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ABSTRACT

This report evaluates the second year of the MacMagic program at Davidson Middle School in San Rafael, California. The program uses Macintosh computers, video cameras, tape recorders, and other related technology in a team teaching environment to enhance thinking and learning in an integrated English, history, and multimedia course. Children from different cultural backgrounds, and with differing abilities and perspectives, work together toward shared goals and rely on each other for instructional support as each tries to master new technological hurdles. Observations of an eighth grade class that was taught through this method indicated that the MacMagic program was different from other English and history classes because it was built on: (1) a definite approach to teaching; (2) the use of complementary staff expertise through team teaching; (3) the opportunity to use additional time for instruction and student work; (4) a constant attempt to tailor class assignments and instructional interactions to encourage student interest and motivation; and (5) a set of instructional tasks that vary in their cognitive, social, and procedural complexity. The MacMagic program also provides significant support for students whose first language is not English through its focus on group activities, multimedia technology, and small classes. (MDM)

BERYL BUCK INSTITUTE FOR EDUCATION

"Knowledge exists to be imparted" Ralph Waldo Emerson

An Evaluation of the MacMagic Program at Davidson Middle School

San Rafael City Schools

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An Evaluation of the MacMagic Program at Davidson Middle School

San Rafael City Schools

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Table of Contents

List of Tables

Introduction

MacMagic is a collaborative effort between a number of individuals representing a diversity of talents. The goal of the project is to develop an innovative approach to teaching English and History in the middle grades in which the teacher is a facilitator of learning rather than a dispenser of information. Key elements of this approach include the integration of computer and video technology, cooperative learning and group projects, writing response groups, and practice in problem-solving. MacMagic is seeking to create and document a viable educational model that continues to evolve in its ability to meet student needs and engage students in the learning of academic content in innovative ways.

MacMagic seeks to celebrate the student diversity that now characterizes California public schools. During the second year of the program, the students participating included those identified as gifted and talented, those receiving individual attention from the school's resource specialist, those for whom English was not their native language and who had been participating in the school's English as a Second Language program, and students of color. The diversity of the MacMagic class mirrors the diversity of students found at Davidson Middle School. The program seeks to give all students equal access to the California Core Curriculum in English and History.

The MacMagic team envisions the project as a radical departure from traditional teaching methods. They have had to, in their words, "deal with uncharted territory." They are hoping that their "efforts will allow other schools and teachers a huge head start that will not require the same initial infusion of time, money and people."

MacMagic is not intended to be static. It is expected that the model will continue to evolve as it has during the first two years of the project. Teachers and others who wish to establish a MacMagic program in their own schools should be aware that they would have to adapt this currently evolving model to their own circumstances.

The following report describes the MacMagic Project at Davidson Middle School in the San Rafael City School District during its second year of implementation. It consists of four sections:

- An overview giving a brief description of the MacMagic Project;
- An analysis of how MacMagic is different from a traditional seventh-grade English/social studies CORE class;
- An analysis of how the program appears to be influencing students for whom English is their second language; and
- A quantitative analysis of the impact of MacMagic on students' self-esteem.

Many people deserve thanks for their contributions to this document. The MacMagic team has been extremely warm and welcoming, and the members have openly shared their thoughts and perceptions of MacMagic. They are not only the backbone of MacMagic, their thinking and actions are at the heart of this evaluation, and I am extremely grateful and appreciative for their comments and commitment. Jerry Warren and Bob Vasser have graciously submitted to interviews and contributed their opinions. Dr. Elly Pardo collected descriptive data about the program and interviewed MacMagic students and graduates for whom English was a second language. Mike Howe, the project's *deus ex machina*, has been unfailingly supportive of the project and the need to develop a descriptive portrait of MacMagic that will be of use to others and to further evaluations. Finally, Nancy Dalton, Gene Turtle, and Jeff Blackwell, superintendents of the San Rafael City Schools, as well as the San Rafael School Board have supported the project and sought to transfer what is being learned to other San Rafael schools. To all of these individuals, I say thank you.

An Overview of the MacMagic Program[1]

The room is pleasantly humming with activity as 12 seventh-graders stare intently into their computer screens. Students are using MacDraw to create ice-cream cones on the screen. Students sitting next to each other talk about what they are doing and admire each other's productions. A teacher circulates among the students, commenting on drawings, and responding to questions.

"Mrs. Kelly! How do I get this line bigger?"

"What have you done so far, Jose? . . . What happened? . . . What else could you try?

Jose stares at his computer, thinking hard. He focuses on the icon bar at the top of the screen, taps his finger on the table, and then suddenly moves the mouse to select "tools." After some experimentation, he finds the needed drawing tool, and creates a fatter line.

Next door, eight students are working together in two groups of four. Their task is to discuss the differences between the Chinese and Native American creation myths they have just read, devise their own creation myth, and then plan a group poster to illustrate their myth words and pictures. Another teacher circulates among the groups, posing questions to extend students' thinking about the myths and clarifying details of the assignment they are working on.

"How is the sun different in the two myths, Mary?"

"I don't know."

"Maybe Hyun can help you. You two talk about this, and I'll come back in a little while to find out what you decided?"

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[1] I am indebted to Dr. Elly Pardo for her contributions to this chapter.

Across the hall, eight students have just completed watching a scene from To Kill A Mockingbird. They comment animatedly on the differences between the way the scene is portrayed on the video and in writing. The written version, they conclude, is more compelling than what they have watched on the screen. Skillfully, the teacher weaves their comments in to a mini-lecture on point of view, and how both versions of the story attempted to show the action from a single point of view.

"You remember when the shot was taken down the street from the porch, whose point of view was that?" . . . "Where would his father have been standing?" . . . "Did we know that when we were reading the book?" . . . "How did the author show us that?"

The name *MacMagic* was coined by a former student and refers to two interactive components of an instructional program that are the cornerstones of its success. The *Mac* component denotes the technology that is used in the classroom to enhance thinking and learning. Specifically, it includes tape recorders, a video camera and associated editing equipment, Macintosh computers and other peripherals including a printer, a scanner, and input devices for sound and video. This technology is a critical part of all class activities, from interviewing to film analysis to writing assignments that build on interviews, films, or other uses of the technology. This technology serves as tools for students so that learning activities can be accomplished through multiple routes.

The *Magic* component refers to the student composition of the program. Children with different cultural backgrounds, abilities and perspectives create a 'magical' learning experience by working together towards shared goals. As the principal noted, "The MacMagic approach to learning pulls together a potpourri of youngsters to help them unfold mutually in an environment where all student ideas are accepted and appreciated." Students are taught to rely on each other for instructional support as each tries to master new technological hurdles. In this way, the computer acts as a leveler for a group of extremely diverse children.

Organizational Characters

During its second year of implementation, MacMagic is taught by a team of three individuals: a Davidson Middle School teacher, a part-time LucasArts educational consultant/teacher, and a part-time LucasArts technical support person. This year, a

student intern from San Francisco State University also provides technical assistance to the class on a part-time basis. Overall, the teacher-student ratio is low, varying form 1 to 7 to 1 to 9.

Teacher planning and cooperation provide the foundation for a program based on two apparently discrepant yet complementary principles: heterogeneity and teamwork. Guiding diverse groups of children to share and collaborate in a challenging academic setting requires thoughtful attention to process. Accordingly, MacMagic program staff meet daily to outline, develop and review the content of instructional activities and to select among procedures that will engage students in innovative learning tasks.

MacMagic students come together daily over the course of a year. Instruction is carried out in a three-period block of time that is two hours and twenty-five minutes in length. This segment constitutes the students' *English* and *History* periods and an elective period entitled *Multimedia*. Classroom activities are developed around an integrated language arts and social studies curriculum that employ technology when appropriate. The language arts component emphasizes literature and writing; the social studies component, which focuses on World Civilizations, is based on the newly adopted California History and Social Sciences Framework.

