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**THE ROLE OF CREATIVE EXPRESSION AND INTERDEPENDENCY IN
CHILD DEVELOPMENT**

City University of New York

PH.D. 1982

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**THE ROLE OF CREATIVE EXPRESSION
AND INTERDEPENDENCY
IN
CHILD DEVELOPMENT**

by

SHARON EGRETТА SUTTON

**A dissertation submitted to the Graduate Faculty
in Psychology in partial fulfillment of the requirements
for the degree of Doctor of Philosophy, The City
University of New York.**

1982

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1982

This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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PREFACE

A PERSPECTIVE ON LEARNING

I began teaching architectural design in a large, predominantly black and Hispanic urban elementary school two years prior to the commencement of this research. I used hands-on experimentation to introduce the basic principles of three-dimensional form to the 8 to 12 year old children who participated in my classes. Each year our studies culminated in the construction of some permanent outdoor structure. The children designed the structure, helped with fundraising, and then built their idea full scale in the school yard. Parents, siblings, and community people joined in the construction activities and in a lively celebration of the completed product.

During my tenure at the school, there were indications that the children were more than a little excited by what they were doing. Frequently, a group would ask permission to remain in class during lunch or a play period so that they could complete an idea or assigned task. Sometimes children would get together to work after school or on a holiday. Even the most repetitive, monotonous tasks were pursued with a high degree of discipline and determination.

Curiously enough, many of the most gifted, diligent workers in my classes were children who, because of their performance on standardized tests, were categorized as low achievers. Each year, as I watched the exuberant commitment of so-called low achievers, I became more and more convinced of the need for developing a view of achievement that would be supportive of the abilities I observed in these children.

There are many capabilities that any one child might have. For example,

a child might be outstanding in reading, writing, spelling, calculating, experimenting, conversing, organizing, questioning, empathizing, observing, performing, and so forth. Responsible teaching ought to maximize the possibility for all children to explore whatever capabilities they have. What actually happens, beyond the very early grades, is a one-sided emphasis on measureable intellectual performance. By fourth grade, the ability to take tests outweighs all other assets, and children find limited opportunities to express and be rewarded for a variety of other talents.

The prevailing educational approach requires that each child demonstrate progress along a specific and limited dimension using an even more limiting tool of standardized measurement. Many people contend that standardized testing is unfair to children whose family backgrounds have not prepared them for the testing procedure. I agree, but I also am concerned that these evaluations ignore important areas of development which, in the long run, are vital to productivity and well-being.

Knowing what you want, wanting what is positive and socially productive, being willing to make all the sacrifices that are required to turn an idea into a reality, and then being able to experience the whole process as pleasurable are attitudes that characterize the person who has learned to succeed in a psychologically healthy manner. Being successful in the entrepreneurial sense requires having an underlying sense of satisfaction with one's self and with one's work. This assuredness makes it possible to outline a plan, endure failure, and continue working until the desired goal is achieved (deCharms, 1976). Productive people have the capacity to immerse themselves in a problem for an extended period of time in a manner that is characterized by joy, enthusiasm, and determination (MacKinnon, 1965; Renzulli,

1978). It would seem that children are most likely to develop a joyful, optimistic approach to work through repeated experiences of doing a job--any job--well, and through repeated experiences of seeing that the pleasure of accomplishment is well worth the effort that the task requires. Yet the possibility that children will have these experiences is undermined by traditional standards of performance. By restricting the scope of what is considered to be valid schoolwork, many children's capabilities are ignored.

It seems obvious that a uni-dimensional, abstract approach to learning inhibits the motivational style of children whose strengths are outside the accepted mode of performance. It seems equally obvious that productivity in a traditional classroom is quite unlike that which is required in real life. In the classroom, children are expected to learn the same identical packages of information in the same identical manner as if every person were going to grow up to live in total isolation from every other person. There is little of no sense of group knowledge or of being in the world together. Competitiveness, rather than cooperativeness, prevails.

While some may object to competition, per se, as a learning style, I would point out that children are acquiring an impractical view of how society functions in an individualistic, competitive classroom. In real life, society maintains itself in an extraordinarily interdependent way. Each person assumes a unique position within an interlocking series of social groups. It would be quite unreasonable to expect that one person would know or be responsible for everything even in the most primitive social system. Perhaps it is just as unreasonable to expect this to happen so consistently in school life. Of course, there are some skills which each child must acquire in order to survive, but these skills are only a means, not an end. Dewey

(1964) warned educators against focusing on the performance of individual children while overlooking the development of broader social ideals within the class as a whole. I agree. The schooling process should encourage each child to look at the larger social situation and to identify his or her capabilities within that situation.

The project which is described here was, in many ways, an application of the Dewey mode of thought. What set this project apart from typical school activities was its method of putting a chronologically and academically heterogeneous group of children together in a real life, performance situation. Children were encouraged to explore their individual strengths in relation to peers, parents, and community members. The outcome of their efforts was a tangible object which provided visible and lasting documentation of the effort that various individuals made.

The experimental program posits in the belief that all children have special gifts which they can learn to identify and which they must utilize in order to become essential, productive members of society. The process that I describe was designed to draw out many kinds of capabilities in a magical, adventurous way, and to provide a supportive social context for developing those capabilities.

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INTRODUCTION

This thesis has two purposes. The first is to evaluate the effectiveness of the experimental program in improving a variety of social, creative, and intellectual skills of fourth and fifth grade children. The second is to describe the environmental conditions which make it possible to reverse a cycle of failure among low achieving children.

I did not begin the work which is discussed in this thesis with the intention of collecting research data. Rather, I was hired as part of a national effort to increase the level of awareness of the built environment among primary and secondary school students. While I was working as an architect and a teacher, the idea of the research took shape. As the residency progressed, I proceeded to search through the literature to find an appropriate theoretical context for what I was observing. At the end of the second year of my work, a theory was formulated and expectations developed which were reflective of my daily teaching experiences. The research data was collected during the third year. Because the experiential information was an integral part of the perspective taken, I will make an analysis of the existing conditions at the school where the research was conducted. A history of the school's educational philosophy and the development of this program at the school is discussed in some detail.

Two sets of expectations are presented in the thesis. One set are those questions which form the basis of the scientific investigation--they are the expectations of the research study. Another set was defined as a result of the larger educational goals of the on-going program. These expectations represent long range hopes and ideals. Although these latter goals could

not be studied within the framework of a dissertation thesis, they have been included because they provide a meaningful basis for discussing the implications of the empirical study.

Every attempt was made to design a scientifically objective study. However, my lack of detachment from the experimental conditions will be more than evident to the reader. The ongoing program grew out of a specific interest and a highly personal point of view which, in turn, influenced the direction of the research. Although I may have succeeded in building a justification for my approach through an analysis of the literature, the empirical study measured, in effect, an outcome that I created. The problem of personal involvement is by no means a unique one in environmental research. Suffice it to say that the benefits of studying a real life situation seem to outweigh the disadvantages of working within a more controlled situation even though there may be some loss of objectivity.

To compensate somewhat for the subjective assumptions which underlie the statistical analysis and to offer evidence of the effectiveness of the program from a common sense perspective, I have included anecdotal reports and unsolicited comments as well as unexpected data in discussing the implications of the study. The unexpected data represent concrete, objective facts which were not originally sought out through the research design.

CHAPTER ONE
AN ECOLOGICAL ANALYSIS OF MOTIVATION

The Psychologist's Experimental Approach

The study of motivation is central to all of psychology because it looks at the "why" of behavior and personality. The task of the researcher in this area is to discover the motives behind any given action. Since there is no way to observe directly a motive or to get an objective account of it from the subject, the researcher must rely on observing the various behavioral reactions that occur as different incentives are presented within an experimental setting. Variations in behavior can then be associated with these different incentives (Cofer and Appley, 1964; Brody, 1980).

Numerous empirical constructs of the cognitive processes affecting human actions have been developed using this deductive approach. Empirical theories include both biogenic and sociogenic hypotheses. While biogenic models focus on specific physiological drives, sociogenic models suggest that behavior is a result of broader external factors which are social in nature. The implication of the sociogenic approach is that behavior can be shaped to reflect the aspirations and values of a given culture or subculture (Cofer and Appley, 1964). It is the latter approach to motivation which is relevant here.

Social motivation research looks at the incentives which are inherent in the social environment. Although a number of themes have been investigated, there is no coherent theory or approach to the field at this time (Brody, 1980). Many of these themes would seem to have some importance for educators. For example, research supports the hypothesis that people are in-

terested in minimizing shame and maximizing pride (Trope, 1980). Studies also show that the absolute value of an achievement is relative to the individual's level of aspiration, with high achievers needing to be more successful at more difficult tasks (House and Kinscherf, 1979; Kuhl, 1978). It has been demonstrated that knowledge of results improves motivation. However, unless the activity is valued, feedback will not improve performance (Simon, 1979). Choice and control over what you are learning has been shown to increase performance (Bally, Perlmutter, Karsh, and Monty, 1978). Praise is more effective than admonishment; and, because individuals tend to conform, individual motive patterns can be affected by group patterns (Cofer and Appley, 1964). Finally, situations which are threatening to confidence and self esteem are assimilated in different ways by various individuals. While high achievers tend to improve their performance, low achievers may be adversely affected by threats to their identity (Iverson and Reuder, 1956).

Although experimental research in the area of social motivation would seem to be quite apposite to pedagogical theory, there are several reasons to be reserved in applying these concepts to the daily conditions encountered in a public school classroom. First, many social motivation experiments are designed to increase frustration or embarrassment to see how the subject will react--hardly a reasonable classroom technique. Second, practically all the experimental subjects were college students who, in general, are probably motivated and achievement-oriented. This is certainly not true of the typical public school population. Finally, the laboratory conditions in these experiments do not reflect the complexity of real life situations. It is unlikely that motives are experienced one by one as they are in an experimental design. It is also unlikely that a socioeconomically diverse group would re-

spond with any degree of consistency to the same incentive, or that over a period of time the same subject would respond in an identical manner to the same situation.

Social motivation researchers simplify situations in order to get a clear idea of cause and effect. Unfortunately it is difficult to apply these simplified, artificial conditions to the complexity of the classroom. Because researchers in this area fail to consider incentive conditions in a holistic manner, the resulting empirical constructs have a limited usefulness to the classroom teacher.

Motivation and Self Esteem

More relevant to understanding motivation from an ecological perspective are concepts about self esteem which principally have been developed by clinicians and field researchers. Certainly these concepts provide some insight into varying responses to the same incentives. Self esteem is a dominant factor in achievement-oriented behavior. It affects the child's willingness to try. Self esteem determines the amount of creative, risk-taking behavior a child will engage in. While a high self esteem can increase a child's willingness to accept challenge, a low self esteem can bring on anxiety about approaching new tasks (Cleaves and Bean, 1981).

In effect, low self esteem has the potential of blunting any given incentive. Curiosity to explore the situation at hand may be limited by personal fears. Conversely, high self esteem can raise a child's capacity for self confident responses. High self esteem means that you are satisfied with yourself. It means that your social and emotional attributes, your abilities and skills, and your physical characteristics add up to a positive picture (Rosenberg,

1979). One issue discussed in the literature, which is pertinent to this research, is the way in which the things we create serve as a representation of our skills and abilities. Our egos are expressed through a variety of external symbols, but we experience the outcome of our creative efforts in a special way. The process of making something provides an opportunity for exploring our personalities, special skills, and intuitive ideas. It is a way of discovering our limits and potentials (Lowenfeld and Brittain, 1975). A successful outcome is a concrete reflection of our capabilities (Rosenberg, 1979), and the pride that is experienced can lead to improved self esteem.

The total picture of ourselves is not seen directly, but rather through a "looking glass" reflective of how other people see us (Cooley, 1912). The reflection is formed by other people's perceived reactions to our physical, social, intellectual, and creative characteristics. Naturally we are the most concerned with the reactions of people who are significant in our lives. Another way that we understand our own worth is by comparing ourselves to other people. Any one person's level of self esteem depends on that person's feelings in relation to a family or group. Measuring one's self and understanding one's worth in relation to other people has a big effect on motivation (Alderman, 1974).

