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HIGH SCHOOL TECHNICAL DRAWING STUDENTS TEACH
COMPUTER ASSISTED DRAFTING TO GIFTED/LEARNING
DISABLED STUDENTS: AN ACTION RESEARCH STUDY

A Dissertation Presented

by

JOSEPH E. RYAN

Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

DOCTOR OF EDUCATION

September 1992

School of Education

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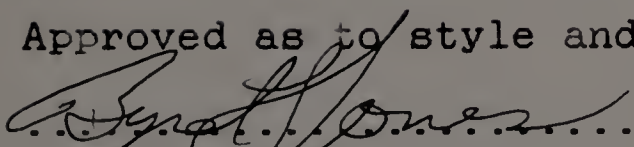
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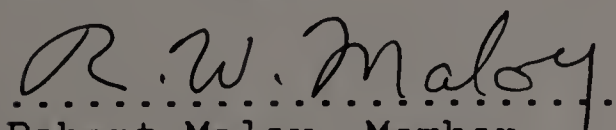
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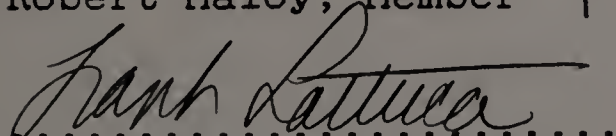
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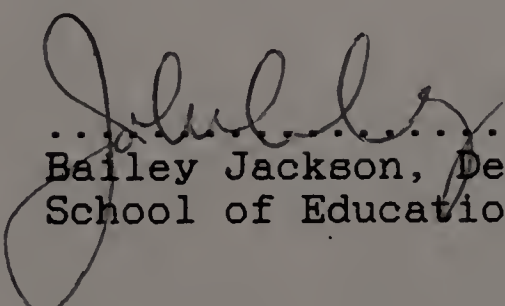
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For the family that once was

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My acknowledgements must go to a generous Betsy Connelly, the too-numerous-to-mention school administrators and staff members who supported the study, and, the not-too-numerous-to-mention ten boys who were its subjects. The boys, whose names have been changed in this document to ensure confidentiality, remain as a fond memory.

The dissertation process is not survivable without the support of a few skilled people. Those few, whether they direct research with wisdom, or act as a 'watchdog' for clear and concise writing, can make the onerous possible.

Special thanks to Frank Lattuca for service on committee, Bob Maloy for council from proposal through dissertation stages, and, Byrd Jones for his critical eye.

Finally, I wish to recognize my friend Chuck Ozug for reading and commenting on thousands of pages of text over a twenty-eight month period. Chuck's suggestions for revision are given full consideration throughout the dissertation with the exception of this single paragraph.

ABSTRACT

HIGH SCHOOL TECHNICAL DRAWING STUDENTS TEACH
COMPUTER ASSISTED DRAFTING TO GIFTED/LEARNING
DISABLED STUDENTS: AN ACTION RESEARCH STUDY.

SEPTEMBER 1992

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As a model program, this study utilized high school students who tutored elementary students in computer assisted drafting (CAD). The tutors (called interns) offered various aspects of Technology Education to fifth and sixth graders (called youngsters).

All youngsters were classified as gifted. In addition to high intelligence, each had some learning disability. Consequently, they were both gifted and learning disabled, or G/LD.

Using a case study method, this study compared five author formulated propositions to data from observations and interviews.

Proposition I: Changing Schools

By utilizing existing resources, teachers can bring about positive changes in school policies and procedures. The study examined a staff-initiated, adapted change in an existing classroom practice which gave school staff a sense of ownership and, therefore, encountered little of the resistance that frequently accompanies imposed changes.

Proposition II: Cooperative Education

College-bound students have fewer opportunities to participate in off-campus learning experiences than do non-college-bound students. Although scheduling and other difficulties work against easy implementation of cooperative education programs for college-bound students, the study demonstrated that such programs can be successful.

Proposition III: Building Relationships

The interns, as positive role models, provide a vital component in the affective development of the G/LD youngsters, many of whom tend to be isolates.

Classroom observations indicated that the youngsters admired, respected, and confided in the interns regarding personal matters.

Proposition IV: Technology and Values

Fear of job loss, coupled with the fear that technology is beyond human control, causes people to distrust and/or fear technological change. The interns expressed concern regarding jobs, the environment, and, the threat of war. None expressed fear of technology or felt that it was beyond human control.

Proposition V: Seeking New Teachers

Because few capable students are interested in teaching careers, the study attempted to present a positive image of teaching, thereby cultivating an interest in the profession. Prior to their involvement in the study, all of the interns indicated having little or no interest in teaching. At the end of the year-long study, these views remained unchanged.

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CHAPTER 1

THE PROBLEM AND THE SETTING

Within the past few years many American cities and towns have seen the cost of operating their schools increase. In some communities, federal, state, and local financial allocations have been reduced. In communities not subjected to such reductions, inflated dollars purchase less for the schools. As a result, public educators, at all grade levels and curricula areas, have been challenged to find creative ways to maintain quality programs.

Although cutbacks limit the schools' resources, educators with vision find and use resources, which have been available but underutilized, in order to maintain programs. Teachers with initiative and perseverance are searching for additional resources in the form of staff, supplies, and equipment so as to enrich existing programs and to expand offerings.

Bringing about a positive change within a school program by utilizing existing resources is the subject of this dissertation. A model program was designed and implemented by the author in his employing school system to demonstrate such a change process. Briefly stated, the program utilized the skills of high school technical drawing students (called interns) to tutor

various aspects of technical education to elementary students. Classroom activities revolved about the introduction of a computer-assisted drafting (CAD) program. The fifth and sixth graders (called youngsters) are special needs students classified as gifted or extremely gifted. In addition to possessing high intelligence, each of these student has some learning disability. Consequently, they were both gifted and learning disabled or, G/LD. (For definitions of CAD, gifted, extremely gifted, and learning disabled, see Terms Defined.)

The Problem

A school's technical programs which are equipment-intensive and require much interaction between teachers and students are expensive to maintain. Effective instruction in such courses demand small classes with close supervision. Unfortunately, a low student/instructor ratio is not feasible in most school systems. Budget constraints and the reduction of teaching personnel have caused many class sizes to increase. In an effort to maintain the quality of instruction, many schools make use of student tutors to provide personal instruction for fellow students. The use of peer tutors or cross-age tutors, is a promising way to improve the cognitive and affective education of

tutees, and, at the same time, enhance the proficiencies of students serving as tutors.

Peer tutoring studies conclude that students who are entrusted with such roles are energetic and responsible in their new classroom roles. In addition, young children tend to admire, imitate, and seek the approval of older children. Consequently, peer tutoring as a form of instruction may be as effective as traditional forms of instruction.

Purpose of the Study

New program offerings for students can meet with strong opposition from a school culture, which frequently exists within a rigid system. Consequently, changes in these cultures are more readily accepted when they are adapted to the existing school structure. This study examined the process by which a new school program was designed, introduced, and adapted, to improve an existing classroom practice.

Using a case study method, the author compares five propositions which he has formulated to data collected through observations and interviews.

Findings of the study are reported as conclusions and recommendations which result from the analysis of the collected data.

Description of the Study

There were four male students in the advanced CAD program at Bingham High School. They worked with six youngsters in the Resources Program at Coster Elementary School, all of whom were male. Following a case study approach, the author observed, reported, and analyzed the interaction between these two groups. The study was conducted over a period of approximately thirty five school weeks in an elementary and secondary school located in a relatively affluent suburban community of approximately twenty thousand residents. The students participating were (1) six elementary students experiencing a first exposure to computer-assisted drafting (CAD) and (2) four twelfth grade technical drawing students with CAD skills. The elementary students were to learn CAD skills, and the secondary students were to assist a teacher in CAD instruction.

The youngsters were all identified as having academic capabilities superior to those of average age mates. Although all of the youngsters spend at least part of the school day in a regular classroom, better than half of their time is spent with a single teacher in a room with other G/LD students.

The author believes Resources provides a necessary and effective program for the youngsters. After

observing classroom activities for a number of months, he concluded that the youngsters were well served by Resources. They felt comfortable with their gifted peers, and, although most of them had other gifted students as their closest friends, they had, for the most part, other friends as well. Nevertheless, in spite of having an identifiable circle of friends, each student expressed some alienation from the general school population. Helping these students deal with this sense of isolation was a primary reason for the program at Coster School.

Terms Defined

CAD: Computer assisted drafting. A process by which technical drawing is done on a computer screen instead of on paper using traditional instruments, such as T square, triangles, and pencils.

COOPERATIVE EDUCATION: A learning situation beyond the traditional classroom where students learn primarily through interaction and experience.

CROSS-AGE TUTORS: Using older students to tutor younger ones.

GIFTED STUDENTS: The following description of gifted students was given by the Maryland Report to Congress 1972.

Gifted and talented children are those identified by professionally qualified persons who by virtue of outstanding abilities are capable of high performance. These children who require differentiated programs and services beyond those normally provided by the regular school program in order to realize their contribution to self and society. Children capable of high performance include those with demonstrated achievement and/or potential ability in any of the following areas: general intellectual ability, specific academic aptitude, creative or productive thinking, leadership ability, and visual and performing arts.

EXTREMELY GIFTED STUDENTS: Students with extremely high abilities (IQ test scores above 160) in a single area, or in a variety of subject areas.

GIFTED STUDENTS WITH LEARNING DISABILITIES (G/LD):

Students who possess both high abilities for learning and an impediment to learning.

INTERNS: Bingham High technical drawing students used as assistants in teaching CAD to elementary students.

LEARNING DISABILITY: Students who experience physical, mental, or environmental difficulties in the learning process are considered disabled. Public Law 94-142, the Education for All Handicapped Children Act (1975), offers the following definition:

A disorder in one or more of the basic psychological processes involved in the understanding or in the using of language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. The term includes such conditions perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning problems which are primarily the result of visual, hearing or motor handicaps, or mental retardation, or emotional disturbance, or of environmental, cultural, or economic disadvantage

PEER TUTORING: Instruction provided to a student by a student of approximately the same age.

RESOURCES: A special classroom at Coster Elementary School, equipped for instruction in a variety of curricula areas and designed specifically for G/LD (Gifted Learning Disabled) students.

RESOURCES DIRECTOR: The teacher who is responsible for the Resources program at Coster Elementary School.

TUTEES OR YOUNGSTERS: Elementary students studying CAD at Coster Elementary School.

Limitations of the study

The author believes that his observations at Coster school were the result of the interactions between the particular individuals in a particular place and time. The author does not wish to predict what would happen if similar studies were undertaken;

rather he has documented, analyzed, and interpreted what occurred within the unique circumstances of the Coster study. The author contends, however, that the procedures which were followed in planning, implementing, and evaluating the Coster School project established guidelines which would be useful to change strategies when applied to similar projects.

A number of classroom procedures, including the use of equipment and materials, teaching methods, time schedules, and other pertinent factors, had to be altered in order to adapt the program to existing conditions within the school.

In addition, long-range planning was difficult and the program was subjected to major restructuring with little prior notice. Initially, the interns were to be assigned to Resources two afternoons per week. After as many conflicts as possible were resolved, the program was limited to one afternoon per week. Classes met on Monday or Tuesday afternoon depending on the interns' physical education class. Seeing the youngsters once each week provided less opportunity for the author to interview them than the author had to interview the interns.

Because of commitments to mainstreaming, the youngsters' class schedules lack regularity. As a result, it was sometimes necessary for some of the

youngsters to leave the Resources classroom while instruction was taking place. The youngsters sometimes arrive sporadically for the same reason. As a consequence, instruction was, at times, fragmented, and occasionally interns had no student with whom to work.

All the interns were male because no female students were enrolled in the high school technical drawing classes; typically these classes average between eighty and ninety percent male. This percentage is consistent with the small percentages of American females choosing high school courses which lead to careers in engineering. Likewise, all youngsters were male since, although Coster School has gifted female students, none were learning disabled.

The Coster School project is the author's second exposure to teaching elementary students and his first experience with gifted youngsters.

The total population sample used is small, relative to the universal populations of "computer skilled high school drafting students," and "elementary G/LD students."

The study had several limitations with equipment. One limitation involved the transportation of a computer. A special rolling table was designed and built at Bingham High which permitted the technical drawing department's only Apple II computer and plotter

to be transported across parking lots and loaded into a school van. Although all equipment ultimately functioned well despite the effects of transport, there existed the possibility of damage and the consequences of equipment failure.

With only two computers available, two youngsters often drew in the traditional way with board and pencil while two others worked with computers. It had been the author's wish to test a new approach to CAD by teaching the program with computers exclusively. However, given the limitations of equipment, some traditional methods were employed.

The study's interviews were both structured and unstructured with some being planned and others being conducted in a more spontaneous fashion when opportunities were presented. Structured interviews began with a written list of questions to be presented verbally to the subjects. Although the author attempted to stick to the specific questions outlined in the structured interviews, the subjects' responses often prompted unscheduled questions. Responses to unscheduled questions provided valuable data, but, at the same time, limited the subjects' opportunity to respond to the original interview questions.

CHAPTER 2

IMPROVING SCHOOLS: A LITERATURE SURVEY

An Overview

Off-campus learning programs are frequently chosen by non-college bound high school students. Although these programs can dovetail classroom learning with practical experience for many students, they are, for a number of reasons, chosen less frequently by the higher achieving and college-bound. The Coster School study selected a group of these college-bound students who had technical drawing and CAD skills and tested these skills in an off-campus program.

The nature of schools and other institutions to resist change and to seek the status quo has been widely documented by researchers. This initial topic in the survey of literature provided a foundation for the planning stage of the program. As expected, the author encountered many anticipated and unanticipated difficulties with the implementation and operation of the program; thus he experienced, in a practical way, phenomena discussed in the literature.

Understanding how to utilize high school students as tutors for gifted learning disabled students with

the problems that are attendant to these special students, in an area of teaching expertise in which the author had no prior experience. The author relied upon the available literature to develop greater knowledge areas.

Computers and other technical devices have an increasing presence in the educational and personal lives of young people. Some of the technological implications of these devices are reviewed in this survey of literature.

The author wished to determine if students who act in the roles of tutors have a positive experience with the art of teaching, and as a result, consider teaching a possible career choice. Students as potential teachers is this chapter's final topic.

Introducing Changes in the Public School

In October of 1957 the Soviet Union launched the world's first satellite and with that action challenged America's military and scientific preeminence. In the years that followed, public educators in the United States, witnessed a significant increase in funding for their science and technology programs, a phenomena that was, in part, an attempt to maintain international competitiveness.

Identification of the fatal AIDS virus in the early 1980s, which to date defies immunology and cure, prompted radical change in the focus and emphasis of sex education in public schools. Departments of health and physical education now place more emphasis on curricula which stress disease prevention. In addition, science and social studies classes openly discuss the physical and sociological implications of AIDS, HIV testing, condom distribution, and other critical issues. Prior to the AIDS virus, frank discussions relating to sexual behavior were considered inappropriate in many schools.

Changes in the American approach to science teaching in the 1950s and 1960s, and the struggle with AIDS in the 1980s and 1990s, demonstrate the schools' capacity to adapt to the challenges of foreign powers and the threat of disease. However, given the absence of such hardships, schools tend to establish acceptable standards of practice and tend to resist changes.

Besag (1984), and Tye (1985), describes the loss of flexibility in schools as a process by which schools adopt a pattern of familiar rigid procedures or rituals. Schools, and other institutions, contends Besag (1984, p. 37), are threatened by external forces and tend to maintain the status quo as a means of survival.

By its nature and establishment, an institution becomes self-justifying and reluctant to make dramatic alterations. There is a status quo orientation in an institution that is difficult to overcome. The institution was established for certain social purposes, has survived by doing things in certain ways, and the actors fear major disruption in that process. An institution tends to be conservative and self-protective.

American schools resist changes because, according to Boyd (1988), changes call into question the legitimacy of the institution and, thus, its claim on public resources. Changes also disrupt familiar organizational routines that are valued by administrators, teachers and parents. Changes, continues Boyd (1988, p. 150), "often imply large real costs . . . in return for presumed future benefits They challenge common understandings about what educational systems look like and how they work." Those forces external to the school, wishing to control or change schools present a perceived threat and, even when the changes are presented with the best of intentions, are met with skepticism or resistance. As such, contend Jones and Maloy (1988, p. 17), "public schools in the United States resemble closed systems or self-perpetuating cultures that will be less and less functional for future societies."

The tendency of schools to resist change reflect the nature of the people within those institutions.

According to Palin (1978) and Sizer (1984), human nature tends to continue with activities that provide a certain security, rather than enter activities of uncertain consequences. Palin (1978, p. 35) chooses a number of descriptors for this phenomena: "Terms such as 'homeostasis,' 'habit,' and 'primacy' are used. Self-distrust, insecurity, regression and dependency on authority figures are also identified as conservative influences." Mann (1978, p. 154) has a similar view on the individual's resistance to change: "When faced with a conflict between old roles and new, old structures and new, old values and new, most choose the more comfortable path--the one already familiar--rather than the one towards change."

Organizational changes in schools and other institutions may be, according to Herbert (1981, p. 344), either intentional, imposed, or adaptive. Intentional changes originate at management levels and try to improve efficiency. Imposed changes come from forces external to the organization and result from social or cultural mandates. Adaptive changes are frequently small adjustments to prevailing conditions and their impetus usually comes from people closest to the operations being modified. Adaptive change strategies often proceed with little difficulty while

intentional and imposed changes often meet strong opposition.

Mandated policies or procedural changes in schools can meet with opposition from members of the teaching staff who frequently are the chosen implementers of change. According to Sarason (1982, p. 232), these changes are, more often than not, mandated and passed along for implementation without the type of dialogue that clarifies the teachers' position on the issue. Sarason also notes that proponents of change frequently lack sensitivity to the problems created for teachers when they are forced to learn a new system and/or unlearn an old one. Sarason contends that proposed changes imply criticism of an accepted practice. "If there is any one principle common to efforts at change, it is that one effects change by telling people what is the 'right' way to act and think."

Institutions mandating changes must supply their implementers with sufficient useful information for change. This information, according to Palin (1978, p. 30), is only useful when it makes allowances for the concerns of implementers. Institutions are mainly concerned with the collection of information about how the innovation can be installed. However, those who actually implement the programs are more interested in information about potential risks. Palin suggests that

implementers need to know what problems to anticipate, and what solutions were found by previous users. "In general, local innovators want information that reduces the uncertainty that comes with implementing innovations." However, Fullan (1982, p. 62) cautions that supplying the implementer with generous amounts of information is no guarantee of success.

Greater specificity can be harmful if it overwhelms people with information. As with other aspects of change, clarification and skill in using new resources is a process in which demonstration materials may represent a starting point - but it is what people develop in their minds and actions that counts. Change is a difficult personal and social process of unlearning old ways and learning new ones.

Zaltman (1973), Smith (1976), Palin (1978), and others have identified meaningful discussion of critical issues among members of a school change project as an essential step to the program's success. The chances that a proposed school change will succeed are enhanced when proponents of change clearly understand prevailing school conditions, and those responsible for implementation have a clear vision of what the change intends to accomplish.

Clearly stated goals are essential to effective school changes. According to Fullan (1982, p. 57), goals that are not clearly stated, work against the implementation of changes. "In short, lack of

clarity--diffuse goals and unspecific means of implementation--represents a major problem at the implementation stage." Ironically, Fullan contends that legislated and mandated changes are deliberately stated in a general way, with the hope that the impending changes will gain wider acceptance by potential implementers. Fullan reasons that "to make innovations highly explicit at the development stage may mean that they are inappropriate for most of the variety of settings in which teachers operate." As a result, the need for clarity and specificity on one hand, and the need to provide for adaptability to particular situations on the other hand, creates a dilemma for planners and implementers.

Those who wish to initiate policy and procedural changes in schools and other institutions frequently use established change strategies as models. In this way strategists can avoid some of the problems that are encountered when implementing similar changes. Carlson (1991, p. 14) describes two broad categories for models as either rational or interactive. The rational model is scientifically-based, expert-driven, assumes a linear process, and severely limits the number of variables being examined. Success is defined as accomplishment of the plan's objective. Concern for unintended effects is limited. Unlike rational models,

which are objective, interactive models are subjective. Decision making is enlightened by individual, subjective experience. Judgments are interpretations which mix facts, attitudes, observations and values. Interactive models recognize the inconsistency of human behavior and the variant nature of social environment.

Carlson (1991, p. 18) prefers an interactive model in educational planning. "Interactive planning models, which suggest an interpretive view of the social world and emphasis on shared understandings, appear to be of greater potential value for educational planning than rational models." Carlson (1991, p. 79) feels that strategies for change cannot be translated into predesigned rational processes and suggests that planning for change can be enlightened from practice. Such planning utilizes improvisation and the resultant feedback to "narrow the gap between intention and actual outcomes." He argues that, although improvisation does not usually include a written plan, a cognitive process still takes place as rapid acts are evaluated constantly. Carlson (1991, p. 72) cited reactive behavior by a football quarterback as bringing order to disrupted situations. "The outstanding quarterback's actions are not randomized response or arbitrary choice. The choice is derived from personal knowledge, and [is] related to a vision."

Flexibility and looseness in structure are essential to successful school changes in the view of Jones and Maloy (1986, p. 7). Change strategists "must tolerate 'deviant' ideas and actors, listen to suggestions and criticisms, and support experimentation." When such flexibility exists within a program, it is more likely to be accepted by the people whom it involves. The need for school staff to "buy in" to the idea of a proposed change is characteristic of successful change strategies is generally recognized.

According to Heck and Williams (1984, p. 95), "Changes in practice are more likely to occur if they are a result of inquiry in which teachers have been involved and for which they see some value." Teachers and other participants in school changes tend to increase their commitment when they are involved in the decision making process. Heck and Williams (1984, p. 124), further contend "An underlying assumption of change theory is that if those who will be affected by the change are involved in program-planning and decision-making, they will be more willing to make the necessary adjustments and commitments to implement the planned change."

Implementing changes can also be facilitated by reducing the levels of bureaucracy. This encourages

greater commitment by implementers and, ultimately, increases the chances of project success. According to Mann (1978, p. 161), "If possible, the number of decision making levels between innovator and implementer should be reduced to minimize the chances that a program will be so altered or subverted as to make it useless."

Ultimately, effective change strategies in schools eliminate some of the traditional boundaries within schools, or between schools and other agencies. The restructuring of schools, according to Rivera (1990), refers to the relationship between the innovative practice and the traditional or 'commonly practiced' instructional policies. In matters of school change, strategists can anticipate resistance both from institutions and from individuals within or outside of these institutions.

Rivera also contends that the relationship between the process of collaboration and the innovative practice gives a second meaning to school restructuring process. In collaborative ventures, teachers assume new and expanded roles. Teachers, who traditionally work independently, form a strong base for change when operating as an organized unit. They tend to be more adventurous in their teaching methods and try approaches they might otherwise not have tried. Such

is the impact of having the support, advice, or positive reactions of colleagues.

In summary, changes in schools are easier to implement during difficult times. Institutions tend to seek the status quo and resist changes until confronted with circumstances that demand change. In the absence of real or perceived threats, changes evolve slowly as institutions adapt to new situations. When faced with crisis, however, changes tend to be more abrupt, radical, and originate at sources outside the institution. The literature suggests that when it is necessary to impose changes on schools and other institutions, these changes be presented with a degree of flexibility which permits adaptations to specific situations. In addition to giving the implementer a feeling of control and ownership in the project, flexibility in the change process will likely result in a more enthusiastic participant.

Utilizing Existing Classroom Resources

At a time when schools face reduced funding and increases in their number of students per class, educators are becoming more aware of the potential for students to become a valuable human resource. Fantuzzo (1989) observed that, when given greater classroom responsibility and useful roles, such as those of peer or cross-age tutors, students can be a cost-effective addition to the classroom. This cost-effective use of students was also noted by Pierce, (1982, p. 16) when he compared tutoring services offered by paraprofessionals and tutoring offered by students. He concluded that the groups were equally effective in producing student achievement, and the use of student tutors was cost-effective. In addition to financial benefits, student tutoring programs create a wide range of experiences that make a positive contribution to the development of the participating students.

The benefits of tutoring programs to both schools and students has been well documented (Schmuck, 1975; Johnson and Johnson, 1980; Pierce, 1982; Schine, 1982; Hedin, 1983, 1987; Mitchum, 1983; Pratt, 1983; Swadener, 1984; Scruggs and Osguthorpe, 1985; Johnson and Idol-Maestas, 1986; Bruffee, 1987; Greene, 1988; Trapani, 1988; Fantuzzo et al, 1989; Adams and Hamm, 1990; Bernard, 1990; Foot et al, 1990; Shlomo, 1990).

Tutoring is a complex interactive process. In contrasting it with classroom learning, Hedin (1983, p. 21) describes it as "less predictable, less compartmentalized, perhaps more profound, and certainly more elusive to researchers". As such, the true benefits, both academic and affective, for both tutors and tutees, can be difficult to assess. Stahl (1983, p. 8) contends that, as a result of the process "the tutors may benefit as much as the tutee". Fantuzzo (1989, p. 173) contends "the tutor shows significantly greater cognitive gains than the student being taught". Studies by Hedin (1983), Johnson (1986), and Dichter (1989), support a notion that tutor and tutee both benefit academically from tutoring. Greene (1988) provides evidence of the affective benefits of tutoring.

Bruffee (1987, p. 44) cites the works of a number of learning theorists supporting tutorial programs as a method of developing student decision-making skills. These skills are particularly enhanced by environments that cultivate interaction among students. According to Bruffee, "learning diagnostic judgments is not an individual process but a social one." He continues that people learn to make judgments in groups because the interaction helps the individuals to "talk each other out of unshared biases and presuppositions." In

addition, Shlomo (1990, p. 33) contends that the interaction of students working in pairs or small groups promotes the development of reasoning skills.

Over 323 studies have been conducted over the past 90 years comparing the impact of cooperative, competitive and individualistic learning situations on achievement. On the basis of the research, it may be concluded that generally achievement is higher in cooperative situations than in competitive or individualistic ones and result in more frequent use of higher-level reasoning strategies . . .

Furthermore, peer and cross-age tutoring foster the emotional and social development of students, particularly students in the early stages of adolescence. Schine (1982, p. 11), in paraphrasing Erikson's two stages of psycho-social development of the early adolescent, says that in the 'industry inferiority stage' the student searches for a mastery of environment. A healthy resolution to this stage is a feeling of competence. An unhealthy resolution is a feeling of inadequacy. In the second stage, the 'identity crisis stage,' the adolescent struggles with internal and external changes and searches for faith in institutions and people. At the same time, adolescents search for intimacy, relationships with authority, and clarification of values and commitments.

Schine suggests that adolescents need and search for close personal contacts. Schools, given their

present structure, are ill-prepared to meet this need. However, when the adolescents have opportunities to share learning and personal experiences with a student tutor, particularly when the tutor is viewed as a role model, intimacy can be achieved. Students are inclined to share their personal thoughts with other students. Tutors can be matched up with tutees that have similar backgrounds and personal problems in order to ease them through difficult periods of change. In addition, for the tutee personal instruction diminishes the fear of failure and possible public disgrace.

Research by Foot (1990, p. 109) supports the importance of student interaction in the affective development of adolescents. Foot contends that responding to the adolescents' need for intimacy will facilitate their interpersonal development. In addition, the roles assumed by adolescents in the tutoring process assist them in identity formation. Rubin, (1990, p. 222) in paraphrasing previous research, states that data has "led psychologists to conclude that peer interaction is a significant force in the development of normal social relationships and social skills."

Researchers do not agree on the impact tutoring has on the self-concept of tutors and tutees. Bernard (1990, pp. 5-7) contends that "peer interactions are

powerful influences on a child's development of identity and autonomy." Bernard further comments that, within the tutoring model, "the experience of being needed, valued, and respected by another person produces a new view of self as a worthwhile human being." Hedin (1983, p. 14) and Pratt (1983, p. 29), in paraphrasing previous research, state that studies showed tutors with higher levels of self-concept than non-tutors although the average effect on self-concept is small or insignificant.

Tutoring should not be considered the exclusive domain of top academic students. Johnson (1986, p. 20) contends that many students with "a wide variety of academic skill levels" have the potential to perform successfully in the tutor's role. Students with average academic skills have been successful tutors, particularly when dealing with tutees with poor attitudes towards school and learning disabilities. Stahl (1983, p. 12) comments on tutoring special needs students in the mainstream.