Integrated is the word that best explains the organization of the instructional program. By and large, classroom learning combines curriculum areas into student-centered, group-oriented projects that are supported by a variety of technological tools. Instructional tasks, however, are not technology-dependent; that is, they are not driven by computers and audiovisuals, only enriched by them.

The MacMagic program acknowledges that technology is part of every student's future. Consequently, computers not only become substitutes for a good deal of paper and pencil learning, but they also facilitate complex tasks by providing learners with educational alternatives. MacMagic strives to give students control over what they are learning, and to develop their *visual* literacy at the same time it encourages students to develop traditional literacy (e.g., reading, writing and speaking) skills.

Although technology supports most curricular tasks, the software used in the class has been deliberately limited. There are no "educational" software programs that

seek to impart information to students or develop skills in a particular area. Instead, students use three computer software programs -- MacWrite (for word processing), MacPaint (for graphics), and HyperCard (for multimedia organization) -- supplied with Macintosh computers. These programs are treated as the basic tools with which students are to complete assignments and engage with specified English and History content. Because these software tools are unstructured and open-ended, what is produced is totally a result of what a student does.

The Computer and Learning

The computer is a non-biased tool. It does not comment on an individual's accent or ability to speak and write; nor does it judge the quality of an individual's work. To the contrary, the computer provides the same opportunity for all users to be expressive and to create attractive text and graphics. The ease with which it enables students to edit their written work, seek an alternative wording, and check their spelling, provides important support to a process-based writing program. In addition, the computer equipped with the software described above, can be used in ways that further students' efforts to:

- organize and synthesize a variety of types of information such as sound, pictures, and text;
- think logically and understand sequential tasks in which future steps are dependent upon steps already taken;
- comprehend and explore relationships between cause and effect;
- work with other students to create complex projects merging text, graphics, and sound;
- master specific skills of graphical or written expression;
- envision and create connections between individual pieces of information; and

- extend their own abilities to express themselves, no matter how initially circumscribed.

Instructional Characteristic

The MacMagic class emphasizes a process approach to learning rather than one that is segmented or compartmentalized. All classroom tasks are inter-related, overlapping, and inter-disciplinary; many are also ongoing. In this way, projects and skills build upon one another to form an integrated continuum of increasingly complex learning opportunities for students. Perspective-taking, creativity, analytical thinking, and cooperation are major instructional goals.

The program uses a cooperative approach to learning. A cooperative approach is one in which students are grouped into working teams of four to five people. Teams are established on the basis of academic, social and linguistic criteria. A typical team consists of two pupils with strong reading and writing abilities, one or two individuals with strong cooperative skills, and another, either with limited English language skills or a defined learning disability. These team clusters form the primary support groups for students throughout their instructional day. Nonetheless, cooperative groupings are changed approximately every three months, thus enabling youngsters to interact closely with a wide range of peers. The clusters are also altered on an activity basis so that smaller groups of two or three different children may be teamed on a project. In this way, a pupil will participate in three different cooperative clusters and at least ten different activity groupings over the course of the school year.

Teachers perceive that a cooperative learning arrangement has academic, social, and emotional benefits for all students. The *academic benefit* of this arrangement is that children of varying strengths and abilities come together in an interactive learning environment where peer tutoring and role modeling are encouraged. *Socially*, cooperative groupings are community-building units that afford youngsters opportunities to get to know each other well and to appreciate individual differences. The *emotional value* of cooperative clusters is that they create a safe environment in which pupils can take risks; they can question, explain, create, discuss, dispute, and hypothesize without being labeled, bullied, or ignored.

Instructional Environment

The working environment for students consists of three large classrooms: one, used primarily for non-computer activities, another housing 18 Apple computers, and a third for video equipment. Individuals move among all three classrooms as they engage in various tasks and projects. As one of the MacMagic teachers explained, "*Students have the independence to work together in a family-type atmosphere that promotes sharing, discussion, and collaboration.*"

Student Characteristics

Youngsters were selected for the MacMagic class on the basis of their diversity: cultural, socioeconomic, behavioral, and academic. Their exact composition changes each year to reflect changes in the diversity of students found within the school as a whole, as well as changes in the pool of students recommended for participation in MacMagic.

Teacher and counselor recommendations were the primary factors in determining which blend of individuals would best benefit from a program serving pupils with varying scholastic abilities, interests, motivational levels, lifestyles, and language backgrounds. All school programs contributed students to the class: Regular, Gifted and Talented, Resource Specialist (for students with defined learning disabilities), and English as a Second Language. During the 1989-1990 school year, the program housed 26 eighth graders. These students were from ten different countries and represented seven language groups. Fourteen had a home language other than English. This year, the program's twenty-nine seventh graders come from six different countries and represent four language groups. Nine have a home language other than English.

It is important to note here that for the 1990-1991 school year, the decision to begin the MacMagic program in the seventh grade, instead of the eighth, was based on the recognition that a student's one-year participation in the MacMagic program merely set the stage for a variety of follow-up opportunities. Because eighth graders move to

the district's public and private high schools, they do not have the advantage of being able to return on a regular basis to the MacMagic classroom.[2]

Tables 1A and 1B present demographic summaries of the student diversity in the MacMagic program from 1989 to 1991.

[2] One proposed plan for follow-up work, still in its formative stages, has considered using seventh-grade MacMagic program graduates for one period a day to become teaching assistants for entering seventh graders.

Table 1A

MacMagic Classroom Composition: Eighth Grade
1989-1990

Total # of Students	Countries Represented	Languages Spoken	# of Speakers
26	Mexico	Spanish	2
	El Salvador	Spanish	1
	Nicaragua	Spanish	1
	Costa Rica	Spanish	1
	Ethiopia	Ambaric	1
	Etritrea	Trgigna	2
	Vietnam	Vietnamese	3
	Hong Kong	Chinese	2
	Haiti	French	1
	Unites States	English	12

Table 1B

MacMagic Classroom Composition: Seventh Grade
1990-1991

Total # of Students	Countries Represented	Languages Spoken	# of Speakers
29	Mexico	Spanish	2
	Guatemala	Spanish	1
	El Salvador	Spanish	2
	Vietnam	Vietnamese	3
	Korea	Korean	1
	Unites States	English	20

What Makes MacMagic Different?

Over the past two years, the MacMagic team has created an instructional approach and a curricular program that blends five separate elements to create a distinctive experience for students. In my opinion, it is these elements that *make* MacMagic different from other English/Social Studies classes. Similarly, each of these elements pose challenges that must be addressed and resolved if other schools and teachers want to replicate the MacMagic program. This section of the report describes each of the elements that make MacMagic a distinctive educational experience, and discusses the implications of these elements for further replication. MacMagic is different because it is built upon:

- A definite approach to *teaching*;
- The utilization of complementary staff expertise through *teaming*;
- The opportunity to use additional *time* for instruction and student work;
- A constant attempt to *tailor* class assignments and instructional interactions to encourage student interest and motivation; and
- A set of instructional *tasks* that vary in their cognitive, social and procedural complexity.

I will discuss each of these elements below.

Teaching

Maintaining A Relaxed Atmosphere

Walk into the MacMagic classroom, and one is immediately struck by its easy, relaxed atmosphere. Most students are energetically busy. They talk and laugh about the work they are doing, asking questions and making jokes as they proceed. Students move around the two classrooms, sharpen pencils and get drinks. The MacMagic staff singles out students for special attention or questions individuals about missing

homework. At the same time, students approach the teachers to ask for technical help or clarification on an assignment they missed. At times, the noise level rises, and a teacher will generally call this to the students' attention. Similarly, sometimes teachers talk with individual students about their deportment, reminding them of the behavior necessary for MacMagic to function. Most of the time, however, students are busy working, and one is struck by the amount of preadolescent energy being spent.