The perception of your position within a group allows you to predict how successful any of your actions will be. In order to feel self confident in taking an action, it is important to have a feeling of security in relation to a particular reference group. You must be confident that you will be able to function in an acceptable manner within a given situation. You must have a sense that your behavior will be met with approval by the people in your group. You must believe that you have a special importance to your group,

and that you will be able to make appropriate decisions about what is right and wrong (Clemes and Bean, 1981; Staub, 1978).

Obviously, a supportive reference group is essential to having the self confidence to try and take risks. The degree to which someone competitively evaluates his or her abilities in relation to a peer group determines, to a large extent, that person's self evaluation (Staub, 1978). In order to understand how various children respond to given incentives, it is important to look at those children in relation to their peer group. It is also important to recognize that children have very little control over their social relationships. A child typically moves from contact with the mother to the rest of the family, then to a few playmates selected by the parents, and finally to an assigned group of classmates with an assigned teacher (deCharms, 1976).

Each year this group of classmates has a significant impact on any one child's self evaluation. In middle to late childhood, a child's relationship with classmates takes on a special significance. It is at that time that children are first beginning to discover their respective positions in the group. As an awareness of social interactions increases, each child begins to test out his or her ability to influence the group. The social values and behaviors that a child acquires are, to a degree, a result of the social processes within the peer group (Bronfenbrenner, 1970; deCharms, 1976; Turiel, 1978; Sears, 1964).

The importance of the social structure of the classroom is obvious. Peer reactions to attributes and the active comparing of self to peers affects the child's self concept in a dynamic way. Ultimately, self concept influences performance because it influences the child's willingness to try.

The importance of encouraging supportive peer group relationships in middle to late childhood are apparent, but in reality the reverse happens. It is during this period that the typical classroom becomes highly competitive and perhaps even asocial. Emphasis is given to individual academic achievement at the expense of creating of supportive social environment. According to motivation research, it is the low achievers who would be most adversely affected by asocial exchanges with peers (Iverson and Reuder, 1965).

Positive Outcomes of Cooperative Learning

The literature on cooperation addresses the issue of the importance of social interactions from another perspective. Cooperation researchers have gathered considerable evidence regarding the effectiveness of a cooperatively structured classroom in improving learning. It is again unfortunate that most of the information about cooperative behavior has been developed through experimental studies which do not reflect the complexity of real life situations. Most of the game studies which have been used in cooperation research force an alternative choice between cooperation and competition. The game itself defines whether cooperation or competition is the acceptable behavior. The problem with these studies is that it is difficult to say whether the behavior exhibited during the game would have some carry over effect on the child's style of relating to people in other situations (Johnson and Ahlgren, 1976; Staub, 1978). Certainly it seems likely that some extended exposure to cooperative activities is required in order for them to have a meaningful effect on the child's self concept and general performance. The experimental research fails to address the problem of how a cooperative orientation might be encouraged on an ongoing basis in the class-

room.

Johnson and Johnson (1978) offer some insight into how a teacher might structure a positive classroom environment. They believe that an ideal classroom should simultaneously offer a variety of social exchanges between students. They point out that there is no clear dichotomy between competition and cooperation in real life. In many instances, it may be possible and even desirable to compete on one level and cooperate on another (Staub, 1976). Johnson and Johnson believe that the classroom should provide opportunities for learning to compete in a positive fashion while maintaining a generally cooperative nature. They suggest that lessons be arranged so that children are sometimes working cooperatively, sometimes competing for fun, and sometimes working autonomously on their own. In this way, children gain experience in selecting the appropriate behavior for a given situation.

Johnson and Johnson show that there are numerous positive outcomes to a cooperative instructional style. Students are more capable of understanding another person's viewpoint, intellectually and emotionally--a skill which is central to social, moral, and intellectual development (Bridgeman, 1977; Johnson, Johnson, Johnson, and Anderson, 1976). Cooperative learning experiences also affect motivation. There is evidence that students perceive an increased likelihood of success and that success is seen as more important--significant factors in motivation (Johnson and Johnson, 1975). Students also see themselves as being more intrinsically motivated and more in control of the situation in cooperative settings. They are more willing to express their ideas and feelings to classmates, and are more susceptible to being positively influenced by the teacher because the teacher appears to

be fairer and more likeable. Positive interpersonal relationships, which are a necessary condition for learning and for liking school are likewise improved in a cooperatively structured classroom (Johnson and Ahlgren, 1976; Johnson, Johnson, and Anderson, 1978), as is self esteem (Johnson, Johnson, and Scot, 1978).

Given this research, it is hard to understand why the typical classroom model is a competitive one. Even though it is clear that positive emotional consequences result from a situation in which people either share in the same goal or help one another in achieving separate goals, there are very few classroom activities which really encourage this. Despite the evidence that people are likely to feel they are part of a group when there are equal chances for rewards and success among group members, despite the evidence that working together creates a social bonding in which people feel they are part of something larger than themselves, and despite the evidence that these feelings of connectedness are important conditions of high self esteem, and therefore of high performance (Rosenberg, 1979), our traditional concept of education is one in which competitive, individual achievement overshadows all other concerns. The regular comparison of students on objective measures sets up such a competitive atmosphere that it may be difficult for students to even imagine cooperating (Johnson and Johnson, 1978).

Social Qualities of Classrooms

It is clear from all of the literature that has been reviewed so far that the social quality of the classroom affects the child's motivational system in a powerful way. The social environment which exists in the classroom provides incentives which may be reacted to in a positive or negative manner, depending on the child's relationship to other children. It is also clear that the tradi-

tional mode of education encourages competitive interactions which may have a particularly adverse effect on low achievers.

Sampson (1980) provides additional evidence for paying greater attention to the social quality of learning from a cognitive perspective. He takes the position that no action can be understood apart from the social setting in which that action occurs. The social setting is comprised of the historical and current habits and ideals of a particular group. All thoughts and ideas are based on the observation of interactions within a given group. Thinking therefore is never an isolated, individual act. It is a continuing process in which objective, observable acts occurring between two or more people are internalized (Vygotsky, 1978). "I think" really means "we think" about something in relation to specific places and events in our lives (Billig, 1976). Yet Sampson feels that relatively little attention has been paid to the nature of collective thought. The theories of Piaget, which dominate cognitive psychology, focus on the individual's transformation of a passive outer world. The role of other people and the emotional quality of objects is not considered. Sampson questions Piaget's implication that human learning can occur through an abstract, symbolic transformation of essentially passive objects. Piaget's model, in Sampson's view, suggests an intellectualized process which ignores the emotional, interactive quality of thought. In fact the concepts which Piaget chooses to investigate--time, space, mathematical operations, and so forth--are without social context. His concern is with formal mental operations. However, higher mental operations occur within a social context which affects those operations (Vygotsky, 1978). Objects and events are symbolically transformed into ideas and feelings which are part of a dynamic social reality (Sampson, 1980).

Sampson's point is that the social nature of cognition should be recognized and approached in some intended way. What he is saying is not so different from the position taken earlier by Dewey (1916). Dewey felt that educators should recognize the potential of the social environment as a medium for learning values. While Sampson is concerned with the role of psychologists in value formation, Dewey looked to the educator to make children aware of all the habits, ideals, hopes, standards, and opinions of the society into which they were born. Dewey's focus was on the commonality of the social experience. He argued that maturation included a process of developing a similar emotional and intellectual disposition or a likemindedness in responding to daily expectations and requirements. Further, he reasoned that since it is this commonality of response which makes possible all of the great technological, artistic, scientific, and moral achievements of society, it is within the jurisdiction of the educator to provide an environment in which the values of society acquire a practical meaning for children.

Dewey's call for likemindedness and his rationale for placing social and moral development within the classroom are well taken and are referred to again and again in this thesis. However, what Dewey leaves unresolved is a method for accomodating individual differences within a common, shared experience. Obviously this question must be addressed or the danger of conformity arises.

This research posits in the belief that it is the role of educators to promote a common understanding of larger social goals, but that it is equally important to be supportive of individual or subcultural differences in achieving those goals. These two dimensions of the child's social environment will be a continuing theme throughout the thesis.

The Educator's Applied Approach

Motivation is as central to the philosophy of education as it is to psychology. Without motivation, intelligence can not develop (deCharms, 1976). A continuing question for educators is how to make schooling a more highly motivating experience. Probably the British primary schools have provided the best response to that question.

The reform of primary schools in Britain synthesized the developmental and educational theories of Piaget, Montessori, and Dewey (Featherstone, 1971). Montessori, who began her work with retarded and mentally ill children in Rome in the early 1900's, believed that a rich sensory environment could increase learning. She developed a set of highly tactile materials for young children to work with. In one instance she mounted large sandpaper letters onto a smooth background. Children were to run their fingers over the letters to develop both sensory and motor skills while learning the basic symbolic skills of counting, reading, and writing. In this way children could begin developing intellectual skills before the age of five. The weakness of the Montessori approach was that she standardized the use of her materials so that each child had to go through the experience in a predetermined way and sequence (Hunt, 1964). Individual differences were not acknowledged, nor was creativity or self expression an issue. However, her concepts for creating opportunities for direct sensory experience were an outstanding contribution to pedagogical theory.

John Dewey and the progressive education movement introduced several other innovative themes to the tradition of instruction in the late 1800's. Some of the things that Dewey believed were that education should begin with the child's experience, that learning should involve direct, active

experience, that basic skills should be viewed as a means not an end, and that the school should be a social community where a spontaneous interchange between students, teachers, and community resources can occur (Deal and Nolan, 1978).

Although there was some application of the concepts developed by Montessori and Dewey in experimental programs, their theories had a limited impact on the philosophy of public education in America. Their approach to learning was based on the belief that the environment could alter innate aptitude, and this belief was in conflict with other prevalent scientific theories. Their ideas were not in keeping with Stanley Hall's behaviorism, the Darwinian intelligence testing movement, or the psychoanalytic theories of psychosexual development (Hunt, 1964).

It was not until the broad social critiques of the 1960's that educators began to rethink these early ideas of Dewey and Montessori. Their theories were supplemented by Piaget's research which pointed to individual discovery and play as important conditions of cognitive and affective development. Piaget emphasized the need for accommodating individual learning styles by showing that development occurred at different rates for different children. This concept became the cornerstone of alternative styles of education.

As the reform in infant schools was publicized during the late 1960's, American interest in an alternative approach to education grew. The British became advisors to American teachers who wanted to rethink their patterns of instruction. Both private and public schools as well as Headstart centers across the country adapted ideas for an informal approach to teaching from the English. North Dakota ran a program to retrain elementary school teachers in British concepts. Working at City College in New York, Lillian

Webber trained teachers for infant-style classes in public schools in that city. Rosemary Williams came from England to organize an advisory team at the Education Development Center which later served as the principal investigator for the USMES program which I describe in the next chapter (Featherstone, 1971). However, after the mid 1970's, as objective measures of performance began to decline, there began to be some pressure to focus on learning basic skills in the traditional manner. As the back-to-basic movement gained momentum, the commitment to open education decreased, and educators returned to their customary teaching methods.

Theories of Open Education

The British infant school administrators recognized the need to accommodate different styles of learning. They organized classrooms so that children had a choice of opportunities. They also recognized the importance of allowing children to experience things directly. Touching, feeling, smelling, etc., gives a reality-based understanding of an object. Hands-on experience makes an impression which can not be matched by abstract concepts (Lowenfeld and Brittain, 1975). The natural environment is full of vivid impressions of color, oddity, sudden change, intensity, complexity, novelty, and so forth, which can stimulate one's ability to observe and explore (Berlyne, 1960). Through a direct encounter with nature, children learn to distinguish causal relationships and to respond emotionally to the loveliness of objects (Sukhomlinsky, 1977). First hand experience increases the ability to open one's self up to a new situation or problem and to sense everything about it. These are essential characteristics of the intelligent personality (Holt, 1964).

The open education approach considered that children also learn from their

own activity. Learning what the body can do by testing out the limits of one's physical power is most assuredly a principal engagement of infants and young children at play. Play is the means through which children explore the boundaries of their physical selves as well as the limitations and possibilities of materials. Challenging physical exercise centers attention and provides an enjoyable experience (Csikszentmihalyi, 1975). Since the physical activity which accompanies play is important to development, open education advocates felt that work should not be set apart from play. In fact, they noted that for children play could actually be work (Featherstone, 1971).