Special education students are likely to have less self-esteem and inappropriate or immature social and emotional behaviors. Peer tutors can be effective role models for these students... When a special student is seen as having a friendly relationship with a non-special education peer, greater peer acceptance can result.

Research by Greene (1988) supports the notion that the special needs students can benefit both academically and affectively as tutees, and, that non-special education students who act as tutors can also profit from the experience. Johnson and Johnson (1980) note the benefits of assigning special needs students to small heterogeneous study groups. The group interaction, suggest the authors, facilitates mastery of the assigned work by the special need student.

Some researchers indicate that special needs students can function in the role of tutor. According to Trapani (1988, p. 15) this is a somewhat unusual role for the learning disabled student. "While handicapped children have been tutored in a variety of subjects and settings, rarely have they been assigned the role of tutor." Scruggs (1985, p. 15) suggests that self-contained special education classes "would benefit well from interventions in which some of their handicapped students served as tutors for students who were less high functioning."

Most research suggests both peer and cross-age tutoring promote development of academic skills, attitudes, and values in tutors and tutees in special needs and non-special needs classes. Scruggs (1985, p. 22), compared peer and cross-age tutoring in special

education classes and found that "attitude gains were observed only in the cross-age configuration, suggesting that cross-age tutoring may hold more potential for social gains." Consistent with the findings by Scruggs, Pratt (1983), and Hedin (1987) conclude that cross-age tutoring is more effective than peer tutoring when dealing with non-special needs students.

One-to-one teaching, contends Hedin (1987, p. 42), is an exceptionally effective teaching method. She contends that tutoring surpasses conventional classroom methods and out performs computer-assisted instruction in raising student achievement in math and reading. In addition, it is more cost effective than is the use of computers. Some educators propose integrating the benefits of tutoring and computer instruction. Adams (1990, p. 92) states, "There is general agreement--in practice and the literature--that working on computers in cooperative pairs is usually better for beginners than is working alone." Computers, adds Adams, unlike television and other passive technologies, interact with the student; moreover, students working in pairs can add active elements to computer software that is less than engaging. In commenting on a tutoring project which was designed to provide sixth graders with computer instruction by using high school students

as instructors, Swadener (1984) concludes that, although the program had no noticeable effect on achievement for the sixth graders, and no influence on their attitudes toward computers, the high school tutors' attitudes became significantly more positive as a result of the program.

Research studies of program implementation have identified potential problem areas for new programs. Hedin (1987, p. 46) notes that scheduling sometimes necessitates running tutorials after regular school hours. She suggests that programs are best scheduled during school hours so that all students, particularly those who will not remain after school, may participate. Transportation of students from building to building can present a legal as well as logistical problem.

Another difficulty, according to Hedin, is the teachers' lack of management experience. With the presence of tutors in the classroom, the teachers' role moves away from dispensing teaching services and moves toward the role of manager of 'auxiliary teachers'. With the presence of tutors in the classroom, the teacher needs a new focus on authority. Sharing authority is, according to Schmuck (1975, p. 78), "one of the most difficult instructional issues for teachers". Teachers must be willing to accept the

notion that the increased classroom demands that are placed upon student tutors must be accompanied by an increase in their authority. Increasing the tutor's authority is essential to the type of program support that is necessary for its success. Teachers who tend to be non-democratic in their approach to classroom procedures can anticipate difficulty in dealing with this issue.

Educating the Gifted/Learning Disabled Student

Special programs for the gifted/learning disabled are a relatively new phenomenon in public schools. However, the G/LD student has, according to Minner (1990), always existed. Such gifted individuals as Albert Einstein, Leonardo da Vinci, Woodrow Wilson, Winston Churchill, and Igor Sikorsky are but a few historical figures, who might be classified as G/LD by today's educational standards.

G/LD students often go undetected in public education. One explanation for this phenomenon is that high intelligence masks the learning disability and, at the same time, the disability conceals intellect when interpreted by conventional measures. The G/LD students compensate for impairment and often test at grade level or as having normal intelligence. Whitmore (1985, p. 177) gives an example of such ability to compensate in a description of a fourth grader who was unable to read but still earned C grades in that subject. In class, the child was required to regularly read aloud written book reports. Since she was unable to read, the child used superior auditory memory to repeat a report given by another student in a previous class. As an adult this individual reported that she

felt very lucky because "the teacher never recognized the duplication."

Providing special programs in the public schools for academically gifted students is a topic of controversy. Criticism of special programs comes from sources external to as well as within the schools. Supporters of the programs contend that these students represent the future of American leadership, particularly in the study of science. If the youth of our nation are our most valuable resource, then the gifted represent the pinnacle of that resource and programs which challenge their intellect are necessary in spite of their high operational costs. Opponents of such programs take a more democratic approach, seeing the school as an instrument of equal opportunity for all students; these opponents view gifted programs as giving more to those who already have an advantage.

Advocates contend that age classification for the gifted provides these students with an environment which simply does not challenge. Given their need for stimulation, if the schools do not provide it, these students will find it in other ways. Critics of gifted programs feel that removing the gifted from the regular classroom tends to exacerbate their sense of isolation. Schneider (1989, p. 48) comments that "programs have been criticized for depriving regular children of

appropriate models and opportunities for association with the gifted, and some have contended that a 'good' program for the gifted is a 'good' program for all students."

Special programs which enable the gifted to proceed rapidly through the prescribed grade requirements make it possible for these students to skip one, or several, of these grades. Often a gifted child ends up in a classroom where he or she has little in common with classmates of their own age. Placing the child in an environment which is both academically comfortable and appropriate to his or her social and emotional development is difficult. According to Altman (1983), facility with language and abstract reasoning skills triggers mature thoughts, in some cases causing early onset of developmental stages of personal growth. Such an onset, coupled with rapid progression through these stages, presents the challenge of properly placing the gifted child.

Researchers disagree on the issue of social isolation as it relates to gifted students. Some contend that gifted students experience alienation where others, such as Schneider (1989), contend that the gifted youngster is a relatively well-adjusted individual, and there is little evidence to support the notion of bright children as social isolates.

Sociometric data collected by Grace and Booth (1958) and Miller (1956), as reviewed by Schneider, indicate that gifted children were most often preferred by their classmates. The next group considered was the typical, (average intelligence), followed by the retarded. Austin and Draper (1981, p. 129) summarizes the research as follows: "These studies have not been in agreement; many studies support Terman's contention of gifted popularity; others refute or modify this social picture."

The Schneider study (1989, p. 54), which indicated that gifted students tended to be well adjusted, also concluded that "The greater the difference in IQ between gifted and control children in the same class, the lower was the peer acceptance of the gifted child, at least in grade five." It appears that the giftedness alone is not the reason for the isolation; rather, the degree of that giftedness tends to cause isolation. Roedell (1984) states, "While moderately gifted children tend to be popular with their classmates, children with unusually high levels of ability sometimes have more difficulty in finding compatible peers." Hollingsworth (1942), as reported by Austin and Draper (1981, p. 131), contends in her report of school children with IQ scores above 180 that these children are not unfriendly by nature, but their

efforts to socialize with age mates are dismal failures because their peers do not share the same interests, language facility, or creative leadership tendencies. Hollingsworth concludes "The more intelligent a person is, regardless of age, the less often he can find a truly congenial companion."

Some researchers contend that the gifted cause or prefer isolation from the non-gifted and that they seek companionship with peers who have similar intellect. Rice (1985, p. 142) concludes that a majority of gifted students preferred some separation. In contrast to this desire for some separation expressed by moderately gifted students, the extremely gifted did not wish to learn with the nongifted. Rice noted "The extremely gifted were almost unanimous in their opinions that totally separate education was necessary."

Perhaps another reason for the social acceptability of gifted student versus the extremely gifted is the concern of the gifted for helping their non-gifted peers. Rice (1985, p. 142) contends that "The extremely gifted did not appear to be impressed by the 'social motive'. They felt little motivation toward assistance to students with lesser ability."

When choosing friends, gifted students are more likely to choose gifted rather than non-gifted companions. Because their thinking matures more

rapidly than that of their age peers, gifted students are likely, according to Altman (1983), to maintain relationships with older peers and adults. According to Austin (1981), of the gifted students in her study, some had no friends at all, and, if they did have friends, they were older. Austin (1981) determined that gifted children had relatively high social status within their peer group, even though that peer group may not consist of many chronological age peers.

The brighter the youngster the more difficult is his or her task of finding companionship. Austin (1981, p. 131) concluded "The higher the IQ score, the fewer the friends." Roedell (1983, p. 129) encouraged schools to help these youngsters make friends. "The potential social alienation of extremely able children can be avoided by special efforts to help such children find companions with similar interests and abilities." Roedell states that without such efforts these youngster may be seen by peers as different and strange."

Janos (1988, p. 215), in a study of gifted students who were admitted to colleges in their early teen years, concluded that these students had vital social lives that were both intimate and included a larger circle of friends. For the first two years of college, the gifted tended to move in social circles of

their age mates. However, "after roughly the beginning of the third year at the university, there appears to be a marked expansion in the range of ages represented among friends."

Much pressure is placed on the gifted youngster by parents and teachers who have unreasonably high expectations. In addition, these students place pressures on themselves. Galbraith (1985, p. 16) states "Gifted youth in this study felt overwhelmed by the expectations of parents, teachers, peers, and ultimately themselves." Kaplan (1983, p. 75) feels that "gifted youth who do not fully understand or accept themselves frequently over value their cognitive dimensions at the expense of their affective needs. For a long time parents and teachers have rewarded their thinking and praised their brainpower." Dirkes (1983, p. 68) expresses a concern for the best interest of the gifted youngster when they attempt to deal with adults with good intentions. "Parents and teachers who seek fulfillment through children anticipate that the young benefit from their good wishes... Many of these gifted youngsters relieve pressure through withdrawal or through overt rejection of adult values."

The gifted tend to be perfectionists and can confuse their human worth with their academic skill. Kaplan (1983, p. 74) states "Giftedness does not mean

that these individuals' worth rests in their superior mental abilities and having a fine mind is all they are." Kaplan suggests that the gifted feel the only acceptable performance is an exceptional one. Often the gifted students' self esteem is diminished when they fail to maintain the high academic standards which they have set for themselves.

A preoccupation with trying to measure up to performance standards can cause these youngsters to develop different perceptions of their giftedness. Some gifted, according to Kerr (1988), view their intelligence as a trait or an inborn talent or inherent ability. Others, because of the pressure to perform in an exceptional way, see their intelligence as a variable, or something you do, as opposed to something you possess. According to Kerr's study (1988), approximately two thirds (64%) of the gifted students saw their giftedness as a measure of the performance that they must constantly maintain.

Gifted children tend to be more independent and less concerned with the opinions of others than their non-gifted peers. Lehman (1981, p. 134) cites Kennedy (1962), Ramaseshan (1957), Warren and Heist (1960), Wrenn, Ferguson, and Kennedy (1962), Haier and Denham (1976), Lucito (1964), Milgram and Milgram (1976), as studies supporting gifted students scoring higher than

average IQ students on such personal growth traits as "self-sufficiency, dominance, independence, originality, nonconformity, positive self-concept, and internal locus of control." Lehman feels that the picture of gifted students created by the study is a positive one. They seem to feel comfortable with themselves and with interpersonal relationships. The gifted had positive feelings about themselves whether questions were couched in terms of how they felt about themselves, or, in terms of how they were seen by others. In addition, the gifted were more determined to have more positive family and school relationships than their non gifted peers.

In contrast to the Lehman study, Maddux et al (1982, p. 77) states "It would be an error to assume that high self concept and high IQ are always found together." Maddux cites Torrance (1980) who contends that the gifted child's search for a realistic and favorable self-concept is often painful and prolonged. "The gifted child frequently derogates himself and is severely handicapped by his low estimate of himself." The results of the Maddux study suggest that the school plays a critical role in the development of a positive self-concept in the gifted student. It also suggests that a negative self-concept is a central trait which

distinguishes the underachiever from the student who is performing at ability level.

Based on the data from a number of studies cited in this document, results are inconclusive on the issue of self-concept for the gifted student. However, the studies do suggest that, if gifted student are to perform at ability levels, they can only do so if they have a positive opinion of themselves. It can be concluded, therefore, that educators must be attentive not only to the gifted student's achievement but, also to how the student perceives his or her achievement.

Studies also suggest that G/LD students, in much the same way as the learning disabled with average cognitive ability, encounter difficulties with memory and perception. This difficulty causes deficits in reading, writing, and mathematics. Baum (1984, p. 16) notes the G/LD student's frustration: "This unique combination of extraordinary strengths and severe weaknesses is confusing and frustrating for these students. It is difficult for them to understand how they can learn and not learn at the same time."

Schools in the Post Industrial Society

Educational systems can have no more fundamental obligation to the societies they serve than to prepare the individuals of those societies for a prosperous, self-sufficient, and self-fulfilled life. These vital human qualities, which are nurtured in schools, serve to justify the existence of those schools, and provide the foundation for a productive society. Put another way, knowledge empowers the individual, and, in turn, the individual strengthens the society at large. Therefore, schools must offer students the opportunity to acquire a wide range of work skills, and, these skills must be transferable, directly or indirectly, to the occupations in which people will toil in order to support themselves and loved ones.

A basic understanding of computer use is an increasing requirement for job entry in most occupations. As such, computer literacy has become an essential part of education for all students, and the number of computers available in most school confirms, to some extent, the school's commitment to these skills. Although it is extremely difficult for schools to keep pace with the private sector in expanding computer applications, these applications must be expanded at all grade levels so as to meet the changing needs of students and of society.

Children use computers in classrooms and at home with a wide range of software, much of which they find both stimulating and enjoyable. This is evidence that children have access to, an interest in, and, given the opportunity, will learn how to operate a personal computer. These children often develop remarkable computer-related skills at an early age. Cross (1990, p. 1) describes these children as technologically elite.

Statistics show that elementary and preschool children are significantly different from baby-boomers and previous generations, demonstrating quicker response rates, better hand-eye coordination, and faster decision-making skills - presumably due to the many hours children have logged playing computer games that foster those characteristics.

Computers play a vital role in the modern school. Data bases contain vast amounts of information that teachers can retrieve for students, or students can retrieve for themselves. By using interactive menus, students can proceed with many computer functions with a minimum amount of teacher assistance. The computer's efficiency has made the student more independent, thereby eliminating some of the teacher's functions in the classroom.

Although the current generation of students has access to more information than has any previous one, it should not be assumed that access to information

means mastery of that information. Cross (1990, p. 2), after acknowledging the assets of the computer in the classroom, also noted some liabilities. "These same devices may also be contributing to a generation that has lower interest and capabilities in reading; has a shorter attention span; expects immediate gratification; and is bored if not stimulated both visually and orally."

Although the computer is an effective tool in meeting cognitive needs, its efficiency in the affective domain is questionable. Computers allow students to operate in independent fashion requiring only occasional teacher assistance, thereby reducing some of the interaction that is an essential part of the learning process. Cross (1990, p. 2) contends that educators must learn to deal with the realities of computers. At this point computers cannot "supply context, make creative linkages between different items of information, make value judgements, deal with the unexpected, or respond satisfactorily to personal interactions." McGahn (1988, p. 209) offers the following opinion regarding computers and the affective needs of students:

Affective education (feelings attitudes etc.) also seem to be mostly outside the realm of the computer. Much of our affective development comes from interacting with other humans and modeling

our behavior after theirs. Computers may be able to simulate some human behavior, but they won't - within the foreseeable future - be able to model human behavior in all of its irrational complexity. Computer impact on affective education may be limited to the development of positive attitudes towards working with machines.

Adequate operational skills with computers is a single component of a wide range of skills that determine technological literacy. In the technological society, the extent to which individuals are able to acquire and implement technical skills, as well as readily adapt to changing job skill requirements, will determine to a great extent their occupational success or failure. The types of jobs that individuals will have access to, and ultimately the types of life styles which can be afforded, will be determined by job skills since many potential employees will compete for a limited number of positions with good salaries.

Because computers are interactive devices and can supply information quickly and precisely, less communication between workers is required. If the current trend continues and computers are an increasing factor in job function, we may assume that, the more people work with computers, the less they will work with other people. We may also assume that, as systems advance, the human element will be further reduced when machines communicate with each other without human intervention. Zuboff (1988, p. 249) cites a plant

managers' frustration. "All our resources go into making machines talk to each other, not people!"

In spite of computers proven success, adaptation to computers and other new technologies can meet with resistance from the working class. Zuboff (1988, p. 310) cites Philip Green who posed this problem to the manufacturing sector.

The traditional proletariat is in severe decline in advanced capitalistic societies ... but those societies continue to produce the proletariat as if it were still the motor force of production. What is reproduced, therefore, is an obsolescent class whose social cost (to reproduce and maintain) is far beyond its productive capacities in a "post-industrial or "knowledge" society... The proletariat, or at the very least its children, ought to be joining the knowledge class and thus expanding the sphere of the new technology, in planned conjunction with the phasing out of the old technology.

Workers offer resistance to new technologies for reasons that are well-founded. Technological changes not only reduce job skill levels, which is a particular problem in non-union jobs, but also reduce the number of workers. Zuboff (1988, p. 249) explains that new expenditures for technology can only be justified as a capital substitution for labor. One company manager explains the situation as follows: "The signal to the organization is 'reduce the number of people.' The traditional logic here is that if you begin with one

hundred positions and bring in a new technology, you should end up with seventy-five positions."

The American workforce has a growing segment of unemployed blue collar workers who once earned higher salaries than those earned in service jobs. These workers are what remains of a failed manufacturing economy. Domestic firms choosing to meet the challenge of foreign competition are at a disadvantage because of the lower wage scales that some of these nations offer. High labor costs dictate that more production systems must be automated to reduce these costs and keep the company competitive. Consequently, the ranks of the unemployed skilled workers swell.

In addition to those who resist technological advancement because it threatens their livelihood, there are others who resist for less rational reasons, perceiving the "thinking machine" as an enemy. Replacing human intelligence with artificial intelligence presents a threat to members of a counter-culture which yearns for a return to a simpler life. These "technophobes," as they are described by Aldridge (1981, p. 82), seek "a life where the broken places in individual human nature are healed and the lost connections between humankind and nature are restored." Technophobes stand in conflict with advocates of technology, sometimes referred to as

'technophiles,' on such issues as automation in the workplace, which, in the view of the technophobe, can have a dehumanizing impact.

Ellul (1980, p. 95), who has been identified as a technophobe by Aldridge, feels that the most central question about computers deals with its limits: "Will the computer remain a simple inert instrument, which man can do with as he pleases, or will the robot seize its autonomy and replace man?"

Zuboff (1988, p. 245) quotes an automated plant manager who expresses a similar concern for machine control. "Are we all going to be working for a smart machine, or will we have smart people around the machine?"

Ellul further contends that we are reaching a final stage where man's mind is becoming unnecessary: "Man is faced with another being capable of doing everything that man used to do, but with greater speed, accuracy, etc."

It seems certain that automated equipment will see increased usage in the workplace. Much less certain, however, is the role people will play as they interact with this equipment. It is difficult to envision with any degree of certainty what the current generation of students will encounter throughout their working lives. Assuming that more jobs will rely on automated

equipment, a number of possibilities scenarios can be considered. Two major themes which emerge, and stand in marked contrast, are as follows:

1. In the years to come, greater use of sophisticated electronic equipment will make require workers to possess better basic skills than they currently have, consequently, these workers will need to be constantly retrained in order to keep apace of constant changes in procedure. Workers will have to be smarter than ever before.

2. The future workplace will be increasingly dependent on machinery and decreasingly dependent on people.

Just as the industrial age served to replace much of the workers physical labor, the information age will replace much of his mental labor. Machines will be programmed to make the decisions that people once made. The possibility of human error will become less prevalent, and, as such, the skill of employees will decline in importance.

These themes represent extremes positions on the issue of control in the workplace. The first contends that the control will remain with people because smart people build smart machines and can, thereby, design them to suit human purposes. The second theme is less optimistic regarding human control. It contends that equipment will be increasingly dominant and that people

will surrender some, and perhaps at some point, all control to equipment.

Civilization resulted from the adaptation to tool use by both individuals and groups. It is uncertain whether human discovery of tools lead to cooperative efforts or cooperative efforts were an impetus toward tool use. Braun (1984, p. 1) comments on this phenomenon as follows: "It is idle to speculate whether tools and techniques are the cause or result of cooperation. What matters is that since the beginning of mankind humans banded together and used tools and techniques to overcome hostile forces . . . "

Braun also points out that the improvement of tools, the means by which they were used, and the evolution of social institutions, resulted in a surplus of basic goods. "Technology and social organization may be two faces of mankind, but they point firmly in one direction: improved chances of survival; improved living conditions; the creation of surpluses beyond the bare necessities."

Improved technologies result in better production processes, and such technologies increases the supply of surplus goods. These surpluses were beneficial in all primitive societies and still are beneficial where supplies are inadequate. However, in contemporary societies where production has reached extreme levels

of proficiency, such surpluses can be more of a bane than a benefit. Under such conditions, overproduction consumes energy and limited resources, and it adds to the accumulation of waste products. As new goods replace older ones, many of which still function well but are rendered obsolete by product improvement, problems arise with the disposal of the older goods, many of which are made of materials which resist decomposition or are considered hazardous waste. In spite of efforts to recycle, global trash continues to accumulate at an alarming rate, and there is no clear solution in sight.

Perhaps, a partial solution to the accumulation of excess goods is to design the goods to last longer and to limit their production. This is not easily done, particularly with products that are part of rapidly expanding technologies such as electronic equipment. In an information age where knowledge advances rapidly, and that knowledge is reflected in new products, the life expectancy of these products becomes shorter. Asking manufactures to limit production, particularly in capitalist economies, is likely to encounter much opposition.

There is perhaps no issue which is a more frequent subject of debate between technology's supporters and its detractors than the issue of its alleged autonomous

nature. Does technology take on a life of its own, independent of those who produced it, or is it neutral and subject to human control? Generally speaking, contends Jalbert (1987, p. 85), attempts to address the autonomous nature of technology fall into two categories: "On the one hand there are those who would underscore the autonomous nature of technology . . . On the other hand, there are others who construe technology as essentially neutral and devoid of a logic or independent life of its own."

The theory of 'technological determinism' expresses a belief in technology as an external influence on society. Mackenzie and Wajchman (1985, p. 4) contend "this is a theory that technology is indeed an independent factor, and changes in technology cause social changes." A less extreme version of this theory argues that technology is only metaphorically external. Mackenzie continues: "the technologists who produce new technology are in this view indeed members of society, but their activity is, in an important sense, independent of their membership of society." Technological determinists contend that technology is in some way autonomous, either literally or metaphorically, of social context.

Ormiston and Pitt et al (1990, p. 121) contend that there are at least two contexts within which the

autonomous nature of technology is an issue: in its use and in its development. He feels that, in the first case, it is alleged that once technology is brought into use, it takes on a life of its own, free from human guidance and control. In the case of technological development, he contends that technology is merely applied science, the result of scientific theorizing put to practical use. In this sense, technology is not independent of science and cannot operate autonomously.

Ormiston and Pitt (1990, p. 121) argue that technology is not autonomous. "If we take a quick look at the first point we can note that an examination of the possibility of a technology running away from human control reveals that it is a worry without merit." In order to reduce fears about autonomous technology, we must re-characterize our concept of technology to include both its products and its processes.

I am urging that rather than think of technology only as products of certain kinds, that we think of technology as a process that includes: deliberation and policy formation, implementation and use of tools and systems, and feedback mechanisms leading to information updating and assessment procedures. Once technology is viewed as a process... fear of autonomous technology degenerates into pathology.

Where Ormiston and Pitt chooses to distinguish technologies' uses from their development, Ellul (1980,

p. 30) chooses to distinguish their discovery from their application. Ellul states "I am simply trying to point out that there is a world of difference between the laboratory discovery of a technology and its universal application." The danger in these technologies, he contends, does not lie in their growth but rather in an attitude that envisions "tomorrow's world as today's laboratory."

Schools should provide students with an awareness of the negative aspects of technology such as its potential to render workers jobless, cause isolation in the workplace, and threaten ecology. In addition, schools are obliged to offer students computer skills necessary for job entry in nearly all occupations. The study at Coster School will, through close interpersonal contact of interns and youngsters, not only foster the students' computer skills but also promote responsible attitudes towards the use of technology.

A Search for New Teachers

Research supports a belief that an insufficient number of capable young people are interested in teaching as a career choice. If these indications are correct, our American teacher population will soon be under-supplied.

The likelihood of a teacher shortage within the next few years is one of the issues being examined in this research. Currently, the birth rate, which had undergone a steady decline for a number of years, has stabilized and is projected to increase through the late 1990's. In addition, a sizable percentage of the current teacher workforce is approaching retirement age. Given these circumstances, there is reason to suspect that the demand for new teachers will gradually increase. Part of this research document is directed at examining the likelihood of these shortages. The study will also seek an understanding of prevalent student attitudes towards teaching careers through the use of surveys and interviews.

The increase in school population projected for the 1990s is based in part on changing attitudes towards marriage and family by members of the 'Baby Boom' generation. The decline in enrollments which marked the 1980s is explained by Andrews and Marzano

(1991, p. 26) as the choice of many Baby Boomers to defer, for a number of reasons, marriage and childbearing. However, childbearing for some of these boomers began and increased through the 1980s, causing school populations to rise for the first time in more than fifteen years. National elementary and secondary enrollments, according to Andrews and Marzano, is approaching 40.3 million, a figure which is a significant increase from the 39.7 million recorded in 1983. School enrollments are projected to reach 44 million in 1997. Although an increase in the school population seems to indicate a demand for more teachers, this increase in population does not by itself mean that more teaching positions will become available. As has been the practice in Massachusetts and other states, increased enrollments in difficult economic times can simply mean larger classes.

In addition to increased school enrollments, an accelerated retirement rate among practicing teachers should result in a need for new teachers. Many schools are staffed with teachers who entered the profession in the 1950s and 1960s. Before the year 2000 many of these staff members, now in their forties or fifties, will reach retirement age; consequently, these retirements will create opportunities for new teachers.

The availability of teaching jobs varies both geographically and culturally. According to the Association of Teacher Educators (1991), most teachers are white, female, middle class, and, as a majority (97 percent), can instruct in the English language only. Few jobs exist in white suburban schools, however a sizable number do exist in areas of poverty, and in schools with culturally diverse populations. According to the Association Report, like their counterparts in medicine, law, dentistry, and other helping professions, teachers are reluctant to practice in the settings where the need is the greatest.

Accurate projections of future teacher needs in specific subject areas are difficult to make. For example, the Commonwealth of Massachusetts Division of Employment Security (1987), which projects a six percent increase for all teachers through the 1990s, indicates a 24.4 percent increase in need for technical and vocational teachers. Math and science positions, as well as those positions which handle special needs or bilingual students, have traditionally been more difficult to fill than most areas. Thus, projections for these areas are higher than the general teacher population.

Some researchers do predict excessive teacher shortages in the near future. Data from the National

Center for Educational Statistics (1986) reports a projected need for 1.12 million public and private school elementary teachers, and .53 million secondary teachers between 1985 and 1993. This projection is more than two thirds of the total existing teacher workforce. Furthermore, the Carnegie Foundation for the Advancement of Teaching (1987) reports that the number of students currently planning to enter teaching is sufficient to meet only 63 percent of the anticipated 1993 need.

Researchers John N. Mangieri and Richard E. Kemper (1984) of Texas Christian University designed a series of questionnaires that attempted to assess the degree to which academically capable eleventh and twelfth graders were: 1) very interested, 2) somewhat interested, or 3) not interested in teaching careers. Besides determining how many of these students were interested in teaching, the study also sought an understanding of why these students were, and why they were not, interested in teaching. The survey was originally administered to over 5000 college bound high school students. The study had a final sample of 4349 cases. The students were of mixed gender, from twenty-one schools in six different states, of varied racial and socioeconomic backgrounds, and from urban and rural settings.

Results of Mangieri and Kemper (1984) support a contention by the National Commission on Excellence in Education (1983) that an insufficient number of capable students are interested in teaching. Mangieri and Kemper conclude that about half of the students surveyed had no interest in teaching, with about one quarter having some interest in teaching. Less than ten percent expressed a high level of interest, with the remaining students expressing no opinion.

In addition, the survey revealed that, for students expressing interest in teaching, knowledge and skill in subject matter area ranked highest among reasons offered for their interest. Among those not interested in teaching, salary issues, professional advancement, lack of respect from students, and other working conditions were the most frequently cited reasons for their lack of interest.