Implication: MacMagic teachers must be excellent and vigilant overseers of student behavior.

In classes where students talk with one another, are allowed to get up and move around, and where the atmosphere is easy going and relaxed, it is generally more difficult to maintain an acceptable level of noise and movement than classes characterized by frontal teaching and restricted student movement. While the MacMagic staff were generally in control of student behavior, there was often the sense that if a few students became too rambunctious, classroom chaos would ensue. This possibility required that MacMagic teachers be proactive in their classroom supervision, attending to and arresting incipient disruptions before they progressed.

Integrated Content

Although a CORE class covers the subject areas of both English and social studies, many teachers approach each subject separately, discussing English topics and homework in one period, and attending to social studies in another. MacMagic, on the other hand, takes pains to integrate English and social studies. Assigned readings of historical fiction complement the historical periods being studied. Moreover, there is no strict distinction between the time spent on English and that on social studies.

Implication: English and social studies curriculum materials must be carefully selected to be complementary.

It is often difficult to find novels at an appropriate reading level and length that complement material being covered in social studies. Similarly, many teachers do not learn how to integrate subject matter content during their preservice training, nor are

many texts and other commercial materials produced that specifically integrate subject areas. The task of tying together English and social studies is generally left to the teacher, and requires thought, planning, and experience. Teachers need release time to plan and put together interdisciplinary curriculum as used in MacMagic.

Establishing and Maintaining Student Accountability

A central part of the MacMagic instructional philosophy emphasizes that it is student *learning* rather than teachers teaching that is fundamental. For this to occur, however, student effort must be supported by an accountability system that communicates clear expectations for student learning and provides feedback about whether students are on track. MacMagic teachers necessarily expend considerable effort keeping track of whether students have completed assignments, and the quality and progress of their efforts on new projects. Considerable class time is spent trying to make the requirements of specific assignments clear to students, so they will understand the nature of the work for which they will be accountable. Such attention to the characteristics of appropriately completed assignments is even more important when it is completed in a collaborative group assignment, for the inclusion of additional students brings with it the opportunity for additional confusion and unequal contribution to the group's product.

> *Implication: Students' expectations for appropriate learning must be explicit and progress toward (as well as deviations from) the criterion performance must be communicated regularly to students.*

As I observed MacMagic, I sometimes wondered if the requirement that students be held explicitly accountable for learning was felt to conflict with another tenet, perhaps implicit, of MacMagic philosophy that holds that students should not be placed in embarrassing public situations. During oral reading, students are allowed to "pass" and not read sections of the text. As I was told, "Everyone has to write; not every one has to make oral presentations or answer questions." While understanding the motivation behind such an approach, I wonder if it compromises the expectation that students are responsible for their learning, and should be held accountable for it. Moreover, it would seem worthwhile to instill in students the notion that part of the learning process is to share one's struggles (and successes) in a supportive classroom community. In actuality, teacher-led group discussion (recitation) appeared to be dominated by a group

of students who frequently participated. And on one occasion, I observed the MacMagic staff member leading a class discussion ask that "someone who doesn't usually share" contribute; there were no takers.

When I shared this observation with the MacMagic teachers, their response was that I had "missed the point," because "every student is supported in the way that works best for them . . As a teacher you have to know the students and decide what is best for each one of them." This response is worth consideration. Teachers must use their own clinical judgment to decide when a student is ready to read out loud to the class, when a student should be pushed farther then they would go on their own, and when a student should be allowed to remain silent when called to respond. There are no formulas or explicit rules to guide these judgments; they must be made spontaneously in light of how a particular student has been performing. It is, as the MacMagic teachers noted, a question of "timing."

At the same time, in good teaching, instructional and emotional support are balanced by academic demand. During the times I observed the MacMagic classroom, I sometimes felt there was a lack of accountability for high-level participation. Students frequently passed when called upon or did not participate in oral discussion. This may be due to the fact that MacMagic students vary tremendously in their reading and speaking skills. Poorer students may be embarrassed to divulge their weaknesses before their peers. If these observations reflect general classroom participation patterns, however, they suggest there may be a double standard of accountability: there are those students who participate and are called on, and there are those students who can get away with not participating. The learning consequences of such a possibility deserves consideration.

Balancing Experimentation with Explicit Skill Development

The MacMagic approach walks a fine line between encouraging students to experiment while they are learning something new, and requiring students to learn a specific set of pre-defined skills. This is especially apparent when being introduced to the mechanics of a new technology. When students first had the opportunity to make a video tape, they were allowed to experiment. As a result, their first shots were unplanned and taken more or less at random. A similar opportunity for experimentation occurred when students were introduced to different software capabilities. MacMagic

staff often encouraged students to "Try it! See what happens." After an initial period of experimentation, however, students were held accountable for learning specific skills, and given structured exercises that limited their investigations in order to help them accomplish this task.

> *Implication: It is important that students have both the opportunity to experiment and are required to acquire certain skills. Experimentation is generally the first phase, followed by more structured exercises.*

Question Deflection

Of all the teaching strategies I have described, it is unquestionably that of deflecting students' questions that is most central to MacMagic pedagogy. In enacting this strategy, MacMagic staff refuse to be placed in the traditional role of teacher -- the sage who possesses, controls, and distributes knowledge. Instead of maintaining an instructional role that encourages student dependence on MacMagic staff, there is a conscious attempt to encourage students to rely on their own expertise and that of other students. This is seen most clearly when students approach MacMagic staff with questions. Here are two examples:

- A boy is seated staring into a computer screen half full of text. He has been sitting that way for several minutes. He raises his hand, and a MacMagic teacher approaches. He asks, "I'm on page 4 and I've run out of things to say." The teacher responds, "What could you do to get more information?" Student: "Go to the library, but...." His face is overcome with subsequent looks of dismay, resistance, and finally, acknowledgement. He turns and says disappointedly to a classmate, "I quit."

- A girl is seated at the computer. She raises her hand, and is approached by a MacMagic teacher. The girl asks how to enlarge the graphic image she has on the screen. Rather than responding with the requested help, the teacher turns to the student sitting next to the girl and asks him if he knows how to enlarge image. He responds he does, and the teacher asks him to demonstrate this to the girl asking for help.

Students expect to ask for and receive answers from teachers. When they don't receive answers and are thrown back on their own devices, they -- as the above excerpt illustrates -- are initially frustrated and disappointed. It requires more effort, is less predictable, and more risky to rely on oneself or on other students. Although students generally shared computer expertise and helped each other accomplish their goals, I sometimes overheard students refusing help from other students with the comment, "Don't touch my stack; you always mess it up!" Taking such risks, however, are part of MacMagic and teachers strive to give students the information they need to function, but not the specific answers they are trying to attain.

At the same time it should be remembered that if students are to learn from their fellows, there must be a critical mass of students who are expert in needed areas. This is not always the case. Especially in the areas of initial computer usage, video production, and hypercard scripting, there were not a critical mass of experts who could serve as peer teachers. This meant that MacMagic staff had to initially teach specific skills, thus establishing a base skill level that individual students would extend and embroider. When this conscious instruction was attempted, it succeeded best when MacMagic teachers explained explicitly the skill being taught and modeled its usage. For example:

- A MacMagic staff member is using the projection screen and overhead projector to demonstrate using the mouse and the pull-down menus. As she moves the mouse, she alternates between explaining and asking students questions about what she is doing: "Now if I wanted to open a new file, where would I go?" [Students respond, some correctly, some incorrectly] "That's right, on the top left there is the file menu. Let's see what happens when I pull it down...."