Open education theories translated into real school settings through informal, flexible physical arrangements. The concept of open education should not be confused with the concept of open space. The former was concerned with the development of a flexible methodology for learning. The latter grew out of aesthetic concerns for a particular type of modernistic imagery. Although open spaces were frequently utilized in infant-style classrooms, they were not necessary for facilitating the intentions of an informal approach to learning. An open classroom could operate within a traditional space except that there were no desks or assigned places. There were, instead, areas of activities, and children were encouraged to keep written records or logs of what they were learning. They worked individually or in small groups. The teacher was to oversee all the different activities, intervene when necessary, change the pace, ask questions, make suggestions, and so forth. The open education approach effectively liberated the teacher from the need to teach the entire group. Individual children could work at self-initiated tasks, requesting information from the teacher as necessary to complete their work. Obviously the teacher's role in this situation was a

much more difficult and creative one than in a traditional classroom.

For several reasons the interest in open education was shortlived. For one, a high level of spontaneous input was required on the part of the teacher. The additional effort certainly would have discouraged anyone who did not have a real commitment to the philosophical goals of open education. Second, cut backs in educational resources meant that many newly hired teachers who were often the most receptive to new ideas were dismissed. Finally, as mentioned earlier, there was a growing pressure on teachers to produce students who could do well on standardized tests. Many teachers felt more secure in covering the prescribed skills within the traditional classroom organization.

We will return to this discussion because the theories of open education regarding direct, physical, and playful learning are central to the direction taken in the experimental program.

Two Thought-provoking Studies

DeCharms' Study of Motivation

There are two studies which greatly influenced the theoretical approach taken in this thesis. One is a longitudinal field study carried out by deCharms (1976) in grades five to eight of an innercity school district. Motivation was expected to increase among the children who participated in a three-year program. DeCharms took the position that motivation could be improved by increasing the child's ability to cope with social situations. Sixteen teachers received intensive training during a summer motivation workshop. The training was directed towards giving the teachers a clearer insight into their own motivational characteristics so they could understand and direct improvements in their students. The students of trained teachers were compared over a three-year period to the students of sixteen untrained teachers

in a quasi-experimental, time series design.

The theoretical framework of the project was based on deCharms' origin-pawn concept of personal causation and on achievement motivation theories. DeCharms proposed that the propensity for purposeful activity was determined by the capacity to define goals and then cope effectively with other people in achieving those goals. He thought that skill in dealing with other people depended on three things: understanding yourself, being sensitive to the needs of others, and understanding the reasons behind other people's behavior. Several exercises were developed in conjunction with the teachers to help the children improve these skills. The exercises included curricular lessons which were completed cooperatively, goal-setting discussions, play acting, and log writing.

DeCharms measured the effects of the experimental training on academic achievement and on the thoughts of the children as indicated by written and verbal responses, by attendance records, and by general classroom behavior. Although there was a significant improvement in academic achievement, the various measures of behavior showed minimal improvements. The clearest outcome of the behavioral observations was that the teachers became better personally acquainted with the children. We must infer that the experimental exercises, per se, led to improved academic achievement. In fact, it seems quite possible that cognitive skills improved because the particular teachers who elected to be in the program had focused on improving their teaching methods. Or, the extensive classroom observations could have improved the quality of the lessons given. DeCharms' research leaves open the question he was most interested in exploring, i.e. does a child's understanding of his or her potency in the group increase motivation and

performance? A successful outcome in one area is demonstrated, but DeCharms makes no attempt to evaluate the process as a means for improving personal causation.

What is curious about this research is that the theoretical discussions emphasize the interpersonal, emotional nature of motivation, but this theme is never really carried through into the research design. DeCharms' approach was designed to help children develop a socially mature way of achieving their goals within what is an essentially competitive framework. During teacher training, he recognized the need for group cohesion and solidarity, however these opportunities were not presented in a very forceful way in the classroom. It is true that the desks were arranged so that children could see each other and that children were involved in group discussions about goal setting and performance. Nevertheless, as far as the study explains, there was no emphasis on developing a common purpose or sense of responsibility towards each other in a practical way. The children had to abstract intellectually the benefits of responsible, directed behavior through discussions and play acting about artificial situations. There was no real life situation which required the interpersonal behavior that DeCharms wanted the children to acquire. Had he looked at the possibility of learning personal causation through a reality-based process rather than through abstract play acting and through a direct, emotional response to the day to day requirements of group activity, I think the results might have been very different.

DeCharms' study is but one indicator of the degree to which abstract, non-social learning is ingrained into current cognitive theory. The potential of learning through social interactions is not typically recognized. A major

fault I find in the infant school approach and one which would be supported by the cooperation literature is that, even though children were encouraged to help one another, the emphasis was placed on individual exploration. Opportunities for learning from the social environment are minimal in an individualistic setting.

Bronfenbrenner's Study of Childrearing in Two Cultures

Another study which merits special attention was carried out by Bronfenbrenner (1970). After systematically comparing the socialization process of Soviet children to that of children in the United States, Bronfenbrenner was able to provide some valuable evidence about the importance of the social environment in cognitive development. These two groups were selected for study because their methods of child rearing are highly contrasting. In the United States, parents are primarily held accountable for the socialization of children. In the Soviet Union the teacher is responsible for transmitting social values.

The Soviet educational system provides a means for maintaining social order. Instructors are responsible for developing all the physical, intellectual, artistic, and social characteristics which are necessary for good citizenry. In the Soviet classroom children learn in relation to each other under the guidance of a teacher (Sukhomlinsky, 1977). Bronfenbrenner looked at the effects of this basic difference in social upbringing on character development. After extensive field observations, Bronfenbrenner concluded that American children were more rebellious, aggressive, and delinquent in their behavior than Soviet children. He attributes these differences to the fact that Soviet discipline is group oriented. Children in the U.S.S.R. are explicitly taught socially acceptable behavior via peer pressure. Each child

is responsible for seeing that his or her group performs properly. Children learn to monitor each other's behavior at an early age. Typically a Soviet child will personally intervene when another child misbehaves. An American child ignores the situation or calls an adult to intervene.

The Soviet peer group, in effect, serves as a means of enforcing socially acceptable behavior. Although Bronfenbrenner acknowledges the dangers of such a normative approach, he thinks there is much to be learned from Soviet methodology. In the United States, social instruction occurs within each family, and it may not always be given the attention it requires. In some cases the child may receive adequate training at home only to form peer groups which are independent of or even adverse to the values he or she has learned at home. At best, American peer groups develop in an unstructured way, outside the educational setting and autonomous from adult society. Bronfenbrenner argues that children's peer groups should have a more structured relationship to adult society. To accomplish this end, he proposes a system of role modeling for American classrooms. Most experimental studies look at modeling as an inhibitor of behavior, but Bronfenbrenner feels that constructive models of response can also be encouraged. The model, he suggests, should have a similar sociocultural background to the child and should be a highly competent, respected person who provides a major source of support to the child. The model can have a greater influence on behavior if the child can actually observe the consequences of the proposed behavior in a concrete way, and if there is another adult who later reinforces what the children have observed. In an optimal situation, a community member would serve as the model and the classroom teacher would provide reinforcement. Bronfenbrenner feels that children should be more involved in reality-based objectives. He suggests that classroom activities

should center around some responsible task on the behalf of other people in the school community and surrounding neighborhood.

In effect, Bronfenbrenner restates ideas expressed earlier by Dewey (1916). Providing an environment for transmitting values through a collective, experiential process was a key issue in Dewey's writings. He was convinced that meaningful learning could not happen in an abstract, artificial way. Dewey believed that children learned to predict the consequences of their actions in an environmental context consisting of peers and adults engaged in the execution of tasks. He thought that it was the educator's responsibility to design a simplified environment that would make children aware of their actions in relation to a peer group.

It seems more than likely that the Dewey/Bronfenbrenner approach could reduce some of the antisocial behavior which is prevalent among American youth. Their approach would also seem to have the potential of improving feelings of self worth by allowing children to identify a positive role for themselves within a peer group that has the support of adults who are significant in their lives. The concepts of Dewey and Bronfenbrenner provide a principle basis for the expectations set forth in this research, i.e. collective work can be expected to improve prosocial behavior and self esteem.

A Summary of the Literature

In piecing together the various concepts which appear in the literature I have just presented, it would seem that several major themes emerge which are relevant to this research. First, self esteem and self confidence play a key role in the quality of a child's performance. A child must believe that he or she is capable of succeeding. Without self confidence children will not be open to the challenges that make learning and growth possible.

Second, the methodology of presenting subject matter can increase the motivation to learn. Beginning with the child's natural interests and abilities, encouraging direct, sensory experience, and allowing children to explore the limitations of the body and materials through self initiated tasks are methods that educators have used to maximize excitement about learning.

Third, the social environment provides both positive and negative incentives for learning. It can affect the child's image because self evaluation is dependent on peer reactions and standards of performance. The social environment is also an implicit part of the cognitive process. It is through interpersonal transactions that children acquire a set of habits and ideals. If properly attended to, the classroom environment could provide an ideal opportunity for maximizing socially acceptable behavior and for allowing children to discover their potential for making a contribution to the group.

These themes will form the theoretical basis of the research. However before I can present the expectations, it will be necessary to look at the explicit environmental context in which the ongoing program began. The program developed out of the school's educational philosophy and my own approach to architectural education in relation to specific sociocultural conditions. The school's focus and mine were not always coincidental. While I was more concerned with the role of social interactions in the environment, the school's primary interest was in a teaching methodology which encouraged individual hands-on experimentation. Nevertheless there was a rapport between the school and myself which allowed our differing perspectives to work in a complementary way.

The next chapter will be concerned with presenting the way in which these two perspectives coalesced to give a particular direction to the ongoing pro-

gram. Once the explicit conditions have been placed within the general theoretical framework, inferences can be made about the motivational potential of the program. At that point, expected improvements can be outlined.

CHAPTER TWO

A DESCRIPTION OF THE PROGRAM

Two years prior to the formal commencement of this research, I was hired to work as an architect-in-residence in a public elementary school. The school had a population of 1,200 children and was located in a turn-of-the-century building in a residential area of a large metropolis. The residency was part of a national program called Artists-in-Schools which began during the 1960's. The program has placed poets, visual artists, dancers, filmmakers, musicians, and actors in elementary and secondary schools all over the country. Architecture was added to the program during the 1970's and this particular residency rapidly became a very popular option for school administrators. An architectural residency has multiple benefits. In addition to being exposed to an art form which utilizes technical information, the children who participate generally make some practical improvement in their school environment.

A School and An Architect: Our Respective Viewpoints

The experimental school, which I will refer to as P.S.H., had a long history of experiences to prepare it for participating effectively in the architecture program. The principal had been working along with the teachers and staff for a period of ten years on the development of a child-centered, experiential learning environment. P.S.H. had the reputation of being a place where creative thinking took precedence over rigid standards of performance. Educating the whole child and integrating all parts of the child's learning was a priority. It was an overcrowded school with a large lower income, minority population. However, it was by no measure a ghetto school. In fact, many parents and children thought of P.S.H. as a speci-

al school. Artists from various disciplines were frequently entertained there, and the school was considered to be a national model for improving the quality of education through the arts (Remer, 1982).

During the time that open education was in vogue, i.e. from 1969 to 1975, teachers had attended a variety of training programs both in and out of the school to learn alternative styles of teaching. One program which is particularly relevant in explaining the school's preparedness for the architecture program was the Unified Sciences and Mathematics for Elementary School or USMES program which had its roots in the British infant school philosophy. USMES outlined a methodology for leading children through a real world problem solving process. The teacher was to act as a catalyst to stimulate the children's thinking about some reality-based problem. The children were to find their own solution, implement it, and judge its effectiveness. P.S.H. was not only an USMES school, as participant schools were called, it was a center for training teachers from all over the city. The originators of this program expected that the USMES method would improve both intellectual and social skills. They predicted an improvement in intellectual ability because it seemed to them that subject matter learned in relation to a specific problem would be more meaningful. They also expected that social development would occur because the problem solving process required an exchange of ideas among children.

