevant participants.

The facilitator's manual will have one new feature that we believe will be a way of offering immediate technical assistance to the facilitator. At the end of each chapter, there will be a section called "HOT LINE." This is a place were a facilitator supposedly calls in with an emergency question and receives an answer. These questions, written by EDC, reflect the types of critical issues and problems that tended to arise in the sites. To answer these questions, we will draw on the ways field-test sites overcame problems. The answer will serve as a vehicle for including vignettes from the field sites. For example:

> **HOT LINE: ASK THE AUTHORS** (Start-up): The teachers in my site are spending an inordinate amount of time selecting a curriculum topic. Three times already they have reached agreement on an idea only to discard it at the next meeting. Are we making progress or spinning our wheels?
>
> **RESPONSE:** This is a sign of progress. You should be complimented on your ability to give teachers the time they need to come up with a worthwhile topic. This is not an easy task since there are so many factors to consider. We saw teachers in one school too quickly select a topic without ever delving into what they really wanted students to gain in the unit. They never really talked about the link across disciplines. This unit never had clarity for teachers or students. In another site, teachers not only changed topics several times, but they also changed the content areas involved. They finally selected "The Human Body" (linking science and language arts) after discarding westward expansion and the Civil War (which would have linked social studies and language arts). Don't be discouraged. Be glad that the teachers are willing to devote important up-front time to finding a topic that will work for them and their students.

One particular set of procedures will undergo revision--the one that leads teachers through the curriculum design process. Figure 17 lists the original set of steps and the new steps. One reason we have made these changes is to make sure that teachers understand the I-Search process and have a chance to experience the process themselves, as the Freetown teachers did. A second reason is to make the process less fragmented. In the field test, we asked teachers to design one phase of the I-Search

Figure 17
CURRICULUM DESIGN PROCESS

Original Process
(Refine topic *)
Identify curriculum objectives
Select materials and resources
Design Building Block strategies
Read/discuss/design Stage I activities
Read/discuss/design Stage II activities
Read/discuss/design Stage III activities
Read/discuss/design Stage IV activities
Plan how to introduce unit to students

Revised Process
Read/discuss I-Search process
Refine topic
Identify possible materials/resources
Identify overall goals/objectives
Brainstorm activities for all four stages
Determine pacing
Refine objectives/refine activities
Write up activities/flow charts
Plan how to introduce unit to students

* Topic was supposed to be determined prior to curriculum design.

process at a time. Thus, they lost the big picture. This may have been a factor that elongated Stage 1 and abbreviated Stages 3 and 4. A third reason is to help teachers link the objectives more closely to the activities and to make this more of an iterative process.

In the original version, we expected teachers to design the entire curriculum unit within five successive days. Only one of the four sites, Easton, followed this model. Most of the other sites used a few days one week and some the next. There were advantages to both models. When teachers have five days in a row, there is a momentum that builds up across the days. When teachers have an interval between days, they have time to mull over previous plans and to return to the design tasks with a refreshed view.

None of the teams were able to design activities across all four stages of the unit during the initial time for a variety of reasons. For example, they did not know what direction the students' interests would take, how long activities would take, or what it would be like to work together. In the revised plan, we will recommend that teachers do some general planning that carries them through the unit. However, it will be important once the unit is underway to set aside time to refine the plans for Stages 3 and 4. The common preparation periods may not be sufficient and additional time may be needed to complete and tighten plans.

REVISING THE PHASE I FINDINGS

In Phase I of the Technology Integration Project, we carried out a naturalistic study in four diverse middle schools to understand what it takes to promote successful technology integration. At that time, our definition was:

> Successful technology integration occurs when teachers use applications of technology in a sustained way to promote and support special needs students' progress and participation in mainstream learning.

The Phase I findings fell within five categories as represented in the conceptual framework (see Figure 1). The outermost circle in Figure 1, school-based facilitation, included findings about school- or system-wide decisions and actions concerning technology integration that affect more than a single teacher or single classroom. The middle ring was made up of three categories that directly enable or inhibit the teacher's efforts to integrate technology. Enough of the right kinds of supports at this level make it possible for the teacher's energy and time to be focused on the students and curriculum; too few supports at this level can leave a teacher isolated, frustrated, and without enough knowledge or confidence to use computers successfully with students. The findings in the center of Figure 1 focused on teacher knowledge and practice and their impact on the technology integration process.