- A student tells a MacMagic staff member that her video tape has run out. He replies, "That's strange; those are 1 hour tapes. Let's go see." The student and the teacher walk together into the old library/video room and examine the camcorder together. He shows her how to monitor tape usage.

In general, it feels unnatural to refuse to answer students' well-meaning questions. And a student intern who joined the program was unable to restrain himself from solving students' problems. The appropriate role, however, is to provide students with the resources and requisite information they need to answer their own questions and solve their own problems, thus forcing them to take responsibility for their own learning, rather than siphoning the needed knowledge out of the adult instructor.

> *Implication: Appropriate MacMagic pedagogy requires that if students are available possessing requisite skills and knowledge, teachers deflect students' oral questions to other students or back to the student who asked the question originally.*

Teaming

Making MacMagic work demands a team effort bringing together the complementary expertise of three, well-qualified, gifted teachers. In part, this is because the program is being developed at the same time it is being implemented, and the MacMagic staff serve as the program's development team. As is the case in most program development, the different individuals on the team have specific and distinct competencies in the areas of: 1) curriculum development and subject-specific teaching; 2) helping students learn to use computers; and 3) the more technical aspects of software programming, computer maintenance, and video production. By blending their skills, the MacMagic staff is able to create a rich instructional program that is beyond the capabilities of any one teacher.

Beyond the developmental tasks of program development, however, the MacMagic model requires multiple teachers to work together. They must share their expertise and help each other expand and extend their own capabilities. This enriches and empowers the team as whole. In the words of one MacMagic staff member, "a different approach -- particularly in the roles people play. It should not be expected for one teacher to do it all! -- That wouldn't be healthy for anyone." At the same time, it should not be expected that those on the team will only do what they do best.

By exploiting the organizational and instructional possibilities made available when three teachers have responsibility for 30 students, MacMagic is able to provide

students with a rich and varied curriculum. Without the presence and skills of all MacMagic staff, the program could not exist in its current incarnation and would have to be truncated in some fashion. As a MacMagic staff member noted, "[The program] won't work in a classroom of 1 teacher and 30 kids. You need a technical support person. I don't think a single teacher could do it all."

> *Implications: MacMagic requires a team of teachers, each bringing distinct and complementary skills. This allows the possibility of breaking classes into smaller groups, and providing individual instruction and coaching for each group. It also allows the program to build on the skills of three individuals rather than one. It is not intended that MacMagic be instituted by a lone teacher surrounded by computers.*

Technical Expertise

Although the Macintosh computer and associated software (Mac Paint, Mac Draw, Hypercard) is renowned for its ease of use, MacMagic still requires the frequent presence of a technical expert to maintain the computer network, guard against the introduction of computer viruses, diagnose, and when possible, remedy hardware problems, and demonstrate the fine points of software usage and hypercard programming. Since video and computer/video multimedia production are also part of the MacMagic program, there are other types of technical expertise necessary to keep this aspect of MacMagic functioning. This includes knowledge of video lighting, mixing, sound recording and mixing, video editing and transfer to computer hard disk, etc. And while some types of technical support can take place without students being present (i.e., reformatting a hard disk), other contributions are specifically focused on students (i.e., demonstrating how to "fade" one card in a hypercard stack into another; finding files that are inexplicably missing). Thus the technical expert must be more than a technology expert, familiar with the workings of chips and code, s/he must care about and be able to work with students, serving as a tutor and coach as well. The technical expert is the magic person of MacMagic -- dispensing special effects, translating from the machine to the child and back and forth, demonstrating the capabilities of the computer and video technology. At the same time, s/he must explain how the magic is being produced, so students can take control of the magic and use it again without further assistance. This is where the role of teacher eclipses that of technical expert. The teacher role is fraught with well-known challenges and frustrations For example:

- Students have just begun working on their Biostacks. A boy asks a MacMagic staff member how to make a text field on one of the cards in the hypercard stack "pop up" when the viewer reaches the card. The teacher demonstrates how to write a few lines of hypercard script, the meaning of key terms and phrases, and how to use the scrapbook to record the script and make it available for other cards. S/he then attempts to explain the programming concept of a "Do loop" which is central to making the special effect work. The student's eyes glaze over. Content that now his card has a pop-up field, he seems impatient to continue working on his stack, and brushes off the teacher's questions about whether he understands how a "Do loop" works.

Since s/he is the only one with this special expertise, the demands of being the technical expert overwhelm that of being a teacher coach. Over the course of the year, I observed several times when the technical expert was engaged talking with a student about an assignment or in some other content-focused interaction. A technological emergency would erupt, and the expert would be called away from the instructional conversation to check to see if a computer file was really lost or demonstrate again how to use the video editing machine.

The technical expert is one pivot on which MacMagic turns. If the technology goes down, the daily activities of the class must change. As one MacMagic staff member put it, "Technical support **is necessary** [sic] -- and it can be achieved in a number of ways." Finding ways and money to do this presents an important requirement -- and challenge -- for schools wishing to implement a MacMagic program.

Implications: The frequent availability of an individual with specific, in-depth technical expertise is necessary to maintain the technology that is integral to the MacMagic program.

Coherent Instructional Approach and Philosophy

Although the diverse skills found in a team of teachers are necessary to make MacMagic work, it is extremely important that the team members share a coherent instructional approach and philosophy. For example, two of the MacMagic staff attended a summer workshop taught by the Bay Area Writers Project. This experience,

coupled with the opportunity to work and plan together during the previous year's incarnation of MacMagic, solidified individual commitments and understanding of the MacMagic approach. As one staff member commented, "We're more cohesive this year."

To maintain a cohesive instructional approach that draws on the skills and interests of different staff members requires that the MacMagic staff have time to talk with one another, plan lessons, and decide on instructional strategies. As one MacMagic staff member told me, "The most valuable time we had was planning time." Accordingly, there must be time available for MacMagic teachers to work and plan together. Finding protected time within the school day when several teachers can meet and plan is often difficult and may require modifications of the daily schedule. This is necessary, however, if MacMagic is to provide students with both rich and cohesive instructional experiences.

Implications: Planning time for MacMagic staff is as important as instructional time for students.

Time

Time and expertise are the instructional resources that are essential to the implementation of MacMagic. In addition to working on the MacMagic team, one staff member taught an afternoon CORE course two periods in length. (MacMagic covers three periods.) Given the reduced time available, the teacher was not able to do as much with the students in the afternoon CORE class. She did have the opportunity to introduce them to word processing and was able to allow them to use this tool in their writing, but there was not time to include hypercard in the curriculum. The class also did not have the opportunity to produce video tapes.

Implications: To include the variety of activities currently found in the MacMagic program requires that students remain in the class for at least three periods.

Split Groups Strategy

As noted earlier in this report, the typical daily organization of MacMagic activities is built around a "split groups" strategy. After a brief period of time when the class

meets as a whole, students divide into either two or three groups. These groups work on either a traditional assignment (e.g., completing geography worksheets, reading and discussing a passage in the textbook), an assignment involving computers (e.g., using Mac Draw and Mac Paint to design ice cream cones, word processing the information they have gathered for their research paper), or a video assignment (e.g., making a documentary about the MacMagic Program). Although those students working on video are sometimes allowed to spend the entire period on the project, students working on traditional assignments, and those working on computers switch activities after half of the remaining class is over. This means that students generally have 20 - 45 minutes working on a single activity, depending upon the amount of time spent together in the entire class and the number of groups operating that day.