In an effort to add to the research that had begun with Mangieri and Kemper, Ryan (1987) administered the same surveys to two smaller student samples. The populations in the Ryan study differed from the national group in that the Ryan groups had exhibited knowledge and skill in science and technology. The intent of this study was to determine the degree to which students showing skills in school curriculum areas would be interested in teaching. The science

group is a sampling of 1987 Massachusetts State Science Fair contestants. The technology group is a sampling of members of the Connecticut Chapter of the American Industrial Arts Students Association.

The Ryan study reported that the sample of 73 science and 48 industrial arts students contained a very low percentage of "very interested" students. In the "somewhat interested" group, more science than industrial arts students were somewhat interested, but results were quite similar to those of the Mangieri study. Twice as many industrial arts students as science students responded as "not interested" in teaching. An average of these two groups yielded a percentage close to those of Mangieri. None of the results of the Ryan study challenged the results of Mangieri and Kemper, and, in fact, Ryan's results tended to confirm Mangieri and Kemper's.

A second survey study was designed by Ryan (1990) and administered to a small sample of technical drawing students at the end of their junior year in high school. This survey requested these students to rank two lists of professions and jobs in order of their degree of desirability. On both lists, teaching was ranked as one of the least desirable occupations. These same students were later recruited to be part of the Coster Study, and, ultimately, they participated in

the cross-age tutoring project. It was the author's intent to see if these students, who once ranked teaching as undesirable, would change their minds to any degree after a practical exposure to the teaching profession.

Results of the Ryan Survey 1990

Survey I asks for a rank order of seven professional occupations. They are ranked from most desirable to least desirable with lower numbers being more desirable.

ENGINEER.....	13
BUSINESS.....	27
SCIENTIST.....	27
LAWYER.....	31
DOCTOR.....	32
SOCIAL WORKER....	46
TEACHER.....	50

Survey II asks for a rank order of 10 professional and non-professional occupations. They are ranked from most desirable with lower numbers being more desirable.

SELF EMPLOYED....	14
CONSTRUCTION....	32
POLICE.....	32
OFFICE WORKER....	42
FIRE FIGHTER....	43
SOCIAL WORKER....	47
MEDICAL STAFF....	47
AUTO MECHANIC....	51
TEACHER.....	54
FARMER.....	72

The students in the Ryan (1990) survey indicated that, at this point in their school careers, they had little interest in teaching careers.

Analysis of the Teacher Shortage Issue

Probably there will be a shortage of teachers by the end of this century, particularly in some special subject areas. The reasons for the shortages are as follows:

1. Increasing number of students through births and immigration.
2. An aging teacher population
3. A lack of interest in teaching as a career because of low salaries, poor working conditions, and a poor public image of teachers.

Summary of the Survey of Literature

Promoting Changes in Schools

Historically, during times of war, famine, disease, and other forms of human misery, schools have successfully implemented radical changes in policy or procedures when confronting However, given the absence of such national dilemmas, schools tend to resist change, preferring to maintain the status quo.

Resistance by institutions is a normal response and can be anticipated as part of the change process. Like other institutions, schools adopt rigid patterns or rituals which serve to justify their existence.

When these patterns are challenged by proposed changes, the legitimacy of the institution itself is threatened. Consequently, the inertia which is inherent in schools and other systems causes the systems to become less and less functional.

Resistance to change can be understood in terms of the people who make up the institutions. Changes are frequently mandated by authorities who often lack sensitivity to the concerns of those who are being requested to implement these programs. Proposed changes imply that some accepted policy or practice works poorly or not at all. Implementers are concerned with the possibility of failure, and tend to resent being told what the correct way to act and think is.

Change strategies are often formulated with the help of theoretical models. Subjective interactive models seem to be better suited to educational planning than do objective rational models. Interactive models include planning as a function of practice. Interactive models depend on flexibility and looseness in structure, feedback, improvisation, and a process of constant reevaluation.

Imposed changes are more likely to succeed if they win the support of implementers. This end is achieved when those introducing the changes are sensitive to the implementers' concerns, and permit them to become

part of the decision-making process. Chances for success are further improved by the reduction of decision-making levels.

Utilizing Human Resources Within the Classroom

Currently, Massachusetts and other states face manpower shortages as reduced funding to public schools has caused significant teacher layoffs in many communities. With the student teacher ratios increasing, class sizes are becoming difficult to manage. One possible solution for overcrowded classrooms is the utilization of capable students as tutors to assist teachers. In fact, peer and cross-age tutoring practices, popular in the 1950s and 1960s, are finding their way back into the public schools.

Tutoring programs provide an alternative way to learn for both the tutor and tutee. The tutor assumes new rights and responsibilities and, in turn, is expected to be a more active participant in class activities than a traditional student. The tutor must draw on an acquired base of skills necessary for reacting, improvising, and learning from current and past experiences. The tutor's knowledge has immediate application, and, as such, is more meaningful to the tutor than abstract theories acquired in traditional classrooms. The tutee is provided with an intimate

relationship with an instructor close to his or her own age. Close contact not only makes possible the type of feedback that supports cognitive learning but also permits the tutee to discuss problems and issues that, for a number of reasons, may not be discussed with regular school staff. To this end, tutors can be carefully matched up with tutees who have similar backgrounds and/or learning styles in an effort to maximize affective gains.

The use of student tutors is a proven cost effective method of instruction. Furthermore, many researchers agree that tutoring is not the exclusive domain of high achieving students. Average students, researchers contend, have proven themselves capable tutors, as have some learning disabled students when these students are entrusted with the tutor's role. Using tutors to teach computer skills has also been noted as an efficient practice.

The use of tutors to improve instruction has been extensively researched. There is general agreement that both tutors and tutees benefit from involvement in such programs. Tutoring programs are particularly helpful in the development of decision-making and reasoning skills. However, research findings lack consensus on topics such as the following: whether the tutor or tutee is the primary beneficiary of the

program, and, whether or not tutoring impacts the self-concept of tutors in any significant fashion.

Several problems are familiar to researchers and implementers of tutoring programs. For example, making tutoring programs fit school schedules can be difficult. Because of schedule conflicts, some programs are forced to operate after normal school hours, thereby excluding many students who could profit from such programs. Transporting tutors from building to building presents both a legal and logistical problem. In addition, the average teacher's lack of skills in supervising instructors and the need for these teachers to share authority in cooperative classrooms are areas of difficulty.

Providing Additional Resources for Special Students

Federally enacted legislation has assured that schools will provide special needs students with the extra services necessary for their academic and social development. Most funding for special programs in public schools is directed at programs that focus on students with learning disabilities and at programs for the gifted and talented. Recognizing, testing, and providing services for learning disabled and gifted students is a common school practice. However, much less funding is provided and many fewer programs exist

to assist students who are gifted and at the same time learning disabled (G/LD)

Testing available in schools frequently fails to identify the G/LD student. These students, because of their high intelligence, often discover ways of masking or compensating for their disability, and many achieve at the levels comparable to those of average students. In a similar way, students with high levels of intelligence can go undetected because of learning disabilities. As a result, these students test at a level that is lower than their true intelligence level. G/LD students deal with the frustration of having an inner sense of being smart, even though in the classroom they display what appears to be less than adequate academic competence. Many of these students proceed through years of public school education without a receiving a formal assessment of their G/LD condition.

Gifted, learning disabled, and G/LD students share a common educational problem. Each of these students is removed from the mainstream of the school and placed in a classroom with students of similar ability. Although such arrangements might best serve the student's cognitive development, the absence of opportunities for interaction with a diverse student population can be a deterrent to his or her social

development. Being assigned to a special class can create in this type of student a sense of isolation.

Because they are removed from the mainstream, special needs students tend to build friendships with other special needs students. This tendency is particularly common among gifted students whose accelerated learning skills have left them with little in common with non-gifted classmates other than age. Although researchers tend to agree that gifted students are no more inclined to seek isolation than are average students, a tendency towards isolation is frequently noted among extremely gifted students. Clearly, the higher the student's intelligence, the more difficult it is for that student to find compatible mates. If these students do not choose to be alone, or if they choose to socialize only with other special needs students, they often have difficulty being accepted by students from the mainstream, that is, by students who reject them because they are perceived as being different.

Although being gifted can present some difficulty with acceptance among mainstream students, gifted students are generally pleased with their giftedness. However, these students are often subjected to the pressures of well-intentioned adults, both at home and at school, who wish to ensure that the students'

talents are not wasted. In addition, the pressures that these students impose on themselves are often more severe than those that come from other people. Often, when a great deal of attention is paid to these students' giftedness, they begin to see their intelligence as an indicator of their worth as a human being. Conversely, academic failure, or even reports of marginal performances, can for students with such a focus be unbearable.

Students and the Technological Society

For approximately two hundred years, the United States has been a world leader as a manufacturing nation. However, with the industrial age coming to a close and the information age burgeoning, many good salary blue collar jobs in manufacturing are disappearing. The fact that many domestic products are being replaced with imports also contributes to this phenomena.

Within the existing structure of the domestic manufacturing sector, the number of jobs continue decline as a result of automated systems. Furthermore, the consumption of foreign products and the replacement of workers by machines have created a dramatic shift in jobs away from manufacturing and toward lower-paying service sector jobs. Present and future changes in the

nature of work will alter the skill requirements for entry level employees, and, as a result, will alter the curriculum offerings in the schools responsible for providing students with employment skills. Although specific skills for future workers cannot be anticipated with any great degree of accuracy, it may be assumed that these employees will need abstract reasoning skills and will need to be computer literate.

In the same way that machines have reduced the physical demands on employees, computers have reduced the need for mental effort. Within a few short years, computer systems, once cumbersome and requiring constant human supervision, have become compact and increasingly less human-dependent. In addition, computers continue to be less expensive, to have greater capacity and speed, to offer excellent support services for skill training and maintenance. As computers take on a greater share of the work to be done, the question arises as to whether these systems will eliminate workers entirely.

Ellul (1980) describes the confrontation with the machine as one where man faces another being capable of doing everything he can do, and do it with greater speed and accuracy. Machines work day or night, require no salary or benefits, never call in sick, and can be depreciated. From the perspective of the

capitalist, the use of automated equipment is a more efficient and cost effective way to do business.

Modern production techniques make it possible to produce a more consistent product with greater speed. This increase in production can help relieve shortages in under supplied markets. However, at the same time, such techniques can create over supplies in markets where no such shortages exist, and, ultimately, can create a deflated market with falling prices. In addition, overproduction increases the amount of obsolete, often difficult-to-dispose-of products, thereby contributing to an already unmanageable accumulation of global trash.

Some people view technological advances as a menace. They contend that technology is autonomous and, once introduced, takes on a life of its own, one which is free from human guidance and control. Advanced weapons systems are considered by 'technophobes' to be classic examples of the menace of autonomous technology. Technophobes further contend that nuclear weapons programs, Star Wars, and other such initiatives will eventually lead to human devastation.

Issues Related to Staffing Public Schools

During the first seven decades of the twentieth century, an adequate number of new teaching jobs existed for those who were willing to commit themselves to the rigors of its training process. However, in the 1970s, changing views on careers, marriage, and family resulted in a dramatic decline in the birth rate. Consequently, within a few years schools began to experience a significant drop in the number of students.

A significant number of Baby Boomers who delayed a commitment to family life have, in recent years, chosen to bear children. Coupled with the existing school population, the children of the 'boomers' have caused the student population to stabilize, and future projections indicate some increases. Given that school age populations continue to increase, the number of new teachers needed to serve these students should increase. In addition to increasing student numbers, the number of teachers retiring from the profession should contribute to the availability of teacher openings. Many of these teachers, hired in the 1950s and 60s, will retire in the 1990s. As a result, many researchers contend that, within a few years, competent and certified teachers will again be in short supply.

Finding a sufficient number of skillful teachers to staff America's schools may be particularly difficult since, as researchers are finding, teaching no longer has appeal to capable young people. Mangieri and Kemper (1984), in a survey study of 5000 college bound high school students, concluded that the greater majority of these students have little or no interest in the teaching profession. The survey, which also attempted to determine why so many of these students were not interested, listed salary issues, lack of professional advancement, lack of student respect, and poor working conditions, as the major reasons for their lack of interest. In an attempt to add to the research of Mangieri and Kemper, Ryan (1987) administered the same survey to smaller samples of students with specific skills. Ryan raised the question of whether or not special subject matter skills would promote interest in teaching that subject area. For example, would students with a proven competence in science wish to teach science? Although some of the results varied slightly, results of the Ryan study confirmed, for the most part, those of Mangieri and Kemper.

Propositions of the Research

Proposition I: Changing Schools

Schools can become more effective places to learn through creative change strategies which are initiated, implemented and administered by teachers. During the process of change, teachers often discover new resources for school improvement.

Proposition II: Cooperative Education

Opportunities to participate in practice oriented off-campus cooperative work experiences are generally reserved for students planning to enter the workforce after graduation from high school. It is this author's belief that these experiences would be beneficial to the college bound student as well. The Coster study examines this belief through an off-campus, cross-age tutoring experience in CAD.

Proposition III: Building Relationships

Students who are academically gifted and, at the same time, learning disabled, face unique problems in schools. The way they are perceived by others, and their own self-perception cause in these students confusion and a sense of alienation. Consequently, the

positive, older male, role model presented to the by the interns is a valuable component of the youngsters affective development.

Proposition IV: Technology and Values

In contemporary society, computers and other machines increasingly perform functions which were once done by people. Automated systems threaten to render workers jobless, and, coupled with fears that technology is beyond human control, can cause people to distrust and/or fear technological change.

Consequently, negative aspects of technological change can generate a backlash against technology rather than eliciting judgments about how to best use it.

Therefore, schools, in addition to offering technical skills, must create for students an awareness of how technology impacts people.

Proposition V: Seeking New Teachers

Research evidence supports the position that there will be a future shortage of highly qualified teachers. If such shortages are to be avoided, students with the potential to become high quality teachers must be recruited. Recruiting can be efficiently conducted within the classroom by teachers as a function of vocational guidance.

CHAPTER 3

DESIGNING THE STUDY AND COLLECTING DATA

Introduction

The Resources classroom measures approximately fifteen feet by fifteen feet and is situated the end of a long hallway in Coster Elementary School's upper level. Although less than spacious it is compact and well-organized and its scaled-down tables, chairs, and other furnishings make it appear somewhat larger. Upon entering, a visitor faces a large round table with cut-down legs, surrounded by chairs of appropriate heights arranged in front of a single window partially obstructed by a portable blackboard. The room's rear area has space for individual study and quiet time. The right wall counter is set up with computers while the left provides a showcase for student work. (See Figure 3.1)

With the exception of their teacher, the occupants of the room are also scaled-down. Bev stands as a giant among the six boys who reach heights of about four feet with weights of about sixty pounds each. The youngsters give the appearance of being perfectly average students until they begin to speak. They are friendly and eager to discuss a variety of topics: sports, abstract science, art, recreation, local politics. When they begin to speak, they choose words

that are surprisingly sophisticated, and the nature of the conversation is adult-like.

The Resources students are special needs students having learning disabilities and high or extremely high levels of intelligence. Each has been referred to the program because of some difficulty with learning in the mainstream. Because the Resources class is small, the students are given the individual attention necessary to help them overcome their disabilities, and the curriculum encourages independent study so as to stimulate each student's unique talents.

The academic needs of the youngsters are well served by the Resources program. However, there is reason to believe that these students might experience feelings of alienation as a result of being removed from the mainstream. A concern for the potential alienation of the youngsters was a primary reason for the placement of high school tutors in the Resources classroom in the fall of 1990.

Designing the Study

The survey of relevant literature, summarized in Chapter 2, concluded with the formulation of five propositions which provided a theoretical foundation for the dissertation. The CAD tutoring project at Coster Elementary School added a practical dimension to

the research document. Interaction between the interns and youngsters at Coster School permitted the author to observe the types of behavior that were suggested in the survey of literature, the types of behavior that the author anticipated might occur, and other behaviors which were not anticipated.

To ensure confidentiality the names of all study participants, as well as the names of schools and community, have been changed. See appendix C.

Figure 3.2 charts the author's course of thought and action from the conceptual stages of a school change project at Coster Elementary School to the completion of this dissertation. The figure shows in graphic fashion the logic which connected the various components of the research.

As in many case studies, the reduced but unanalyzed data from observations and interviews is quite lengthy. As such, it is not included in the dissertation but is available for review.

The Coster Elementary School study attempted to document the impact that older students have on the cognitive and affective development of younger ones. The study was designed to demonstrate how high school students can be utilized to improve the instruction of elementary youngsters. Essentially, the study introduced the youngsters to the use of computers in

technical drawing or CAD. Figures 3.3, 3.4, and 3.5 are samples of the youngsters CAD drawing.

In addition to helping youngsters develop cognitive skills, the study examined student attitudes and values. A primary goal of the program was to create for both the interns and the youngsters an awareness of, and a sensitivity to, the problems that are created for both people and environments when technology is not carefully controlled. The study included the interns' expressed opinions on a number of social issues that has technological implications.

The Coster Study presented the interns with an opportunity to learn from personal experience. As an off-campus, practice-oriented, learning situation, the study enabled the interns to benefit from the direct application of skills acquired in the classroom. The interns' learning experience was, in the author's view, cooperative and similar to an on-the-job training program.

The interaction between the interns and youngsters was examined as a case study. Data was collected through direct and participant observation, as well as through questionnaires and interviews with the involved students and with other relevant personnel. The author acknowledged his initial limited understanding of teaching the gifted and relied upon the expertise of

the director of Resources, a program for G/LD students of which the youngsters were part.

The study was inductive rather than deductive, and it was designed to build rather than test theory. As action research, the study closely examined patterns and themes which emerge as a result of classroom observations. Data from observations was used to formulate interview questions, which added to questions that originated with the survey of literature. The participating students provided, through their observable behavior in class, input to research topic selection. In this way, the students helped to design the research.

Yin (1984) assesses the role of the participant-observer as a special mode of data collection where the investigator is not a passive observer. In such studies the investigator may take a variety of roles and may actually participate in the events being examined. Yin further states that this type of data collection lends itself well to everyday settings, such as organizations or small groups. Merriam (1988, p.102) concurs with Yin on the value of participant-observer data collection:

"Participant-observer is a major means of collecting data in case study research."

During the Study's early stages, the author was an active participant in classroom activities, functioning in a traditional teacher's role. It was assumed that placing the interns in teachers' roles would, initially, cause some anxiety, a reaction which would warrant the support of a member of the staff to resolve conflicts or other unanticipated problems. After several months, all instructional duties and conflict resolutions were handled by the interns, thereby permitting the author to make observations free from the demands of teaching. Having the interns provide classroom instruction was extremely beneficial to the author since careful observation and the posing of appropriate questions would not have been possible were the author in a traditional teacher's role.

The students involved in the study might best be described as a convenience sample. The four high school interns represented the total population of the Technical Drawing III class at Bingham High. The six youngsters were chosen after a search of three elementary schools was conducted. The author sought a student population which would willingly take part in the study and be available at an appropriate time. The youngsters were part of Coster Elementary School's Resources program for G/LD students.

Rationale for the Case Study Method

Merriam (1988, p. 27) and Marshall and Rossman (1989, p. 48) suggest the use of case studies to examine an innovative school change project. According to Merriam, "Innovative programs and practices are often the focus of descriptive case studies in education." Case studies, such as the one proposed here, attempt to examine some phenomenon within a social context. Unlike a survey study, which generally needs a large sample of respondents, the case study lends itself well to intensive study of a small sample. Merriam states that case studies focus on a particular case, need to provide a "thick and rich description," create in the reader an understanding of the phenomena, and are inductive in that they deal with specifics.

Since this particular case study case uses the researcher as the principal instrument for data collection, the researcher must be sensitive to personal biases. Merriam (1988, p. 39) warns of the dangers of subjective research because the primary instrument in a case study is human and, as such, all observations are filtered through one's world view, one's values, one's perspective. Another obstacle to successful subjective research is lack of proper planning of the research project. Rothman (1980, p. 88) offers the following suggestions:

- . Anticipate what will happen.
- . Have a set of priorities laid out.
- . Anticipate decisions
- . Set realistic deadlines.
- . Have a broad basic strategy.

The author anticipates that the analysis of data will be a complex process and must begin at the early stages of the study. Merriam (1988, p. 123) recommends that the data be interpreted as it is collected. "The collection and analysis should be a simultaneous process in qualitative research." She observes that this simultaneous process is the distinguishing feature of qualitative design. Locke et al. (1987, p. 70) also suggest an early approach to the analysis of data. He cautions the researcher as follows: "Countless unfortunates have found themselves with shoe boxes full of unanalyzable data, all because the analysis was supposed to take care of itself."

One of the author's functions during CAD instruction at Coster School was note-taking. As the program progressed, the number of notations per session increased significantly. This increase might be explained as a consequence of a heightened sensitivity to classroom activity and/or improved note taking skills. Notes on each session were rewritten and filed on a computer disk. These files were reviewed periodically so as to examine the nature of the

observations, and to record the frequency with which particular observations repeat from session to session.

Marshall (1989) shares insights in the complex process of reducing raw data collected in field notes into meaningful and distinct categories. She describes it as reducing reams of data into meaningful 'chunks' which provide the researcher with insights about the data's significance. Data collection was, for the author, a continuous process of assigning collected data to specific categories. Observations were examined in terms of their specific nature, frequency with which they are observed, and their immediate and long range importance to the interns and youngsters.

Observation Techniques

Field notes compiled during observation periods provide the raw data from which a study's findings will eventually emerge. Merriam (1988) contends that the researcher must rely on memory to reconstruct what has been observed. Merriam (1988) cites Taylor and Bogdan (1984) as the sources of the following suggestions for the observer:

- . Pay attention.
- . Focus on one person, mentally blocking others out.
- . Look for key words in people's remarks.

- . Concentrate on a conversation's first and last remark.
- . Mentally play back remarks during breaks.

Observational Procedures at Coster School

All collected data was placed in one of four broad categories: Program Formation, Program Operations, Relevant Concepts, and External Factors. The broad categories were then subdivided into topics. Breaking down the raw data presented some difficulty since some data could have fit appropriately in two or more categories or topics. However, the author made decisions as to which category was most appropriate for each citation, and, therefore, created distinct classifications. The number of times cited (Frequency) and total lines of field notes collected (Data Lines) appear at the top of each subdivision. Frequency refers to the number of times during the study a field note deals with a specific topic. Data Lines refers to full or partial typed lines which appeared in the raw data. It was assumed that the most frequent citations would pertain to issues most central to the study. However, it was not assumed that a citation which appears infrequently, or a single time, was insignificant to the study.

Data Categories

1. Program Formation
2. Program Operations
3. Relevant Concepts
4. Factors External to the Study

Data Subdivisions

1. Observations Assisting Program Formation

Nature of Citation	Frequency	Lines
a. Intern Rookie Mistakes	6	27
b. Interns and Organization	4	25
c. Youngsters and Organization...	1	10

2. Observations of Operations

Nature of Citation	Frequency	Lines
a. Good Teaching	18	77
b. Specific Disability	14	73
c. Interns Control Class	12	71
d. Bev's Transition	13	43
e. Intern Teaching Style	11	50
f. Matt's Alienation	9	53
g. Loose Class Structure	9	39
h. Intern as Role Model	5	26
i. Researchers Activity	5	21
j. Key Informants	3	18
k. Interns Commitment	3	16

l.	Times of Inactivity	3	16
m.	Ram Pull Toy	3	12
n.	Researcher's Transition	2	9

3. Observations which Pertain to the Concepts

Nature of Citation	Frequency	Lines
a. Accelerated Learners	13	75
b. Gifted Isolates	12	97
c. Positive Features of G/LD	4	17
d. G/LD see Giftedness	1	4

4. Observations Related to External Factors

Nature of Citation	Frequency	Lines
a. Potential Teachers	8	27
b. The War in Iraq	6	22
c. Finding Additional Resources..	4	14
d. Human Skill and Automation ..	3	11
e. Cooperative Education	2	12
f. Cost Effect of Resources	1	10

Interviewing Techniques

Both Merriam (1988, p. 102) and Whyte and Whyte (1984, p. 94) stress a need to use interviews in conjunction with participant-observation in order to ensure effective data collection. Merriam observes

that participant-observation "when combined with interviewing and document analysis, allows for a holistic interpretation of the phenomenon being investigated." Whyte states "In stressing the importance of linking interviewing with observation, I have noted that observation alone does not reveal to us what people are trying to accomplish or why they act as they do."

Both Yin (1984) and Merriam (1988) state that the interview may be structured, which is, according to Merriam, (1988, p. 73) "an oral form of a written survey," or, open-ended in the form of conversation which encourages the respondent to interpret and give opinions. It is through the open-ended form that the respondent can describe and interpret their perceptions in a unique way. The researcher may, according to Yin (1984), ask the respondent to propose his or her own insights into certain occurrences. The more interpretive the respondent is, the closer his or her role in the research is to that of an "informant." Key informants have been recognized as a critical part of successful case study research.

Merriam (1988) suggests case study interviews which proceed from the posing of several different types of questions. Examples of typical questions presented to interns and youngsters are as follows:

Hypothetical Questions: "If you were teaching this class, and could teach anything you wanted, what would you teach?"

Devil's Advocate Questions: "Some people say that technology is self determining, that is, it is free from human intervention and, once created, cannot be contained. A classic example of such phenomena is the threat of nuclear weapons. How do you see this issue?"

Ideal Position Questions: "What benefits are there for you in this study? . . . In what ways do you see your own education, particularly technical education, operating poorly? How would you change it?"

Interpretive Questions: "What classroom observations are evidence of the gifted student's sense of isolation?"

In the year at Coster School, both structured and open-ended interviews were conducted with the interns, youngsters and the Resources director. Although interviews were spread across the entire year, most were held during the last two months of the study. Some interview questions originated in the survey of literature and others arose as a result of classroom observation. Several of the twenty eight interviews appear as an appendix in this dissertation.

Sequence of Interviews

INTERNS: MICK, TIP, TOD, AND SAUL
 YOUNGSTERS: MATT, PADRICK, DON, CHAD, BRYAN, ANTON
 RESOURCE DIR: BEV DONNELLY

NUM.	DATE	INTERVIEWED	MAJOR TOPIC OR TOPICS
1.	Oct. 24	Mick	Insights on Matt
2.	Nov. 1	Bev	Program corrections
3.	Dec. 21	Interns	Program development
4.	Jan. 7	Pad, Matt	Benefits to youngsters
5.	Jan. 10	Bryan	Benefits to youngsters
6.	Jan. 22	Youngsts.	G/LD students and friends
7.	Jan. 25	Bev	Difficulties of the G/LD
8.	Mar. 18	Matt, Don	Perception of giftedness
9.	Apr. 22	Mick	Programs for G/LD
10.	Apr. 23	Tip	View of technology
11.	Apr. 24	Tod	Program pluses and
12.	Apr. 28	Mick	Liabilities of technology
13.	Apr. 29	Tip	G/LD vs. average student
14.	Apr. 30	Saul	Potential teachers
15.	May. 3	Tod	Cooperative education
16.	May. 6	Tip	Potential teachers
17.	May. 10	Tod	Potential teachers
18.	May. 14	Tod	Automation vs. people
19.	May. 15	Tip	Overproduction
20.	May. 16	Saul	Program in hindsight
21.	May. 17	Mick	Potential teachers
22.	May. 22	Tod	Service vs. craft jobs

23.	May. 23	Saul	The war in Iraq
24.	May. 29	Matt	Final comments on program
25.	May. 29	Chad	A troubled youngster
26.	May. 29	Don	Final comments on program
27.	Jun. 5	Padrick	Final comments on program
28.	Jun. 5	Anton	Final comments on program

The first section of Chapter 4 of this dissertation extracts significant points from observations and uses these points to formulate interview questions.

The following outline shows the observational topics that prompted interview questions and the interviews in which these questions were presented. Most, but not all, of the 'Nature of Citation' classifications were used to formulate questions.