In Phase II of the Technology Integration Project, we developed and field-tested an innovation based on the Phase I findings, the literature, and our own knowledge in four diverse schools. Based on the added two years of study, we have broadened our definition of successful technology integration:

> Successful technology integration occurs when regular and special education teachers jointly design and implement effective mainstream curriculum that meets the needs of developing adolescents. As an integral part of the teaching and learning process, teachers and students use a variety of technology applications to promote and support special needs students' progress and participation in mainstream learning.

This definition reflects the shift in the project's orientation as discussed in Chapter 1. The process of integrating technology into the curriculum is not driven by the technology. Rather, it

is driven by developing a strong and effective curriculum--one that responds to the intellectual, social, and biological needs of developing adolescents. A curriculum that fosters inquiry-based learning meets this challenge for all students with diverse learning needs. Within such a curriculum, technology applications become one of the many tools teachers and students use to explore topics, gather information, organize knowledge, and express what they are learning to others.

The research we carried out in Phase II was guided by this orientation. We studied schools that were using our approach to engage in the change process--change that focused on curriculum and instruction. Our findings in Phase II reflect this emphasis. Figure 18 presents the revised list of findings that combines Phases I and II. None of the Phase I findings have been deleted in this revision. However, we have added five new findings and have modified others as indicated by the italicized text.

Figure 19 presents a revised conceptual framework. This conceptual framework clusters the findings within three categories: curriculum and instruction; teacher development; and school-based facilitation. At the center is inquiry-based curriculum and instruction that integrates technology to meet the needs of developing adolescents who have diverse learning needs. The middle ring encompasses the findings that focus on teacher development--what it takes to help teachers design, implement, and evaluate the curriculum. The outer ring represents what needs to take place at the organizational level to support teachers' efforts. EDC's work over the past five years has shown that it takes dynamic interaction among all levels within a school to promote successful technology integration.

Figure 18

PHASE I AND II FINDINGS

Teacher Knowledge and Practice

1. In order to improve the way technology is used with *diverse learners in the mainstream,* teachers need to gradually acquire, draw on, and integrate knowledge about:
   - *the developmental needs of adolescents*
   - *special needs students' strengths and needs*
   - *how inquiry-based learning can meet the needs of developing adolescents, taking into account their diverse learning needs*
   - *the potential contribution technology can make to the learning of all students within inquiry-based instruction*
   - *instructional strategies that support inquiry-based learning*
   - *assessment strategies*
   - *hardware and software*
2. *An inquiry-based curriculum unit, such as an I-Search unit, can serve as a vehicle for using a variety of technology applications that help students become exposed to information, explore a topic of their own choosing, gather information, organize and analyze information, and express what they know.*
3. In order to promote successful technology integration with *all students who have diverse needs,* it is critical for the teacher to *employ active teaching practices. This includes being* actively involved with students' use of *technology applications,* regardless of the type of technology.
4. When teachers engage with others in ongoing reflection about the *curriculum, instructional methods, technology, and student progress,* they are more likely to critically evaluate their practice and redesign instruction to better meet student needs and curriculum goals.

Technology Resources

5. Someone needs to be responsible for ensuring that hardware is kept in good working condition and that technical problems are solved *as they arise.*
6. When *teachers consider their curriculum goals, they have a context for reviewing* and narrowing down choices of software that will meet student needs.

Teacher Development

7. When novice computer users have someone to whom they can turn for knowledge about computers as well as emotional support and reassurance, they are more likely to begin integrating technology into *instruction to meet curriculum goals and student needs.*
8. In-service workshops can contribute to teachers' acquisition of this knowledge, but are insufficient in helping teachers use this knowledge in their work with students. Teachers best learn to successfully *design and redesign curriculum* and integrate technology through ongoing school-based support and structures for collaboration and communication.
9. *Teachers benefit from receiving ongoing technical assistance from those who have expertise in the areas of inquiry-based learning, curriculum design, and technology use.*
10. *By engaging with colleagues in designing, implementing, and evaluating an inquiry-based curriculum unit, teachers develop and expand their knowledge and skills.*

Collaboration and Communication

11. When two people work together collaboratively to try out software *within a curriculum unit that meets students needs*, technology use tends to be more successful.

12. Regular, ongoing communication between regular and special educators who teach the same students often facilitates designing and implementing *successful curriculum units that integrate technology* if the focus of the communication is on curriculum goals, instructional strategies, and student needs.