While this arrangement ensures that each student has access to the computers each day, and enables MacMagic staff members to supervise a single assignment each day, it effectively reduces by 1/2 or 2/3 the potential amount of time a student can work on a project. My sense as an observer of the class is that the flow of time is choppy, mirroring the rigid, bell-driven units that make up the periods of the school day. From the disappointment in the faces of students who are required to relinquish the computers and return to regular assignments, it is clear that many students would like to spend longer class periods working on the computer. Currently, if students want to spend more time on the computer, they can come in at lunch or after school.

At the same time, few students express a desire to spend more time on traditional assignments. In fact, one effect of the split groups strategy was to encourage some students working on traditional lessons to be clock watchers who kept time and informed the teacher when it was time to change groups. This took time and attention away from the traditional assignment. At the point students changed groups, classroom management was problematic. Some students invariably would not have the necessary materials, others would have difficulty settling down and refocusing on another assignment. Changing gears, it seems, from the wizardry of the computer to the tradition of the textbook is difficult. Students expressed the opinion that the textbook was inevitably tedious, and "just putting the same information on a computer screen would make it more interesting." As I was observing a traditional lesson in which students read passages from the textbook and discussed their implications, a MacMagic student walked in and asked for a volunteer to be interviewed for his video production. One boy jumped up and replied energetically, "Me! Anything to get out of this class!"

As one member of the MacMagic team has commented, "Split groups do create 'problems' in terms of managing time and tasks." These seem well understood by the MacMagic team, and they have tried a number of different ways to resolve them. They have also used other organizational formats that I was unable to observe.

It is worth considering, however, that the split groups strategy prevents students from spending protracted periods on specific projects. At the same time, it guarantees each student will get a daily dose of computers. Given the fact that print-based assignments will never be seen as exciting as those that involve technology, it might be possible to maintain the same levels of student motivation interest and provide longer periods for students to work on and develop their projects by using a different time allocation strategy.

> *Implications: The allocation of time and students to traditional and technologically-enhanced assignments is problematic. Experimenting with different approaches can enable teachers to strike a balance between student motivation and the opportunity to work for longer periods on assignments.*

Tailoring

In planning MacMagic assignments, teachers take pains to allow students to tailor a generic assignment to their specific interests and backgrounds. The Biostack assignment in which students create a hypercard stack describing themselves, their background and their family is exemplary of this. Although basic conditions were established that every student must meet to successfully complete the assignment, there was a great deal of room for tailoring each stack to match the student's self-interests. Students could include family photographs and their own drawings. They could decide what parts of their backgrounds to emphasize. They could determine the order in which viewers encountered the cards on which their biographical information was displayed. Except for assignments intended to teach basic factual material (What is a samurai? Where is Baghdad?), there was always room for students to personalize each assignment to reflect some aspect of themselves.

MacMagic staff actively encouraged such personalization by showing interest in students backgrounds and interests and valuing what each student had to contribute. I observed a staff member talk to a student about the plans he was making for his

biostack. She concluded the conversation saying, "That's a great idea! You've got a lot to include, then [in your biostack]."

Implications: Part of the MacMagic curriculum is the lives of the students enrolled in the class. Teachers must allow students to include their own concerns in assignments and must communicate that they are interested in and value these concerns.

Technological Tailoring

Surprisingly, the Macintosh computers also enable students to personalize their work environment by allowing a number of setup options such as sound choice, blink rate, icon placement, etc. This may contribute to the overall sense of control students have about their work and environment. At the same time, such opportunities for technological tailoring allow increased opportunities for students to ignore the academic content of an assignment in their infatuation with technological possibilities. For example:

- Students are working on their Biostacks. Two girls sitting next to each other are comparing their birth announcement cards. Across from them a girl has accessed the Macintosh Control Panel and spends five minutes changing the sound level, blink rate and other things unrelated to the Biostack assignment.

- Jim is working on his research paper. It is getting near the end of the period. He exits his writing and spends the remaining class minutes rearranging icons on Desktop, commenting to himself, "I'm sure a neat [e.g., concerned about order] person."

- When given a writing assignment students have the opportunity to choose what font they will use.

Implications: Macintosh computers and Mac Write word processing software allow students to tailor their work and writing environment to suit them. This, in itself, is probably beneficial. At the same time, it allows students to spend more

time rearranging the format of their assignment or the computer environment in which they are working, than on their writing itself.

Task

Although discussed last, the nature of the tasks assigned to students is probably the most significant innovation in the project, for it is the characteristics of the task that most directly drive what students do and what they learn.

It is through tasks that the information and skills making up the curriculum are packaged and delivered to students. Task characteristics together with teacher-instituted accountability for student performance determine how students think about and operate on the information contained in assignments. They help govern whether students will use complex information processing strategies engaging long-term memory when confronted with an assignment or surface processing approaches to identify and file needed information in short-term memory ready for rote recall. Moreover, the instructional support system teachers provide students can help determine whether students approach tasks efficiently or flounder by focusing on inessentials.

The task structure of MacMagic -- the nature of the assignment students complete -- sets it apart from most English and social studies classes. MacMagic incorporates a variety of learning tasks, some relatively simple (e.g., Word Bank assignments), some of medium complexity (e.g., current events), others extremely complex (e.g., Create a poster describing the values, customs, means of production, etc. of an imaginary culture; Write a research paper and make it into a hypercard stack). When complex tasks are assigned, students intrinsic love of working on the computer encourages them to persevere on the machine in ways they might not if the task was a paper and pencil writing task.

Complex tasks without equivocally right answers emphasize the natural differences in ability and motivation found among students, for there is no one model to imitate, no correct answer to find. Many students become anxious in the face of such ambiguity, and part of a teacher's job in this situation is to support students so they are able to achieve acceptable levels of performance.

Implications: By including an abundance of tasks that are complex and relatively unstructured, students' accomplishment of these tasks will vary according to their abilities and motivations. Thus, there will be a wider range of performance demonstrated in MacMagic than in a traditional classroom that employs focused tasks with explicit answers. Teachers must be ready to accept this variety of task performance, and create a grading strategy that encourages rather than discourages students whose performance is weak.

Different writers define classroom tasks in different ways. I prefer to separate the task system -- the set of assigned academic activities a student completes within the classroom and as homework -- from the accountability system, or the way in which a teacher assesses student performance on those assigned activities and reports progress to the student and his/her parents. In addition, I distinguish between the cognitive, social and procedural aspects of tasks, and I will use these distinctions here.

Cognitive Aspects

The cognitive aspects of tasks include the nature of cognitive operations students must use to complete the task. At a low level, they may require students to identify information. Slightly more complex are tasks that require students to remember information. More complex still are tasks that require students to organize or evaluate information. Finally, there are tasks requiring students to transform information from one organizational form to another. Such assignments may entail more than one media, as when information in several books is integrated and transformed into a hypercard stack. MacMagic students were often presented tasks that required them to organize and evaluate information, as when they evaluated each other's hypercard Biostacks. This assignment provided students with the following instructions:

- This biostack is intended to tell you about a person's life. Briefly describe what you have learned about this person (not all the details -- but the kinds of events and experiences that have been shared). .. After some **careful** thought, list some suggestions that would let this biostack give you an even better understanding of the person who created it.

- To get to know this biostack you have to learn to navigate through its cards. Describe the ease or difficulties you had doing this.

Implications: For many students to be able to succeed with complex cognitive tasks, they have to learn new cognitive strategies. The teacher must support this process, coaching students along one step at a time, and modeling how s/he would go about using cognitive strategies to accomplish the task.