Observations for Interview Questions

1.	DATA CATEGORY	Program Formation	
	NATURE OF CITATION		RELATED INTERVIEW
b.	Interns and Organization	2,3,11,14,20
2.	DATA CATEGORY	Program Operations	
	NATURE OF CITATION		RELATED INTERVIEW
a.	Good Teaching	9,11,14,20
b.	Specific Disability	1,9,25

c. Interns Control Class	20,25,26,28
d. Bev's Transition	7,11,14
e. Interns' Teaching Style	5,25,26
g. Loose Class Structure	20
h. Interns as Role Models	3,4,5,11,17,24,25,26
j. Key Informants	3,8,21,24
k. Interns' Commitment	3,11,15,17
m. Ram Pull Toy	4

3. DATA CATEGORY Relevant Concepts

NATURE OF CITATION	RELATED INTERVIEW
a. Accelerated Learners	1,7,8, 13
b. Gifted Isolates	6,7,13,24,25,26
c. Positive Features of G/LD	17,20
d. G/LD see Giftedness	8

4. DATA CATEGORY Factors External to the Study

NATURE OF CITATION	RELATED INTERVIEWS
a. Potential Teachers	11,14,16,17,20,21
b. The War in Iraq	10,23
c. Finding Additional Resources	7,15,27,28
d. Human Skill and Automation	12,18,22
e. Cooperative Education	3,7,14,15

Propositions and Topics

Chapter 4 presents data collected through observations and interviews, and it compares these findings to the five original study propositions which, from this point on in the dissertation, will appear in a somewhat shorter version than the original statements appearing in Chapter 2. The findings of the study are listed as topics under each proposition, and they result from the synthesis of observations, interviews, and propositions.

Proposition I: Changing Schools

Teachers can bring about positive changes in school policies and procedures.

Topics

1. Founding Premise of the Foster School Study
2. Bev as a Resource
3. The Interns as a Resource
4. The Youngsters as a Resource
5. The Cost Effect of 'Resources'

Proposition II: Cooperative Education

The Coster Study presented an off-campus experiential learning experience to a group of college-bound high school students.

Topics

1. Designing a Cooperative Learning Experience
2. Interns Views on Cooperative Education
3. The Youngsters as Tutors

Proposition III: Building Relationships

The interns in the Coster Study acted as positive role models for the youngsters.

Topics

1. Bev's Perception of Role Models
2. Interns' Perception of Role Models
3. Youngsters' Perception of Role Models
4. Youngsters' Response to the Interns
5. Discussion of Role Models at Coster School

Proposition IV: Technology and Values

Computers and other machines perform functions which were once done by people. Fear of job loss, coupled with fear that technology is beyond human control, causes people to distrust or fear technological change.

Topics

1. Interns' Perceptions of Technological Issues
2. The War in Iraq

Proposition V: Seeking New Teachers

Research supports a future shortage of highly qualified teachers, particularly teachers in technical fields. Practicing teachers can ease the shortage by promoting the profession within their classrooms.

Topics

1. Pretesting the Interns
2. Interns' Views on Teaching as a Career

Evaluating the Study's Effectiveness

The final section of Chapter 4 examines data which support the Coster Study as a worthwhile learning experience for the interns and youngsters.

The study provided a vehicle for meeting student needs which could not have been met in a traditional classroom. It is proposed that the interaction of the two unique populations was a mutually beneficial experience, and, the involved students both enjoyed the program and considered it a profitable experience. It is further proposed that the study's results can be a useful guide for other change strategy projects.

Topics

1. Growth of the Interns
2. Bev as a Measure of Program Success
3. Indications of Interns' Commitment
4. Evaluating Cooperative Education at Coster School
5. Meeting the Needs of a Unique Population
6. Youngsters Evaluate the Interns' Influence
7. Evaluating Classroom Control
8. The Teacher as Learner

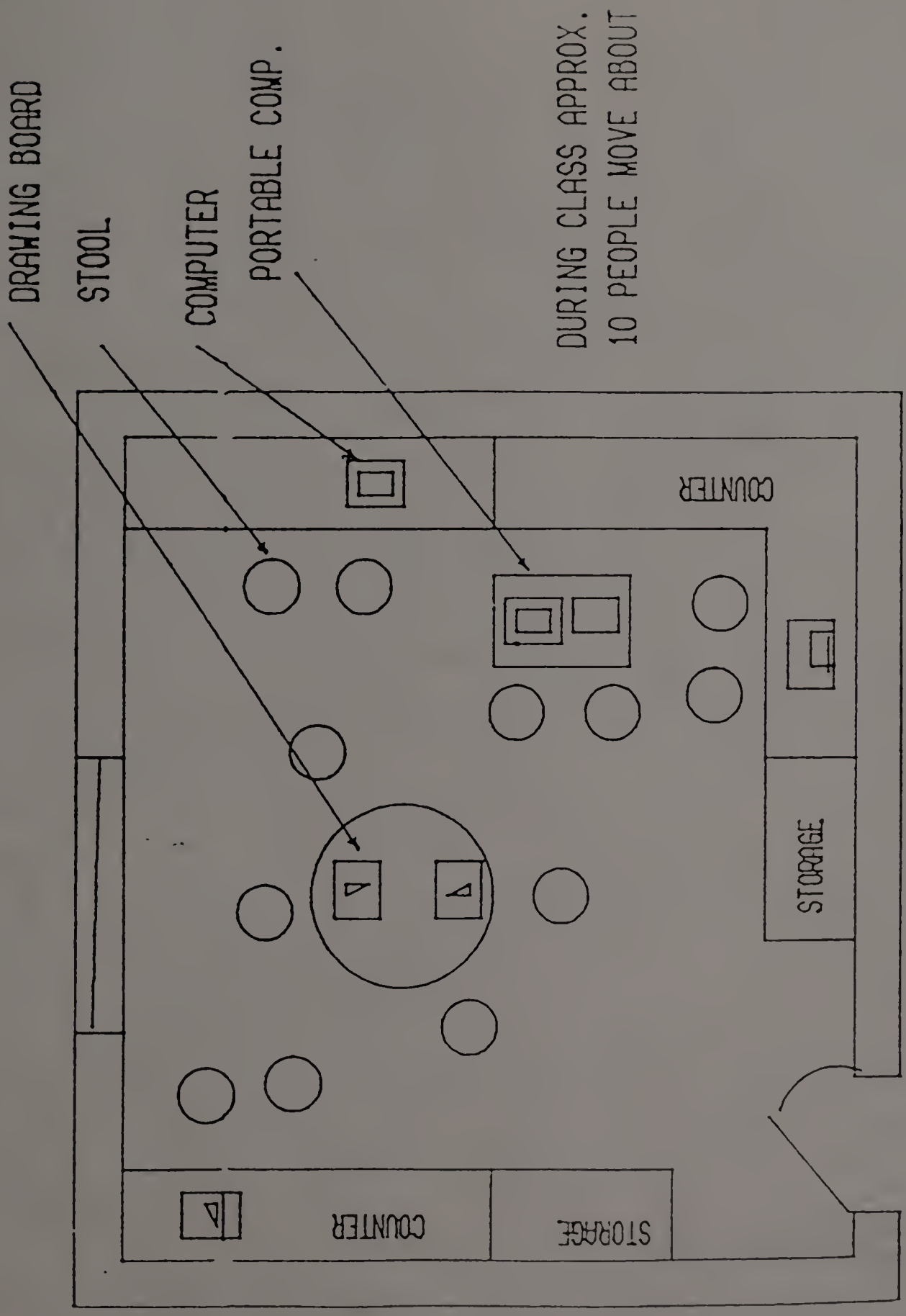


Figure 3.1 Resources classroom

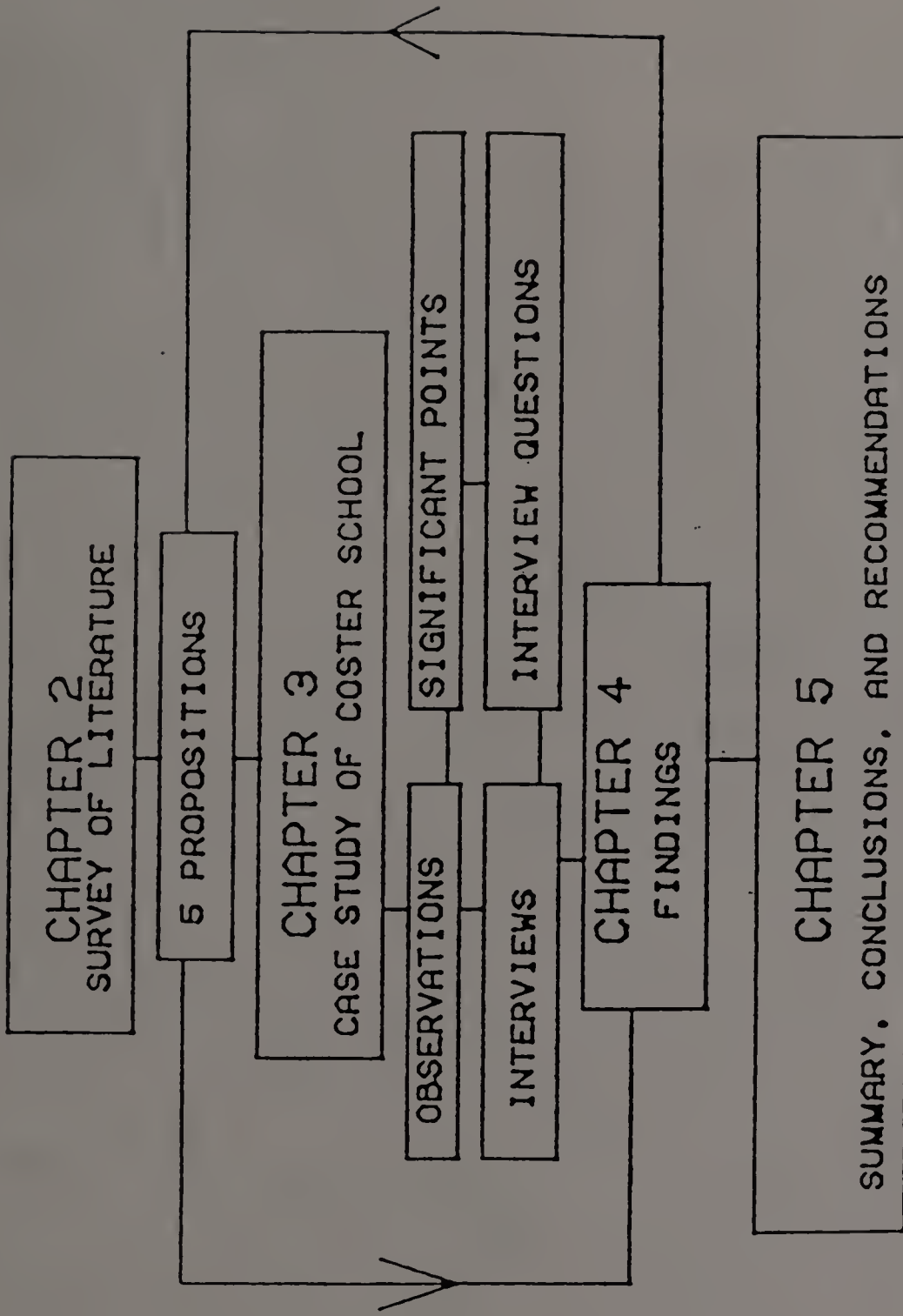


Figure 3.2 Conduct of the study

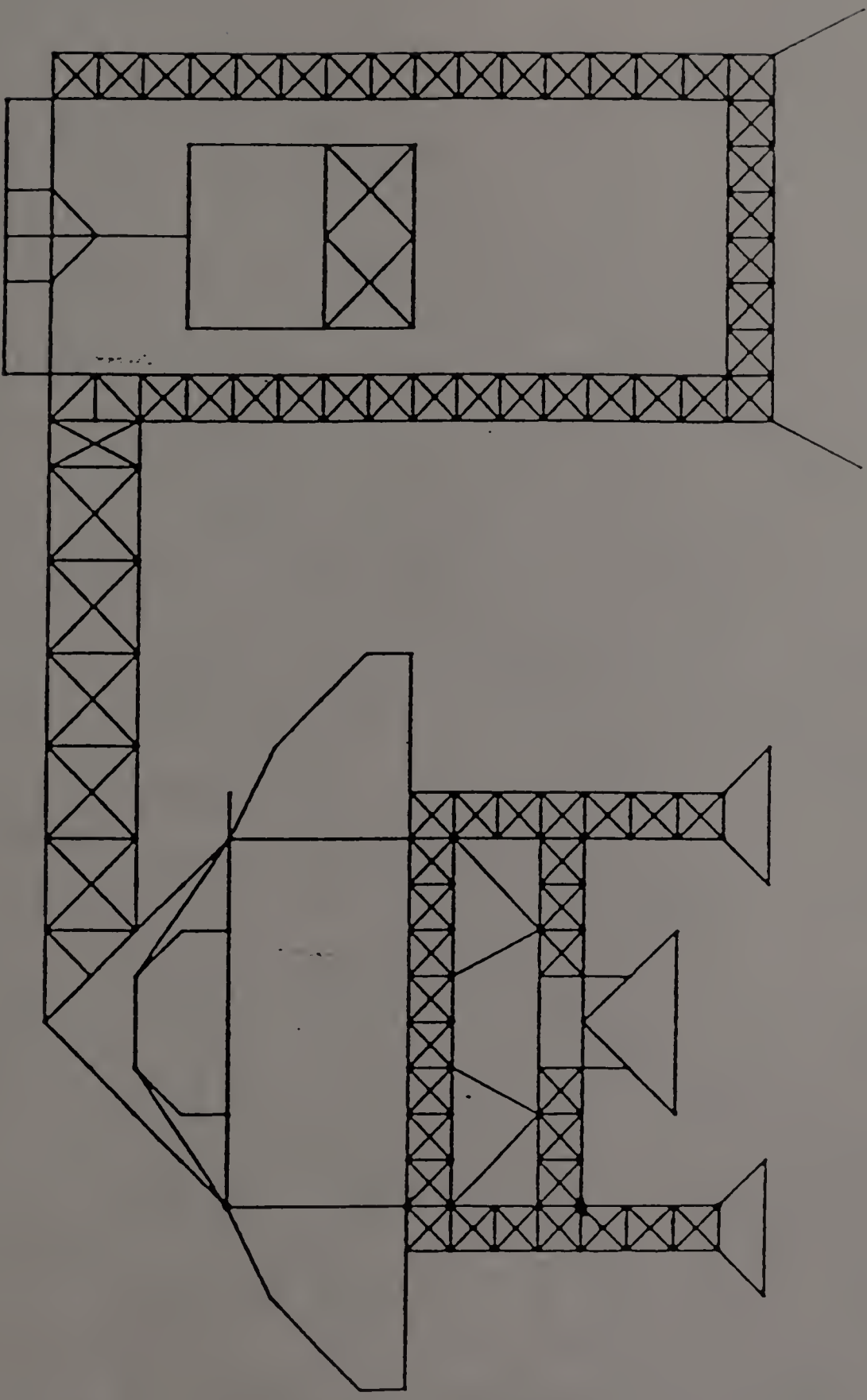


Figure 3.3 Sample of student work

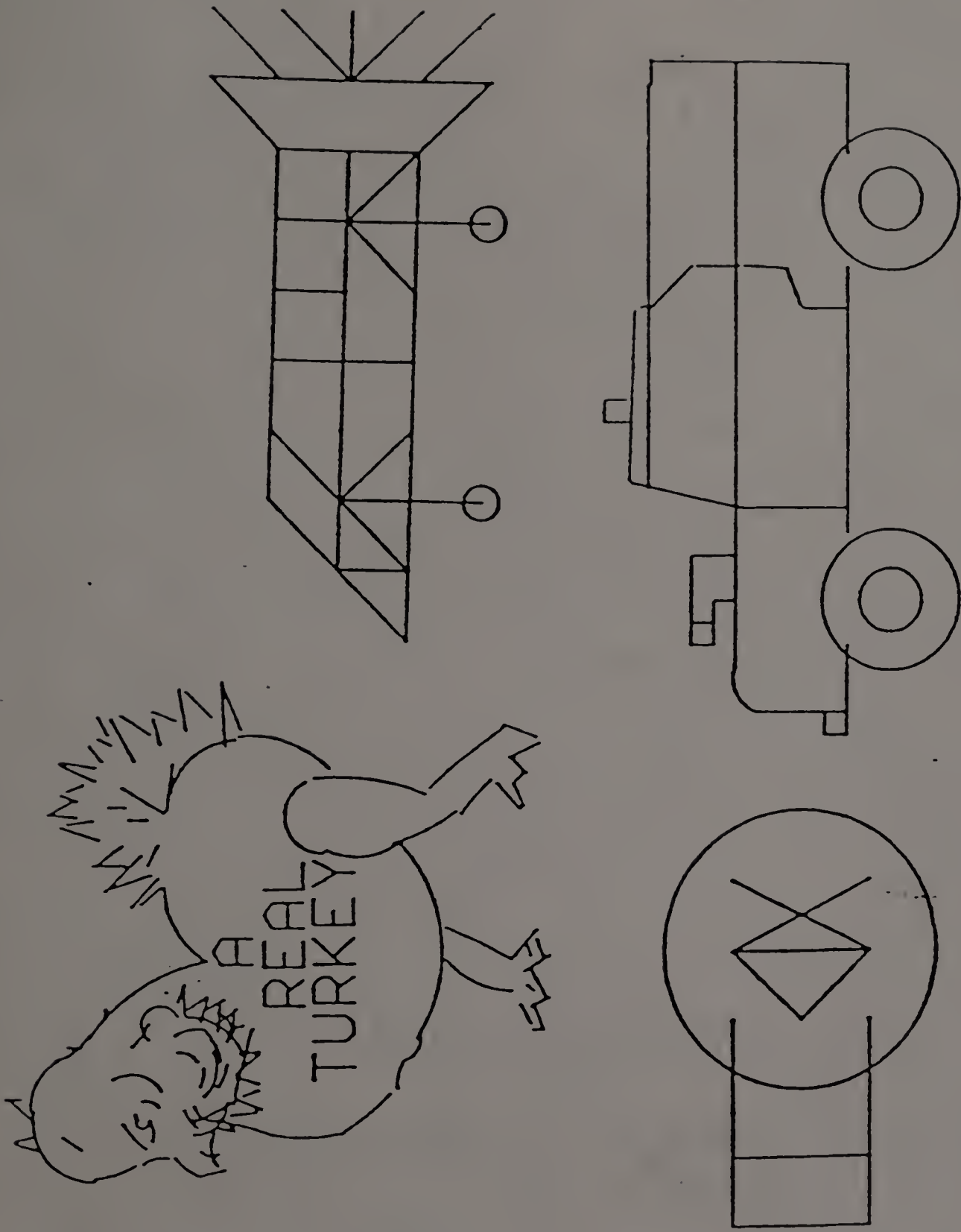


Figure 3.4 Sample of student work

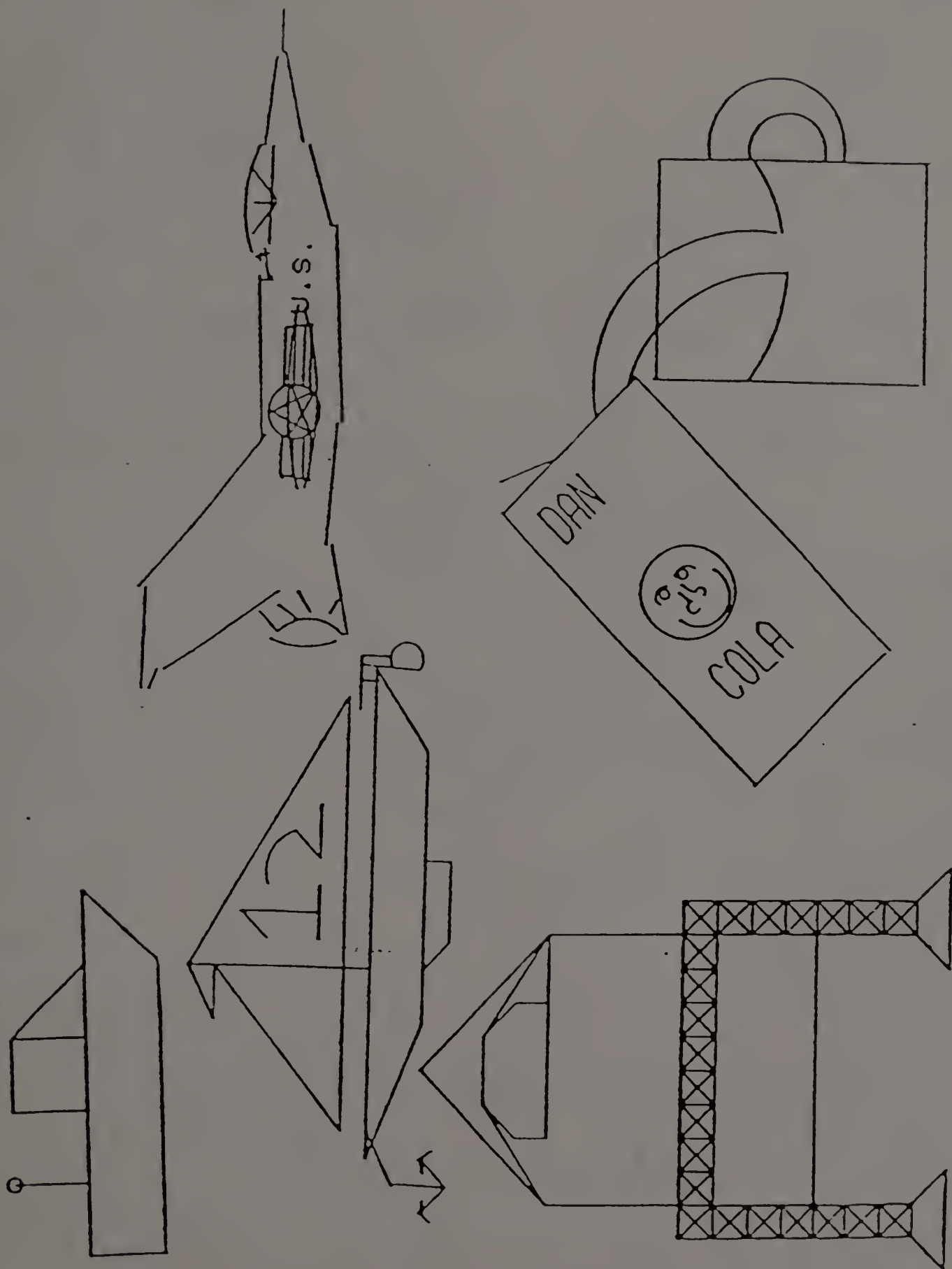


Figure 3.5 Sample of student work

CHAPTER 4

FINDINGS OF THE STUDY

In order to be useful, data must somehow be separated into discrete categories. This process of separation is difficult since much of the data does not clearly belong in a single category, but could be placed in two or more of them. Case study researchers frequently note their frustrations when sorting out collected data. Such was the case of the Coster Study.

Researchers must carefully examine each observed event and decide into which category it will be entered. Generating these classifications proved to be a most difficult and time consuming process. However, when categories were finally designated, the study had, for the first time, the structure necessary for it to proceed.

The significant points of classroom observation were compared to the study's propositions for purposes of formulating interview questions. The final stage of data collection is a comparison of that which was revealed in interviews with the original propositions of the study.

Program Organization

Because of the experimental nature of the Coster Study, the formation stage was a continuous process throughout its duration. During the early stages of the study, and periodically as the year progressed, Bev provides insights into the unique nature of the G/LD student. Once into the instructional phase of the study, it was necessary to request feedback from the interns to improve the quality of instruction. The interns suggested formal lesson plans, assigned drawings from textbooks and other sources, and more efficient methods of equipment mobilization. In an attempt to measure the youngsters progress they designed a test of drawing skill. Initially, the interns were uncertain about their ability to teach and control the youngsters. The interns were reassured that their instruction was more than adequate, and reminded that their control of the youngsters was essential to the success of the study. The interns responded favorably by demonstrating control that was, except in extreme cases, quite satisfactory.

Interview Questions Based on this Citation

The Resources Director had keen insights on the particular needs of her students. She provided constant feedback on what was good, and what was not good, about the program and help make critical decisions on how and where it should proceed. After the first class meeting at Coster School the author took a few minutes to exchange ideas with Bev on how the program should be altered to make it more effective. These are a few of her recommendations.

The program needs more structure. We have enough tutors to work one on one with the youngsters but it seems that they still have idle moments. We should use buddy system. That way each youngster knows that he is responsible to somebody. I would like the youngsters to try some of the traditional drawing methods. Perhaps we could use some triangles, compasses, 'T' squares, and so forth.

[Interview 2]

The program used much improvisation during the its early stages because of the interns lack of teaching experience. Early classroom sessions focused on socialization of the two student groups, building the interns confidence, and promoting their leadership role in the classroom. Over a period of months the interns assumed nearly all instructional duties in the classroom.

Because the program was very loosely structured, it was subject to constant revisions. Just before Christmas the interns were asked to comment on the program's development and their (the interns) emerging role in it. Tip responded: "Things are getting better. I see our roles getting clearer all the time."

Saul responded to questions similar to those presented to Tip.

I think we're all enjoying it (the study). I think the ideal way would be to run it from start to finish, reorganize, and run it again. Of course, the program would have to run for at least two years.

[Interview 3]

By mid April the interns had clearly established themselves as the youngsters source of instruction handling nearly all classroom matters without assistance. It was apparent from observation that the program was working very well. Tod commented on these visible signs of program effectiveness.

I notice that, when we arrive at Coster, the youngsters are watching the doorway for us. When we come to class, whatever is going on in class stops right away. The kids are always anxious to get started on the drawing. You know they really like it. When Mrs. Donnelly wants to threaten them she says 'Next time we have tech drawing, you won't be permitted to take part.'

[Interview 11]

Saul as well as Tod used Bev's confidence in them as a measure of program success. He commented on the program's loose but effective operation.

I think Mrs Donnelly trusts us much more than she used to because she leaves us alone with the kids more often. She really keeps the youngsters working when she's in class. I think the youngsters are more independent. They seem to be doing more drawings on their own, not like in the past when we were more in control. I think everybody seems to relax a bit near the end of the year.

[Interview 14]

Approximately one month after Interview 14, Saul made some additional comments and reflections on his year at Coster school.

I think we should have had more emphasis on a teaching atmosphere. Most of the things the Coster kids did were of their own choice. I think the program would have been better with more required assignments. For one thing, it would have given us [the interns] a better idea of what teaching was really like.

[Interview 20]

Program Operations

Good Teaching

Good teaching was the most frequently cited observation in the Coster School study. These observations were in reference to the interns knowledge

and skills related to CAD, as well as their interaction and positive impact upon the youngsters.

The youngsters are concerned with their rapidly approaching high school years. The interns frequently shared their high school experiences with the youngsters who listened intently to this primary information source.

During the study, the uniquely different personalities of the interns emerged. Saul, who is a highly skilled drafting student, was sometime uneasy in a teaching role because of shyness. Tip did a commendable job as an instructor, but occasionally needed direction. Tod experienced much growth as an intern. He took on extra responsibilities and developed a close relationship with the youngsters. Much of the intern leadership came from Mick. He seemed to have a personal investment in the program based upon a personal experience where his academic capabilities were inaccurately assessed. Mick initiated and administered a test of the youngsters drawing skills.

Because of the friendly relations between the interns and youngsters, the Resources classroom was frequently louder than most traditional teachers would prefer or tolerate. However, it was observed that, although loud, the youngsters pretty much kept focused

on assignments and the classroom was generally within the interns control.

The interns received regular reassurances that the instruction that they were providing for the youngsters was of high quality. This was done to provide them with a needed confidence boost, and, because they were in fact doing fine work.

Interview Questions Based on this Citation

Donny was bigger than most fifth graders. Prior to and during the Coster Study he frequently engaged in fights with fellow students. Mick has good insights regarding the difficulty that Donny was having in his dealings with these students. He was also aware that this was a problem which would not be easily solved. Mick comments as follows:

I think Donny has little confidence in himself. He's big enough to beat up most kids his age. This might be how he handles frustration. He might be under pressure to do well in school because he is smart. This might make him mad.

[Interview 9]

Tod was somewhat surprised at his success in the classroom. With an improved self image, Tod began to consider the possibility of other undiscovered talents.

For one thing, I never thought I would be able to teach. I couldn't believe how much I really knew about drawing. I figure if I can teach, there must be a lot of other things I can also do - that I never thought I could.

[Interview 11]

At times it appeared that the interns were having difficulty controlling the youngsters classroom behavior. It is the author's opinion that this difficulty resulted from the way the interns were presented in the program's early stages. Saul clearly understood the role he was intended to play at Coster School. That role did, however, somewhat limit the amount of control he and the other interns had over the youngster. He offers some comments regarding classroom control.

I don't think any one of us wanted to be an authority in the class. I think we were there to work with them, and talk to them as an older brother might. I always felt that the youngsters saw us as other kids, just older. We had a lot of fun with them, but it was hard to get them to do something when they didn't want to do it.