School-based Facilitation

13. When decisions about hardware acquisitions, hardware allocations, and scheduling focus primarily on curriculum goals and teacher experience and expertise, then they are more likely to *lead to using technology to support learning and teaching within a strong curriculum.*

14. Once a *curriculum decision* is made, it is unlikely to be implemented unless someone who is committed to the decision determines what steps must be taken and ensures that the next step happens at each point in the implementation process.

15. Once a *curriculum decision* is made, administrators and teachers need to communicate with each other during implementation to determine whether the decision is working or needs to be revised.

16. In order to support *teacher's efforts to design, implement, and evaluate curriculum,* administrators must put structures in place so teachers can communicate and collaborate on a regular basis.

17. When administrators vary expectations according to teachers' individual needs, interests, and abilities, and give teachers choices about how and when to implement *inquiry-based curricula,* successful technology integration across classrooms is more likely to occur.

18. In order for successful technology integration to occur beyond individual classrooms, administrators *and teachers need* to

    - *understand that curriculum innovation is the starting point for technology integration*
    - *have a vision of the value and potential of inquiry-based learning*
    - *have a vision of how technology and other tools can enhance inquiry-based learning*
    - *understand that organizational-level changes are needed to support teachers' efforts*

19. When there are policies and procedures that promote links between special and regular education programs, then it is more likely that *curriculum planning* and implementation will meet the needs of *diverse learners in the mainstream.*

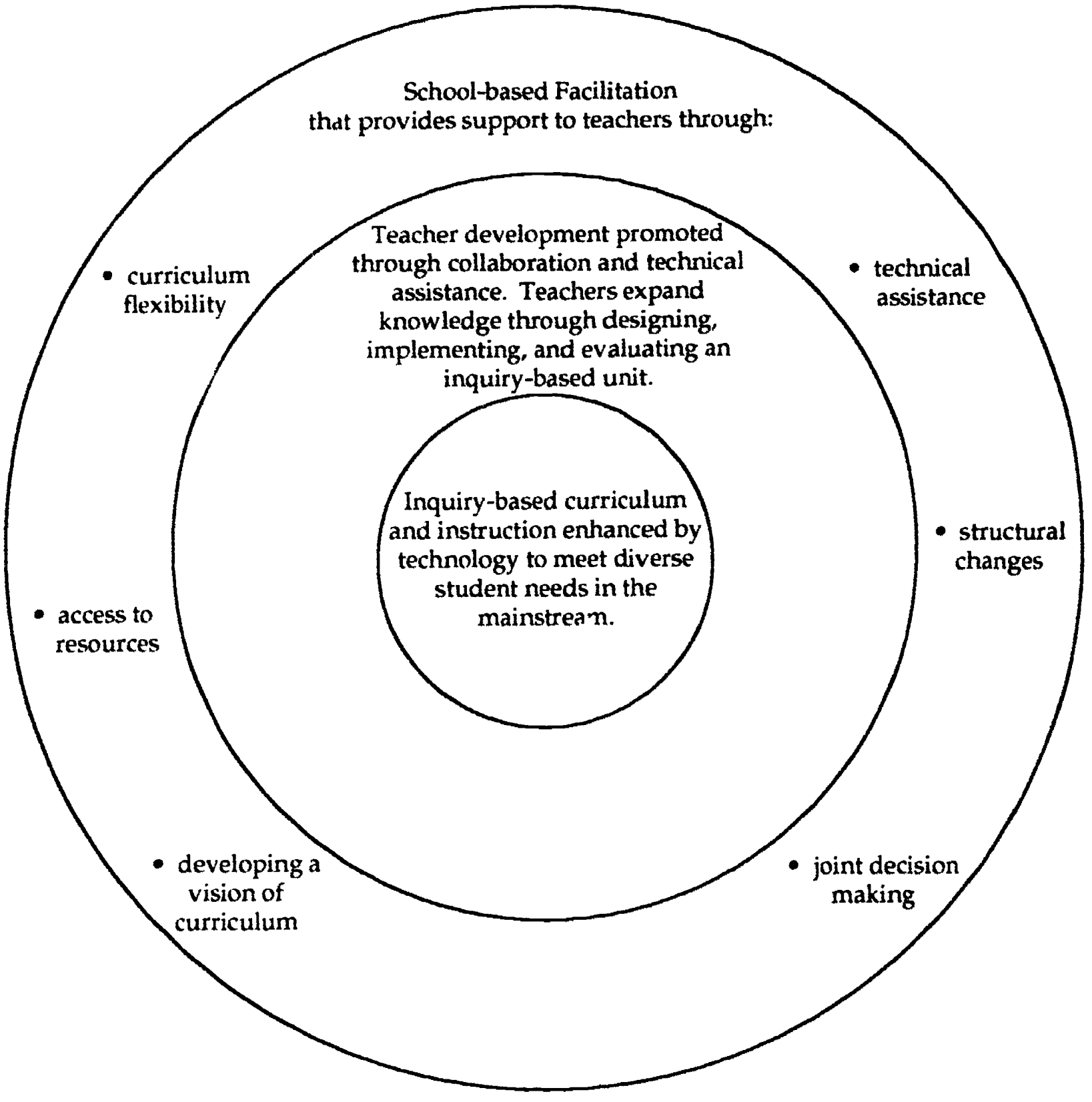
20. *In order for teachers to feel comfortable about developing new curricula that integrates technology, administrators need to give teachers permission to vary or modify content, instructional processes, and the materials they use in the classroom.*