Social Aspects

Many MacMagic tasks were not only cognitively complex, they also required students to work with one another in complex ways. For example, the weekly word bank activity required students to ask others what a word means first, before looking in a dictionary. Editing of student papers was often done in response groups; social studies projects and video productions were done in groups. Each of these tasks require complex social communication based on mutual understanding, sharing of ideas, and sometimes, negotiating the completion of a joint product. These are difficult social skills for most seventh graders (and most adults!), and the teacher has a key role in monitoring student behavior and helping students to be able to perform these skills. Since the social life of most seventh graders reflects a mixture of silliness and purpose, it is incumbent on the teacher to diminish silliness and encourage purposive involvement.

In addition to the social problems stemming from communication, there are logistical problems that arise from students who have key roles being absent during collaborative projects. Unless all students have written essays, it is impossible to form a response group, and edit the essays.

Implications: Teachers must serve as coaches in the social as well as the cognitive domains. Since many of the tasks students complete weekly in MacMagic have social aspects, teachers need to be alert to task failures that result from students inadequate social skills as well as from weak cognitive ones.

Procedural Aspects

Given the use of computer and video technology in MacMagic assignments -- which are, in actuality, types of procedures students must use in completing the assigned task -- the procedural aspects of these assignments are often difficult for students to master, especially at the beginning of the year.

Students must spend considerable time learning several software programs as well as elementary video production techniques before they can use these procedures unselfconsciously. As procedures become more complex (as in the addition of sound to hypercard stacks), students may once again become confused. Such confusions may be quite productive, and give kids the opportunity to teach each other or to meet and surmount a personal challenge. At the same time, they require careful monitoring from teachers to make sure that they do not result in making kids anxious and uncomfortable. There is a fine line between anxiety that encourages problem solving and creativity, and that which discourages effort.

In addition to the necessity of learning the procedural aspect of assignments that include some form of technology, there is another way in which procedural problems can alter and eventually sabotage complex tasks. This is when the siren call of technology overwhelms the content focus of the assignment. In such a case, students spend more time and energy illustrating or animating their Biostack than describing their family background. As all teachers know, this procedural pitfall is not specific to assignments that require the use of technology. All free ranging project work that requires students to illustrate the content they have learned with a model or representation of some form provides the opportunity for students to spend all their time on the model, and little on exploring the content to be learned. Although there is no way to completely avoid this problem, the MacMagic staff addressed it by setting up specific check points where students had to demonstrate they had learned the content that is at the center of the project.

Implications: Teachers must be aware that the procedural dimensions of complex tasks pose specific challenges to students and the appeal of technology often overwhelm students' interest in the academic content to be learned. Establishing specific training and accountability procedures can help diminish problems stemming from the procedural aspects of tasks.

Second-Language Learning[3]

Introductory Remarks

Language organizes how we communicate facts and experiences with others. Although governed by a set of cultural rules, it abounds in creative possibilities. Students who enter a new culture are already habituated to the syntax of their first language and the cultural norms this language expresses. They must now develop new perspectives on how events and transactions in the *other* culture are perceived, and the capability of expressing themselves using the rules and syntax of the new culture. There are several prerequisites for developing such capabilities.

Prerequisites 1: Second-Language Learners Need Input from Native Speakers

Without appropriate models, second-language learners cannot approximate the sounds, grammar, and conventional uses of that language. Native-speaker input, then, is essential to understanding, and understanding is the cornerstone of speaking. Learners cannot acquire what they do not hear. Furthermore, if what they hear is not on target, they will develop incorrect hypotheses about the way a language should sound and be used. Accordingly, the more people hear a language modeled by native speakers, the more they increase their knowledge of that language and the ability to use it to think and speak. Conversely, if linguistic input is limited or off target, individuals will not attain full mastery or a high level of proficiency in the language they are acquiring.

In light of these facts, the MacMagic program has been providing a great deal of English-language support for second-language learners. In its first year of operation, the program enrolled 12 non-native speakers and 14 English-speaking natives; in its second year, it had 9 non-native speakers and 20 English-speaking natives. For Year I then, the proportion of native speakers to non-natives was approximately one-to-one. For Year II, however, this proportion was two-to-one. In this way, all language-minority students in the MacMagic program have received extensive input from fluent English role models.

[3] Dr. Elly Pardo is the principal author of this chapter.

Prerequisite 2: People learn to speak by being spoken

Speech is purposeful. It serves to explain, to orient, to prohibit, to negate, to mandate, to express emotions, etc., so that individuals will think, feel, or behave in certain ways. Communication between and among speakers is essential for learning *how* to say *what to whom* and *when*. Learners may know some or a good many things about the structure of a given language, but without regular, communicative input, they will not come to understand how to use that language purposefully. Interactive communication, then, is basic to the development of appropriate language knowledge and use.

In a school environment, second-language students must learn from their English-speaking peers how to encode ideas and events that are relevant to their social and academic experiences. Without the input of English speakers, language-minority youngsters do not develop linguistic resources and interpersonal relationships that help them participate fully in a range of educational opportunities.

To address the issues of access and participation, the MacMagic Program has established a cooperative learning environment that has facilitated a multiplicity of interactive instructional experiences for native and non-native, English-speaking pupils. These experiences have not only advanced the communication skills of all students in the program, but they have also helped to create mutual understanding and respect for individual differences.

Prerequisite 3: Language Acquisition Occurs Optimally in Environments Richly Supported by Concrete, Contextual Evidence.

Language is a tool for labeling culturally-significant objects and events and the relations between these. To acquire and infer appropriate meanings, language learners need direct ties to the things and situations they are encoding.

The MacMagic Program has been particularly successful at creating an instructional environment that relies heavily on situational cues. To achieve this focus, context and curriculum are integrated into a framework of structured and explicit learning opportunities that depend heavily on student collaboration.

Prerequisite 4: Language Acquisition Occurs Optimally When the Learners is Actively Involved with Their Surroundings.

Since language is best acquired in context, then it must refer to what people are doing and saying about things in that context. Like young children who learn to speak and behave by interacting with their environment, second-language learners must also be given adequate opportunity to explore and manipulate the information they are trying to encode.

In a MacMagic setting, learning occurs through hands-on experiences. Pupils internalize ideas by manipulating information in concrete ways. The computer and other audiovisual aids facilitate active learning as does instruction in cooperative groupings.

Prerequisite 5: People Learn Appropriate Language Behaviors by Participating in a Wide Variety of Situations.

Different situations elicit different kinds of vocabulary, linguistic expressiveness and conduct. Through exposure to a range of events and interactions, language learners gain psychological insights and linguistic resources that they can then test out in novel situations. In this way, language learning becomes a process of hypothesis testing and refinement.

A major emphasis of the MacMagic Program is to engage students in diverse learning experiences. These experiences, which are both multidisciplinary and multisensory, encourage a wide variety of vocabulary learning and use. Analytical and inferential thinking are strong components of a MacMagic approach to instruction. Consequently, second-language pupils not only acquire linguistic tools for encoding basic understandings but also for expressing complex relationships.

Prerequisite 6: Second-Language Learners Learn Best when they Feel Competent to Learn

Anxiety and discomfort are often byproducts of learning a new language. Individuals originally competent in expressing themselves find themselves tongue-tied and awkward in speech. The inability to express oneself clearly can cause second-language learners to feel generally incompetent, and this lack of confidence can affect

their willingness to use the new language. Conversely, when second-language learners are confident about their general abilities, this often results in positive expectations about their language learning as well.

Through the use of computers, MacMagic provides an environment where students can demonstrate their competency in manipulating the computer without using words. Students who have difficulty describing what they are doing in English are still able to open, retrieve, and save files, use MacDraw, change the appearance of their documents, etc. In fact, some of the students who were originally quite weak in their English skills, have proved themselves to be among the most competent in their ability to use the Macintosh computer.