According to teachers at P.S.H., a primary benefit of USMES was that it provided a way for every child to assume an initiative and make some important contribution to the class. An attribute which had not been noticed in the traditional classroom structure suddenly stood out. As one teacher explained, "A boy who had never been respected as a person suddenly became

an asset. Because of the project, I began to see him in a different way." Success might have depended on being tall enough to reach up high, being strong enough to carry something heavy, having a parent who knew how to weave or make pots, or being very neat, or thoughtful, or patient. Every child could be successful on some level.

USMES was a theme-oriented approach to learning the curriculum. Twenty-four categories of investigation, called challenges, were defined. Many of the challenges were concerned with the environment. They included problems of traffic flow, bicycle transportation, growing plants, raising pets, and so forth. The environmental challenges were particularly appealing to P.S.H. because they were in keeping with the principal's educational philosophy. He felt that children's learning should be active and that it should require physical involvement and contact with stimulating objects. In some cases children designed and built solutions to the various challenges as part of the problem solving process.

In 1975 there were massive budget cuts throughout the school system. P.S.H. lost about one-third of its original staff and the USMES program slipped into disuse. The people who were fired were the recently-hired teachers who were most willing to experiment with innovative methodologies. As teachers were shifted around within the system, replacements came in who were not as interested in attempting new approaches. Concurrently the population of the school began to have more black and Hispanic children. In the psychological depression that followed the budget cuts, many teachers began to use the excuse that this new population could not work independently. Gradually fewer teachers experimented with open classroom techniques, but the principal maintained an optimistic outlook on keeping the school special.

He recognized another opportunity which presented itself in the form of the Arts-in-General-Education program or AGE. This program required a commitment to using the arts as a curriculum focus. Outside artists and community people were brought in as resources to introduce new materials and techniques. The principal saw AGE as a means of keeping the staff actively involved and excited about the school without requiring them to make the kind of philosophical commitment to innovative teaching techniques that an open classroom required.

When I arrived at P.S.H. the school had been an AGE school for three years. The architectural residency was one of three being offered that year throughout the city. These were the first architectural residencies in such a large urban area. The state arts agency which administered the funding anticipated that these sites might pose opportunities or difficulties that previous sites in smaller cities had not. For this reason they decided that the residency should only be offered to an AGE school who had considerable experience in managing smaller arts projects. Of all the residencies, the architectural one required the largest commitment on the part of the school. The staff had to be willing to provide human resources and to raise a substantial amount of money in order to make the program work effectively. Of the three schools which were selected, two were inner city schools and the third was a suburban school. Initially I was hired to work in both inner city schools. I will briefly describe the second school later in this chapter.

P.S.H. had never been officially designated as an open classroom school, and many of the original advocates of alternative teaching techniques were no longer there. Nevertheless, when I arrived the school seemed very non-

institutional. Because of its long term commitment to hands-on learning, the school as a whole was already familiar with problem solving and with the rudiments of the architectural design process. Teachers and children had a basic knowledge of tools, methods, and materials of construction. Most importantly, there was a willingness on the part of the teachers to tolerate the disorder and mess that building things necessitates, and a savvy for coping with that mess within the custodial constraints of a public school.

I, on the other hand, was in very unfamiliar territory. Before beginning the residency I had been teaching architectural design on the college level. I had some experience in working with children in community settings, and I had once played concerts in public schools. However it had been some time since I had been inside a public school classroom.

I made an analysis of my college teaching experience to see how it would or would not relate to the conditions in a public school. There seemed to be several major differences to which I would have to adjust. First I had been accustomed to working with about ten to fifteen students and to giving each person a great deal of individual supervision. The classes in this school had thirty to thirty-five children. Second, in an architectural school a high priority is given to technical precision and craft. From the little I knew about children, I realized that the emphasis should be on expressiveness and excitement. Third, architecture is a highly technical subject requiring special equipment and a lot of space to work in. Obviously I would have to simplify the subject matter so that it could be understood by low achieving children. I would also clearly have to learn to work without the traditional equipment and space. Fourth, the final outcome of the year's work was to

be one major element and I was to be responsible for helping the children design and construct it. In architectural school the teacher reviews hypothetical solutions to abstract assignments without ever proceeding with a real solution. At P.S.H., we were to have objective proof of the success of the training.

Fortunately for me P.S.H. had one very comforting asset. The atmosphere there had a studio quality to it. Children were busy doing different projects in a noisy unstructured way similar to what I was used to in an architectural studio. I began to explore the differences between a classroom and a studio to see how this asset could be made optimal.

The learning process that goes on in an architecture school essentially could be classified as a cooperative one. An art or design studio is different from a traditional, individualistic classroom in several ways. For one, information must be shared in a person to person manner. Although some principles can be transmitted through lectures and books, students learn by observing others at work and by making their own errors. A studio becomes a human library of information because the student is able to observe other peers working on different techniques and concepts and to see which are relevant to his or her own ideas. Although each person works at achieving a unique, special idea, it is never assumed that the learning process can occur in isolation from peers. Beyond the initial fear that an idea will be stolen, students generally realize that they can only benefit by sharing their work. The studio concept in art and design schools sets up a cooperative, interdependent information-sharing process between students even though on another level those students are engaged in fierce competition with each other. The studio idea that an individual approach grows out of an ongoing peer

group process is, therefore, essentially in contrast to the isolated classroom process in which each person can learn from official, written down sources as much as he or she is capable of absorbing.

Secondly, studio assignments require that the student produce some tangible object which is often of considerable size. Since the typical student does not have the private space or equipment which may be needed to complete these objects, assignments are worked on in the studio. This work goes on late at night and over the weekend. The result is that an unusual camaraderie develops in connection with a given assignment. Even during classtimes a studio atmosphere is much different from, for example, a library full of students working together because intense intellectual concentration is not required. In the typical studio there are radios playing, chit chatting, frequent snacking, and often one student will need other students to physically assist on something. In contrast to a library where each person works separately in quiet isolation, there is a lively, almost boisterous atmosphere of work-in-progress in a studio. Because hands-on work is time consuming, mid- and end-term projects put students in close contact with one another for extended periods of time. I would concur with Csikszentmihalyi (1975) who contends that strong feelings of affiliation grow out of an intense experience of working together. According to what architectural students have expressed to me over the years, working in a studio is an invigorating, social experience. Completing a project, no matter how difficult, is not a matter of controlled, solitary discipline, but of being buoyed up by the spirit of the group. In short, working has a childlike quality of play, and the studio is a source of inspiration as well as information.

Finally, studio assignments in architecture schools frequently reflect the in-

terdependent relationships that are peculiar to this field. Building things requires teamwork since no one person can do the whole job. Technical information is required which is beyond the capacity of any one discipline on a project of even modest scope, and another industry is needed to execute the drawn idea. Once a project is complete, its success depends on the values and habits of the clients or users of the building and on the sensitivity of the building and its users to the surrounding environment. Part of the educational process in architectural schools is to train students to coordinate all the diverse goals and purposes of the cast of characters who may be encountered in an actual building project.

It seemed more than reasonable to stress the interdependent characteristics of studio work to the children at P.S.H. not only because I was experienced in this approach, but because the team concept addressed some of the difficulties I anticipated encountering at the public school. If students learned to work with each other, then the student/teacher ratio problem would be minimized and the synergetic excitement of group activity would be maximized. Certainly teamwork would be necessary if we wanted to achieve our goal of building one final product.

So it was with the intention of creating an interdependent work structure that I began my residency at P.S.H. Obviously my values and the school's were somewhat different. The school's primary commitment was to the value of direct, individual experience. My commitment was to the value of a shared, social experience. However, the school and I realized that our respective ideals were complementary aspects of the creative process and of the development of a confident, productive child. As a result there came about a partnership and respect that was an essential factor in the level of success that was

achieved in terms of a high degree of participation and energetic involvement on the part of the children, teachers, staff, parents, and myself.

An Unsuccessful Residency

The importance of the partnership of values between P.S.H. and myself can not be stressed enough. Earlier on I mentioned that I had been in residence at another school. That other residency provided me with overwhelming proof that there has to be a fundamental, mutual respect between any visiting consultant and the school. In the case of my other, short-lived engagement I was, from the outset in disagreement with the school's educational philosophy. It seemed to be based on the theory that lower income, minority children need a lot of discipline and structure. What I faced when I walked into a classroom were half-asleep faces lined up in neat rows, copying from the blackboard. Both the children and teachers were unprepared to cope with the freedom of movement that my activities required. Asking the children to move around physically in the room caused utter chaos. Frequently there would be a huge emotional outburst from some child which would be met with vigorous screams on the part of the teachers. By the end of the day, I would be convinced that I had caused the problem.

This school espoused a commitment to art and art education, but it was unprepared to accept and utilize the nature of the creative process. Children were expected to make pretty things without creating any mess, disorder, or noise. Parental involvement consisted of two or three people who came to admire what I was doing or to complain about the school, but who had no intention of actually helping out. All rules were to be strictly adhered to, and the tyranny of the custodian took precedence over common sense. No one was willing to put out the extra imaginative effort that making something beautiful requires.

I spent most of my time in that residency at meetings with the teachers trying to arrive at a compromise between the school's values and mine. The meetings were fruitless discussions in which the teachers asserted that, since they were going to be evaluated on their class's ability to perform on objective measures, they could not spend time on this program. As far as they were concerned the program could not impinge on classroom activities except during my scheduled weekly visit. The principal would verbalize the idea that the program could be used to teach the curriculum, but then he would start pressuring me to get started on some usually creative end-product so the school would have something to show for its efforts. Our lack of commitment to each other resulted in a very unproductive residency in which everyone contributed a minimum amount of energy. At the end of that year, I terminated my involvement at this school.

Organizing an Architectural Program at P.S.H.

Schools which wanted to participate in the Artists-in-Schools program applied for funding through their districts which then applied to the state arts agency, which, in turn, received monies from the federal government. The state agency assisted the school in locating appropriate candidates for the residency, but the school interviewed the candidates and ultimately decided who was to be hired. In the case of P.S.H., this application and hiring process was conducted by a committee made up of the principal and a group of parents and teachers who were responsible for overseeing AGE programs.

The AGE committee was interested in the concept of school development through the arts. They felt that everyone--staff, children, and community people--could become actively involved in the management of the school by organizing and participating in various art projects. In formulating the ap-

plication, the AGE committee described the architecture program as something that would be large enough in scope to have a real impact on school development. Just the fund raising that was required to support the project would generate a high level of participation in school management.

The original intent of the committee was to use the built environment of the surrounding community as a resource for learning about the classical use of architectural elements. However, during a nationwide training session, the principal and I were introduced to what other architects and designers were doing across the country. We began to think more about the environmental problems of the school building. In my initial meetings with the AGE committee, the school's public image began to be discussed as an area of concern. In the last ten years, there had been an increasing socioeconomic discontinuity between the school and the surrounding community. While the school's population had changed from a white, middle class one to a predominantly lower income, black, and hispanic one, the homeownership in the immediate surrounding neighborhood had not. Those residents frequently sent their children to private schools. Coincidental with the change in population was a custodial moratorium on cleaning up graffiti. This resulted in a perceived increase in vandalism and added to the growing disparity between the school and the community. The committee, rejecting the inevitability of a ghetto image, began to realize that the architecture program could provide an ideal arena in which the children could perform in a creative way and, at the same time, upgrade the external appearance of the school. It was with this focus, i.e. that the program should increase the children's awareness of and sense of responsibility for the surrounding community while increasing nearby resident's awareness of the school as an enterprising resource in the community, that the residency began.

More specifically, the goals with which the residency began were as follows:

- a. The program should stimulate school development in the sense that the staff, children, and community people should have the feeling of being actively engaged in the management of "their" school.
- b. The architectural design process should be conceived of as an interdependent, family-like activity in which each member assumes a unique role based on his or her special interests and abilities.
- c. The school should not succumb to a ghetto image. The architectural program should provide visible evidence in the community that the school and its children are special and creative.
- d. All areas of learning should be integrated by the classroom teachers. This implied a theme approach and working alongside the classroom teacher to look for ways of making the long term activity a central focus of all other learning.