[Interview 14]

Saul was sensitive to the youngsters creative nature. That creative nature, he contended, would justify a loosely structured classroom environment

which offered a variety of required and optional student assignments.

I think both assignments are important. Importance is determined by the person rather than the assignment. It depends on the type of person you are. I think choices are more important to creative people. I think when you are not very creative, the choices are less important.

[Interview 20]

Specific Disability

The youngsters are challenged by a variety of impediments to learning. Attention Deficiency Disorder, hyperactivity, poor control of emotions, and physical handicaps are some specific problems. These disabilities often promote inappropriate behavior, which in turn, cause other problems.

Donny is a big, aggressive and often angry youngster with a long history of fighting in school. Padrick, requires constant attention to keep him focused on assignments. Without close supervision, he would accomplish very little in school. Chad has an abrasive manner, which, as a consequence, causes him difficulty in making friends. Match is hyperactive and has some physical limitations. Each youngster has their own separate and unique struggle.

Interview Questions Based on this Citation

Matt is a highly motivated student having great confidence in his academic skills. In other school matters, such as physical education, he lacks this confidence and would prefer to not participate. Mick gave his views on Matt's early entry to high school citing the gym area as one potential problem

Matt is very bright and knows it. He seems to feel that his work is always the best in class. For example, he mentioned to Padrick that his work was much better than his. I think some of his problems are created through his classroom success . . . He doesn't like gym to begin with. He told me he has trouble with the class because he has a bad hand [loss of some function], and because his classmates tease him. If he thinks they tease him here, wait until he gets into a high school gym class.

[Interview 1]

Padrick had, as did Matt, ADD (Attention Deficiency Disorder). Simply stated this means that they has trouble keeping their minds on their work. For the youngsters, short attention spans presented a real impediment to learning. Mick makes the following observation. "I think Pad is pretty much normal. I don't think he has any more difficulty concentrating than the average kid." His assessment is, however, in conflict with information from the Resources director. Bev stated that Pad was a disaster in a regular class and worked way below grade level. She felt that if he

were in a regular class, he would be just another disabled child, accomplishing very little.]

[Interview 9]

Chad classroom manner included a pattern of frequent disruptions. This pattern understandably provoked the interns. In spite of an abrasive manner, Chad seemed to be a decent but troubled youngster and the interns treated him compassionately. Chad discussed with the author two major issues of concern: his inability to make and keep friends, and, his disruptiveness in class. He did not appear to understand the role he was playing in the things that caused him to be unhappy. When asked about friends Chad responded: "I don't really hang around with anyone. Most of the time I ride my bike by myself." When asked if he had been a discipline problem in class he says: "Sometimes I was. What usually happens is, you have a misunderstanding and you get blamed for something you didn't do."

[Interview 25]

Interns Control Class

A loosely structure classroom permitted the interns to supervise the youngsters in a non threatening way. The interns worked in much the same manner as an older brother might help a younger one. The interns promoted a close and friendly relationship. However, the friendly environment was occasionally a deterrent to classroom control.

Good natured teasing of the youngsters by the interns, as well as other uses of classroom humor, were effective at motivating the students. Tod, a very humorous young fellow, was particularly good at this.

From October to January no classroom control problems, with the exception of occasional childish behavior, were observed. When Chad arrived approximately half way through the year the classroom underwent some changes. Within one week, all the interns knew that Chad was going to be difficult to control. As winter ended the youngsters began to show symptoms of 'spring fever'. At that time Chad was particularly disruptive. However, it was observed that with the exception of Chad, the interns provided

constant supervision and reinforcement for the youngsters, and consequently, maintained good control of the class.

Interview Questions Based on this Citation

Saul commented on the youngsters constant quarreling with each other as a factor in maintaining control of the class. He also noted that, generally speaking, they were easily managed in class.

I thought the kids were pretty good to work with. They were cooperative. If you took away all the time they spent in arguments with each other, they were really good to work with.

[Interview 20]

Chad seemed comfortable with the interns approach to classroom control. He commented on how the intern's instruction was different from instruction from regular teachers.

They didn't really yell at you like regular teachers. If you didn't pay attention, you just didn't learn. I think they were easier than regular teachers because they know what it's like to be taught by regular teachers and they understood the problems.

[Interview 25]

The interns served dual roles for the youngsters as authority figures and friends. These roles were in conflict when they felt it necessary to restore order in the classroom. Donny had a rather humorous way of

illustrating the difference between control of the classroom by interns, and control by a regular teacher. Donny's comments follow. "I never really saw them as teachers . . . I saw them as friends . . . You could never put a head-lock on a regular teacher."

[Interview 26]

Anton agreed with Chad that the interns were more understanding than were regular teachers stating that "The high school boys have a better idea of what it's like to be a kid. They were much more understanding."

[Interview 28]

Bev's Transition

Bev was fair but firm with the youngsters having a strong presence in the Resources classroom. Initially, it was difficult to determine whether or not she was pleased with the program's progress. Although she gave assurances to the interns that she approved of their handling of the youngsters, her classroom supervision continued while the interns tutored.

Her concern for the youngsters was understandable since as their teacher she was responsible, and

ultimately accountable, for the quality of their instruction.

Bev had other teaching duties that did not meet in the Resources classroom. As the year progressed, she appeared to be much more comfortable with leaving the interns in charge to fulfill these other commitments.

Interview Questions Based on this Citation

When Bev made her original commitment to participate in the Coster study, she commented on its potential for the affective development of the youngsters. During a January interview she elaborated on that aspect of the program.

The interns provide a solid male role model. Most of them do not have such a model. What I mean is, each youngster has a male role model that are pretty much like they are. The interns are an insight to average teenagers.

[Interview 17]

Saul took note of a growing confidence on Bev's part. He commented that she tended to be out of the classroom more frequently in the latter stages of the program affording them more complete control of the youngsters. He indicated a sense of program harmony and cohesiveness.

I think Mrs Donnelly trusts us much more than she used to because she leaves us alone with the kids more often . . .

[Interview 14]

Interns Teaching Style

As the year at Coster School progressed, the unique personalities of the interns began to emerge. The interns differed in their preferences for required and selected assignments. Saul and Tip in particular, and Mick to some extent, preferred to work with drawings from a standard drafting textbook. Tod, on the other hand, preferred the youngsters to select their own assignment either from a text, or to create a drawing from memory. Tod noted that he felt the youngsters preferred him to the other interns because of the choice he offered them on assignments.

All interns, with the exception of Saul, seemed comfortable in the Resources classroom at all times. Saul, in spite of his excellent drawing skills, sometimes seemed ill at ease due to apparent shyness.

Interview Questions Based on this Citation

The interns did not follow the normal rituals in terms of attendance taking, discipline, etc. which characterize the typical teacher. Their lack of teacher routines and their youthfulness created different perceptions of their roles. Bryan expressed with more certainty than Chad that their function was one of teacher. "I see them as what they do, and what they do is teach."

[Interview 5]

Donny had a history of being unable to concentrate on his school work for even short periods of time. His lack of attentiveness and an aggressive manner resulted in frequent conflicts. He was asked several questions regarding the impact the program was having on him.

At first I was a bit shy, but I got over that. I figured I'd just join in on the fun . . . If I had to listen to an ordinary class, I probably would have fallen asleep. The high school kids made it interesting . . . I learned that not all high school kids have 'Mohawk' hair cuts. It makes me think that high school is not as bad as it appears.

[Interview 26]

Loose Class Structure

All members of Resources spent at least part of the school day in the mainstream. Their schedules changed frequently, and as a result, the youngsters entered and left the Resources classroom at random. Under these circumstances, it was necessary to have classroom plans that could be adapted to new situations.

Interview Questions Based on this Citation

The literature suggests that gifted students respond well to loosely structured classrooms while learning disabled students tend to work better with close controls. The youngsters were both bright and creative and responded well to a loosely structured classroom. However, Saul in an interview made note of their learning disabilities as a factor to be considered when establishing these structures Saul offered this thought. "It's pretty hard to decide how much structure you need with such an unusual group. I guess you pretty much play it by ear."

[Interview 20]

Interns as Role Models

The interns acting as role models could be observed in the Resources classroom in a great number of subtle ways. Consequently, the list of citations is not lengthy. However, in the interview phase of the study, the topic is discussed at greater length. The author was somewhat surprised to discover through interviewing that the youngsters were unaware, for the most part, that they were responding (in the author's opinion) favorably to the interns as role models.

Interview Questions Based on this Citation

Tip suggested in an interview that one role of the interns was to provide a person that the youngsters could trust. "I think we provide someone for them to confide in. They say things to us they never would say to a teacher.

[Interview 3]

Tod gave some specific illustrations of how the youngsters looked up to the interns.

I think they see us as role models. Padrick likes to wear my hat. He has been commenting all year on my Champion sneakers. Last class he had a brand new pair just like mine. The first thing he said to me was 'did you see my sneakers?'. . . The

other day I talked to Padrick about being my pen pal when I went off to college. I gave him my phone number and I took his. The other day he called me, not once mind you, but three times. I was out and he finally got me on the third try.

[Interviews 11 and 17]

Chad's efforts to please the interns was uncharacteristic of his independent personality. In spite of constant disruptions of the class he showed great admiration for the interns.

I can't think of anything I didn't like. Those guys [interns] really made the program fun . . . I wish the program were longer. I wish we were going to continue it next year. I would have enjoyed having more contact with the high school kids.

[Interview 25]

Providing positive role models which would positively impact the social development of the youngsters was a primary goal of the Coster Study. In a joint interview with Padrick and Matt, The question of non-cognitive learning experiences was put to Matt. Matt was of the opinion that these experiences were unneeded.

Matt's classroom behavior indicated a receptiveness to the influence of the interns regarding cognitive and affective matters. However, in an interview the issues of affective learning and interns as role models Matt responded that he had learned nothing from the interns but computer skills. "I

already knew all that stuff about learning from older kids. Don't forget, I have two older brothers."

[Interview 24]

Key Informants

All interns, at one time or another, brought keen insights and understanding to the study. However, Tod's outspoken manner, and Mick's personal experience with an erroneous assessment of his academic capabilities in the primary grades, made these two interns particularly helpful to the research.

Although Matt sometimes resisted interviewing, when in a receptive mood, his insights were the best of all the youngsters. This might be explained by the extreme natures of both his giftedness and learning disability.

Bev served as an invaluable primary source of information on G/LD students.

Interview Questions Based on this Citation

Tod was quick to assess the youngsters skills and limitations, and was more than willing to share his views. "The kids are smart but remote. Padrick is not

like the other kids. He's smart but lazy. Jeremy is into war and destruction.

[Interview 3]

Mick experienced some of the personal satisfaction that is characteristic of a beginning teacher. He noted that teachers, in the process of instructing students, can learn many things from these students.

You get the satisfaction of passing along an idea. I know this made me feel good. Not all kids will profit from this information, but you influence some kids . . . You learn a lot of things from students. I was in the classroom to act as a teacher, but I got the feeling that I was learning more than the youngsters.

[Interview 21]

Matt has made a firm commitment to create a better public awareness of G/LD students. He and the other youngsters prepared an special program on this topic for fellow students at Coster School, part of which was featured on a television news broadcast about G/LD students. Matt is openly critical of Governor Weld's educational policy.

I think one real problem is identifying those students who are G/LD. My brother Jim is an example of that. His giftedness was never recognized, and of course, never treated. Jim is in college now learning how to become a special needs teacher.

[Interview 8]

Bev provided key information on G/LD students as part of both formal interviews and informal class discussion. The instances are too numerous to cite. It should be noted that she was the primary source of background information for the nature of G/LD students in general, and its specific impact on the students at Coster school.

Interns Commitment

The opportunity for the interns to work on a special assignment outside of the school building was for them an exciting and novel experience. The researchers initial concern was that the novelty might fade with the passing of time and turn the Coster study into disaster. Fortunately this did not happen. Surprisingly, the interns volunteered to extend the completion date of the study, and returned to tutor at Coster School on their own time.

Interview Questions Based on this Citation

Tod changed his mind about attending a private school for his senior year because of his interest in the Coster study. This major change of plans bespoke his interest and commitment.

Last spring I did not intend to return to BHS for my senior year. For a lot of reasons, My family and I thought I would be better off if I finished high school at another school. The main reason I came back to Bingham High was the Coster Program . . . It (The program) gives me a chance to help someone. I think it also helps me feel better about myself. I think the Coster kids need role models. I really look forward to the classes.

[Interview 3]

Tod's commitment to the Coster study became apparent at its very early stages. He contributed much to the program and cited a number of personal benefits he had received as a participant in the program.

I've had a real interest in the program since you talked about it last year. I remember when I was in elementary school my older sister's boy friend used to tutor french in my school. I thought it was a good idea then and still do. I'm pleased that I got this chance . . . I never thought I would be able to teach. I figure if I can teach, there must be a lot of other things I can also do - that I never thought I could.

[Interview 11]

The fact that the program operated so smoothly as a direct result of the interns commitment came as something of a surprise to the researcher. Tod felt the key to successful off-campus learning experiences is carefully screening candidates.

I think it would have to be done under the right conditions. I think it would only work when all the students involved were serious about it. Everybody would have to be committed to it. Even a small number of kids who were not really

serious, could spoil the whole thing by fooling around.

[Interview 15]

Although expressing no interest in a teaching career, Tod had developed an appreciation for the difficulties of teaching and some insights to what a teacher is and does.

"I think I have more respect for the position. When I was at Coster, I went through about ten percent of what a regular teacher goes through."

[Interview 17]

Ram Pull Toy

The youngsters made their first trip to Bingham High the week before Christmas. The intent of the high school trip was both social and to permit the youngsters to assemble a wooden pull toy from parts that been-pre made by the interns.

Relevant Concepts

Accelerated Learners

The fine intellect of the youngsters was observable in the classroom. As students of computer drafting, the quality of their work was extremely good and their assignments were completed quickly. In addition, the youngsters were quick to comprehend and apply abstract computer functions.

Providing the interns with background information relative to the characteristics or traits which describe the G/LD student, as well as promoting a sensitivity to the decisions which must be made in their regard were important parts of the interns' preparation for instruction at Coster School. This information was provided by the Resources Director, whose training and experience in this field are extensive.

During an informal instructional session Bev, shared her views on teaching the G/LD student with the interns. She contended that gifted students learn rapidly and, as a result, often complete grade requirements before their age mates. Early grade completion forces the gifted child to decide

whether to stay in the mainstream, with students of all academic capabilities, or to choose a gifted program where he or she will be removed from the mainstream for at least part of the school day.

The gifted student must also decide whether to skip grades in school. At Coster School Matt faced the prospect of skipping two school grades. Although very bright and mature intellectually, his emotional maturity is at, or below, his age in years. In addition, he has physical challenges which cause him to be classified as disabled. Matt and his parents faced a difficult choice.

The gifted child must decide whether or not to devote the non-school time, which the average student uses for play time, to other academic matters. During classroom sessions the author would occasionally discuss after school activities with the youngsters. A variety of sporting events such as baseball and basketball were mentioned, along with other outdoor activities, such as camping, bird watching, biking and others. The youngsters non-school time seemed to be spent in much the same fashion as that of average ability students. The exception was Matt who devoted much of his time to scholarly activities.

Interview Questions Based on this Citation

In subsequent interviews the interns, youngsters and Resources Director further addressed the issues of accelerated learning. Mick was asked to elaborate on his views of Matt's possible grade skip.

Matt is very bright and knows it . . .

[Interview 1]

Bev considered grade skipping by the gifted a hotly contested issued for students, parents, and educators. She responded as follows regarding grade skipping:

This is a real problem. On one hand, the youngster is in a classroom of older students. On the other, if they do not advance, they might lose motivation. There are those who insist that, if the school can not hold the gifted child's interest, they will find interest somewhere else. This could lead to problems with drugs etc.

Students in gifted programs tend to be removed from the mainstream. However, if special provisions are made, the gifted students can be brought into close contact with nongifted students in ways that are beneficial to all.

Bev made the following relevant comment.

Through mainstreaming and reverse mainstreaming, the youngsters have done a lot of tutoring with primary grade students. They also ltutor same age students, and, sometimes, older students.

[Interview 7]

The terms gifted and talented are used to describe high ability students. They are not, however, as Matt contended, synonymous. As a student who is both gifted and talented, Matt felt it important to make a clear distinction between the two:

As you know, we are considered both talented and gifted. You have to make a distinction between these two. Talented is much narrower than gifted. Talented means that you can do a particular thing well. Gifted is an ability to do well in a broad range of things. Talent is something you have; gifted is something you do.

Matt also volunteered his opinion on some school problems which G/LD students encounter.

I think one real problem is identifying those students who are G/LD. My brother is an example of that. His giftedness was never recognized, and, of course, never treated. He is in college now learning how to become a special needs teacher.

[Interview 8]

Tip's response to an interview question illustrated the guidance that the interns provided for the youngsters as they faced G/LD issues.

Sometimes they (the youngsters) have problems that they discuss with us. They voice their personal concerns. Like when Matt was talking about coming to the high school. I think, as high

school students, we could tell them what it is really like to be a high school student.

[Interview 13]

Gifted Isolates

When gifted students choose to participate in special programs designed specifically for the gifted and talented, they tend to reduce their contact with non-gifted students. However, whether 'mainstreamed' or placed in special classes, these students tend to seek the companionship of other gifted students. Such was the case of the Coster Study. The youngsters, for the most part, chose their closest friends from students within the Resources classroom.

Gifted students often complain about being teased by peers. Dealing with the youngsters' rejection in this regard was a constant struggle for the Resources Director. Bev pointed out that the youngsters' behavior was different from that of average children. However, that difference, as seen by the youngsters' peers, can be a source of ridicule for the youngsters.

Gifted students often insist upon excelling in the activities in which they participate. As a result, they may reject activities in which they have displayed poor or average ability. The youngsters generally

considered physical education to be one of their least favorite subjects. Matt, in particular disliked it, had some physical limitations to success in that class. Bryan, who was noted for his athletic skill, enjoyed his physical education classes.

The youngsters at Coster School saw themselves as having fewer friends than the average student, and they chose other gifted children as friends. In Matt's case, he chose the friendship because of the support it provided. Matt also noted that, in his experience, the sense of being alone was more of a problem in a private school than in a public school.

Interview Questions Based on this Citation

In an interview with Matt, Padrick, Donny, and Anton, each youngster was asked to name his closest friend. All youngsters but Padrick chose another member of Resources.

[Interview 6]

Bev was asked for her view on gifted students as isolates. She commented:

Gifted students are no more isolated than average students. G/LD students are different. They occasionally do things which are

inappropriate. Fellow students respect their intellect but ridicule the inappropriate behavior.

[Interview 7]

The literature suggests that gifted students often have an adult-like sense of humor. This appeared to be the case with Matt who said that what he saw as funny, and what the average fifth grader saw as funny, were different. Matt contends: "I can tell you this, I never get the jokes the average fifth grader tells."

[Interview 8]

The literature suggests that gifted students generally reach a point of acceptance by classmates in the final two years of college. It seems that at this age fellow students forget that gifted students are younger than they are. Tip was asked to speculate on the youngsters' acceptance into the adult world.

I'm only a few years older than those guys. I see the youngsters as odd because they think in a way that is more mature than kids their age. At some point this should level off.

[Interview 13]

Matt could be uncooperative during interviews as well as in many other situations. However, given the right conditions, he was extremely insightful. Matt

was asked if the influence of the interns was helping his social adjustment.

The tech drawing part of the program didn't help because nobody outside Resources took drawing. But I am getting along better through the part of the program that allows me to get out into the regular classes. [Matt tutors older and younger students.]

I think going to Coster School helps. Last summer was the first time I played with more than one kid. I made a lot of friends through Padrick.

[Interview 24]

Establishing meaningful relationships with fellow students was particularly difficult for Chad because he was a new resident of the community and because his personal manner was frequently abrasive. Chad felt alone. "I don't really hang around with anyone. Most of the time I ride my bike by myself . . . I liked the program a lot. The high school kids were really helpful."

[Interview 25]

Donny saw the interaction with the interns as an exercise in growing up. He felt the experience provided some help with his behavior problems. In addition, he indicated that he and Matt, students who have great difficulty making friends with non-G/LD students, spend nearly the entire day in the Resources classroom.

[Interview 26]

Positive features of G/LD

The youngsters have been utilized as tutors at Coster School. In addition they present special programs to their fellow students. One such program focused on an awareness of what the G/LD student experiences. Through this program they could both showcase their talents and recognize their disabilities. Another program of this type was presented to the youngsters and interns by Matt. The program related, in great detail, Matt's recent trip to Philadelphia.

It was observed that in matters of instruction as in other matters, the youngsters were kind and generous.

Interview Questions Based on this Citation

The interns and youngsters appeared to establish friendships that would last beyond the completion of the study. Tod spoke of agreeing to be a pen pal to Padrick "The other day I talked to Padrick about being my pen pal when I went off to college. I gave him my phone number and I took his."

[Interview 17]

G/LD see Giftedness

It was noted through classroom observation that the youngsters are very conscious of their own academic capabilities and those of other people. They were eager to challenge each other's knowledge, often arguing excessively on minor issues. One intern assessed them as being more argumentative than children their age. Since research indicates that gifted children tend to be perfectionists, it is understandable that they have a strong desire to prevail in disputed matters.

How the gifted child perceives his or her giftedness is a critical issue. Studies suggest that they can perceive it as something they are, that is, as an internal part of their human nature, or, as a function they perform. Dealing with failure is generally easier for the gifted child who perceives giftedness as a function.

In an interview, Matt and Donny were asked for their perceptions of giftedness.

Q. Donny, is giftedness something you are, or something you do? In other words, is it something like a personal quality you have, or is it a function you perform?

A. A performance.

Q. Matt, how do you feel about the same question?

A. I think it is both inherent and performance.
(Matt then elaborated on the distinction between
gifted and talented.)

[Interview 8]

External Factors

Potential Teachers

Between the spring of 1990 and the spring of 1991, the interns had a first hand experience with the teaching profession. During the program's early stages none had expressed interest in a teaching career. Although none had changed his view on this issue by program completion, each had developed new understandings and insights about the profession. In addition, the interns behaved in a more adult manner as a result of their increased leadership responsibilities in the classroom.

Interview Questions Based on this Citation

Prior to his involvement in the Coster Study, Tod had little confidence in himself as a student. He rarely challenged what was said in class and he did the minimal amount of work required. The experience at Coster School was a great confidence builder for him.

I never thought I would be able to teach . . .

[Interview 11]

Saul was quiet and soft spoken and not fond of putting pressure on the youngsters to complete their assignments. At times he appeared somewhat uncomfortable in the role of tutor. Saul was an excellent student and had his sights firmly set on a career in engineering.

For me personally, I wouldn't want to teach. I don't feel right about teaching. I don't feel I did a real good job at it. It's not that I feel I couldn't do it; I just don't want to. My real interest was, and still is, engineering.

[Interview 14]

Tip provides some insights into the lack of interest in the teaching profession by students who possess technical drawing skills. Consistent with the findings of Mangieri and Kemper (1984) and Ryan (1987), low salaries and the maintenance of student control are factors which make teaching less than desirable as an occupational choice. When asked if he would like to teach, Tip responded as follows.

I don't think so. Maybe it's the money. I don't see a lot of money there. The life style I'm used to couldn't be supported on a teacher's

salary. I don't think I could handle all the problems of dealing with kids.

[Interview 16]

Tod doubted very much that he would end up in the teaching profession. However, his perspective on teaching had been altered as a result of the Study. "I am a little bit (interested in teaching). Not to the point where I would like to do it. I don't think I would have the patience with kids."

[Interview 17]

Assuming the role of tutor presented some difficulties for the interns because of their lack of experience in this role, and because the youngsters' academic skills were, at times, equal or superior to those of the interns. Saul provided an interesting insight on teaching extremely intelligent students.

They were smarter but they did have some problems. Some of the things we did, like making those pull toys at Christmas time, were things that they found difficult. When we played basketball, Matt had an awful time. I think we were helpful at those times. I think they knew we were not nearly as smart as they were but we were still able to help them. I think it was important for them to know that they can learn from people who are not as smart as they are.

[Interview 20]

It was apparent to the author that Mick enjoyed being a tutor. He was quite effective at getting the youngsters to stick to assignments and to produce commendable work. Mick recognized many good aspects of the teaching profession, but, balanced against its drawbacks, he will not choose teaching as a career.

You get the satisfaction of passing along an idea. I know this made me feel good. Not all kids will profit from this information, but you influence some kids . . . You have the feeling that you might get a bad bunch of kids. You think you might get kids that acted the same way that you did . . . Money is a big factor. It seems that we ought to have more young teachers. It seems there are not enough opportunities for young teachers.

[Interview 21]

The War in Iraq

Unexpected events occurred during the Coster study. The conflict in the Middle East was such an event. The interns discussed the subject with concern in the high school classroom, and they extended that discussion to Coster School.

Both the interns and youngsters seemed preoccupied with the war's people and events. Support for American forces as well as an interest in the technology of

warfare was evident in the youngsters' work as they showed a preference for drawing sophisticated weaponry.

The war provided a dimension to the study that could not have been anticipated. However, the daily events as reported by the media stimulated classroom discussions and raised a number of questions regarding the responsible use of technology.

Interview Questions Based on this Citation

Tip expressed a concern for the increased use of nuclear weapons. In addition, he recognized that an additional consequence of improved weaponry is the disposal of old weaponry.

I think it's frightening. I think that we keep creating better and better weapons. Like the war in Iraq. We just make more destructive stuff all the time. And when we have newer and better weapons, what do we do with the older ones? I think a major problem is, when we make the new stuff, the old stuff is obsolete and we haven't figured out what to do with it.

[Interview 10]

Saul made a number of points regarding the war in Iraq. Although supportive of American military efforts, he criticized the use of propaganda. He also felt quite strongly that the result of the armed conflict, in terms of winning or losing, was unrelated to the 'just cause' of the parties in conflict.

I think the press tended to over glorify it [the war]. There was lots of propaganda . . . That's the problem with propaganda. The media tries to convince people that victory came because we were the good guys. We won because we had better weapons, and that has nothing to do with being right or wrong.

[Interview 23]

Finding Additional Resources

In the year which preceded the study at Coster School, the author attempted to enlist the support of school personnel who were potential valuable human resources, and to collect whatever physical resources were available. In the spring of 1990 the author was fortunate enough to gain the support of the school superintendent, high school and elementary principals, Resources Director, and other school personnel who controlled such factors as supplies, equipment, and transportation.

Once into an operational phase, the program's most valuable resources, although available at no cost, were the skills of the interns and the Resources Director.

Perhaps the programs greatest short fall in terms of resources was lack of computers. They were in adequate but less than ideal supply.

Interview Questions Based on this Citation

Padrick discovered that he could confide in the interns in a way that he could not confide with regular teaching staff. He felt personal matters were easier to discuss with the interns than with regular teachers. Padrick also commented on the program's need for more computers.

[Interview 27]

Anton suggested an increase in the number of computers as one way of improving the program quality.

[Interview 28]

Human Skill and Automation

Bryan seemed to enjoy free hand sketching and drawing with pencil and instruments. He was the exception, however, in that all other youngsters had a strong preference for drawing on the computer. The novelty of using a computer in this application may account for the general preference of the youngsters. Perhaps over a period of time the youngsters might wish to return to traditional approaches, but, during the study's duration, pencil drawing was of little interest to them.

Because of their speed, skill, and adaptability, the use of computers in the drafting industry represent a significant improvement over traditional methods. However, there are several disadvantages to their use. CAD programs fall far short of traditional methods in developing motor skills. They also prohibit the individual from producing work which is uniquely his or her own. Finally, because of their efficiency, computers can reduce the number of jobs available in design professions.

Interview Questions Based on this Citation

Mick articulated a dilemma that results from automation's tendency to reduce jobs, and man's tendency to seek fulfillment through work. He commented on people he perceived as fearing technology.

I think I need to work. Some kind. Some people work because they really enjoy it . . . One group for certain (who fear technology) are the environmentalists. Both of my parents work in those kinds of jobs. People who work on assembly lines and know that they might be replaced by a machine . . . I think people who can be put out of work by machines would dislike them or be afraid of them.

[Interview12]

Tod discussed the ways in which a capitalist economy tends to eliminate jobs.

The owners can invest their money in machines. Then they can increase profits by

elimination of labor. Machines don't have to be paid; they work all night and weekends, never call in sick.