Student Ratings of Program Impact

Table 2 presents data on student perceptions of the impact of the MacMagic program on their spoken English, reading ability, writing skills, and self-esteem.

Table 2

Student Perceptions of Program Impact

Mean Ratings for Group Responses

Scale:	1	2	3	4	5
	not at all	a little	an average amount	a better than average amount	a great deal

	Spoken English	Reading	Writing	Self-Esteem
1990-1991 (N = 9)	3.6	3.3	3.4	3.9
1989-1990 (N = 7)	4.3	4.3	4.4	4.3
GRAND MEAN**	3.9	3.8	3.8	4.1

** As a result of numerical rounding at the individual-group level, in some cases the grand mean is slightly lower than the average of the group means.

Data show that overall, former students gave slightly higher ratings to the effect of the MacMagic class on their language, literacy skills and self-esteem than did students presently enrolled in the program. Seventh graders considered the class to be having an *above average* impact on their self-esteem and spoken English skills. Evaluations of their reading and writing skills were in the *average* category. Generally, former eighth-grade program participants gave *above average* ratings to each of the specified categories.

Group differences can best be accounted for in terms of length of stay in the program. At the time of data-collection, seventh graders had been enrolled in the MacMagic class for only four months; former eighth-grade participants, however, had the advantage of evaluating the full nine-month impact of the class. Furthermore, these students were also able to assess program effect from a more objective position; namely, unlike the seventh graders, eighth graders were not immersed in a process that they were judging.

Typical comments regarding the impact of the MacMagic program on the performance and self-perceptions of language-minority students are listed below.

Spoken English

Many individuals identified group interaction activities as effective means for increasing their oral language ability:

- "(The class) helps me when we're talking in English, when we're working together in small groups."

- I had a chance to talk out loud in class. The class presentations and team work gave me a chance to do this...Team work was when groups of two to five people discussed projects and information."

- Writing stories and reading in front of other kids for correction helped me....Speaking in front of the video camera also helped me."

Another factor that some students considered helpful with their oral language development was teacher explanation:

- I know the English language pretty well, but it (the class) helps me broaden my vocabulary....There's a lot of explanation in class."

Reading

Reading published and student-prepared stories in large and small groups was the most frequently-mentioned activity for helping language-minority youngsters understand how written words were pronounced. In fact, oral reading and classroom literature discussions were activity areas a number of students indicated they would like to see expanded. Students stated the following:

- "Some words I don't know so if someone else pronounces them I can remember them better."

- "I learned to pronounce English better and to read English more fluently by listening to native speakers." (translation)

- "I liked to read my stories to the other kids in small groups."

Several interviewees also considered sustained silent reading, a fifteen-minute segment occurring daily at the beginning of class, to have improved their reading ability.

Writing

Although a few seventh graders expressed the need for closer supervision of their writing, overall, comments about student writing progress were extremely favorable. Many youngsters were complimentary of the support they had received from both teachers and peers:

- "Almost everything we do is checked by the teachers, and they help (us) correct it."

- "In other classes, the work was more individualized. In this class we get a lot of writing support from other students."

- "I write a little differently now than I did, let's say, a year ago. I write better because I get a lot of writing advice from other people, especially teachers and their assistants. I also get writing advice from other kids in group-writing projects. We read each other's stories and offer corrections."

- "We got topics to write. We read our papers to each other in small groups. Then each group selected the best paper, and the best papers from the groups (were) read to the class. I learned about good writing skills from reading and discussing other people's papers."

Student feedback for individual story writing was structured around response groups. These groups were clusters of four to five individuals who critically examined each other's work. This was accomplished according to strict guidelines that referred to three stages of analysis. Comments at each stage were color-coded so that a student author would receive peer feedback in a clear and organized way.

Stage one required that youngsters indicate what they liked about a particular paper; stage two had them note what they didn't understand about that paper; and stage three required that they explain where the paper needed modification or more information. To facilitate individuals in their review of each other's written material, teachers had prepared a list of suggested remarks that students could cite when giving feedback to one another.

MacMagic program graduates, in particular, believed that the frequency of their writing assignments had helped them improve their written skills:

- "It (the class) helped me a lot because I wrote a lot, and now I realize that I can write well. I know grammar better because I had to write a lot of stories and summaries. I also know a lot about story development." (translation)

- "The teachers made us write a lot of stories. On Saturday T. and I used to stay in the library all day. He'd write a story, and I'd write a story, and then we'd correct each other's work."

- "I had writing assignments almost every day about my past, my lifestyle, journals..."

Self-Esteem

Comments in this category emphasize the positive impact the MacMagic class has had on student *self-acceptance, confidence,* and *cross-cultural understanding*. Several youngsters appreciated the openness of the classroom environment and its sense of community-building.

- "The teachers here are fair. The students are nice. They don't make fun of you or anything. We are just all the same."

- "There are no put-downs in the MacMagic class."

- "The class helps me make more friends. I feel that I'm part of a group; I'm not left out."

- "You could ask any question that you wanted. All the kids were friendly."

- "The class was exciting. Different people (were) helping each other. I felt like part of a group. We knew each other a lot, and now we continue to help each other."

- "You see kids for three periods so you get close to them and the teachers and so you feel more at home...MacMagic helped me feel good about school. It wasn't because the class was easy but because it felt like a home away from home."

Other students explained that their self-esteem was higher because the MacMagic class had enhanced their knowledge base:

- "You feel better about yourself because you have more skills than other people, and you can explain and show these skills to them."

- "(The class) makes me feel good because I know something about computers. I'm learning a lot about things I didn't know before."

Motivation was another successful program outcome identified by some youngsters:

- "When you learn and see yourself improve and you have something to motivate you to keep learning, you have the confidence to keep learning."

- "(The class) helped me have courage to do the things I wanted to do. I got a lot of help, and I wasn't embarrassed to talk in class. I had more courage to tackle harder problems. (The) MacMagic (class) wouldn't let you leave tasks. Everyone had to do the work. There was no special treatment because you were not a native speaker. All the kids were treated the same."

- "The teachers help you a lot. They give you the time that you need. You can work at your own pace. When you accomplish something, that makes you feel good...I'm getting better grades than I used to get so it makes me strive harder to get (even) better grades."

Effect of MacMagic Activities on Students' Other School Work

An instructional program is only as effective as its power to enable pupils to meet a wide range of educational challenges. Learning experiences must serve as capacity-building opportunities for individuals to acquire and synthesize new information, skills, beliefs, and feelings. According to language-minority students presently and formerly enrolled in the MacMagic class, the instructional content of the class' learning environment has and is continuing to generate a host of academic and personal advantages for them. Many of these advantages have been highlighted in the context of program descriptions provided earlier in this document. Others will be enumerated below.

Of principal importance here is that every student interviewed believed that the MacMagic class had a positive effect on his or her other school work. For the most part, comments from respondents could be grouped into three overarching categories: linguistic, behavioral and academic.

Linguistic effects addressed English language-learning opportunities, particularly in the areas of communication, vocabulary-building, pronunciation, and writing:

- "(The class) has put me in contact with more Americans so I can learn more English." (translation)
- "I learn more about word meanings..."
- "I'm learning how to pronounce English better."
- "I've become stricter with myself when I write now because others are correcting it (my writing)."

Student judgments concerning the effect of the program on their learning and social behaviors were extremely revealing. Specifically, these judgments showed that the MacMagic class had helped them with both organizational and interpersonal skills.

- "I'm learning to compromise, to get along better with other kids..."
- "Before the MacMagic class I was really shy and didn't get along well with other people. The MacMagic class really helped me connect with other students. Now, in other classes, I get along with other people, and I work better in groups."
- "I think I learned how to cooperate with different kinds of people from different countries... We (were) from all over the world so we help(ed) each other. It (was) just like trading ideas and information."
- "(The class) helped me because I became more organized."