We agreed that the most suitable approach would be an in-depth one of working with a few classes for long periods of time. The work would be directed towards one major goal that could possibly involve other classes and community members in the final stages. I would begin by teaching jointly a limited number of classes alongside a regular classroom teacher on a weekly basis. Each class would last about ninety minutes. The first semester would be spent getting acquainted with each other as a working group. During the second semester we would begin the architectural design process proper. At that time we would decide what was to be built based on the client's needs, the client in this case being the school community. Then we would sketch out some ideas for how our proposal might look. We would select one or several of the most appropriate ideas and then develop them technically as a

buildable entity. Finally, the project would be constructed out of doors. See Appendix A for a detailed description of the format followed during the experimental year.

The year's schedule was, in fact, built on Bronfenbrenner's suggested model of expanding social interaction in that initially children would work alone or in teams of two on a project of limited scope. Then small groups would form and, as the program continued, the group would expand to include several classes and even parents and community members working on one major idea (See Figure 1). Although the details changed each year, we essentially followed this format for the three years that I was at the school.

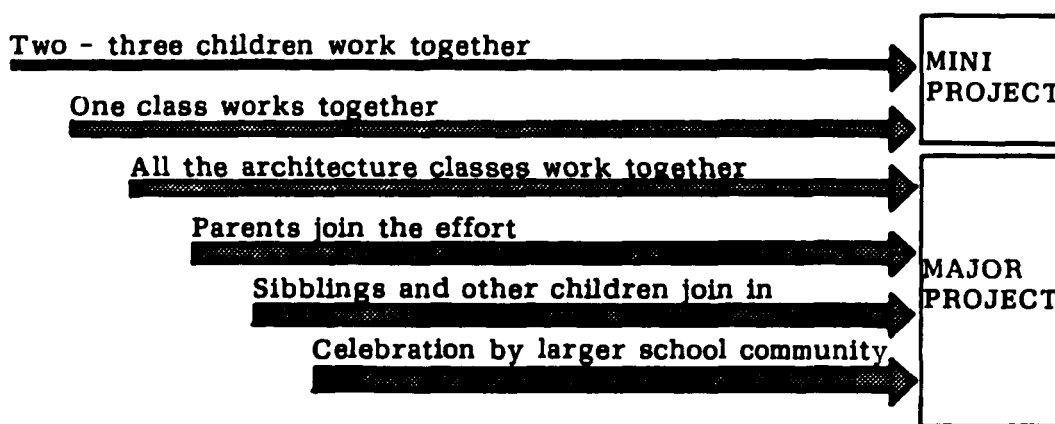


FIGURE 1

Diagram of the Project's Expanding Social Interaction

A Description of the Work Process

During the first semester classes were conducted in a fairly structured way. I had a scheduled session with each class every week and all the children in all the classes covered the same material. See Appendix B for a detailed description of a typical lesson given during the experimental year. The lesson began with a mini lecture or demonstration and ended with a hands-on ses-

sion. Although the teacher knew the general direction of the work in progress--I had meetings with the teachers to plan an overview for a series of lessons--she did not know in advance the specifics of what would go on in a particular session. I would simply ask the teacher to assist me in some way and include whatever demonstration was needed as part of the children's demonstration.

The national coordinators of the Artists-in-Schools program stressed the importance of having well-planned activities which were, whenever possible, developed in consultation with the teacher. The first year I worked at P.S.H. I devised a workbook which completely described every activity as well as the tools and materials it would require, and the skills that would be covered. The activity description ended with suggestions for other related hands-on exercises that the teacher might want to try. The lesson plans for a series of activities would be written after a brainstorming session with the teachers and inserted into the workbook. Although most of the teachers didn't really use the workbook--most of the time the children were totally unprepared for what was to go on in a particular session and most teachers did not experiment with the suggested exercises--it was probably initially a good organizing experience for me. By the construction phase, however, all planning broke down. Whatever plan I made had to be constantly modified because I was, quite frankly, stretched to the limits of my capabilities. I had never really constructed anything with my own hands. Trying to learn how to use the power tools in the middle of a public school classroom filled with tiny desks and thirty-five children and provide instruction at the same time was more than I could manage. The construction phase was one emergency after the next, and the children loved it. Anytime I would scratch my head wondering if and how to go on, the children would come alive with sugges-

tions--good suggestions--for solving the problem.

Based on this experience, I began to loosen up in my planning during the second year. I would try to give the impression that we were all inventing the course of action as we went along. I would think out loud, or pose alternative possibilities for what could go on next. By the third year, I had gone off on so many spontaneous tangents, including several lessons on printmaking, that we began the construction phase almost a month behind schedule.

The second semester began in the same structured way except that we would start to focus on an idea for our final project. After a particular design had been selected for development, each class worked on some different aspect of that process. One class might work on building a structural model while another drew up a measured plan or specified and ordered materials. In some classes there may have been a further division of labor within the class with the teacher working with one group while I worked with another. During this time, however, classes were still fairly scheduled and, although it was already apparent that some children were much more involved and much more able to invent jobs for themselves than others, all the children were spending the same amount of time in the architecture class.

Construction usually began sometime after spring vacation in April. At the beginning of this period I would give a lesson on the meaning of "on charrette"--an expression originated by architectural students at the Ecole des Beaux Arts to refer to that period of working night and day to get a project completed to the highest possible standards. The first year I was quite perplexed about how to incorporate a charrette into the institutional requirements of a public school. However, I simply did not know another way to

get something made. Architects always charrette, so one day I gave a lesson on the origin of the term. I told the children that we would definitely have to go "on charrette" if we wanted to finish our idea. They agreed and some classes made signs for the doors to their rooms which said "Do not disturb--on charrette!" Figure 2 expresses one child's understanding of what a charrette would be like.



FIGURE 2

Drawing from a Fifth Grade Boy's Log

As I was rushing from one class to the next with all my power tools, not having eaten my lunch, and trying to figure out how to get more hours out of the school day, I kept apologizing for how much disturbance I was causing. However, only one teacher, who kept shouting at me that I must learn to obey the rules, seemed to care. The constant noise of the power tools was accommodated and the children's only concern was that I should be able to eventually get myself cleaned up. On several occasions different children commented on how dirty I was. One girl exclaimed that she thought all along that I was a man because I was so dirty and sweaty. Another boy offered to get his mother to make a dress for me to wear to our end-of-the-project celebration.

As time went on there was a definite crescendo in activity and excitement over the course of the year not only in my project but throughout the school. At the beginning of the year, children worked in a more orderly way with activity in the hallway being quite limited. By the end of the year, as all the various projects began to take shape, rules were bent and the hallways filled up with the excitement of completing work. I may have introduced the term "on charrette" to the school, but I have the feeling that the spring time had always been a charrette period for P.S.H. The architecture program was probably only an exaggeration of the school's typical end of the year excitement so everyone readily accepted any chaos that the charrette caused.

One requirement of the design was that it should be modular. We had to be able to build many small sections inside which could then be assembled into a large element outside. During the first year all of the inside construction took place in the various classrooms. By the second year I had a lab that I would set up during the construction phase. Some of the work was then supervised by the teacher in the classroom while I took other children to work with the power tools in the lab. It was at this time that some students began to really distinguish themselves. I explained very clearly that children who could keep working independently and find jobs for themselves would get to stay the longest. The children who began to play with the tools or who required excessive attention had to leave and send back replacements. It was a simple choice and the children who caught on found out that they could stay indefinitely.

When all the modular pieces were ready, the Parents Association would arrange a Sunday building session so that older siblings, parents, and friends could help with the heavy part of the outdoor construction. The first year

only a half dozen parents came along with two teachers and their husbands, the principal, and perhaps twenty-five children. The women elected to do painting and cleaning tasks while the men commandeered all the tools. By the third year, the activity had really intensified. The Sunday building occurred on two days. The project scope was much greater so there were many more jobs to do. On the busiest of the two days about thirty-five adults came including four teachers, and the principal. There were at least seventy-five children including many older brothers and sisters and graduates of the school. By this time the women had gotten to be much more aggressive in the tasks they chose and in using a range of tools.

The reaction of the passersby to the work in progress also changed. That first year there were several instances in which someone walked by and shouted at me, "Are you crazy or something? This thing won't last a week so you might as well go home, stupid." Teenagers would taunt the children with "sucker" calls. However, after our first project the communications changed. The teenagers began to grumble that they never got to do this kind of stuff, and the adults frequently complimented us, saying how nice it was that the structures had not been vandalized. Of course there continued to be nonbelievers who asked questions like, "What kind of special coating are you using to prevent graffiti?"

After the Sunday building session, the charrette heightened. I began arriving at school an hour or so before classes started. Those children who had gotten really involved in the work would be waiting for me. Sometimes we worked on half-days, or holidays, or after school. The charrette spirit at P.S.H. certainly measured up to and exceeded any architectural school charrette I had ever experienced. We never finished a moment too soon--

perhaps just a few hours before the unveiling. I was frequently asked, "But why don't you start earlier so you won't have to work so hard?" My answer was that we needed the time to get to know each other and organize our energies, and that the charrette intensity was an essential part of the creative process. In addition, the charrette offered the children who were capable of going all out on something a chance to test out their commitment and to see a group of adults working to make something be as perfect and as beautiful as possible.

During the third year, the construction process was especially lively because of the concurrence of another program, Project Interaction. This was a state-funded program created for the purpose of reducing isolation of minority students. The mechanism for solving the problem of adverse stereotyping was to be defined by the participating school. In keeping with their hands-on artistic orientation, P.S.H. decided that this could best be done by setting up situations in which parents, teachers, and children worked on creative projects together. By working together everyone would get to know and respect each other more.

Project Interaction sponsored a number of workshops and social events throughout the year. The activities had a tremendous effect on parent participation in the school. A family room was set up next door to the principal's office, and the whole atmosphere of the building seemed to be affected by the mothers who "hung out" there, brewing coffee and passing out a variety of fattening refreshments.

It seemed natural for Project Interaction to join the architecture program which also had a community orientation for the end-of-the-year project. That year we were proposing to build a musical toy called the Street Orches-

tra in the school playground. The children had designed the toy as a jungle gym which was to be equipped with a variety of percussion instruments to play and to play on. The rest of the playground had deteriorated so the Project Interaction group decided that they would put their efforts into fixing up the area. Then the playground would be opened up for general community use. In addition to the four architecture classes who were involved in the building of the musical toy, twenty other classes joined Project Interaction to complete an eight by fifty foot mural and to plant a sizeable flower garden. This meant that a good portion of the school and many parents were involved in the playground improvements in one way or another.

When the work was complete, there was traditionally a big ceremony to unveil the finished product. The event was in celebration of all the arts projects completed during the year. There were music and dance performances, and a graphic arts display filled the entire gymnasium. Every child was involved in some way. The first year the celebration was attended by about three to four hundred people. At the third year celebration, the Project Interaction group added a pot luck buffet to the arts festivities. Parents and teachers were asked to contribute some ethnic dish. That year at least five to eight hundred people attended the supper and performances.

A series of photographs are contained in Appendix C which illustrate the work process and the completed end products.

The Long Process of Making It Work

The activity and excitement that the building projects generated were a very evident feature of the program. However, those three years were not without problems. As I had anticipated, there were major difficulties in learning to teach design which essentially requires individual attention in a class of

thirty to thirty-five children, especially since the area was so unfamiliar to everyone. My expectation that teamwork would minimize my management problem did not work out. In fact, my insistence on collective work created an even bigger problem. Despite the USMES orientation, both the teachers and the children resisted the idea of working together. In my view teamwork meant that each person should define his or her role even if it was a supporting one. I wanted the children to learn to negotiate job responsibilities and supplies and to experience deCharms' (1976) idea of achieving your own goal without compromising someone else's. The teachers, however, seemed to think that this approach was unfair since, in many cases, one child upstaged another. They wanted me to arrange a situation in which children would have perfectly equal opportunities to work on their individual ideas. When the children would argue about who was to do what, this seemed an okay part of the problem solving process to me, but the teachers would urge me to allow the children to work independently with their own individual materials. I persisted that resolving conflicts in small teams was a necessary beginning if we expected to accomplish our goal of building one large project by the end of the year, and so the dispute continued. Eventually the problem diminished probably because the children came to expect that being in the architecture class meant working in teams.