[Interview 18]

In a later interview Tod volunteered more of his perceptions on the conflict between automation and work done by people:

More and more things are machine made. As far as jobs go, there are fewer opportunities for people who like to make something. I would like to see a world where more things were man made instead of machine made . . . Products from automated systems can't tell you anything about the people responsible for the production. For example, the indians used to put pictures on the pots they made. People who look at these pots a hundred years later can tell a lot about the indian who made that particular pot.

[Interview 22]

Cooperative Education

The Coster School study attempted to establish a model for cooperative education programs geared specifically for the college bound student in these students' fields of intended studies.

Interview Questions Based on this Citation

Assuming control of the Resources classroom required a period of adjustment for the interns. It was several weeks before it appeared that they were comfortable in this role. In an interview Bev pointed out that, although the Coster Study was, for the interns, a first exposure to tutoring, the youngsters had prior experience as tutors.

Through mainstreaming and reverse mainstreaming, the youngsters have done a lot of tutoring with primary grade students. They also tutor same age students and older students.

[Interview 7]

Tod compared the CAD program with a child development program which has been in operation at Bingham High for several years. The program takes advantage of a low instructor/student ratio in much the same manner as the CAD program. Tod expressed a wish to learn through experience.

I think it's a good way to learn. It's practical. You have to prepare in the classroom first, then you test yourself when you go to Coster School. It's something like the Child Development program. [Bingham offers a course in home economics where pre-school children participate in a nursery school under the supervision of high school students.] A lot of things you learn in high school seem like they don't have much use. You ask yourself 'How is this going to help me? What good is this?' In the Child Development program, the first half of

the year students learn about little kids. In the second half, they work directly with these kids.

[Interview 15]

Saul saw the Coster Study as a way to explore potential careers and as an effective method of learning through performance. He enjoyed the liberties that were afforded him as a tutor, but he was well aware of the additional pressures that the role imposed.

I think it would be a good way for someone who thought they might want to teach, to get a chance to try it out . . . It was a good chance to test what I knew about drawing. It was a good to see that I really knew some things . . . It was a chance to learn in a way that is really different. It's more fun than sitting in class, but there is some pressure. If you don't know something you can look pretty silly.

[Interview 14]

In interviews 3 and 15 Tod expressed his views of cooperative education. He suggested that this method relies on experimentation and the practical testing of potential solutions to problems that are presented in the classroom. He commented that these programs are only successful with, and should be restricted to students capable of acting as adults. In addition, he commented on the busy schedule created by the Coster Study.

[Interviews 3 and 15]

Proposition I: Changing Schools

Teachers can bring about positive changes in school policies and procedures.

Founding Premise of the Study

If teachers plan to develop an innovative program in a public school, and they plan to do this without financial backing, then he must base his efforts on a belief that there are resources which are not financial that can be accessed to make that program a successful reality. The Coster School study was based on such a belief. It was understood from the program's early planning stages that the school would provide no financing. However, it was soon discovered that this lack of financing would not be a major obstacle to the success of the program.

Both the school superintendent and principal of the hosting school proved accommodating. The Resources Director willingly committed a considerable amount of time and effort to expanding the program offerings to her students. An additional computer was accessed through media services, and software was borrowed from the high school technical drawing program. Other

drafting equipment and materials for project fabrication as well as the use of tools, machines, and a school van were granted by the Bingham Public Schools.

Not to be overlooked as a resource were the highly skilled technical services of the interns. These skills were, as were all other resources utilized without the need for funding.

Bev as a Resource

It was apparent from the beginning that Bev would be an invaluable resource. She had extensive experience and excellent insights into dealing with the special problems of G/LD students, and was willing to work with me and the interns.

Bev is an excellent primary source. She really understands the G/LD student. She offered to give me a copy of a paper she recently wrote on this topic.

[Observation 3J]

Bev had teaching responsibilities that extended beyond the Resources classroom. However, because G/LD students are demanding and because Bev felt an extreme sense of commitment to the efficient operation of the Resources program, she tended to limit her commitment to these other responsibilities. However, it was

observed that, with the passing of time, she felt increasingly more comfortable with leaving the interns in charge of the G/LD youngsters, a decision which enabled her to fulfill other teaching obligations.

Bev will be at a meeting for about thirty minutes. It's nice to see that she is at ease with the interns in charge of the class.

[Observation 3D]

Bev acknowledged the interns as a valuable resource for the youngsters. She recognized the youngsters need for a positive older male role model, a service which could be provided by the interns.

The interns provide a solid male role model. Most of them do not have such a model. What I mean is, each youngster has male family members that are pretty much like they are, which is unlike most male figures. The interns are an insight to average teenagers.

[Interview 7]

Interns as a Resource

The youngsters' admiration for the interns was frequently an observable reaction. This admiration was, in the opinion of Tod, the primary reason for the program's success. Tod felt that the youngsters achieved because they enjoyed the program.

When we come to class, whatever is going on in class stops right away. The kids are always

anxious to get started on the drawing. You know they really like it . . .

[Interview 11]

The interns provided instructional services at no cost to the hosting school. It is, however, the opinion of the researcher that the quality of instruction provided could not have been duplicated even if the program were well funded. Because the interns were young, they were much better suited to dealing with certain problems.

Saul quietly slips into a seat next to Chad and begins to help him. This is significant since Chad is nobody's favorite student. Chad can be a wise guy, but Saul is going out of his way to help him out. Saul is a quiet, bright, thoughtful young man.

[Observation 2H]

Padrick expressed a confidence in the interns which he did not have in regular members of the teaching staff stating that the interns were "easier to talk to."

[Interview 27]

Donny saw the interns as a refreshing change in classroom procedure.

If I had to listen to an ordinary class, I probably would have fallen asleep . . .

[Interview 26]

Initially, the author intended to utilize the interns for instructional services only. However, it was discovered that the interns had an interest in

helping to collect research data. As a result of this interest, the interns became more deeply involved in the study and took an active role in data collection. Before they could be utilized, however, the interns needed some basic understanding of case study research.

I take time to explain data collection to Tip. I feel the better he understands this research project, the more valuable his participation in it will be. I explain observation and interviewing techniques and why I choose these methods. Tip seems quite interested.

[Observation 3B]

In addition to instructional obligations, Tod considered himself to be a researcher in the Coster study. "I think I know better than most people what it's like to do research. I think I got to be part of a program that most kids wouldn't get the opportunity to be part of."

[Interview 11]

Mick is aware of the mutually beneficial effects of passing along information.

You get the satisfaction of passing along an idea. I know this made me feel good . . .

Mick is also aware that, teachers may use students as sources of information, in a manner similar to the way students utilize teachers as sources.

You learn a lot of things from students. I was in the classroom to act as a teacher, but I got the feeling that I was learning more than the youngsters. I think when students offer their

ideas, and teachers listen to them, it helps to "ease the stress" between the generations.

[Interview 21]

The interns began the year with a great deal of energy. However, senior year can be a difficult time for students to sustain that interest because of the many unique distractions that are a part of that year. Fortunately, the interns' interest and energy did not fade. In fact, in the spring, at the request of the interns, we extended the study's completion date.

Today I spoke to Bev about the interns request to extend the study beyond the projected April completion date. She agrees. Mick says that they can come back for this one class per week without difficulty. What this means is the interns will return to Coster School after they have fulfilled their high school requirements. They wish to tutor on their own time.

[Observation 2K]

Youngsters as a Resource

The Resources youngsters have been utilized to present special programs to fellow students at Coster School. In addition, they tutor younger and, sometimes, older students in that school.

Bev tells me that the youngsters are preparing a program to present to fellow students that attempts to explain the unique nature of G/LD students. They do this sort of class demonstration regular on a variety of topics.

The session they are preparing will be VCR taped for classroom use.

[Observation 1C]

The Coster Study was a first tutoring experience for the interns. However, such was not the case regarding the youngsters who had already engaged in this practice.

Through mainstreaming and reverse mainstreaming, the youngsters have done a lot of tutoring with primary grade students. They also tutor same age students, and sometimes older students.

[Interview 7]

Cost Effectiveness of 'Resources' Program

Handicapped children are protected under Public Law 94-142. According to this law, special support services must be provided by cities and towns for students with learning disabilities in public schools if services are available, or in private schools if they are not. When it is determined that support services do not meet the needs of disabled students, cities and towns have no choice but to pick up the expense of these services at private schools. Although such programs have been offered in the Bingham schools for many years these services are not, in the author's opinion, totally appropriate for students who are both gifted and learning disabled.

The author believes, based on long term classroom observation, that the services offered in Resources are quite appropriate for the unusual needs of G/LD students, and these services are offered at significantly lower costs to the community than they would be in a private school. Resources became even more cost effective with the addition of the CAD program.

Without question, the Resources program is more cost effective than similar programs in private schools. Moreover, according to Matt, private schools, in spite of their high costs, are less effective in dealing with the G/LD student who feels isolated.

Matt felt isolation was more of a problem in the private school than it is at Coster School. "All the students in the private school said they had no friends."

[Observation 1B]

Proposition II: Cooperative Education

The Coster Study presented an off-campus learning experience to a group of college-bound high school students.

Designing Cooperative Education

The Coster School study required several months of careful planning before it was implemented in September of 1990. Throughout that planning stage, the program slowly developed its own unique structure. Gaining access to a school (ultimately Coster Elementary), collecting equipment, and finding a school vehicle for transport presented some minor problems. However, the major difficulty encountered in the program's formation was dealing with the inflexibility of the high school student's schedules. Scheduling conflicts, many of which remained unresolved, were a serious threat to the program's implementation.

Each intern, through a plan developed in the spring of 1990, was scheduled to have the last two class periods of the school day assigned to a technical drawing class. When the 1990-91 school year began, none of the interns had been scheduled as planned. This scheduling error required a total restructuring of schedules in order to access the correct time slot. Ultimately, two of the six interns could not resolve conflicts and were forced to withdraw from the program.

The scheduling difficulties were in part attributable to the demands of the interns' schedules. Each of these students selected courses intended for

college bound students. Since the interns had reserved the final two periods of the school day for technical drawing, their schedules lacked flexibility and they encountered difficulty accessing necessary courses. Courses with a limited number of sections, such as chemistry and physics were particularly difficult. The scheduling conflict was a clear illustration of why cooperative learning experiences are difficult to design for college track students, and, consequently, seldom offered to these students.

Interns' Views on Cooperative Education

Learning through experience was for Saul new, exciting and, sometimes, a little threatening.

I liked the program. It was a chance to learn in a way that is really different. It's more fun than sitting in class, but there is some pressure. If you don't know something you can look pretty silly.

[Interview 14]

Tod adjusted quickly and well to the Coster School study. In the Resources classroom he was energetic and purposeful, qualities which were

never observed in a traditional classroom. He appeared to have a strong preference for inductive learning.

[Interview 3]

In a later interview Tod expressed his views on cooperative education from the perspective of its

practicality, its need for reliable personnel, and the difficulties that can be encountered by the college bound student.

A lot of things you learn in high school seem like they don't have much use. You ask yourself: How is this going to help me? What good is this?

[Interview 15]

Youngsters as Tutors

The youngsters perform a special service at Coster School. They make special program presentations to fellow students and serve as tutors. This cooperative learning experience was discussed by Bev in an interview.

Through mainstreaming and reverse mainstreaming, the youngsters have done a lot of tutoring with primary grade students. They also tutor same age students, and sometimes older students.

[Interview 7]

Proposition III: Building Relationships

The interns in the Coster Study acted as positive role models for the youngsters.

Bev's Perception of Role Model

In an interview Bev acknowledged that the interns would provide a needed male role model for the youngsters.

The interns are teenagers with average intelligence acting as positive male role models for the youngsters. Most of them do not have such a model. What I mean is, each youngster has male family members that are pretty much like they are, which is unlike most male figures. The interns are an insight to average teenagers.

[Interview 7]

Interns' Perceptions of Role Model

All interns, at some time during the study, acknowledged one of their purposes at Coster School was to act as a role model for the youngsters. They explained how they could help the youngsters in ways which were not cognitive.

Tip suggested in an interview that one role of the interns was to provide a person that the youngsters could confide in. "I think we provide someone for them to confide in. They say things to us they never would say to a teacher . . . I think they look up to us."

[Interview 3]

In a subsequent interview Tip reaffirmed his belief in the need for the interns to provide guidance for the youngsters by acting as role models.

Sometimes they have problems that they discuss with us. They ask about their personal concerns. Like when Matt was talking about coming to the high school. I think, as high school students, we could tell them what it is really like to be a high school student.

[Interview 13]

In Interviews 11 and 17 Tod gave some specific illustrations of how the youngsters looked up to the interns.

I think they see us as role models. Padrick likes to wear my hat. He has been commenting all year on my Champion sneakers. Last class he had a brand new pair just like mine. The first thing he said to me was 'Did you see my sneakers?'

[Interview 11]

Saul makes a strong point when he cites ways in which gifted children can be assisted in the learning process by people who are not as intelligent as they are.

When we played basketball, Matt had an awful time. I think we were helpful at those times. I think they knew we were not nearly as smart as they were but we were still able to help them. I think it was important for them to know that you can learn from people who are not as smart as you are.

[Interview 20]

Youngsters' Perceptions of Role Models

It was difficult to determine if the youngsters were aware that the interns had been placed in the Resources classroom to provide them with positive role models. Many questions were presented to the youngsters that asked about the 'other things' they were learning through their interaction with the interns. Quite often, the youngsters' responses pertained to an academic matter.

During one class session Matt, Padrick, and Donny were asked to name some ways in which the interns could assist them. Each youngster's response related to a specific skill. No mention was made by any of them regarding the interns meeting affective needs.

[Interview 4 and 5]

Chad was asked what personal help the interns had provided him. He replied that they had been helpful with the computer.

I liked the program a lot. The high school kids were really helpful. They taught me a several new things on the computer.

[Interview 25]

Although Donny felt that he had learned things from the interns that were not related to school work, he did not mention the intern's ability to meet his affective needs.

[Interview 26]

Bryan failed to acknowledge that the interns were providing learning experiences that were unrelated to academic matters.

[Interview 5]

In an interview with Padrick and Matt the question of non cognitive learning experiences was raised. Matt was of the opinion that these experiences were unneeded.

[Interview 4]

In a later interview the issues of affective learning and interns as role models were again submitted to Matt for his reactions.

I already knew all that stuff about learning from older kids. Don't forget, I have two older brothers and Alex [exchange student from Germany staying in his home]. I learned a lot from Jim, [older brother close in age to Matt] he taught me a lot about older kids.

[Interview 24]

Youngsters Respond to the Interns

The youngsters interview data did not give a true picture of their interaction with the interns. The youngsters' admiration for the interns was clearly evidenced in daily activities. In addition, despite there being little interview data to support such a contention, the interns regularly gave advice on personal matters to the youngsters and, contributed in other ways to their affective growth. The youngsters'

interpersonal skills developed in the classroom in a visible way. However, the youngsters tended not to verbalize this affective learning in their interview responses.

Although Matt expressed no need for the interns to help him deal with personal problems, his actions in class indicated that he developed positive feelings towards the interns. How Matt would react to questions about the interns as role models was a matter of interest to the researcher.

[Observation 3H]

Chad, in spite of his constant disruption of the class, showed great admiration for the interns. His comments are as follows: "I can't think of anything I didn't like. Those guys [interns] really made the program fun."

[Interview 25]

Padrick acts young for his age. A positive role model would be very beneficial for him. Tod was always Padrick's favorite intern. He would insist upon wearing Tod's hat during class. Padrick even purchased a pair of basketball shoes that were exactly like Tod's. Pad initiates tactile contact with the interns in a way that is quite typical for a youngster his age.

The youngsters' physical contact with the interns was a clear sign of the youngsters' approval. Although such contact between interns and youngsters was a

frequent occurrence, several months had elapsed before Matt initiated such action.

Later in the period Pad went to Mick who was working on the computer with Anton. Pad put his arm around Mick. Still later in the period he had some physical contact with Tip.

The author was curious as to how Matt would react to a role model.

It was determined that the youngsters had a good or, at least, tolerable attitudes regarding the interns. All with the exception of Matt who remained distant. It would be interesting to see if he can build a relationship with the interns.

Matt worked on the computer with one hand on Tod's shoulder. That was the first time I have ever saw Matt touch anyone.

[Observation 2H]

The friendships between the interns and youngsters extended beyond the study. Tod and Padrick agreed to be pen pals when Tod goes to college.

The other day I talked to Padrick about being my pen pal when I went off to college. I gave him my phone number and I took his. The other day he called me, not once mind you, but three times. I was out and he finally got me on the third try.

[Interview 17]

Discussion of Role Models at Coster School

The author proposed that instruction by interns in the Resources classroom was a learning experience directed by positive male role models, and, thus, more than a cognitive learning experience.

This notion was corroborated by the Resources Director, who pointed out the youngsters need to identify with older males who are neither gifted or learning disabled. The youngsters spend much of the school day removed from the mainstream; therefore this contact with the interns provided them with skills necessary for gaining social acceptance beyond their own closed social group.

Observations of both interns and youngsters confirmed an assumption that the interns would, over a period of time, earn the admiration of the youngsters. Responses to interview questions by the interns also confirmed a need to develop role models for the youngsters as a goal of the study. .

However, when interviewed, the youngsters indicated that they were less aware, or totally unaware, that interns serving as role models was one purpose of the CAD program. When asked what help the interns provided, the youngsters would refer to some cognitive matter. Matt was insistent that no affective help was forthcoming as a result of the study.

Although the youngsters seemed unaware of the bonding that was developing with the interns, the youngsters showed regularly, through conversation and physical contact, that they had positive feelings for the interns.

Proposition IV: Technology and Values

Computers and other machines perform functions which were once done by people. Fear of job loss, coupled with the fear that technology is beyond human control, causes people to distrust and/or fear technological change.

Interns' Perceptions of Technological Issues

Interview time was provided to allow the interns to express their views on a variety of technology related issues. Although the author recognizes considerable merit in collecting similar interview data from the youngsters, meeting with the youngsters for one day each week did not provide adequate time for such data collection.

The interns responded to interview questions which asked them to identify or describe individuals or groups who were opposed to, or supporters of, technological change. In the following section the interns describe technophobe, or those people who approach technological progress with apprehension.

Both of Mick's parents are environmentalists. The family situation has afforded numerous insights into

issues which deal with technology and the environment. Mick comments on the threat which technology presents to the worker. "People who are close to automation can fear it. People who work on assembly lines and know that they might be replaced by a machine."

[Interview 12]

Tip lists the following people who oppose, but do not necessarily fear, technological progress.

Average people. People who don't understand (technology and its implications) People with less education. People who have learned by their own mistakes. Maybe, at this point, the guy who invented the atomic bomb. People who oppose nuclear power plants. Folks from Greenpeace.

[Interview 10]

Saul describes people who approach technology with apprehension. In addition, he gives an optimistic view regarding man's continued control of machines.

Parents, grandparents. Particularly grandparents. They didn't grow up with this technology. It must be really strange to older folks . . . Environmentalists, farmers, line workers in production plants whose jobs are threatened by machines . . . Technology is created by people. I think we will be able to keep controls of it.

[Interview 24]

In the following interview, Tod gives an insightful analysis of the value of human craft skill, and how these skills serve to meet a basic human need.

More and more things are machine made. As far as jobs go, there are fewer opportunities for people who like to make something. I would like to see a world where more things were man-made instead of machine-made . . . Products from automated systems can't tell you anything about the people responsible for the production.
[Interview 22]

In this section the interns describe technophiles, or those people who are highly optimistic regarding the safe use of technology. Mike uses high ranking military and business staff as examples of technophiles. He does not, however, see engineering as part of the process which attempts to reduce or eliminate skilled labor.

All the military brass with their "new toys." People who run the companies that make money with better machines . . . Boards of directors, stockholders.

[Interview 12]

Tip envisions the typical technophile as intelligent, well educated, and tending to favor Republican politics.

Smart people like Matt. People like him think they have control because they're smart. I think people with average intelligence would not feel as much in control. Scientists are backers

of technology. They seem to think nothing can go wrong. Like the guy who created the atomic bomb.

[Interview 10]

Saul was interviewed after the conclusion of the war in Iraq. The war was considered worthy of discussion since technological issues had been part of the study and the occurrences in Iraq had been essentially technological. It was assumed that the U.S. victory would help win the support of those who questioned large expenditures of taxpayers money on instruments of destruction, but, the battle between technology's supporters and detractors was certain to continue.

[Interview 24]

Tod has great compassion for the worker whose job is eliminated through automation. He is, at the same time, quite aware of the cost effectiveness of reducing or eliminating labor through the use of machines.

Advanced technology can improve the product, but it shouldn't be used to eliminate jobs. I think of the song about "John Henry the steel driving man". He beat the machine but he had to die to do it . . . Machines don't have to be paid, work all night and weekends, never call in sick. You can save money with machinery.

[Interview 18]

The War in Iraq

The conflict between the United States and Iraq began and ended during the time of Coster Study. Although this event was completely unanticipated, it profoundly impacted both the youngsters and interns. The war illustrated the use of sophisticated technology as well as the moral issues which arose as a result of its use. A combination of student interest and emerging issues compelled the researcher to examine the war in the Mid East within the context of the Coster School study.

Both youngsters and interns had a high level of interest in the events of the war which could be observed daily in the classroom. During the war the youngsters were involved in a variety of war-related activities. For example, in addition to corresponding through the mail with U.S. servicemen, the youngsters created an in classroom bulletin board in support of the troops. Military equipment became a frequent drawing topic. Bryan in particular focused most of his time on airplanes, tanks, etc.

Saul expressed his support of American troops in the conflict, and raised the issue of justice as it applied to the victor and the vanquished.

The media tries to convince people that victory came because we were the good guys. We won because we had better weapons, and that has nothing to do with being right or wrong.

[Interview 23]

Tip describes improved weapons systems as they negatively impact mankind. He contends that, in addition to their improved efficiency for destroying life, they contribute to the accumulation of obsolete and dangerous systems which remain after their replacement by more efficient ones.

We make more destructive stuff all the time. And when we have newer and better weapons, what do we do with the older ones? I think a major problem is when we make the new stuff, the old stuff is obsolete and we haven't figured out what to do with it.

[Interview 10]

Proposition V: Seeking New Teachers

Research supports a future shortage of highly qualified teachers, particularly teachers in technical fields. Practicing teachers can ease the shortage by promoting the profession within their classrooms.

Pretesting the Interns

In May of 1990, approximately four months before the beginning of the Coster School Study, and before any of the interns were requested to participate in it, they were given a list of professional and non-professional occupations and requested to rank them in order of desirability. Responses indicated that teaching as a career was one of the least desirable for all interns when ranked with either professional or non-professional choices. On the basis of learning about such negative feelings by all members of the group, the researcher raised the question of whether such feelings would be altered if the interns could experience teaching in a practical way. Would the interns feel differently about a possible teaching career for themselves as a result of the Coster Study?

Interns' Views on Teaching as a Career

The experience at Coster School helped Tod build confidence in himself.

For one thing, I never thought I would be able to teach . . .

[Interview 11]

Saul continues to have his sights firmly set on a career in engineering.

For me personally, I wouldn't want to teach. I don't feel right about teaching . . . My real interest was, and still is, engineering.

[Interview 14]

Tip gives a description of a potential tech drawing teacher, and provides some insights into the lack of interest in the teaching profession by young people.

I don't see a lot of money there (in teaching). The life style I'm used to couldn't be supported on a teacher's salary. I don't think I could handle all the problems of dealing with kids . . . Teachers have to get summer jobs and they're hard to find with the economy being the way it is. Teaching is rough. I know some teachers who go through hell every day. Some kids are a real pain.

[Interview 16]

Tod doubts very much that he will end up in the teaching profession. However, he now looks at teaching from a new perspective.

I don't think I would have the patience with kids . . . Elementary students have pretty short attention spans . . . I might be interested with older students, but I don't know what subject I could teach . . . I haven't had a lot of success with any subject in school. I think of myself as a real average student. I guess I have been pretty successful in tech drawing, but I don't think I want to teach it.

[Interview 17]

Mick recognized many good aspects of the teaching profession. However, balanced against its hardships, he will not choose teaching as a career.

I know a lot more about what it means to be a teacher. I think it's a difficult job. I don't think it is the job for me. Perhaps it's the money. I think you can get paid a lot more for doing a lot less . . .

[Interview 21]

Final Comment on Data from Propositions

Although the five propositions of the Study were examined as separate entities, there was, in fact, much overlapping. For example, study findings which appeared as changes in schools (Prop. I), might easily have been examined as the introduction of cooperative education (Prop. II) in schools.

Evaluating the Effectiveness of the Study

As are many change strategy procedures, the Study adapted to suit particular circumstances. The program was subjected to constant revision in order to ease its assimilation into the school culture and to better serve the involved students. The study provided a vehicle for meeting student needs which could not have been met in a traditional classroom.

Growth of the Interns

It was observed that the interns matured more emotionally in the year at Coster School than in the two years which preceded it. The interns were self motivated and enthusiastic regarding their tutoring responsibilities. The interns had, during the Coster study, a sense of purpose which had not been observed by the author in the two years preceding the program. This responsible attitude continued until the program's completion in the late spring, which is traditionally a very difficult time to motivate students. For Tod and Mick in particular, this was a chance to discover hidden talents. Both were very average students in grades ten and eleven. However, as twelfth graders

they became more responsible and self-motivated. Their skill as tutors surprised many people, including themselves. Both enjoyed an enhanced self image as a result of the study.

The following observations were made regarding Mick.

Mick seems to be pretty much in control of the class today. He talks with confidence on how he is going to test the youngsters. They offer no resistance, obviously recognizing his authority . . . Within the context of the study, Mick and Tod have provided most of the leadership.

[Observation 2A]

The following observations were made which support the effectiveness of the Coster School study.

Tod is working with Matt and doing a pretty good job with a boy who is very difficult to manage . . . Tod works with Pad on a three view computer drawing. Tod keeps Pad's attention, which is the nature of Pad's disability . . . Donny designed a sports car under Tod's direction. Tod offered good suggestions and Donny was receptive . . . Tod has taken charge of learning the Drawing Layer computer function. This is helpful because none of us really understand it.

[Observation 2A]

It became a practice to acknowledge to both Bev and the interns that I was pleased with the progress the interns were making in the classroom.

It seems to me, given the youngsters' disabilities, the interns are doing a good job. I

mention this to both Bev and the interns. The reinforcement will hopefully motivate . . . This seems our best session to date. All students pulling in the same direction with Bev and me providing little control. They, we, must be doing something right.

[Observation 2A]

Bev as a Measure of Program Success

Bev's attitude towards the interns was a good indicator of how the program was progressing. As the study progressed, her trust in the interns increased.

It is my observation that Bev has taken a secondary role in class, pretty much leaving the interns in charge . . . Bev has been gone for nearly the entire class. She continues to show confidence in the interns . . . Bev is more accepting of us all the time. She has developed a genuine fondness for the interns. This is understandable since they are a group of fine young men.

[Observation 2D]

Saul took note of a growing confidence on Bev's part.

Mrs. Donnelly trusts us . . .

[Interview 14]

Tod made a reference to Bev as a measure of program success. He was asked to point out some indicators of how the program was progressing.

When Mrs. Donnelly wants to threaten them she says 'Next time we have tech drawing, you will not be permitted to take part . . .'

[Interview 11]

Indications of Interns' Commitment

Tod changed his mind about attending a private school for his senior year because of his interest in the Coster Study.

For a lot of reasons, my family and I thought I would be better off if I finished high school elsewhere. The main reason I came back to Bingham High was the Coster Program . . .

[Interview 3]

A strong indicator that the program was both working well and was an enjoyable experience for the interns was their unexpected request to extend the study's completion date. On October 16, 1990 author noted: "It is apparent the interns enjoy the youngsters . . . I worry that this energy will fade away as the year progresses."

Fortunately, the energy did not fade. In the spring, at the request of the interns, the study's completion date was extended.

Today I spoke to Bev about the interns request to extend the study beyond the April completion date. She agrees. Mick says that they can come back for this one class per week without difficulty. What this means is the interns will return to Coster School after they have fulfilled their high school requirements. They wish to tutor on their own time.

[Observation 2K]

Evaluating Cooperative Education

The fact that the program operated so smoothly as a direct result of the interns commitment came as something of a surprise to the researcher. It was hoped that the program would work well. It worked exceptionally well. Tod felt the key to successful off-campus learning experiences is carefully screening candidates.

I think it would have to be done under the right conditions. I think it would only work when all the students involved were serious about it. Everybody would have to be committed to it. Even a small number of kids who were not really serious could spoil the whole thing by fooling around.