- "The MacMagic class made me feel independent...I could take care of my own work."

Academically, former MacMagic students recognized that the program had augmented their critical-thinking ability:

- "The MacMagic class helped me think about how I think about things." (translation)

  "(The class) kind of helped me to think better. They (the teachers) always asked us a lot of questions...MacMagic had super thinking (activities)."

Suggestions for Program Improvements in the Areas of Language and Literacy

Five (56%) of this year's MacMagic students indicated that there was nothing about the program that they would change or improve; two (29%) of last year's participants provided the same response.

Of those students who did offer suggestions for program improvement, several stated that they need or needed more support in the areas of grammar and vocabulary, particularly in the context of reading and writing:

- "I don't understand everything (I read). I don't know all the words."

- "After I wrote a story I needed help with corrections to know how I could improve my mistakes."

Others said that pairing a limited speaker of English and a native speaker would enhance the language development of students with less than fluent English skills. An extremely fluent second-language speaker remarked:

- Give them a special person -- an American -- to help them and work with them."

Along these same lines, someone else added:

- Give non-native speakers more help. Get American students to work closely with the non-native speakers."

Other suggestions for program improvements focused on developing student pronunciation ability by reading aloud in small groups or as a class. A ninth grader also recommended that the program "teach more grammar and give more grammar homework."

Regarding the above suggestions, interview data from teachers indicate that the MacMagic class is being progressively modified to accommodate the needs of second-language learners. For example, earlier it was mentioned that weekly spelling lists contain words that are appropriate to a non-native speaker's level of understanding. Additionally, for computer-writing assignments, many language-minority pupils, although engaging in the same learning processes as their English-speaking counterparts, are often permitted to produce a shorter text. Second-language speakers are also regularly provided with small group support from a teacher or student intern to facilitate their comprehension of social studies material, literature selections and vocabulary assignments. In short, MacMagic teachers have been actively exploring ways of enhancing the language and literacy skills of second-language students in order to maximize the full learning potential of these youngsters.

The Impact of MacMagic on Students' Self-Esteem

Observations of the MacMagic staff have consistently suggested that students in the project increase their self-esteem, and feel more competent as students and as individuals. They recounted a number of compelling stories about individual students who grew in self-confidence over the school year, and performed in ways unthinkable to them at its conclusion.

In an attempt to verify the accuracy of this perception, a well-used self-esteem inventory developed by Susan Harter at the University of Denver was administered to all students in MacMagic as well as in an afternoon CORE class taught by one of the MacMagic teachers and students in another CORE class taught by a teacher not associated with the MacMagic Project. Students completed this inventory in mid-fall 1990 and late spring 1991.

The Harter Self-Esteem Inventory ("What I am Like") assesses children's self perceptions of their global self-worth, scholastic competence, social acceptance by peers, athletic competence, physical appearance, and behavioral conduct. It has been normed on a sample of 438 early adolescents in Denver, Colorado. Tables 3 - 6 display the characteristics of students completing the inventories as well as the class means for each scale of the inventory.

To test for changes over time, a two-way (class X time) analysis of variance was computed using the fall and spring data. The results for all scales for all classes were consistent:

- students' self-esteem did not change over time in any of the classes.

While perhaps disappointing, these results are not surprising when one considers the small amount of time students spend in class compared to the large amount of family and other life experiences they have had when they enter class. To expect two or three periods of the school day to change the average self-esteem for students in a class requires that the class provide an extremely powerful treatment -- more powerful than years and years of interactions with family, friends, and community.

It is possible, of course, that the Harter Self-Esteem Inventory, although widely used by psychologist and researchers, was not sensitive to subtle changes occurring in the orientations and outlooks of MacMagic students. Moreover, since the Harter Inventory focuses on aspects of a child's global personality -- as opposed to the specific orientations and preferences a child has for learning in school -- such changes might be registered by an assessment focusing more directly on student motivation to learn, preference for difficult work requiring initiative and problem-solving, and the like.

HARTER SELF-PERCEPTION INVENTORY

Davidson Middle School

Sample Characteristics

Class	Age		
	11	12	13
MacMagic	2 (4%)	24 (78%)	2 (18%)
Afternoon Core	1 (3%)	24 (83%)	4 (14%)
Contrast Class	2 (7%)	24 (86%)	2 (7%)

Table 1: Number (Percent) of Students by Age, Fall 1990

Class	Gender	
	Boys	Girls
MacMagic	13 (54%)	14 (46%)
Afternoon Core	10 (34%)	19 (66%)
Contrast Class	13 (48%)	14 (52%)

Table 2: Number (Percent) of Students by Gender, Fall 1990

RESULTS OF HARTER SELF-PERCEPTION INVENTORY

Davidson Middle School

Fall 1990

Class	Self-Perception Scales					
	Global Self Worth	Scholastic Competence	Social Acceptance	Athletic Competence	Physical Appearance	Behavioral Conduct
MacMagic	3.00	2.61	2.71	2.67	2.61	2.82
	(0.77)	(0.75)	(0.75)	(0.86)	(0.56)	(0.62)
Afternoon Core	3.20	2.79	3.01	3.06	2.69	3.02
	(0.56)	(0.72)	(0.69)	(0.71)	(0.60)	(0.61)
Contrast Class	3.26	3.03	3.27	2.99	2.71	3.02
	(0.65)	(0.64)	(0.46)	(0.68)	(0.76)	(0.47)
CO Sample[4]	2.84	3.00	2.84	2.71	2.94	3.10
	(0.58)	(0.60)	(0.66)	(0.66)	(0.57)	(0.55)

Table 3: Average Self-Perception Scores and Standard Deviations by Class, Fall 1990

[4] N = 438, lower middle/upper class children

RESULTS OF HARTER SELF-PERCEPTION INVENTORY

Davidson Middle School

Spring 1990

Class	Self-Perception Scales					
	Global Self Worth	Scholastic Competence	Social Acceptance	Athletic Competence	Physical Appearance	Behavioral Conduct
MacMagic	3.22	2.77	2.85	2.72	2.67	2.77
	(0.66)	(0.54)	(0.67)	(0.87)	(0.63)	(0.75)
Afternoon Core	3.17	2.86	3.11	2.99	2.70	2.80
	(0.63)	(0.73)	(0.57)	(0.66)	(0.60)	(0.52)
Contrast Class	3.10	3.04	3.17	2.91	2.71	2.79
	(0.54)	(0.57)	(0.46)	(0.76)	(0.65)	(0.53)
CO Sample[5]	2.84	3.00	2.84	2.71	2.94	3.10
	(0.58)	(0.60)	(0.66)	(0.66)	(0.57)	(0.55)

Table 4: Average Self-Perception Scores and Standard Deviations by Class, Spring 1991

[5] N = 438, lower middle/upper class children

Methodological Notes

Except for the section of this report discussing MacMagic's impact on student self-esteem, the data on which this report is based was collected by visiting and observing the MacMagic class. Dr. Pardo observed the MacMagic class for approximately 20 hours during December 1990 and January 1991, and interviewed staff members involved with the project as well as current and past MacMagic students for whom English was a second language. I also spoke with all MacMagic staff members and observed approximately 72 hours of class time from September 1990 through June 1991. During these observations I took extensive field notes, spoke informally with students, and collected examples of assignments.

Further information on the Harter Self-Esteem Inventory can be found in S. Harter (1985), Processes underlying the construction, maintenance, and enhancement of self-concept in children. In J. Suls & A. Greenwald (Eds.), *Psychological Perspectives on the Self, Vol 3.* Riverside, NJ: Lawrence Earlbaum.