Another difficulty concerned the use of new materials and tools. The first year I worked with three classes each day I visited the school. This meant that I needed to have materials for about one hundred children. Most of the materials we worked with were not available in the school supply room, and many times I wanted to prepare it in some way before the class. For example, a favorite exercise involved using two-dimensional geometric and

free form shapes to construct a three-dimensional space. A tremendous amount of preparation was required to produce the shapes for the exercises and then they had to be transported to the school. For two years I struggled through this preparation until I realized that I could get a group of my best students to cut the shapes out for the rest of the children. As the year went on, I discovered that the children became much more competent as I gave them more responsibility. By the end of the third year, my role had become more of a supervisory one.

What was most extraordinary was that, even though I had completely different students each year, each succeeding class seemed more adept at using the materials and equipment. For example, a small mat knife is essential to model making. When I first brought it out, everyone looked at it wide-eyed, gasping at its razor blade sharpness. During the first year I allowed a child to use the knife and she promptly cut her finger quite deeply. Everyone got very upset about the accident so the teachers and I decided not to allow the children to use the knives. Several teachers, in fact, declined to work with them. For all of the first year I had to cut out every piece of cardboard that everyone needed which was nearly an impossible undertaking. The teachers would try to devise other safer methods of cutting the shapes that the children could manage, but ultimately the mat knife made the fastest, sharpest cut. As time passed, however, everyone got used to the knife. After awhile the rule was relaxed. By the third year the teachers would select a team of "cutters" at the beginning of each class. It was their job to cut out all the cardboard shapes for the rest of the model makers. Oddly enough, only minor accidents happened, and the children took the accidents in stride.

One of the most distressing and difficult problems for me professionally was converting the children's design concept into a buildable project. Although I had discussed the basic principles of structure, construction, and materials at the beginning of the year, the children were certainly not able to incorporate this information into their designs by February. It takes many years of sophistication to learn to produce a design which responds in a rational way to technical constraints. The children's designs were intuitive forms--cardboard sculptures. It was my job to convert their ideas into a buildable reality. The sculptures had to be proportioned using the real materials instead of cardboard. The materials had to be purchased in a size that could be carried up and down the stairs of the school by the children. The modular pieces had to be a size and shape that could fit through doorways and be lifted by children. The joints had to be figured out so that the structures could sustain the weight and stress of climbing children yet be made by an unskilled crew working with borrowed tools. A building permit had to be obtained--no small task since our structures did not fall into any of the categories that the Building Department uses to review projects and since we had no liability insurance for the "construction workers,"

This was a design task that seemed overwhelming each year. Assuming professional liability for a homemade structure that was based on those difficult to manage circles and curving shapes that children inevitably design was more than a little unnerving, especially since my part of the development was done on my own free time, and therefore, in a very hurried fashion.

In addition to the technical difficulties I was also somewhat discomfited about actually changing the children's conceptual ideas. Even though I made a great effort not to lose the playful quality of the children's sketches, the

buildable version was never quite the same. For example, Figure 3 is a child's sketch of the Street Orchestra and Figure 4 is the working drawing I developed for that structure. By the third year, however, I realized that what was happening was a necessary part of the team process. It seemed that the children and teachers should understand how and why I had to expand on the cardboard sketches in order to make them technically feasible. I decided to photograph myself working in my studio to show each stage of the project being developed from the original idea through the selection of the materials and joinery, to a dimensioned working drawing and model. The children were fascinated by the slides and asked many questions during and after the show. They were not only seeing how the final product evolved, they were seeing me at work and working on something that was familiar to them.

Probably the most difficult problem to resolve every year was my relationship to the classroom teacher. In the three years that I was at P.S.H., I worked with thirteen different classes. However there were only ten different teachers because one teacher stayed in the program for two years and another for all three years. My relationship with those ten people ranged from excellent to poor, and unfortunately I can not say that things generally improved with time. What seemed to make the difference was not time or experience. It was a simple matter of whether the teacher and I communicated effectively. Just as the residency as a whole worked because there was a complementary match between my values and the school's values, there had to be a complementary set of goals between the teacher and myself. During the course of the residency, ten very different marriages occurred, some good and some bad.

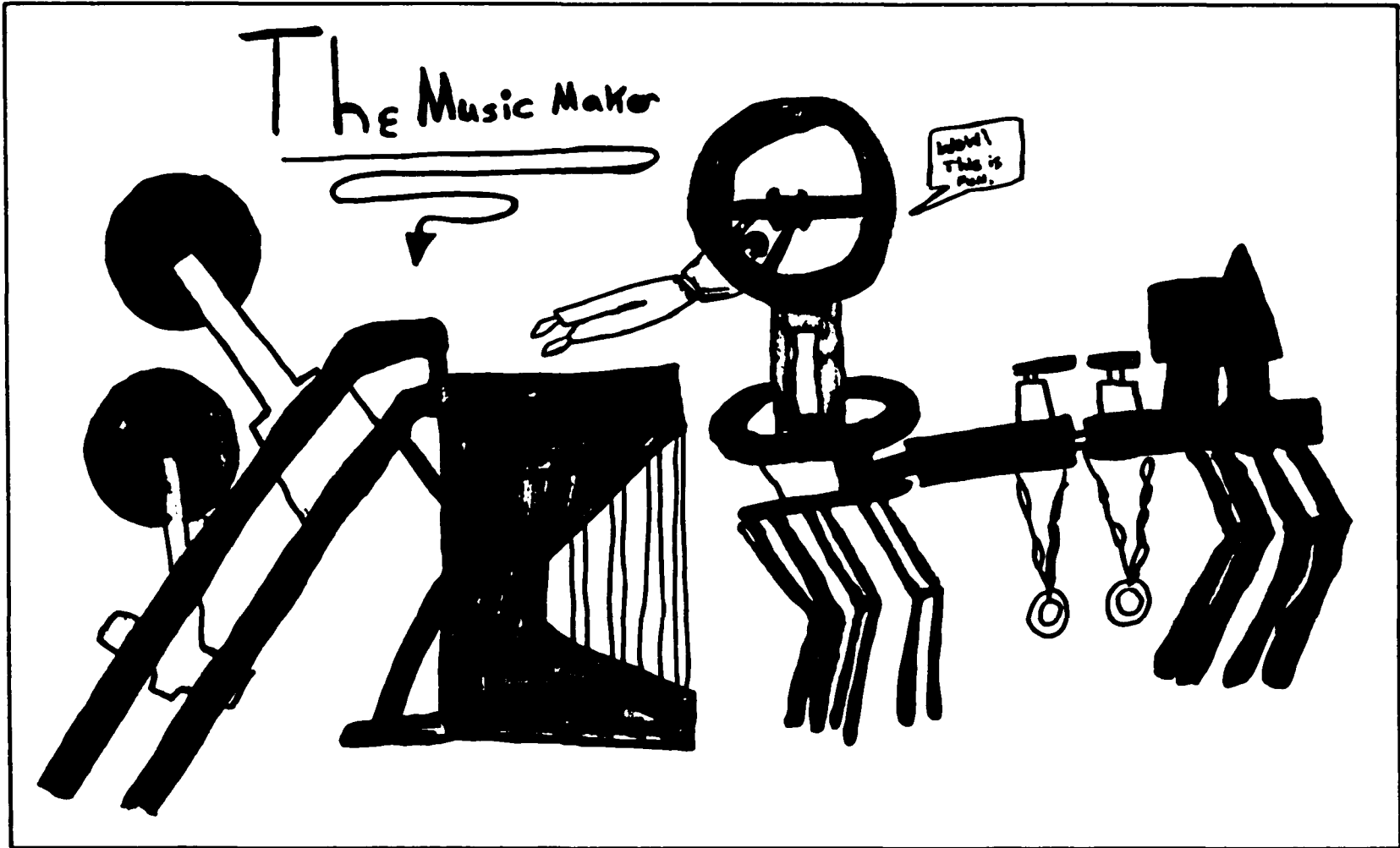


FIGURE 3

Child's Sketch of the Street Orchestra

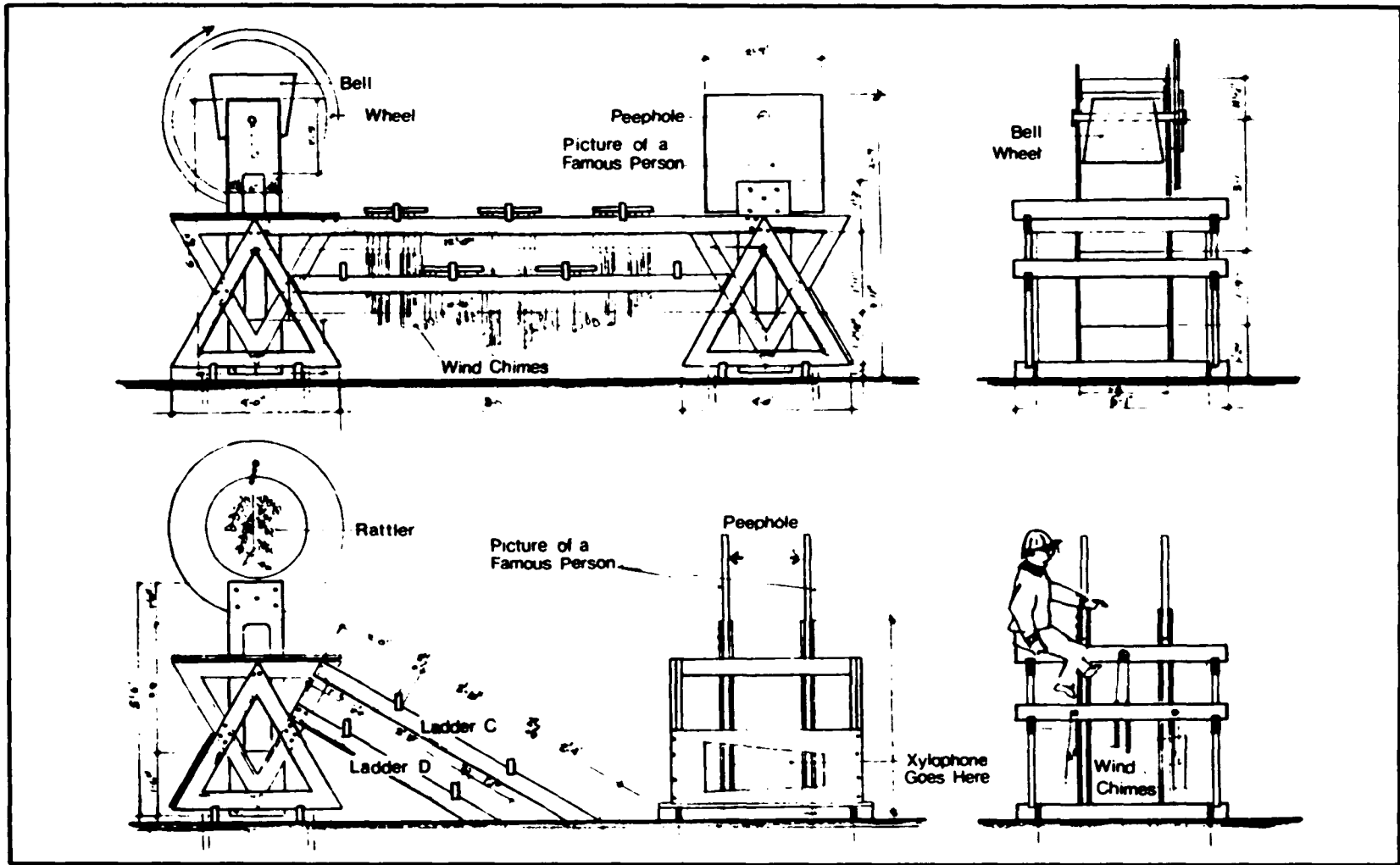


FIGURE 4

Architect's Working Drawing for the Street Orchestra

It was apparent to me from the very beginning that a negative relationship between the teacher and myself adversely affected the children's ability to participate in the program. For example, if a highly structured class was important to the teacher, it was possible that she would see my activities as upsetting to the normal class routine. She might either leave me on my own to deal with classroom management, which I was ill-equipped to do, or begin interrupting with excessive disciplinary lectures. In either case, the discipline problem became the dominant focus rather than the lesson activity. In some instances the teacher and I did not agree on the purpose of the class or the art process. If a teacher felt that art should be set apart from other activities as a special opportunity for self expression, then she might find the collective work or the log writing objectionable. In one case the teacher insisted on a very analytical approach which was at odds with my intuitive approach. What was not so apparent, though, was how a good teacher/architect team could work in the way Bronfenbrenner suggests, i.e. where one adult uses the other to demonstrate positive behavior to the children. Then something happened in the third year which made this idea evident to me.