21. *Administrators need to find ways to provide teachers with technical assistance, not only in terms of technology use, but also in terms of understanding inquiry-based learning, curriculum design, and effective instructional strategies.*

22. *When technology use becomes the catalyst for simultaneous change at the organizational, curriculum, and instructional levels, then it is important for a school to have a facilitator who has*

    - *effective leadership abilities and the power to influence change*
    - *expertise in inquiry-based learning, curriculum design, and technology use*
    - *a schedule that allows for providing support to teachers on both an ongoing and as-needed basis*

Figure 19
REVISED CONCEPTUAL FRAMEWORK



CHAPTER 6: DISSEMINATION PLAN

GOALS OF THE DISSEMINATION PLAN

EDC's dissemination plan has two major goals:

- to provide various audiences with information about Phase I and Phase II of the Middle School Technology Integration Project
- to help schools implement **MAKE IT HAPPEN!**

PROVIDING INFORMATION

The primary audience for our work is practitioners, including administrators, facilitators, and teachers. We rank the practitioner audience as foremost because it will be the group that translates our research-based approach into action. A second important audience is composed of researchers, primarily those interested in studying school-based change, teacher development, evaluation of an innovation, effective instruction that integrates technology and special education. By describing the research methods we have employed within a naturalistic perspective and chronicling our own ongoing refinements of these methods over five years (Morocco and Zorfass, 1988, Zorfass et al., 1989), we believe we can contribute to the field of school-based research. A third audience is made of software publishers since it is important for them to know how schools can best utilize technology to enhance learning and teaching. Figure 20 lists the type of information relevant for each audience.

The two major outlets for these dissemination efforts include journals and conferences, especially those catering to audiences interested in

Figure 20

DISSEMINATING RELEVANT INFORMATION TO DIVERSE AUDIENCES

	Phase I Methodology	Phase I Findings	Phase II Methodology	Overview of MAKE IT HAPPEN!	The I-Search Process	Phase II Findings	Administrator Practices	Teacher Practices	Teacher Collaboration	Inquiry-Based Learning & Special-Needs Students	Interdisciplinary Team	Curriculum Design
Practitioners		✔		✔	✔	✔	✔	✔	✔	✔	✔	✔
Researchers	✔	✔	✔			✔						
Software Publishers/ Hardware Vendors		✔		✔	✔	✔		✔		✔		✔

- technology use in schools (e.g., NECC, The Computing Teacher, T.H.E. Journal, Educational Technology, ConnSENSE, MassCue)
- special education practices (e.g., The CEC Annual Conference, The Journal of Special Education Technology)
- middle school reform efforts (National Middle School Association Conference, Middle School Journal, The Early Adolescence Magazine, New England League of Middle Schools Conference)
- school-based research (American Educational Research Association annual conference, CEC Research Symposium)

Project staff have been writing articles for journals and presenting papers at conferences across all five years of the project, with an acceleration of efforts in Year 5. Appendix D lists (1) papers already published or in press and (2) presentations we have already made or expect to make if our proposals are accepted.

There are two major efforts that we find extremely satisfying because of the audiences we will reach and the information we will be able to share. First, we have written a chapter to appear in ASCD's forthcoming Curriculum Handbook. This handbook, with an anticipated publication date of December, 1991, includes chapters describing state-of-the-art instruction in content areas and case studies of curriculum implementation. Our chapter, appearing in the case study section, describes **MAKE IT HAPPEN!** and presents a case study of the Freetown site. We expect that practitioners who read this chapter will contact us for further information about how to obtain our manual and training. The second effort is an institute at Harvard University titled, "Inquiry and Technology in the Middle School Curriculum" held in July, 1991. Eighty-one practitioners on 34 teams from around the nation attended the institute to learn through first-hand experience about how technology can enhance and promote active, inquiry-based learning in adolescents.