[Interview 11]

In a later interview Tod continued to give his views of cooperative education.

It's practical. You have to prepare in the classroom first, then you test yourself when you go to Coster School . . . A lot of things you learn in high school seem like they don't have much use . . .

[Interview 15]

Meeting the Needs of a Unique Population

Tip describes some things that make the youngsters different from average students, and suggests some ways in which they may be helped.

I think that, for the most part, they are pretty much normal kids. Except Matt. He really has a brain . . . He has a bad hand and some other physical problems that make sports and phys. ed. difficult for him . . . Sometimes they have problems that they discuss with us. They ask about their personal concerns.

[Interview 13]

Youngsters Evaluate the Interns' Influence

The youngsters were observed responding in a positive way to the interns' instruction. In interviews the youngsters confirmed the Coster study as enjoyable and productive.

Chad, who had a long history of disruptive behavior, seemed comfortable with the interns' approach to classroom control.

If you didn't pay attention, you just didn't learn . . . I think they were easier than regular teachers because they know what it's like to be taught by regular teachers and they understood the problems.

[Interview 25]

Anton agreed with Chad that the interns were more understanding than were regular teachers. He commented: "It was (the Coster Study) pretty neat . . . The high school boys have a better idea of what it's like to be a kid. They were much more understanding."

[Interview 28]

Donny implies that classroom control for the interns was at times difficult. He saw the interns as friends rather than teachers.

[Interview 26]

Although Matt expressed no need for the interns to help him deal with personal problems, his actions in class indicated that he developed positive feelings towards them.

How Matt would react to the interns as role models was a matter of interest to the author. The following observations support a belief that Matt had positive feelings.

Matt has a telescoping pointer that he uses when he speaks to classes at Coster School. The youngsters tease him by saying that Tip (who is holding the pointer) has broken it. Matt laughs. I feel this is significant since he would not laugh if he thought it was really broken. He must believe that Tip would not break it . . . Matt is working on the computer. He is working with one hand on Tod's shoulder. This is the first time I have ever seen Matt touch anyone.

[Observation 2H]

When asked to evaluate the Coster School Study, Matt replied that he liked it better than any other school program he had ever participated in.

I liked everything about the program. I liked it better than any school program I have taken . . . I think going to Coster School helps.

Last summer was the first time I played with more than one kid. I made a lot of friends through Pad.

[Interview 24]

Chad, who does not normally respond in a positive way to school situations, seemed pleased with his experience with the interns.

I can't think of anything I didn't like. Those guys [interns] really made the program fun . . . I wish the program were longer. I wish we were going to continue it next year. I would have enjoyed having more contact with the high school kids.

[Interview 25]

Donny was asked several questions regarding the cognitive and affective impact of the interns.

At first I was a bit shy, but I got over that. I figured I'd just join in on the fun . . . If I had to listen to an ordinary class, I probably would have fallen asleep . . .

[Interview 26]

Padrick described his experience with the interns as a very positive one.

I liked it very much. It was fun working with the high school students . . . You could learn easier from the high school students . . . You could talk with the high school kids . . . I liked just about everything about it.

[Interview 27]

Anton's experience with the interns was similar to that of Padrick.

The high school boys have a better idea of what it's like to be a kid. They were much more understanding . . . It would be better with a wider variety of computers. It would be nice to learn to control more types of equipment.

[Interview 28]

Evaluating Classroom Control

Since the interns were only a few years older than the youngsters, the interns sometimes had some difficulty keeping the youngsters focused on their assignments. Saul offers his perception of how the two groups related.

I think we were there to work with them (youngsters), and talk to them as an older brother might. I always felt that they saw us as other kids, just older. We had a lot of fun with them, but it was hard to get them to do something when they didn't want to do it.

[Interview 14]

The Teacher as Learner

Mick was aware that teachers, in the process of instructing students, can learn many things from these students.

I got the feeling that I was learning more than the youngsters. I think when students offer their ideas, and teachers listen to them, it helps to "ease the stress" between the generations.

[Interview 21]

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Proposition I: Changing Schools

Summary

The Coster School Study was conducted during a period of financial constraints for the hosting school system. As a microcosm of what can be done for public education in Massachusetts, the study sought to demonstrate how schools can become better places for students to learn even when schools have less than desirable funding. Cost of the study was minimal, namely the cost of several tanks of gasoline to fuel a school van and a few other small expenses. Otherwise, the program benefited from in-house staff, enthusiastic students, and donated resources, and was able to operate within established financial limits.

Schools are compelled by law to provide special educational services for the G/LD student. These services can be provided within the community or at special schools which, in turn, charge the sending community. Schools for the G/LD are expensive, in large part because they often offer residential

programs. Such programs not only put a strain on local budgets but also remove youngsters from home and the influence of family, critical factors in any child's development. Programs such as Resources not only are more economical than private programs but also permit the children to live at home.

The Coster School Study was a unique experience for teachers and students. Teaching CAD to elementary students was an innovation and required the tutors to possess considerable experience in graphics and computer skills, as well as some basic understanding of the unusual nature of G/LD students. Although neither the author nor the Resources director had complete knowledge of these subjects, together the author and director had the knowledge and experience to plan and run a successful program.

In the program's early stages, these two staff members performed most of the instructional tasks, in addition to preparing the interns for assuming control of the classroom. After a few weeks, the interns had nearly full control of instruction. As the interns assumed greater classroom responsibility, the author devoted more attention to classroom observation as a function of the case study, and the Resources Director undertook teaching responsibilities beyond the Resources classroom.

Data from observations and interviews strongly suggest that the youngsters both liked and admired the interns. Given the strong support interns received, they were able to accomplish a great deal. In spite of their lack of experience as teachers, the interns used youthful perspectives, humor, and concern for the youngsters to teach them in a comfortable way. When interviewed near the end of the year-long study, the youngsters expressed enjoyment for the program and positive feelings for the interns. In addition, they credited the program with being a worthwhile learning experience. One youngster even described his time with the interns as the best educational experience of his life.

Data from both observations and interviews support the belief that the interns perceived the Coster School Study as educationally beneficial and enjoyable to themselves as well. The interns commented during the study that providing instruction for the youngsters was a good way of checking their own knowledge and deficiencies in technical drawing and computer skills. In addition, the interns suggested that they prepare lesson plans which they felt were necessary for good instruction.

The interns made comments in support of their cooperative learning experience at Coster School. For

the interns, taking a more active role in classroom activities was a welcome change. Observations and interviews support the belief that the interns felt themselves capable of being trusted with classroom roles that were more active than traditional student roles. They enjoyed the authority that came with being in charge of the youngsters, and they enjoyed learning in an off-campus location. The interns demonstrated their fondness for the youngsters and expressed their belief that they had improved their self-image as a result of the program. The interns request to extend the completion date of the program. This request meant they would have to tutor on their own time, thereby indicating a satisfaction with the program.

An innovative program can kindle an interest in creative teaching in school staff. The Coster School Study was a source of motivation for the author in that it provided a new experience in a classroom where procedures had grown somewhat repetitive. Working on a new project had a positive impact on the author, and, ultimately, a positive impact on others involved with the study.

Conclusions

Changes in school policies or procedures come about as a result of the actions of people actively involved in the school's daily operations, and the actions of those not involved in daily operations but are politically empowered to make changes. Current research supports the belief that changes originating at sources beyond the school are frequently characterized by mandates, confusion over the exact intent of the change, and resistance by the institution and its staff.

Changes initiated by in-house staff are responses to less-than-desirable existing conditions, tend to be flexible, evolve over a period of time, and usually proceeds with little opposition. Such was the case of the Coster study. The program was a response to a need for improvement in instructional practice which was initiated by the author and the Resources director. Each staff member had a clear understanding of the strengths and weaknesses of his or her student group, as well as insights into the problems that might be anticipated while implementing a major change. The program operated with a flexible structure which was in a constant state of improvisation, review, and restructuring.

With the exception of one elementary principal who did not wish her school to participate in the study, the Coster Study met with no resistance from the institution or its personnel. Students as well as members of school staff and administration cooperated. In addition, parents of the youngsters asked to extend the program for an additional year. It is the author's opinion that, if imposed changes can expect to meet resistance, as the literature suggests, and adaptive changes can expect to meet the type of acceptance that characterized the Coster School Study, then staff-initiated school change projects are worthwhile, cost effective, under-utilized methods of change.

Recommendations

There is considerable agreement among researchers that successful change strategies in schools depend heavily on the approval, support, and energy of those who will implement the change. To this end, change implementers need a sense of ownership in such changes. However, when proposals for change originate outside the school and are mandated, that sense of ownership on the part of the implementers is missing.

Changes that evolve within schools are problem-solving in nature and attempt to correct situations which are unacceptable for students and/or members of

the school staff. Such in-house changes address specific problems; often they are symptoms of larger issues that change strategists often choose to address through mandated changes. It is the opinion of the author that those who wish to address major school issues through mandated changes must, if they are not part of the school community, know the specific problems that the school faces. Such knowledge can only result from direct contact with staff and students as the school operates.

It is the author's recommendation that change strategists, who are not members of school staff become active in the daily operations of the school as a means of getting to understand its specific problems. It is also recommended that change proposals be presented as guides to school staff, and that these proposals enlist their support in designing solutions to school problems. Providing teachers with the opportunity for such involvement ensures that significant problems will be addressed and, ultimately, will address the major issues which underlie the problems. In addition, such an approach gives the teacher a sense of ownership in the change plan, a characteristic which is essential to the teacher's commitment.

Proposition II: Cooperative Education

Summary

The Coster Study united high school and elementary students in a cooperative learning experience.

Cooperative learning, as it relates to this study, should be interpreted as the application of acquired skills to learning situations which are other than traditional classrooms. Although the Coster Study was the first experience of this type for the interns, it was not for the youngsters. It surprised the author to discover that the youngsters had become involved with cooperative learning activities through the presentations of special topics to fellow students and by serving as peer tutors.

Considerable difficulty should be anticipated when attempts to arrange college-bound students' schedules in order to permit them both to elect necessary college prep courses and to keep a time period open at the end of the school day for an off-campus cooperative education experience. In the case of the Coster School Study, two of the six interns who originally had elected to participate in the program had to drop out because of unresolvable schedule conflicts. The remaining four students needed permission from teachers and administrators to make necessary changes. Complex scheduling problems at inception threatened the

program. The first week of school in September 1990 was a time of much negotiating and paperwork.

The interns made a number of astute observations regarding the value of cooperative education. They felt that being required to perform specific skills was an excellent way to test those skills. They saw the experience at Coster School as an opportunity to apply problem solving skills and trial and error methods so as to reinforce lessons learned in the classroom.

Conclusions

In classrooms where the numbers of students are excessive, the use of student tutors provide those classrooms with additional instructional services. However, the benefits of tutoring are not limited to overcrowded classrooms. For example, the Coster Study, represents a successful cross-age tutoring program in a classroom with relatively small student numbers. The Study supports researchers who have documented the potential of tutoring to improve and enhance a wide range of teaching environments.

The youngsters, all of whom had some form of learning disability, confirmed by way of their improved CAD skills that disabled students can be effectively tutored. They confirmed also, by way of their classroom presentations to interns and other students,

the author's belief that disabled students can successfully perform as tutors.

The youngsters learned CAD skills rapidly. It was apparent to the author that no special curriculum provisions would be required for this group of academically skillful fifth graders. The program taught was essentially the same as the one offered to tenth grade students. However, the subjects that the youngsters chose to draw, such as planes and ships, reflect the interest of elementary students. (See samples of student work in list of figures.)

On the basis of grade point average and rank in class, two of the interns were significantly better students than the other two. Although there was no objective comparison for their effectiveness as tutors, it is the author's opinion that the lower-achieving interns were as effective as if not more effective than the high achievers in their roles as tutors. This opinion supports research contending that students who are not high achievers can be successful tutors.

The interns saw the direct application of their knowledge in the Coster School classroom as a rationale for their acquiring that knowledge. During interviews, the interns questioned the usefulness of that which they learn in school. They asked, for example, 'How is this going to help me?' and, 'What good is this?' These

questions express the interns' frustration with some school activities and assignments. The interns' comments support the idea that cooperative education makes clear to the learners the reasons why they should learn particular things.

Research suggests that teachers often have difficulty sharing responsibility in the classroom. This notion was confirmed in the Coster Study. The author found himself, for the first time in his teaching career, conducting a truly democratic classroom, and experiencing some difficulty in the process.

Recommendations

Prior to the Coster School Study, the author raised the question as to why college-bound high school students are under-represented in cooperative education programs. Although scheduling difficulties and other problems work against the easy implementation of such programs, the Coster Study demonstrated that these problems can be overcome. It is the author's recommendation that the results of the Coster School Study be used in support of the need for programs for the college bound and, moreover, that the program should be used as a model for successful ventures of this kind.

Proposition III: Building Relationships

Summary

Federal legislation has enacted laws which provide funding for students with special learning needs. These funds, coupled with funds from other sources, provide a financial base for the development of programs which attend to the needs of gifted, learning disabled, and G/LD students. The Resources Program at Coster School is an example of a recently funded and developed program that addresses the needs of G/LD students.

The Resources students displayed attitudes, characteristics, and difficulties, which were typical of many special needs students. The youngsters, because of close contact with other students in Resources, tended to make friends within that group. Although some had close friends from the school's mainstream, most preferred to socialize with other members of Resources.

There was a general consensus among the youngsters that establishing meaningful relationships with students from the mainstream presented some difficulty. Matt, a youngster classified as extremely gifted, seemed to have the greatest difficulty making friends. He related a long history of having difficulty with socialization in both public and private schools.

Matt's condition confirms research which shows a parallel between difficulty in forming friendships and extremes in intelligence.

Many researchers argue that the use of cross-age tutors as role models can be an effective way of promoting the healthy social development of younger students. Because of the particular difficulty that the Resources students encountered with acceptance in the mainstream, affective development became a primary focus of the interns. The findings of the Coster School Study support the contention that the program was successful in supporting this affective development. Interviews with the interns identified numerous instances in which the youngsters developed positive feelings towards the interns. 'They look up to us.' 'They see us as role models.' 'They confide in us.' are a few comments which confirm the good fellowship.

When requested to recount all the positive aspects of the CAD program, the youngsters mentioned cognitive matters exclusively. They listed 'new things on the computer,' 'architecture,' and certain computer skills as benefits of the program. When asked to describe some positive aspects of the program that were not related to computers or technical drawing, the youngsters could not recall any. Bryan states

explicitly that the interns had done nothing to benefit him that was not related to an academic area. Matt felt that any non-academic contribution the interns could make was, for him, unnecessary since he 'Already knew all that stuff about learning from older kids.'

Conclusions

The close personal relationships which developed during the program and extended beyond its completion confirm research which reports high affective gains through cross-age tutoring. As this research suggests, the interns became role models and trusted friends for the youngsters. Data collected through observation and interviews indicated that the youngsters had confidence in the interns, as well as a desire to discuss personal matters, and a need for approval, advice, and guidance.

The youngsters were subjected to many of the pressures that have been noted by researchers of gifted students. The pressures include those of well-intentioned adults who wish to ensure the students' full development and ultimate success. In addition, the pressures that the youngsters impose on themselves are often more extreme than those exerted by concerned adults. The youngsters spend a significant amount of time in Resources with other G/LD students.

As such, they tend to avoid, and are often rejected from, mainstream groups.

Although none of the youngsters could think of a specific way in which their social, emotional, or affective development were enhanced through their contact with the interns, numerous classroom observations confirmed that the youngsters did indeed seek support and guidance from the interns. At times the interns had difficulty keeping the youngsters focused on CAD assignments because of what appeared to be more important personal matters. Four of the youngsters, from the very earliest stages of the program, openly displayed their admiration for the interns. Chad, who had been in several schools and was a discipline problem in all of them, slowly became less aggressive, less negative, and more inclined to please the interns. Matt, perhaps the youngster most inclined to keep to himself, gradually began to show affection for the interns. Near the end of the program, Matt was observed working on an assignment with one hand resting on an intern's shoulder. This outward display of trust, which would be incidental for a typical ten-year-old, was a significant step forward for Matt.

Recommendations

There is little agreement among researchers as to whether or not G/LD students tend to be isolates, and, if so, whether they are because they are not accepted in the mainstream, or because of their own choosing. Similarly, research which examines the impact of cross-age tutors on the affective development of tutees lacks a strong consensus on this issue.

Based on the data collected in the Coster Study, the youngsters tend to become isolated because of the lack of acceptance they receive from their peers and because they choose to be alone or with other G/LD students. The author recommends the implementation of school programs which present older peer role models as supportive means of development of G/LD students' affective qualities.

It remains something of a mystery why, in spite of overt displays of positive feelings and comraderie between the interns and youngsters, the youngsters failed to recognize the impact the interns had on their social, emotional, and affective domains. In interviews with the youngsters, the author pursued this dimension of the study but to no avail. When asked to describe 'ALL' the things that the interns had done to help them, the youngsters referred to academic matters exclusively.

Data collected in classroom observations contradicted data collected in interviews regarding the youngsters perception of the affective impact of the Coster Study. The author suggests that further research which examines the affective impact of tutoring, particularly research which focuses on the perception of tutees, be conducted.

Proposition IV: Technology and Values

Summary

At some time during their three years of learning technical drawing and computer graphics, each of the interns expressed an interest in engineering or other technical fields, and each student developed skills related to these careers. In an attempt to prepare these students for these career choices, the author raised a number of technological issues in class and discussed these issues with the interns in interviews.

Although technological issues were discussed with the interns, these issues were not presented to the youngsters. If more interview time with the interns had been available, their thoughts on these issues would have been a valuable addition to the study. However, having limited access to the youngsters

prevented their participation in this part of the study.

Interview topics focused on technological advances and their impact on society. The interns expressed their views on the increasing use of computers and automated systems in manufacturing and other industries, and the resultant loss of jobs. The interns discussed the possibility of total machine control in the workplace, the role of automation in a capitalist economy, the possibility of deflated economies resulting from overproduction, and the trash disposal problems which accompany such overproduction.

Interview questions requested the interns to identify those individuals or groups whom they perceived as being strong opponents or supporters of technology. Opponents were referred to as 'technophobes,' and supporters, as 'technophiles.'

In the category of technophobe, Mick, identified environmentalists and those people who live with the threat of being replaced in the workplace by automated systems as technophobes. Tip named Greenpeace and other such groups, people with little formal education, and those whose jobs are threatened by automation as technophobes. Saul viewed technophobes as: older people (such as grandparents), farmers, and those threatened with automation.

Regarding technophiles, Mick named high-ranking military and business personnel. Tip listed intelligent, well-educated people with a preference for Republican politics. Tip felt that Matt, because of his high intellect and interest in science, had the potential to become a technophile. Saul included scientists, engineers and others with a deep understanding of technology, as well as Ronald Reagan. Reagan was included because of his well-funded and highly-advanced military defense system. Tom recognized capitalists because of their potential to increase profits through the use of automated systems.

Conclusions

In general, the interns were in agreement that those people threatened with job loss as a result of automation were most likely to have negative feelings towards advanced technology. They named high-ranking military and business personnel as those most likely to have positive feelings.

Tod provided an interesting insight into the progressive loss of products that bare the unique signature of their producer. Tod compares identical mass-produced products which make no statement about the people responsible for their creation, and, American Indian clay pots which are fabricated and

illustrated by the human hand. Tod feels that each of these pots tells a unique story about the particular indian who produced it. This observation implies that technology promotes more things that are the same and fewer things that are different.

During the first few months of 1991, the United States engaged in a war with Iraq. This conflict provided an unanticipated addition to the study. It was examined as a study topic because it illustrated the unusual nature of modern technological warfare. The interns noted that media coverage promoted strong American sentiments, and, through film editing and carefully selected language (such as using 'collateral damage' to describe the killing of civilians), the media successfully played down some of the horrors of war. Saul, who strongly supported the American efforts in the conflict, was clear in his conviction that an American victory would be the result of superior technology, and would be unrelated to what was just for the parties in conflict.

The interns had the opportunity to express their opinions on the autonomous nature of technology and the potential for mankind to self destruct as a result of advanced weapons systems. Tip expressed concern for the improving effectiveness of weapons systems. He also expressed concern for the disposal of weapons that

become obsolete when improved ones come on line. Saul rejected the notion that technology is a man-made monster, one that is self destructive. Saul feels that as long as people make machines they will control them.

The views of the interns were moderate and did not suggest that they shared the views of either technophobes or technophiles.

Recommendations

Technology is a human activity. More specifically, in spite of much mechanical or electronic hardware that tends to create an image of technology as a force far removed from a human context, all technological contrivances are a product of the human mind, and, in the author's opinion, such contrivances are subject to human controls. The author recommends that technical studies programs in the public school should place an emphasis on creating an awareness of the human dimension of the technical world. It is important that students understand that they are capable of controlling their technical world and that they do not need to feel helpless in the face of life's complexities, or the rapid changes brought about through technology. Furthermore, they should not feel a sense of futility with living in a world of nuclear proliferation.

The author further recommends that more research be conducted into the changing roles of workers in an information age. Assuming that 'employment of the masses' will continue to be a concern for future societies, it is unclear whether or not these future workers, in consort with computers and other automated equipment, will need intellectual skills that are more highly developed than those of today's workers, or if, as a result of the intervention of such equipment, workers will need less highly developed skills.

Proposition V: Seeking New Teachers

Summary

After a steady drop in school populations during the 1970s and 80s, birth rates have increased and projections indicate that the number of school age children will continue to grow through the year 2000. Although an oversupply of teachers currently exists in Massachusetts and other states, research studies suggest that qualified teachers will soon be in short supply because of the rising school enrollments, and because of retirement rates within an aging teaching

workforce. In addition, difficulties in staffing future classrooms might be exacerbated by a declining image of teaching as an occupational choice among the nation's youth. Research by Mangieri and Kemper (1984) and Ryan (1987) confirms a belief that few academically capable high school students are interested in teaching careers. The researchers' survey studies suggest that the greater majority of high school students reject teaching as a career because of salary issues, lack of professional advancement, lack of student respect, and the profession's overall working conditions.

Technical/vocational education has an obligation to provide information related to a wide range of occupational choices. Since the projected vacancies for new teachers in technical education are estimated to be four times as great as the average for all teaching areas, career information related to this occupation is an appropriate topic for class discussion.

One of the purposes of the Coster Study was to determine if the attitudes of the interns towards teaching careers would change as a result of a tutorial experience. Any positive feelings about teaching expressed by this group would be significant, since, prior to the study, all students considered teaching to be one of the least desirable career choices. Negative

feelings were expressed by the interns in May of 1990 on a survey that requested them to rank order a list of professional and non-professional occupations. Their opinions were expressed approximately four months before the start of the Coster Study. This time period was prior to the time when the interns knew of their involvement in the study.

Saul was a strong student in all classes and ranked near the top of his graduating class. Although quite bright, his quiet and non-aggressive manner sometimes made him less effective than the other interns in getting the youngsters to be productive. At times he seemed uncomfortable when circumstances required him to be forceful. Saul felt tutoring at Coster School was an excellent way to gain an insight into teaching as a possible career choice. As a result of the tutorial experience, Saul concluded that teaching was not right for him. His first interest had been engineering and that interest did not change after the year he spent at Coster School.

Tip confirmed some of the findings of research which examines the reasons for lack of interest in teaching careers on the part of young people. He felt that salaries were a deterrent, but he added that he probably would not change his mind if money were not an issue. He described dealing with students as difficult

work, and he noted that some teachers 'go through hell' in the classroom. He thought teaching lacked prestige. Tip did, however, perceive relatively short work days and vacation time as positive aspects of the profession.

Tod had never been a high achieving student. As a technical drawing student, he had exhibited a lack of confidence in his ability, a quality that was consistent with his marginal academic record. During the Coster Study, the author was extremely pleased to note Tod's capacity to quickly adapt to the new classroom situation, establish a rapport with the youngsters, and assume a position of strong leadership. The author observed that the more things Tom did correctly at Coster School, the more confident he became. However, Tod noted that he did not feel well suited for teaching because he was only an 'average student', and, for this reason, prospective students would not really benefit from his teaching. Tod's new-found confidence was apparently not sufficient for him to think of himself as capable of becoming a teacher.

Tod noted that salary was a deterrent to teaching, and he added that his lack of interest in teaching would not change if money were not an issue. Tod concluded that he had a greater respect for what a

teacher is, and he developed a new appreciation for the hard work teachers do, based on his consideration of his own efforts at Coster School.

Mick acknowledge several positive aspects of teaching. He felt a great personal satisfaction in passing along ideas to other people. He commented that teachers can not reach all students, but, they are rewarded by those they do reach. He maintained his original position of not being interested in a teaching career, citing salary and working conditions as the primary reasons. Mick felt he could make more money for doing less work than he would have to do as a teacher, and he expressed some apprehension about the possibility of getting students who 'acted the way he did.' Ironically, based on a comparison of Mick with fellow students, he had always been quite well-behaved. Mick also noted a sense of education becoming stagnant because of its aging teacher workforce. He felt it was time for the profession to bring in some young teachers, but he did not wish to be one of those recruits.

Conclusions

It is the author's opinion that the interns' participation in the Coster Study provided them with an excellent exposure to the teaching profession. During the year-long study, interns developed keen insights and became quite adept in a wide range of teaching skills. Observations and interviews showed evidence of social maturity on the part of the interns, as well as a deeper understanding of what a teacher is and does. Although the interns' opinions about teachers and teaching were greatly altered in that year, all maintained their original position of not being interested in teaching careers.

Saul's rejection of a teaching career was based upon his personal commitment to another profession. However, the other interns had no such personal commitment. Their rejections were not based on choices of other professions; instead, they were based on factors that related to teaching. The interns noted salary and working conditions as the primary deterrents to teaching as a career choice.

Recommendations

Research indicates that teaching is an unpopular career choice among academically capable high school students. This finding is supported by the results of

the Coster Study. Furthermore, the study suggests that, although tutoring can create a greater sensitivity to and appreciation for the teaching profession, it does little to alter the attitudes of students towards teaching careers when the students had little or no interest in teaching prior to tutoring. The study also suggests that most students reject teaching as a possible career choice not because other professions are more attractive but because teaching is perceived as an unattractive career.

The author suggests that many of the problems associated with teaching, particularly problems that deal with funding, will be slow to resolve. However, the profession could help to raise its professional status by addressing issues related to the non-professional aspect of teaching, such as the assignment of non-instructional duties, and issues which involve teacher empowerment. The author contends that many problems related to the profession's working conditions are solvable, and, therefore, for these problems to continue only means that an unnecessary deterrent to teaching as a career choice will continue to exist.

Evaluating Effectiveness of the Study

Summary

Two central research questions were raised repeatedly by members of the proposal and dissertation committees, fellow teachers, parents, and others: (1) Did the students like the program? and, (2) Was it a good learning experience? The final section of the dissertation attempts to answer these questions.

The interns and youngsters had needs that were difficult to meet within the existing structures of the schools. The program at Coster School had the potential to change that structure and, ultimately, through the interaction of the two student groups, to be more successful than existing programs in meeting the students' needs. The Coster Study, in theory, seemed to have the necessary ingredients for success and could be an enjoyable and beneficial experience for the involved students.

For the interns, the Coster Study took place in the final year of a three-year commitment to technical drawing and CAD. During the study, the author noted an emotional growth on the part of the interns, a quality which exceeded their growth in the two previous years. This was particularly true of Mick and Tod who were, by most measures, average students. Mick and Tod

exhibited strong personalities and were responsible for most of the leadership at Coster School. Mick introduced new methods of measuring the youngsters' skills, and Tod volunteered for extra assignments, which included, among other tasks, learning a complex computer function.

Bev's growing trust in the interns was a good measure of the program's effectiveness. Initially she would remain in the class for the entire class period. However, as the year progressed, she felt confident leaving the interns in charge of the class while she assisted students in another classroom.

Saul and Mick noted that they had learned a great deal during the year at Coster School. Saul recognized the difficulties to be encountered when attempting to control children, and he recognized the program as a good means of measuring his acquired computer skills. Mick was of the impression that, even though his role in class was one of providing instruction, he was learning more than the youngsters.

The author was concerned with the possibility that the interns might begin to lose interest in the program as they approached the end of the school year. This concern proved to be unfounded when the interns requested that the study's completion date be extended. This request was granted even though the extended date

made it necessary for the interns to tutor at times when they were not required to be in school.