There was one teacher--Mrs. A--who set up a very family-like relationship between herself, myself, and the children. She was the teacher who worked with me for all three years. During the first year, I missed a week of classes because I had to go to New Orleans to give a lecture at a university. I explained where I was going to all my classes before leaving. Mrs. A took advantage of the itinerary I described to give a geography lesson. The children went to the library to read about New Orleans and wrote entries in their logs about this trip of mine. Several days later there was a tornado near where I was traveling. The children wrote letters expressing their

concern for my safety, and mailed them to my house. When I came back I brought in a map and some post cards for each of my classes and talked about my trip. The children in the other classes were only moderately interested, but the children in Mrs. A's class were full of questions. Apart from wanting to know more about where I had been and what I had done, they were concerned about me and genuinely happy to see that I was okay.

That was the beginning of a friendship between those children and myself, and since Mrs. A was setting things up that way, the friendship happened each year for a different reason with each set of children. The children in her classes would always make cards for me on special occasions (see Figure 5), or bake a birthday cake, or make a present for me. In response, I would do special things for them. I would bring something for them to work with from my studio or spend extra time in their class. In return, the children would work very hard. So our mutual admiration grew.

I knew all along that this friendly, highly personal way of working was very pleasant. However I did not really think about what having someone special to care about might mean in terms of a child's development until the end of the third year when Mrs. A. became seriously ill and had to take a sudden leave of absence. During the first two weeks that she was gone there were many different substitutes. I spent a lot of time with the children taking almost all of them down to the two tiny rooms that served as the construction lab. Since I could not manage twenty-five children working with power tools, I had to think up another activity for some of them. Get well cards, letters, and presents seemed the natural thing. Pretty soon our whole relationship was focused on that teacher--hoping she was okay, talking about whether we should disturb her with a phone call, imagining how pleased she would be

To: Miss Sutton
Happy Birthday to you.
From: Bick from goshyn
many happy birthdays to you
and god bless that special day
happy birthday
Miss Sutton
From: John

Have a happy birthday
From: Deanna

Happy birthday
to Miss
Sutton
From: Edgar

Happy Birthday
Mrs Sutton
From: Sherry

Best wishes
to you
from:
Marisa
Miss Sutton
From: Sean

Happy Birthday
to my dear friend!
H. N. :

Happy Birthday
from: Hue

Happy Birthday
from: Charles

Happy Birthday
from: Heather

Happy Birthday
to a good Architect
I love Happy
Birthday to
you, Danna

I will always
love you Love
Elizabeth

I have very very
much you have
taught me extremely well
I will always love you

Happy Birthday
Love Nicholas Watson

Happy Birthday
Thank Giselle
you
Jason
Smith

Happy Birthday
To: Miss Sutton
Happy Birthday

FIGURE 5

A Birthday Card

with the work we were doing. As unpleasant and unhappy as this particular circumstance was, it was enlightening in that I learned to appreciate the children's ability to earnestly care for someone. This caring seemed to transform them and direct their energies. In retrospect I realized that, all along Mrs. A had been organizing and motivating her classes by showing them how to care about another person.

Finally, in reflecting on the way we all gradually learned how to make things work out and on the adjustments that the teachers, the children, and I had to make to each other, what is probably most important to say on the subject of organizing a program of this sort is that it is a long process. The most perfect plan is only just that--a plan. The ultimate success of the plan depends on each of the participants developing a knowledge about and trust in the other participants' skills, abilities, and work style. The kind of honesty, openness, and organization that was required to accomplish the larger goals of this program could not happen immediately. A major strength of this particular school was a willingness on the part of the principal, teachers, and parents to go through a long process in order to achieve a small success.

CHAPTER THREE
THE MOTIVATIONAL POTENTIAL OF THE PROGRAM
AND ITS EXPECTED EFFECTS

The expectations of the research were based on the assumption that the architecture program was a motivating experience. In part, this assumption was a result of my informal observations of a variety of positive reactions to the work in the years preceding the data collection. There was some reference to these observations in Chapter Two, and they are further discussed in Chapters Five and Six when I relate them to the research results. In this chapter, however, I will evaluate the most salient, motivational characteristics of the program in terms of the literature.

There are three major themes in the motivational literature. First, self esteem and self confidence play a key role in the quality of the child's performance. Second, a hands-on, experiential approach to learning maximizes excitement and helps the child to develop a variety of competencies. Third, the social environment affects the child's performance because it provides feedback about the immediate situation, and because it communicates the habits and ideals of the larger society.

To what extent are these three themes evident in the architecture program?

Opportunities for Improving Self Esteem and Self Confidence

The literature suggests that an experience of this type improves self esteem. The work process and its outcome provided objective confirmation that individual children were making important contributions to a special project. The program had an obvious quality of specialness: art is usually thought of as special; having a "famous" architect in your class is special; and architecture is not a subject that children usually study.

The students who participated in the program expressed to me their feelings of being in a select group since only a few classes in the entire school were able to be included. The specialness of the program was exaggerated by its public visibility in the surrounding community. The tangible objects that resulted from project activities were attractive additions to the neighborhood and they won the admiration of children and adults alike. The literature suggests that people experience a special sense of pride in relation to things they create. In this case, there was an extraordinary opportunity for children to identify with the tangible outcome of their efforts.

The work process involved many kinds of tasks. Even though the outcome was a single, collective one, there were many ways for individual children to explore their special interests. One child might be most interested in writing thank-you notes to donors. Another might prefer to paint or hammer. Still another might choose to clean up the room or organize supplies. Some children preferred the model making that occurred early on in the year and they continued this activity during the construction phase.

As I became more experienced in working with children, I began to depend on them more as partners. During the construction phase, as my own capabilities were stretched to their limit, I clearly needed the children's assistance. By this time of the year, many children had acquired the manual dexterity and the interpersonal skills that were required to take the initiative in solving a given problem effectively.

It is evident that the experimental program offered an abundance of opportunities for making a significant input into a project which had a special importance in the school and the larger community. The project activities encouraged feelings of uniqueness and of being needed and competent. The

literature indicates that these feelings lead to an increase in self esteem and ultimately to an increase in performance.

Opportunities for Excitement Through Hands-on Work

The literature also suggests that the program offers unusual possibilities for experiential learning. The benefits of doing any kind of artwork are self evident: Children begin with their own intuitive ideas and engage all their senses in physical and emotional contact with the external environment. The architectural design process is especially beneficial because it ties into the child's natural habits. Most children engage in the construction of three-dimensional space during play. Making imaginery places with toys and found objects is a customary occupation for children. In this school, where creative work was given a priority, children exhibited a ready capacity for handling materials and forming space. They would begin working without hesitation as soon as the assignment was given out. Further, our particular approach to the curriculum allowed children to use their personal experience as a point of departure. I might ask the children to build a model of their secret play place, or to design a perfect room for their house, or to imagine a special, magical place where they could do all their favorite activities.

The physical activity, which was always just a bit more strenuous than could be managed comfortably, fed into the adventurous quality of the program. Once we had to figure out how to move two tons of concrete down the street and then back up again. Once we had to hoist an object that weighed about one hundred pounds to a height of twelve feet off the ground. Another time we had to carry large, fragile cardboard models down three flights of stairs without damaging them. The children had to manage their bodies and cooperate with each other in an imaginative way in order to accom-

plish these tasks. Since I was not a lot stronger and no bigger than some of the children, the adventure of solving such problems was even more engaging.

The physical, highly whimsical nature of the project activities allowed the children to bring a playful excitement to the work. The literature suggests that this sort of experience increases the motivation to learn.

Opportunities for Learning Through the Collective Process

The intentions of the program were twofold in respect to the social environment that the project activities encouraged. First, the social environment was intended to be a moderator of productivity-oriented behavior. Children were invited to pursue individual goals within a clearly defined common objective. The literature suggests that being successful in the long run involves the capacity to pursue private interests in a prosocial manner. The purposeful, collective nature of the experimental program demonstrated to the children, in a first hand way, the rules of prosocial behavior. Children received immediate feedback on the quality of their individual input into the group effort. If a job was not done properly, it simply would not work or would not fit. If one child was not doing his or her share of the work another child would object and ask to be given that part of the responsibility.

Second, the social environment was intended to be a demonstration of a particular set of social values and habits. Sensitivity to the interdependent nature of interpersonal relationships, awareness of the vulnerability of the physical environment and of individual responsibility for taking care of the environment, and respect for the nature of creative work were values which were central to the experimental program. The design of project activities

clearly demonstrated to the children the practical benefits of following the prescribed behaviors. Just the thought of what vandals might do to our precious work was a clear reinforcement of the need for respecting other people's property.

Probable Causes of Differential Involvement

It was apparent from the outset of the program that some children became more involved than others in the project. The difference in involvement was quite obvious towards the end of the year when children were free to determine their input into project activities. I had observed that children in the intellectually gifted classes were typically the least involved. They did not usually show up before school, nor were they the ones who were able to concentrate on tasks for long periods of time. I also observed that parents and teachers occasionally referred to the group of children who were my most active helpers as the "bad bench crew," indicating that my special helpers were children who required frequent disciplining. It seemed possible that the program provided a compensatory experience for low achieving, low esteem children. The experimental activities allowed children to demonstrate competence in an area that did not rely on previous academic training. If the program could improve these children's feelings of self confidence, then perhaps actual skills and behavior would also begin to improve.

I was also aware that Mrs. A's class always had the highest number of committed participants by the end of the year. It seemed that her relationship to me and her willingness to work on the project might be a factor in how her children related to the work. Her classes were also clearly more responsive to the terms of the collective work process. The quality of our relationship provided a model for the rules of team behavior as Bronfenbrenner

(1970) suggests it would. When the teacher/architect team was not such an effective model of interdependent work, the children were less able to get involved in the process.

In organizing testable hypotheses it will be important to consider differential involvement because children who were more exposed to the process had a better opportunity to reap the benefits of the program.

Skills and Values Encountered in Program Activities

According to the literature there is good reason to expect that the program could lead to improvements in the skills and values which were directly associated with project activities. In addition, other skills might improve indirectly because of the excitement generated by the project. Before setting forth more specific expectations, it is necessary to outline the skills and values that were introduced to the children through the program.

Obviously the children encountered applied and intellectual knowledge about architecture. Some of the information was presented in a hands-on manner. The children were taught how to make scale drawings and how to build structurally sound models using cardboard. They were exposed to various tools for drafting and construction. Other information was presented abstractly during class discussions. We talked about the design process and the architect's relationship to the client and the builder. We looked at other examples of good architectural design. We identified important buildings in the city and looked at the architectural elements which are most evident in those buildings.

Other intellectual skills were touched on indirectly in relation to the program. In making scale drawings, the children were exposed to fractions. Cutting materials required a computation to see which cuts wasted the

least material. During fund raising events, children collected money, paid off debts, and then calculated profits. There were numerous words that the children began using out loud to describe the work, e.g. plane, criteria, parallel, diagonal, equilateral, etc. These words could have been used by the teachers in vocabulary and spelling lessons. One teacher used the complexity of what was happening in the project to reinforce the skill of writing in paragraphs in her fifth grade class.

It is clear that the transitory introduction to intellectual skills which occurred during my weekly visit required follow-up and integration on the part of the classroom teacher. I realized that follow-up had been minimal in the years preceding the research. Nevertheless, I hoped that the specific assignments which were associated with the data collection process would provide an incentive and a structure for an increased amount of input from the teachers.