To continue meeting our dissemination goals, we intend to prepare papers on a variety of topics, such as:

- a description of our naturalistic research methods used in Phases I and II
- the results of the field test
- the value of inquiry-based learning for special needs students

In addition, we have an opportunity to use technology to promote technology integration. A Star Schools Project (funded by NSF) at EDC involves collaborating with an organization, Massachusetts Corporation for Educational Telecommunications (MCET), to design and produce teleconferences that reach middle schools in the New England and New York area. We will explore with MCET the possibility of doing a teleconference series on **MAKE IT HAPPEN!**

In the section below we discuss distribution of the product (to be defined as the manual and accompanying training/technical assistance). One important ramification of all of the dissemination efforts described above is that it raises awareness about our approach, or "prepares the market" to be ready and interested in the products we will have available.

DISSEMINATING THE PRODUCT

Defining the Product

MAKE IT HAPPEN! is a complex innovation that asks administrators, specialists, and teachers to participate in an evolving process across two school years. In order for schools to implement **MAKE IT HAPPEN!**, we believe that they need access to the materials that embody the approach. But, in addition, they need access to training and technical support. The field test results strongly indicate that effective facilitators can help schools implement **MAKE IT HAPPEN!**. However, these facilitators also need training

and ongoing support in order to do so. Therefore, to ensure that **MAKE IT HAPPEN!** is as successful as possible in schools, we define the product as having two parts:

- the **MAKE IT HAPPEN!** manual
- training/technical assistance programs that help schools implement the approach embodied in the manual

We expect that some schools will want to order the manual as a stand-alone product. We have been exploring possible avenues for publishing the manual. These include:

- EDC--EDC has a long history of publishing educational and curriculum materials
- Educational organizations or associations such as CEC or ASCD
- Hardware vendors such as Apple Computer, Inc., or IBM

However, we believe that the best way for a school to acquire a manual would be to receive one as part of a training program. We are currently in the process of designing models for training.

Models for Training

We have identified a number of elements to include in a training program:

- a "kick-off" awareness-building conference that introduces potential users to the I-Search process and gives an overview of the steps in **MAKE IT HAPPEN!**
- institutes to train facilitators
- curriculum design institutes
- regularly scheduled debriefing meetings with facilitators
- establishment of a telecommunications network of users

- publication of a newsletter
- establishment of a clearing house of I-Search units
- **WE MP IT HAPPEN!** conferences for practitioners to shar what they have done

A comprehensive training program with these elements could work well within the context of a **MAKE IT HAPPEN!** network or consortium. We have held preliminary conversations with ASCD about creating a consortium and have had discussions with the Lilly Endowment about creating a network that would encompass Indiana, Kentucky, and Ohio.

At the present time, we have received many requests from schools that want to begin implementing **MAKE IT HAPPEN!**, particularly after the publication of our article in T.H.E. Journal (Zorfass, Remz, and Persky, 1991). We have already begun utilizing several of the training components listed above in the following ways:

- Crispus Attucks School, Indianapolis, and middle schools in South Bend, Indiana[1]

  During a one week training in the summer of 1991, EDC trained interdisciplinary teams of teachers along with their facilitator to design the curriculum units. Part of the time was devoted entirely to the facilitator, to provide training in the overall approach. EDC has visited, and will continue to visit, the site to provide ongoing technical assistance. Throughout the school year, the facilitator will be in contact with EDC to discuss emerging questions, issues, and problems.

- The BOCES (Board of Cooperative Educational Services) in Duchess County, NY

  EDC staff designed and conducted a two-day conference to give practitioners an overview of the I-Search process and the evolving steps of the innovation.

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[1] Interest on the part of two schools in Indiana is not by coincidence. EDC is involved in a project, funded by the Lilly Endowment, that provides technical assistance to middle schools in Indiana.

OTHER OPPORTUNITIES

One of the components in **MAKE IT HAPPEN!** is that an interdisciplinary team of teachers designs and implements an interdisciplinary unit. This resonates with one of the major themes of the middle school reform movement. EDC has found that a great need exists in middle schools for information about how to carry out curriculum design. A large part of our work with Indiana middle schools has been to help teams design interdisciplinary curriculum units, distilling the process from **MAKE IT HAPPEN!** In May, 1991, we organized and conducted a three-day institute in Indianapolis that helped 125 teachers, in teams of two to five teachers, to work through the design process.