There is perhaps no more valid measure of success or failure of the Coster Study than the youngsters' response to it and their response to the interns. In a series of interviews, the youngsters expressed their views on a number of aspects of the program. For example, Chad liked the interns' approach to instruction. He commented 'If you didn't pay attention, you didn't learn.' He also expressed a wish that the program be extended for another year. Donny, in describing the interns, said they were closer to being friends than teachers. In a related manner, Donny acknowledged some difficulty the interns had with classroom control. Although Matt said he needed no help or advice from the interns on personal matters, his classroom behavior was inconsistent with his statement. Matt's classroom behavior indicated that he both trusted the interns and was inclined to actively seek their advice on personal matters. Matt described the Coster Study as the best school program he had ever been involved with.

Matt and Donny both had difficulty with socialization. Both expressed improved relations with age mates as a result of their interaction with the interns. Padrick, who was to become Tod's pen pal when

Tod went away to college, said that he liked 'just about everything' about the program. In interviews, all of the youngsters described the interns as being more sensitive and understanding than regular teachers because they were younger and could relate better to what it was like to be a student.

Conclusions

Mick and Tod's effectiveness as tutors supports researcher that contends that tutoring should not be reserved for the most capable students. These interns were the primary source of leadership in class in spite of their average academic achievement.

Researchers disagree as to whether the tutor or tutee is the primary beneficiary of tutoring programs. Based on the results of the Coster Study, the author must conclude that both groups made significant progress without any indication that benefits accrued in any significant way to one group more than to the other. In a cognitive sense, the interns' progress was easier to evaluate because the author had been working with this group for three years, and he could make reasonable assessments of their ability. The youngsters learned very quickly as tutees. However, it is difficult to determine whether this learning was a function of the interns effectiveness as tutors or a

function of the youngsters' giftedness. Regarding the affective development of the groups, it is the author's opinion that the affective development of the interns was somewhat impacted, and the affective development of the youngsters was greatly impacted by involvement as a result of the Coster Study.

Recommendations

At the conclusion of the Coster School Study it was the author's opinion that gifted students are more demanding on school services than are average students. When these students are extremely gifted or G/LD the demands are even more severe. Gifted students require a low instructor to student ratio for their optimal development and this ratio is often provided by private schools, especially those that are residential.

It is the author's conviction that cross-age tutors of average academic achievement can be effective in promoting the cognitive and affective development of G/LD youngsters. In addition to the benefits for the tutors, the tutees avoid the isolation of private school, enjoy the benefits of learning with students of various abilities, establish positive older-peer role models, maintain a closer contact with home and family, and ensure that money saved from not paying tuition costs is directed to the local community.

Many gifted and G/LD students do not have the benefit of special programs because of the high cost of operating such programs. The author recommends that cross-age tutoring programs, such as the one demonstrated at Coster Elementary School, be included in programs for these students as a method of promoting their optimal development and as a means of controlling operational costs.

APPENDIX A

DATA COLLECTED THROUGH OBSERVATIONS

For the purpose of analysis, data collected through observation was assigned to one of four data subdivisions. That which was observed most frequently within each subdivision and written on most extensively appears in this appendix.

Observations Assisting Program Formation

Observation 1a

Nature of Citation: Intern Rookie Mistakes

Frequency: 6

Lines of Collected Data: 27

Field notes indicated that on a number of occasions, the interns managed to impede the program's progress by making mistakes which could be attributed to their lack of experience as teachers. By far, the greatest problems were created when the interns tried to restore order in a classroom where disorder was caused, at least in part, by the interns themselves.

It is difficult for the interns to maintain control of the youngsters because of the friendly attitude that has developed between them. There is much good natured 'kidding' exchanged between the groups. However, when order must be restored, the youngsters, because of precedent established, continue to act in a less than serious manner. It seems that the interns risk loss of control when they permit the classroom to be relaxed and friendly.

Tod is angry and says: "There is a time to fool around and a time to get serious." Padrick responds: "Yes, and this is a time to fool around." The youngsters seem difficult to control today. The interns spend considerable time joking around with the youngsters. This attitude can confuse the youngsters as to what kind of classroom behavior is expected.

Proper placement of interns and youngsters within the classroom did much to improve this situation.

It is difficult to determine who is working with whom. Tod and Tip are sitting next to each other. Youngsters Pad, Donny, and Bryan are seated together. It seems that Mick is trying to teach all three. It is necessary to change a few seats.

Sometimes paying attention to class work is difficult for the interns as well as for the youngsters.

Mick is fascinated by a logo-lego hookup on the computer. Rather than work on assignments, the youngsters sit and watch Mick as he examines the hookup. One thing the interns must learn is that you must be able to control your own focus if you wish to control the students' focus.

One of the difficult things about teaching is getting students to do an acceptable job on assignments that they would prefer to ignore or work on hastily

Tip is frustrated at the youngsters poor effort on assignments that are done on a board versus a computer. The youngsters have made it clear that they do not want to draw on the boards. Tip has difficulty with this knowing that working on a board is an experience they should have. This is a tough lesson for a potential teacher.

Regardless of their value, students frequently show little effort with things they don't enjoy doing.

Saul, during one session with Chad, discovered the challenge that some students present.

Saul is doing his best with Chad. In spite of Saul's good efforts, Chad is disruptive. Saul is aware of his lack of control and I step in to settle things down. I think with more experience Saul would handle this situation. It is difficult to determine what is necessary to control Chad.

Observation of Operation

Observation 2a

Nature of Citation: Good teaching

Frequency: 18

Lines of Collected Data: 77

Good teaching was the most cited Operational Observation and the most cited in the study as a whole. In addition, it prompted the second greatest number of observers comments as expressed as lines of collected data.

The most prominent feature of this observation is the emergence of the distinctly different personalities of the interns. This opinion is based on the researchers' interaction with the interns during the study, which was greatly altered from the interaction of two previous years of student/teacher relationships.

The logistics of bringing a CAD program to Coster School presented difficulty from the very beginning.

Computer and Plotter had to be transported across town for each class session. This required that an equipment table be pushed several hundred yards through building and parking lot, loaded into a van, unloaded and pushed again into the classroom, and, the entire process had to be repeated for the return trip. The equipment was fragile and doubts existed as to whether it would go undamaged through the repeated travel. It is satisfying to note that, because of the interns' strict attention to equipment care, all equipment escaped damage.

I was marveling at the efficiency with which the interns can deliver the equipment. They handled it much better than I could.

It was observed that having multiple instructors (interns) in the class can, in addition to giving more individual attention to students, complement group instruction in ways that are often amusing. During one class session Bev (Resources Director) asked the interns to provide some suggestions regarding course selection for students interested in engineering careers.

Bev is trying to make the point that good math skills are necessary. Saul said that he liked math, was good at it, and would depend upon it as an engineer. Tod said that he liked math also but was never good at it. Tod has a real soft-sell personality. He is doing a great job with these

kids. He stays right on top of the youngsters regarding fundamentals.

Saul has considerable potential as an engineer. His academic record is quite commendable. Although he shows great mastery of subject matter, he appears uncomfortable in an instructor's role. He is, at times, hesitant to initiate contact with the youngsters.

Saul is painfully shy. It is difficult for him to seek out and initiate interaction with the youngsters.

Saul moves across the classroom to help Matt on a drawing board. I really think he likes working with these kids, and I think he is dead serious about doing a good job. He is, however, held back by his shyness.

Tip is less shy than Saul, but at the same time he lacks the self-initiated style of Mick and Tod. He is, nevertheless, quite capable.

At 1:10 p.m. I notice that Tip is making some real inroads with Matt. Tip is doing well with the least receptive student.

Tip gives Matt a lesson on multiple view drawing. He explains the purpose of three views.

Mick has achieved, as a technical drawing student, average success. He does not appear to worry very much about grades. However, in his new instructors role a significant behavior change has been noted.

Mick seems to be pretty much in control of the class today. He talks with confidence about how he is going to test the youngsters. They offer no resistance, obviously recognizing his authority.

Mick has devised a test whereby each youngster will do a single drawing twice, once on a drawing board and once on the computer.

The youngsters do not like drawing on boards and offer some mild resistance. Mick sticks to his guns. It would be easy to make the popular move and eliminate the board work. Mick obviously knows that part of teaching is making people do the things that they sometime prefer to not do.

The interns are finishing their tests on the drawing boards. They no longer protest or offer resistance to board drawing.

Mick worked at, and was ultimately successful at, moving Bryan from strictly free hand drawing to the use of drafting instruments.

Bryan arrives at 1:00 p.m. and works on a board with Mick. Mick is effective in keeping his attention. Bryan is doing a three view drawing which is a step from his usual free-hand tanks and airplanes.

Of the four interns involved in the Coster Study, Mick and Tod have, over a two-year time period preceding the Study, been less successful in technical drawing than Saul and Tip. Within the context of the study, Mick and Tod have provided most of the leadership. Tod is observed with Matt.

Tod is working with Matt and doing a pretty good job with a boy who is very difficult to manage.

Padrick, who has been referred to Resources because of Attention Deficiency Disorder, responded well to Tod.

Tod works with Pad on a three view computer drawing. Tod keeps Pad's attention, which is the nature of Pad's disability.

Similar reports of Tod helping Donny.

Donny designed a sports car under Tod's direction. Tod offered good suggestions and Donny was receptive.

Tod also volunteered for extra responsibilities.

Tod has taken charge of learning the 'Drawing Layer' computer function. This is helpful since none of us really understand it.

The interns and youngsters talked openly during classes. Consequently, the general classroom environment when the interns were in control was considerably louder than a conventional classroom. This raised the question as to whether the interns lacked control.

There are four interns and four youngsters in class. There seems to be some disorder, given the amount of talking. After listening carefully to what is said, I have to conclude that most of the talking has to do with student assignments. There is more being accomplished than I originally thought, but the accomplishments are occurring in a less conventional way.

The interns and youngsters are talking about contemporary music. As might be expected they all join in singing a song. The song is not loud, pretty much under control. Afterwards, the students quickly return to working on assignments.

It became a practice to acknowledge to both Bev and the interns that I was pleased with the progress the interns were making in the classroom.

It seems to me, given the youngsters' disabilities, the interns are doing a good job. I mention this to both Bev and the interns. The reinforcement, I hope, will serve to motivate.

This seems our best session to date. All students pulling in the same direction with Bev and me providing little control. They, we must be doing something right.

Given the disabilities of these youngsters, I have to determine that the interns are doing a good job. I confirm this idea with Bev. This is fortunate since the interns will make or break this study.

Study is going quite well. I gave Bev some relevant literature. Need to seek her help in understanding giftedness.

Observations Which Pertain to Concept

Observation 3a

Nature of Citation: Accelerated learners

Frequency: 13

Lines of Collected Data: 75

The interns received some valuable background information about G/LD students from Bev at a brief informal meeting held immediately after the first class at Coster School. She focused her remarks, not on the

individual youngsters, but on the characteristics or traits which describe G/LD students. In this way she was preparing them for the youngsters' classroom manner which, she assured them, would be somewhat different than that of the average fifth graders.

Because the youngsters progress through the school's academic offerings more rapidly than average students do, they deal with some special issues. Early completion of grade requirements creates an opportunity to skip a grade (or grades). Challenging their intelligence is often done in accelerated programs which occur outside of the mainstream. Making decisions on participation in these programs can be difficult. In creating the best opportunity for the youngsters' academic development, consideration must be given to the youngsters total development. Each youngster is unique, and, as such, decisions on these issues must be made in light of each individual child.

Bev feels that rapid academic development often causes the youngsters to miss some normal stages of development.

The youngsters progress rapidly through the normal curriculum. A high powered academic program adds more school-related time to their day. This additional time for school matters must be taken from other student activities.

Matt has been for some time involved in after school programs in foreign languages. He has

become proficient in both German and Latin. However, time in these after school classes must be accessed from normal play time.

Sometimes the pressure on a gifted student to take part in highly challenging academic programs comes from parents. However, according to Bev, it is just as probable that the youngsters will exert the pressure on themselves.

The youngsters are not necessarily pushed into accelerated programs even though they generally come from homes where academic matters are more important than they are in the average home. The youngsters do these things because they want to. Last Christmas they requested, as a special treat, an entire day of math.

The youngsters frequently act more mature academically than emotionally.

Padrick is finishing a plate on a drawing board. He has a lot of difficulties controlling his feelings. It appears that his intellectual development is in advance of his age, and his emotional development somewhat below that age.

Gifted students have the capacity to think abstractly.

Mick is helping Donny on the computer. Donny picks up the operations quickly. He mentions that he is able to see patterns in the operation of the software. It seems to me, this thought process is very abstract for a fifth grader.

Gifted students are quick to complete assignments.

Chad finishes a drawing of a birthday cake on the computer. Because of another commitment, he leaves the classroom. Tip notes, and I concur, that it is difficult to believe that he completed the drawing so

rapidly, particularly, with Chad's limited computer experience.

The quality of work makes a strong statement about giftedness.

Anton finishes a drawing of a space ship he began last class session. The drawing is simply terrific. The vehicle is steel framed with intricate patterns of cross bracing. It shows great imagination. From a design perspective, this is perhaps the best work from a youngster to date.

Matt is the brightest of the youngsters, and perhaps the most challenged by his learning disability. He will have to deal with some of the issues mentioned at the beginning of this section.

The primary decision that Matt and his parents must make is whether he should attend grades seven and eight, or proceed directly from grade six to grade nine.

Matt is involved in a discussion with Bev and the interns on the pros and cons of skipping grades seven and eight. Matt feels he can do the work but Bev suggests there is more to it than doing the work. Bev asks: "I can probably do the work too, but does that mean I should be in high school? Will you have things in common with the high school kids? What do you know about being fourteen or fifteen years old? High school boys are very interested in girls. Are you interested in girls, Matt?"

The interns describe the high school as they see it.

The interns suggest that the high school is tough enough when you are of normal grade age. They further suggest that, in order to see the true picture, Matt come to the high school and spend a day. What they are telling Matt is, academic matters aside, he will be eaten alive at the high school. Matt does not agree. I think Matt might have a less than accurate perception of public schools since most of his education has taken place in private residence schools.

The interns feel that Matt's unpleasant experience in physical education classes at Coster School will continue at the high school, and very likely get worse.

Matt responds that his partially functioning hand might be sufficient to excuse him from taking gym class.

It seems that Matt will have difficulty interacting with people of all ages.

Matt has interpersonal difficulties. He does not seem to have a close friend in Resources, and perhaps none anywhere else in Coster School. Maybe his being out of place at Coster School, or at the high school, is not a crucial an issue.

Observations Related to External Factors

Observation 4a

Nature of Citation: Potential Teachers

Frequency: 11

Lines of Collected Data: 27

one year study. At the end of grade twelve, as at the end of grade eleven, none considered teaching as a possible career. Although none desired to teach, it was apparent to the researcher that the interns had a somewhat changed perception of the profession, and this changed perception benefited the interns in a number of ways.

Saul was somewhat uncomfortable in a teaching role. The more time he spent as tutor, the more certain he became that engineering was his proper career choice. In spite of some discomfort, Saul enjoyed working with the youngsters and described the total experience at Coster School as a profitable one. In addition, Saul overcame much of his shyness during the study.

Mick related stories of his own personal learning disabilities. He shared the opinion with Matt that the biggest problem G/LD students face is having their disabilities go unrecognized, or if recognized, treated inappropriately. Mick, based on personal experience, expressed the belief that schools have an obligation to discover what talents and disabilities students possess. This opinion was very much reflected in the way Mick approached his instructional duties.

Tip helped shed some light on a genuine concern that some students have with the non-instructional

aspects of the teaching profession. In Tip's view, teachers "go through hell" in dealing with students who are behavior problems. It is reasonable to assume that there are students who would consider a teaching career were it not for the difficulties of discipline. It appears that, at least in Tip's case, conflict with students was too high a price to pay.

For Tod, the Coster Study was a great confidence builder. Tod's success at Coster caused him to look at himself differently. He expressed some surprise at his teaching success, stating that he never considered himself competent enough to teach. Based on this single success Tod began to consider challenges that he once thought of as beyond his ability.

APPENDIX B

DATA COLLECTED THROUGH INTERVIEWS

During the study a total of twenty eight interviews were conducted with interns, youngsters, and the Resources Director. Six of those [interviews: 1, 7, 11, 14, 25, 27] have be selected for this appendix.

Text of Interviews

NO: 1

DATE: OCT. 24

INTERVIEWED: Mick

TOPIC: Early analysis of difficulties of G/LD students.

QUESTIONS BASED UPON: Classroom Observation (Accelerated

Learners, Specific Disability), Propositions I, III.

Matt and his parents are considering his possible early entry to high school. He may skip grades seven and eight and become a high school freshman at age eleven. Matt seems confident that he will adjust to the high school. However, it has been observed that he has had some adjustment problems with same age classmates, and the accelerated classroom might present more serious problems.

Q. Based upon some early observations of Matt, what are some of the difficulties he may anticipate at the high school?

A. Matt is very bright and knows it. He seems to feel that his work is always the best in class. For example, he mentioned to Padrick that his work was much better than Padrick's. I think some of his problems are a result of his classroom success.

Q. In what specific areas of the high school do you feel he will have trouble?

A. In gym class. He doesn't like gym to begin with. He told me he has trouble with the class because he has a bad hand [loss of some function], and because his classmates tease him. If he thinks they tease him here, wait until he gets into a high school gym class.

Q. What about academic problems, do you see some problem there?

A. I think he's smart enough. I did notice, however, he had some trouble arranging three views of a drawing. More trouble than you would expect from someone so intelligent.

NO: 7

DATE: JAN. 25

INTERVIEWED: Bev

TOPIC: Difficulties of the G/LD

QUESTIONS BASED UPON: Classroom Observation

(Accelerated learners, Gifted Isolates, Bev's Transition, Finding Additional Resources, Cooperative Education), Propositions I and II.

Bev provides some background information on, and insights into, the difficulties these youngsters face in school and in their private lives.

Q. As a parent of young children as well as an educator, how do you feel about gifted students skipping grades?

A. This is a real problem. On one hand, the youngster is in a classroom of older students. On the other, if they do not advance, they might lose motivation. There are those who insist that, if the school can not hold the gifted child's interest, they will find interest somewhere else. This could lead to problems with drugs etc.

Q. The Coster Study is a first cooperative education experience for the interns. Is this true also for the youngsters?

A. Not at all. Through mainstreaming and reverse mainstreaming, the youngsters have done a lot of tutoring with primary grade students. They also tutor same age students, and, sometimes, older students.

Q. Do you think gifted students tend to be isolates?

A. Gifted students are no more isolated than average students. G/LD students are different. They do things which are inappropriate. Fellow students respect their intellect but ridicule the inappropriate behavior.

Q. What is the major contribution the interns can make to the youngsters development?

A. The interns provide a solid male role model. Most do not have such a model. What I mean is, each youngster has male family members that are pretty much like they are, which is unlike most male figures. The interns are an insight to average teenagers.

NO: 11

DATE: APRIL 24

INTERVIEWED: Tod

TOPIC: Program pluses and minuses

QUESTIONS BASED UPON: Classroom Observation (Interns and Organization, Good Teaching, Bev's Transition, Interns as Role Models, Interns Commitment, Potential Teachers), Proposition I.

Tod, in this interview I would like your assessment of the many things that you have seen, or sensed, at Coster School. For today I would like to look at, from your perspective, the good and bad parts of the program.

Q: What are the things that you could point out as indicators that the program is working well?

A: I notice that, when we arrive at Coster, the youngsters are watching the doorway for us. When we come to class, whatever is going on in class stops right away. The kids are always anxious to get started on the drawing. You know they really like it. When Mrs. Donnelly wants to threaten them, she says 'Next time we have tech drawing, you will not be permitted to take part.' I think these kids have real interest in all kinds of computer use. This opens other doors for them. Matt, for example, is really into the computer for writing stories, but this gives him something else. When you show something to Anton, he is real quick at figuring out how he can use it in a lot of situations.

Q: How do the youngsters see you guys? (interns)

A: I think they see us as role models. Padrick likes to wear my hat. He has been commenting all year on my Champion sneakers. Last class he had a brand new pair just like mine. The first thing he said to me was 'did you see my sneakers?'

Q: What changes have you gone through personally during the program?

A: I've had a real interest in the program since we talked about it last year. Part of the reason I came back to Bingham High was this program. I remember when I was in elementary school my older sister's boy friend used to tutor french in my school. I always wished he would come to my class but it never happened. I thought it was a good idea then. I still do, and I'm pleased that I got the chance.

Q: Any other personal changes?

A: For one thing, I never thought I would be able to teach. I couldn't believe how much I really knew about drawing. I figure if I can teach, there must be a lot of other things I can also do - that I never thought I could.

Q: Would you call this a confidence booster?

A: Yes.

Q: What are the weaknesses of the program?

A: I wish we had been better organized. When we gave those kids a drawing test, it worked pretty well. With more testing we could have kept a better record of their progress during the year. I think we can still do that by collecting the things they have in their folders, but more testing would have been better.

Q: Any other observations from any perspective?

A: I think I know better than most people what it's like to do research. I think I got to be part of a program that most kids wouldn't get the opportunity to be part of.

NO: 14

DATE: APRIL 30

INTERVIEWED: Saul

TOPIC: Potential Teachers

QUESTIONS RAISED FROM: Classroom Observation (Interns and Organization, Good Teaching, Bev's Transition, Cooperative Education, Potential Teachers), Propositions V.

We have been doing this study at Coster School for about eight months. With only one week to go in the program, it seems that things are winding down. It's that time of year. The Coster kids are getting 'spring fever', you guys are three weeks from finishing high school, everybody seems to be looking ahead to something new. Let's talk about some of these things.

Q. Why are things so much looser than they were a couple of months ago?

A. I think Mrs. Donnelly trusts us much more than she used to because she leaves us alone with the kids more often. She really keeps the youngsters working when she's in class. I think the youngsters are more independent. They seem to be doing more drawings on their own, not like in the past when we were more in control. I think everybody seems to relax a bit near the end of the year.

Q. Last spring I gave you guys (interns) a survey to select, in order of preference, some possible occupations. It was before I mentioned the study at Coster School. Do you remember the study?

A. Yes.

Q. One of the occupations was teaching. Do you remember where you placed it in order of preference?

A. I don't remember exactly. Maybe in the middle?

Q. As a matter of fact, all of you guys ranked it as one of the lowest choices. One of the reasons for the Coster Study was to see if that preference would change through an exposure to teaching. How do you feel about that?

A. For me personally, I wouldn't want to teach. I don't feel right about teaching. I don't feel I did a real good job at it. It's not that I feel I couldn't do it; I just don't want to. My real interest was, and still is, engineering.

Q. Your personal choice aside, do you see the Coster Study as a way of creating interest in teaching?

A. I think it would be a good way for someone who thought they might want to teach, to get a chance to try it out.

Q. What parts of the program, as you see them, didn't work out well?

A. We had trouble getting them to draw on the boards. They wanted to work on the computer and resisted the pencil work.

Q. I think you guys had some trouble at times keeping the youngsters focused on school work. This is a problem all teachers have. Perhaps it was because we did not force the issue of you guys as authority figures from the very beginning. However, we never intended to place you guys in the class for more academic pressure. That is the last thing some of these kids need. You guys were there for a different reason. What was that reason as you see it?

A. I don't think any one of us wanted to be an authority in the class. I think we were there to work with them, and talk to them as an older brother might. I always felt that the youngsters saw us as other kids, just older. We had a lot of fun with them, but it was hard to get them to do something when they didn't want to do it.

Q. What did you like about the program?

A. It was a good chance to test what I knew about drawing. It was a good to see that I really knew some things.

Q. The study was an exercise in experiential education, that is, it took you from the classroom and gave you a chance to learn at the job site, in much the same way that you will learn in a cooperative job in engineering school. How do you evaluate this as a learning method?

A. I liked the program. It was a chance to learn in a way that is really different. It's more fun than sitting in class, but there is some pressure. If you don't know something you can look pretty silly.

NO: 25

DATE: MAY 29

INTERVIEWED: Chad

TOPIC: Educating a troubled youngster

QUESTIONS BASED UPON: Classroom Observation (Gifted Isolates, Specific Disability, Interns Control Class,

Interns Teaching Style, Interns as Role Models), Propositions III and V.

Chad, I know you are a new student in the Bingham schools. As I remember you moved here from Deerfield at the end of last summer. I wanted to take a few minutes today to see if you are better adjusted to the school now than you were in September. [Chad is a bit of a discipline problem. He has a history of antagonizing both teachers and fellow students. He is part of Resources because of his behavior problems. One of Chad's problems is making friends.]

Q. Where do your friends come from, I mean, are they the kids I see in the Resources program, or are they kids from regular classrooms?

A. I don't really hang around with anyone. Most of the time I ride my bike by myself.

Q. One of the reasons we brought in the high school students was to help you interact with people, particularly with people your own age. How would you assess the interns as a personal help to you?

A. I liked the program a lot. The high school kids were really helpful. They taught me a several new things on the computer.

Q. How was the intern instruction different from instruction from a regular teacher?

A. They didn't really yell at you like regular teachers. If you didn't pay attention, you just didn't learn.

Q. Does this mean that, in terms of discipline, they were easier than regular teachers?

A. I think they were easier than regular teachers because they know what it's like to be taught by regular teachers and they understood the problems.

Q. Chad, were you ever a discipline problem in class?

A. Sometimes I was. What usually happens is you have a misunderstanding and you get blamed for something you didn't do.

Q. Can you give me some words that might describe the high school students?

A. Funny, serious at times, understanding, fun, nice.

Q. Any bad words to describe them?

A. Snobs at times.

Q. As far as the program itself was concerned, Was it a meaningful experience for you?

A. It was fun.

Q. What were some of the things that you didn't like about the program?

A. I can't think of anything I didn't like. Those guys [interns] really made the program fun.

Q. If you could run the program again, what things would you change?

A. I wish the program were longer. I wish we were going to continue it next year. I would have enjoyed having more contact with the high school kids.

Q. Other than computer use, what things did you learn from the CAD program?

A. How to use a pencil in a "funner way". I mean drawing with the pencil instead of taking notes with it, things like that.

Q. Did the CAD program help you make any decisions about your future?

A. Yes. I plan to take more technical drawing in the upper grades.

NO: 27

DATE: JUNE 5

INTERVIEWED: Padrick

TOPIC: Final comments on the program

QUESTIONS BASED UPON: Observations (Finding Additional Resources).

Pad, I understand that you and Tod Are going to be pen pals when he goes to college. Tod tells me you guys share a lot of interests, including Champion sneakers. [Pad bought athletic shoes that are exactly like Tom's Champions.]

A. I liked it very much. It was fun working with the high school students.

Q. How did you see the high school boys? Did you see them as students or as teachers?

A. They were student teachers, so they were both.

Q. How would you compare learning from the high school students with learning from a regular teacher?

A. You could learn easier from the high school students.

Q. Why?

A. You could talk with the high school kids.

Q. Can't you talk to a teacher?

A. You can, but it's easier talking to the boys.

Q. In matters of discipline, did you think you got away with more with the high school students than you would with a regular teacher?

A. Kinda. The boys let you get away with some things. They got away with some things themselves.

Q. Such as?

A. Once in a while they would talk to each other about things that were not part of school.

Q. What are some of the things that you disliked about the program?

A. I don't think there are any. I liked just about everything about it.

Q. What things would you change if we ran the program again?

A. I'd get more computers.

APPENDIX C

HUMAN SUBJECTS CONSENT FORM

Dear parent or guardian:

I am aware of my responsibility to protect the confidentiality of your child who has participated in our 1990-91 school year Computer Assisted Drafting program at Coster Elementary School. As I'm sure you'll remember, some of my senior technical drawing students tutored your son one day each week in computer graphics under my supervision, and the supervision of Mrs. Bev Donnelly.

At this point in time I am writing the final report of the study which will be submitted to the Graduate School of Education at the University of Mass. Amherst as part of my doctoral dissertation. Since the dissertation will become a public document available at the University library or through a reproduction service, I wish to assure you that I have taken the following steps to assure confidentiality.

All student names have been changed.

The following names or titles will not appear in the report: Mrs. Donnelly, Resources, Coster School, Bingham Schools.

It is important that I receive your acknowledgement in this regard. Without it I will be unable to complete the final stages of my research. I request that you sign one copy of this letter and return it in the enclosed envelope.

One final note. I feel compelled to mention how much the high school students and I enjoyed working with the your son, the other boys, and Bev in the Resources program at Coster School. For me, and for the high school tutors, it was truly the high point of academic year 1990-91.

If you have any questions in this regard, feel free to call me during the school day, or at home in the evening.

Sincerely,

Joseph E. Ryan

Please acknowledge receipt of this letter

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