CONCLUSION

On May 31, 1991, EDC held a cross-site meeting for the participants of the field test. One topic of the agenda was dissemination. The teachers and administrators helped us think about how to market **MAKE IT HAPPEN!** They felt that we needed to highlight the fact that this approach is not just about bringing technology into the classroom to benefit special needs students. Rather, it has a wider purpose--to help reshape schools, curriculum, and instruction, so that special education students become excited about learning, invested in studying new topics, successful in using a variety of tools and methods, and proud of their accomplishments. They saw **MAKE IT HAPPEN!** as fostering the kind of interdisciplinary, inquiry-based learning that is being championed by the middle school reform movement. The practitioners foresaw an eager market for **MAKE IT HAPPEN!** This enthusiasm has been echoed by others in the field of regular and special education, technology, and curriculum reform who have attended our conference presentations and read our papers. They support our belief that EDC's school-based approach has combined, in a realistic way, the elements that have the potential to produce enduring change in schools. This is a truly satisfying way to end a major five-year effort--by looking forward to promoting change in the future.

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APPENDICES

Appendix A

Concerns Questionnaire

Name (optional) _____

In order to identify these data, please give us the last four digits of your Social Security number:

___ ___ ___ ___

The purpose of this questionnaire is to determine what people who are using or thinking about using various programs are concerned about at various times during the innovation adoption process. The items were developed from typical responses of school and college teachers who ranged from no knowledge at all about various programs to many years experience in using them. Therefore, a good part of the items on this questionnaire may appear to be of little relevance or irrelevant to you at this time. For the completely irrelevant items, please circle "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale.

For example:

This statement is very true of me at this time.	0	1	2	3	4	5	6	(7)
This statement is somewhat true of me now.	0	1	2	3	(4)	5	6	7
This statement is not at all true of me at this time.	0	(1)	2	3	4	5	6	7
This statement seems irrelevant to me.	(0)	1	2	3	4	5	6	7

Please respond to the items in terms of your present concerns, or how you feel about your involvement or potential involvement with _____ We do not hold to any one definition of this innovation, so please think of it in terms of your own perception of what it involves. Since this questionnaire is used for a variety of innovations, the name _____ never appears. However, phrases such as "the innovation," "this approach," and "the new system" all refer to _____ Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with _____.

Thank you for taking time to complete this task.

0 Irrelevant	1 Not true of me now	3 Somewhat true of me now	4	5	6 Very true of me now	7

1.	I am concerned about students' attitudes toward this innovation.	0	1	2	3	4	5	6	7
2.	I now know of some other approaches that might work better.	0	1	2	3	4	5	6	7
3.	I don't even know what the innovation is.	0	1	2	3	4	5	6	7
4.	I am concerned about not having enough time to organize myself each day.	0	1	2	3	4	5	6	7
5.	I would like to help other faculty in their use of the innovation.	0	1	2	3	4	5	6	7
6.	I have a very limited knowledge about the innovation.	0	1	2	3	4	5	6	7
7.	I would like to know the effect of reorganization on my professional status.	0	1	2	3	4	5	6	7
8.	I am concerned about conflict between my interests and my responsibilities.	0	1	2	3	4	5	6	7
9.	I am concerned about revising my use of the innovation.	0	1	2	3	4	5	6	7
10.	I would like to develop working relationships with both our faculty and outside faculty using this innovation.	0	1	2	3	4	5	6	7
11.	I am concerned about how the innovation affects students.	0	1	2	3	4	5	6	7
12.	I am not concerned about this innovation.	0	1	2	3	4	5	6	7
13.	I would like to know who will make the decisions in the new system.	0	1	2	3	4	5	6	7
14.	I would like to discuss the possibility of using the innovation.	0	1	2	3	4	5	6	7
15.	I would like to know what resources are available if we decide to adopt this innovation.	0	1	2	3	4	5	6	7
16.	I am concerned about my inability to manage all the innovation requires.	0	1	2	3	4	5	6	7
17.	I would like to know how my teaching or administration is supposed to change.	0	1	2	3	4	5	6	7
18.	I would like to familiarize other departments or persons with the progress of this new approach.	0	1	2	3	4	5	6	7

0 Irrelevant	1 Not true of me now	2	3 Somewhat true of me now	4	5	6 Very true of me now	7

19.	I am concerned about evaluating my impact on students.	0	1	2	3	4	5	6	7
20.	I would like to revise the innovation's instructional approach.	0	1	2	3	4	5	6	7
21.	I am completely occupied with other things.	0	1	2	3	4	5	6	7
22.	I would like to modify our use of the innovation based on the experiences of our students.	0	1	2	3	4	5	6	7
23.	Although I don't know about this innovation, I am concerned about things in the area.	0	1	2	3	4	5	6	7
24.	I would like to excite my students about their part in this approach.	0	1	2	3	4	5	6	7
25.	I am concerned about time spent working with nonacademic problems related to this innovation.	0	1	2	3	4	5	6	7
26.	I would like to know what the use of the innovation will require in the immediate future.	0	1	2	3	4	5	6	7
27.	I would like to coordinate my effort with others to maximize the innovation's effects.	0	1	2	3	4	5	6	7
28.	I would like to have more information on time and energy commitments required by this innovation.	0	1	2	3	4	5	6	7
29.	I would like to know what other faculty are doing in this area.	0	1	2	3	4	5	6	7
30.	At this time, I am not interested in learning about this innovation.	0	1	2	3	4	5	6	7
31.	I would like to determine how to supplement, enhance, or replace the innovation.	0	1	2	3	4	5	6	7
32.	I would like to use feedback from students to change the program.	0	1	2	3	4	5	6	7
33.	I would like to know how my role will change when I am using the innovation.	0	1	2	3	4	5	6	7
34.	Coordination of tasks and people is taking too much of my time.	0	1	2	3	4	5	6	7
35.	I would like to know how this innovation is better than what we have now.	0	1	2	3	4	5	6	7

Appendix B

MAKE IT HAPPEN!

CURRICULUM DESIGN WORKSHOP

FEEDBACK FORM

Workshop #_____ Date_____

School_____

Participants_____

Leader_____ Length of Meeting_____

I. Agenda

A. In what ways was the agenda too ambitious, "just right," or too limited?

B. Were any items not covered? Why? When will they be addressed?

C. Did other key topics arise? What were they?

II. Procedures

A. In what ways did the procedures help the team to carry out the tasks? How can they be improved? Please specify.

B. How do you feel about the evolving curriculum design process? How do you think your team members are feeling?

C. Do you feel clear about the next steps within the process? Please explain.

Day 1

EVALUATION FORM

CURRICULUM OBJECTIVES

Name:_____Date: _____

Position: _____

1. To what extent did you read/review the Introduction and the Planning Guide? Check below as appropriate.

Not at all_____ Read_____

Skimmed_____ Studied_____

2. How would you rate the Introduction? Please circle as appropriate.

	good				poor
How clear and understandable?	1	2	3	4	5
How relevant and useful?	1	2	3	4	5
How informative?	1	2	3	4	5

3. What recommendations can you give us for improving the Introduction?

4. How would you rate the Planning Guide? Please circle as appropriate.

	good				poor
How clear is the format?	1	2	3	4	5
How complete is the information?	1	2	3	4	5
How easy is it to fill out?	1	2	3	4	5

5. What recommendations can you give us for improving the Planning Guide?

Appendix C

TABLE OF CONTENTS

CURRICULUM SUPPLEMENT

TABLE OF CONTENTS

PHASE III: GATHERING AND INTEGRATING INFORMATION

PHASE IV: PRODUCING/DISSEMINATING REPORTS AND PROJECTS

OUR CURRICULUM UNIT

Appendix D

Dissemination Efforts to Provide Information to Diverse Audiences

ARTICLES IN JOURNALS

Morocco, C.C. and Zorfass, J. (1988). "Technology and Transformation: A Naturalistic Study of Special Needs Students and Computers in the Middle School." Journal of Special Education Technology. 9(2): 88-97.

Persky, S.E. (1990). "What Contributes to Teacher Development in Technology?" Educational Technology. 30(4):34-38.

Remz, A.R., Persky, S.E., and Zorfass, J. (1990). "Computers and Students with Special Needs: Not Quite Like Pulling a Rabbit Out of a Hat..." T.E.A.M. 5(2).

Remz, A.R. "A Day in the Life of a Computer Specialist." The Computing Teacher, in press.

Storeygard, J., LeBaron, E. and Shippen, N. (1991). "Awesome Authors: The Development of the Reading/Writing Workshop Course." Middle School Journal. 23(1).

Storeygard, J., Russell, S.J., and Zuman, J. (1989). "Making Connections: Links Toward Technology Integration." Hands On! 12(2): 9-13.

Zorfass, J. (1990). "Researchers Pilot Program to Integrate Technology Into the Curriculum." Counterpoint. Vol. 16.

Zorfass, J. (1990). "Top Down, Bottom Up, Meet in Middle." Indiana Strides. 1(3).

Zorfass, J., Morocco, C.C., and Lory, N. "**MAKE IT HAPPEN!** A School-based Approach to Integrating Technology into the Middle School Curriculum." In: Curriculum Handbook, Alexandria, VA: Association for Supervision and Curriculum Development, in press.

Zorfass, J., and Persky, S.E. (1991). "Integrating Technology Into an I-Search Unit." The Writing Notebook. 9(1).

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Morocco, C.C. (1991). "What Teachers Need to Know." Paper presented at American Educational Research Association Annual Meeting, Chicago, IL, April 3-7.

Persky, S.E. and Remz, A.R. (1990). "A School-Based Intervention to Promote Technology Integration." Paper presented at ConnSENSE Conference, Storrs, CT, July 11-12.

Persky, S.E. and Remz, A.R. (1991). "Integrating Technology Into the Middle School Curriculum: You Can **MAKE IT HAPPEN!**." Paper presented at ConnSENSE Conference, Storrs, CT. July 10-12.

Persky, S.E. and Remz, A.R. (1991). "Integrating Technology Into the Middle School Curriculum: You Can **MAKE IT HAPPEN!**. Paper presented at MassCUE Conference, Worcester, MA, October 25-26.

Russell, S.J. (1989). "Holistic approach to Studying Technology Integration: Building Models for Practitioners." Paper presented at American Educational Research Association Annual Meeting, San Francisco, CA, March 27-31.

Zorfass, J. (1987). "Teaching with Technology: New Models for Mainstreaming." Paper presented at Fulfilling the Promise for Every Child Conference, sponsored by Massachusetts Department of Education, Northeast Regional Resource Center, Sturbridge, MA, October, 1987.

Zorfass, J. (1988). "Cases in Integrating Technology: Regular and Special Education Connections." Paper presented at Fulfilling the Promise for Every Child Conference, sponsored by Massachusetts Department of Education, Northeast Regional Resource Center, Danvers, MA, November, 1988.

Zorfass, J. (1989). "A Case of Decision Making in the Establishment of a Special Education Computer Lab: What's Important?" Paper presented at American Educational Research Association Annual Meeting, San Francisco, CA, March 27-31.

Zorfass, J. (1989). "Integrating Technology into the Middle School Special Education Curriculum." Paper presented at Council for Exceptional Children, Technology and Media Division Annual Meeting, San Francisco, CA, April 3-7.

Zorfass, J. (1989). "Toward Successful Computer Use With Special Education Students in Mainstream Settings." Paper presented at NECC Annual Conference, Boston, MA, June 19-23.

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Zorfass, J. (1991). "A School-Based Model to Promote Successful Technology Integration." Paper presented at Association for Supervision and Curriculum Development Annual Conference, San Francisco, CA, March 16-19.

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Zorfass, J., Persky, S.E. and Remz, A.R. (1990). "Promoting Successful Technology Integration: Contributions of Technology Specialists." Paper presented at American Educational Research Association Annual Meeting, Boston, MA, April 16-20.

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"Technology and Inquiry in the Middle School Curriculum." A Summer Institute, sponsored jointly by Harvard Graduate School of Education and Education Development Center, July 22-26, 1991.

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Zorfass, J., Persky, S.E., and Remz, A.R. "Integrating Technology Into Interdisciplinary Instruction." Paper accepted for presentation at CEC TAM Conference, Albequerque, NM, January 9-11, 1992.

Zorfass, J., Persky, S.E., and Remz, A.R. "Integrating Technology Into the Curriculum: Using the I-Search Model." Paper accepted for presentation at Technology and Reading/Learning Difficulties Conference, San Francisco, CA, January 16-18, 1992.

Zorfass, J., Persky, S.E., and Remz, A.R. "Using the Inquiry Process in Interdisciplinary Middle School Instruction." Paper accepted for presentation at Middle Schools at the Turning Point: An Interdisciplinary Conference, Lesley College, Cambridge, MA. February 29, 1992.

Zorfass, J. "I-Search: A Powerful Approach for Middle School Students." Paper accepted for presentation at New England League of Middle Schools Conference, Hyannis, MA, March 29-April 1, 1992.