As mentioned above, children were introduced to a variety of interpersonal skills and environmental values. The project was a literal demonstration of the principle of social productivity. The outcome of the group was more dynamic than that of any single individual. Active cooperation was required among immediate members of the group, and other people who were part of a larger group had to agree tacitly to respect the efforts of the smaller group. Finally, the charrette was an instructional opportunity in itself because it allowed children to have the experience of completely orienting their energies toward the accomplishment of a goal and to see other adults doing the same thing.

Expectations for Improvements

The literature substantiates that the program was an exciting experience.

It encouraged creative expression, physical engagement, and provided opportunities for exploring individual capabilities. At the same time, program activities introduced a range of skills and values to the children. To what extent did the program lead to an improvement in the skills and values which were associated with it?

It was apparent from the beginning that all children were not equally motivated by the program. Some children became more excited by the process than others. Some children were able to channel their initial excitement into a more disciplined pattern of participation. What enabled one child to participate more than another in this particular situation?

Specifically, two questions are addressed in the empirical study. They are:

- a. Given that the experimental program was a collectively structured process which physically engaged children and adults in the creation of a major aesthetic end-product and which allowed each child to contribute to the production of that end product in his or her own special way, can children who participate be expected to improve in (1)self esteem, (2)architectural knowledge and skills, (3)general intellectual skills, (4)cooperative skills and values, (5)environmental values, (6)task commitment, and (7)appreciation of the creative process.
- b. Are the children who get involved in the program low achievement, low self esteem children? Further, what effect does the teacher's involvement in the project have on the child's ability to participate and ultimately benefit from that participation?

Each of the areas specified in the first question represents a measureable dependent variable which is described in the next chapter along with the method for determining involvement. The procedure followed for determining low achievement, low self esteem, and for ranking teachers in the latter question is also described in the next chapter. The scores on achievement, self esteem, and teacher participation are independent variables which are used to predict improvement. Involvement acts as an independent variable in the first question and as a dependent variable in the second.

CHAPTER FOUR

THE RESEARCH DESIGN

A Pre-test Post-test Control Group Design

The experimental group consisted of 112 fourth and fifth grade children enrolled at P.S.H. These grade levels were selected because 9 to 11 year olds seem particularly suited to the focus of the program--they are old enough both to manage architectural tools and materials and to understand fundamental concepts about structure and the design process. This age group is also just beginning to develop a rational understanding of reciprocity in the environment and in social relations (Piaget, 1965).

The experimental group was composed of two fourth grade and two fifth grade classes. The teachers of those classes were all experienced in working with an artist-in-residence. Two teachers had participated in the architecture program in previous years, one fourth grade teacher for one year and a fifth grade teacher for two years. Those two teachers volunteered to participate in the experimental program. The other two teachers willingly agreed to join the program after being personally invited by the principal.

The children were all first-time participants in the architecture program. One fourth grade class contained intellectually gifted children. The other classes were heterogeneous. The girl participants slightly outnumbered the boys.

Two comparison groups were selected. Because P.S.H. had special qualities which may have caused the children there to develop differently regardless of their participation in the experimental program, an in-school

control was used. This group consisted of 30 fifth grade children¹. It was also possible that some children at P.S.H. who were not in the program may have benefitted from the activities. Children frequently participated in the project who were not assigned to the program. For this reason an external control was deemed necessary, and P.S.R. was selected as the best choice for a control school. It was similar in size and population, it was located in the neighborhood, and it had an active arts program. An academically and socioeconomically matched group of 47 fourth and fifth grade children were selected from P.S.R. Table 1 provides a breakdown of the composition of the experimental and control groups by grade and sex.

TABLE 1
Number of Girls and Boys at each Grade Level
in the Experimental and Control Groups

<i>Grade Level</i>	<i>Experimental</i>		<i>P.S.H. Control</i>		<i>P.S.R. Control</i>	
	<i>Girls</i>	<i>Boys</i>	<i>Girls</i>	<i>Boys</i>	<i>Girls</i>	<i>Boys</i>
Fourth Grade						
Intellectually Gifted	15	14	--	--	10	4
Heterogeneous	19	12	--	--	2	8
Fifth Grade						
Heterogeneous	24	27	15	15	14	9
Subtotals	59	53	15	15	26	21
GRAND TOTALS	112		30		47	

¹A fourth grade, in-school control was not used because there were no other fourth grade, intellectually gifted children at P.S.H. who could be used to match the children in the experimental group.

All the children were pre-tested during a one-week period in October and post-tested during a one-week period in May using the same instruments. The testing took approximately thirty to forty minutes on each of the four days of testing. A standardized test was administered on the first day; special tests which were designed for this study were administered on subsequent days. Cumulative record card data and Board of Education standardized test data were also collected on all the children from the previous year and the year of the study for before and after comparison. The pre- and post-testing and the child's school record provided data for the dependent variables describing the seven areas of predicted improvement, those areas being self esteem, architectural knowledge and skills, general intellectual skills, social skills and values, environmental values, task commitment, and appreciation of the creative process.

The degree of involvement in the program functioned as both a dependent and independent variable. The children were divided into four groups to indicate each child's level of participation in the program. The control children were all assigned to a no involvement group. The experimental children were assigned to low, moderate, or high involvement groups based on the data from questionnaires administered at the middle and end of the year. The distribution of children in the involvement groups was normal: Twenty-two percent of the total group were assigned to the high involvement group, 55% were assigned to the moderate group, and 23% to the low group. There was a larger proportion of boys in the high involvement group, and a larger proportion of girls in the low involvement group (see Table 2). The fifth graders were generally more involved than the fourth graders with Mrs. A's fifth grade children being the most involved and the intellectually gifted fourth grade children being the least involved

(see Table 3).

TABLE 2
Percentages of Girls and Boys Assigned to
Each Involvement Group

	<i>High</i>	<i>Moderate</i>	<i>Low</i>
Girls	5%	25%	16%
Boys	17%	30%	7%
TOTAL	22%	55%	23%

TABLE 3
Percentages of Children Assigned to
Each Involvement Group in Each Class

	<i>High</i>	<i>Moderate</i>	<i>Low</i>	<i>Total</i>
Fifth Grade				
Class 1 ^a	33%	48%	19%	100%
Class 2	29%	51%	20%	100%
Fourth Grade				
Class 3	15%	64%	21%	100%
Class 4 ^b	5%	60%	34%	100%

^aMrs. A's class

^bClass of intellectually gifted children

A variety of observations, interviews, and questionnaires were used to assign objective, numerical scores to the four experimental teachers for their commitment and receptiveness to the program. These scores were, in turn, assigned to each child in the class. The teacher's scores and two of the child's pretest scores formed a set of independent variables describing the conditions for involvement. Those variables were the child's previous self esteem, the child's previous academic achievement, the teacher's commitment to completing program tasks, and the teacher's receptiveness to the goals and ideals of the program.

A summary of the source of data for the dependent and independent variables and the time of data collection appears in Table 4.

Efforts to be Objective

This study had an unavoidable subjective bias. First, there was a built-in conflict of interest in simultaneously being the teacher and the researcher, especially since the goals of the research did not parallel the goals of the on-going program. Although the areas that the children were being tested on undoubtedly influenced the manner in which I presented the material, the program had a much more expansive outlook than the research had. As a per diem artist-in-residence, I had neither the right nor the authority to impose a curriculum solely for the purpose of achieving the expectations of the research. My efforts were necessarily directed towards the daily concerns of the program, yet I was aware of my own agenda. Clearly, this is quite different from having a learning objective, a teacher who develops daily methods for reaching the objective, and a researcher who uses instruments of evaluation which are autonomous of those daily teaching methods.

Second, there was an emotional engagement between the children, the

TABLE 4

Source of Data and Schedule of Data Collection
for the Dependent and Independent Variables

<i>Variable</i>	<i>Source of Data</i>	<i>Schedule of Data Collection</i>
<u>Dependent Variables</u>		
Self Esteem	special test	beginning and end of year
Architectural Knowledge and Skills	special test	beginning and end of year
General Intellectual Skills	standardized tests in reading and spatial ability	previous year and year of study
	cumulative record card	previous year and year of study
Cooperative Skills and Values	cumulative record card	previous year and year of study
	special test	beginning and end of year
Environmental Values	special test	beginning and end of year
Task Commitment	cumulative record card	previous year and year of study
	special test	beginning and end of year
Appreciation of the Creative Process	special test	beginning and end of year

TABLE 4
(Continued)

<i>Variable</i>	<i>Source of Data</i>	<i>Schedule of Data Collection</i>
<u>Independent/Dependent Variables</u>		
Involvement	questionnaire	mid and end of year
Excitement	attendance records	end of year
	special test	end of year
<u>Independent Variables</u>		
Self Esteem	special test	beginning of year
Academic Achievement	standardized tests in reading	previous year
	cumulative record card	previous year
Teacher's Commitment to Completing Program Tasks	observations	throughout the year
	interview and questionnaire	end of year
Teacher's Receptiveness to the Goals and Ideals of the Program	observations	throughout the year
	questionnaire	end of year

teacher, and myself--an engagement that was sometimes positive and sometimes negative--which surely influenced the data that I collected. Even though I went to some lengths to disguise the source of the testing, the children knew that I was a student and realized that the research was part of my "homework." The friendships that developed over the year between the children, the teachers, and myself certainly could have increased their effort to somehow help me. Again, this is a much less objective situation than evaluating or being evaluated in an aloof manner.

Third, although I stressed confidentiality to the teachers, their actions indicated that they did not believe this assurance. Even if the teachers trusted that I would not relay the information about them to the principal or to parents, they must have been inhibited in giving their true opinions about my work and the project by knowing that I would be the one to read those opinions. Not only could there have been some reluctance to hurt my feelings, but since I played the role of teacher trainer, it is also more than likely that the teacher's opinions came to be a reflection of my ideas.

Given these inherent difficulties in objective measurement, definitive steps were taken to minimize the subjectivity of the study. In order to overcome the implication that I actually could coach the children on the quantitative measures, I resolved never to discuss any of the specific answers to any questions appearing on the tests. For example, a different scale was taught in class than that which appeared on the test. The children had to understand the concept rather than remember the answer. The qualitative protocols were designed to be overlapping so that the score for any one variable, e.g. involvement, was arrived at by compiling a variety of responses from different sources. Where open-ended responses were scored,

the quantitative appearance of words or ideas was recorded in lieu of an impressionistic interpretation of the content.

The Testing Procedure

The standardized and special tests were administered to the experimental and P.S.H. control children by the classroom teachers. The P.S.R. control children, who were drawn from several different classes, were tested by a substitute teacher.

Prior to being tested, the children were told that a college professor was interested in finding out what children think about the environment and needed their help. Whenever a test was given that contained opinions, the person administering the test was instructed to remind the children that there were no right or wrong answers. She further explained that only the college professor would look at the responses, stressing that the test answers would be an absolute secret between the child and the professor.

None of the tests required any reading on the part of the child. Only the standardized test was timed. The tester read the instructions and the questions out loud, repeating the questions where necessary until they were understood. The special tests, which are described later in the chapter, were constructed by this investigator for the research. They were piloted for understandability on groups of eight to ten children drawn from other fourth and fifth grade classes in P.S.H.

The experimental children were tested prior to being told that they had been selected for the architecture program. Nevertheless quite a few children expressed the view that these were "Ms. Sutton's Tests," and that taking them meant they were going to be the school architects. In effect,

the pre-testing at P.S.H. created its own excitement, and was by no means the same neutral event that it was at P.S.R.

Testing Problems

There were two major difficulties in collecting data at the end of the year. Because of Mrs. A's sudden illness, her class was post-tested under very chaotic conditions. During the week that the tests were given, the class was being taught by several different per diem substitutes and by the teacher who was always shouting at me to obey the rules. The class became so disruptive that several parents withdrew their children from the school, and one child asked to be moved to another room. As noted earlier, this class had the largest percentage of high involvement children. The children who left the class and were not tested at all were among the most active participants in the program. Although the impact of this misfortune can not be assessed objectively, it is likely that the results, especially in the high involvement group, could be deflated because of the inconsistent pre- and post-testing procedures in a class which was expected to be the most outstanding.

Also, because I was totally immersed in the construction process at the end of the year, there was simply no time for me to track down children who missed part of the testing. The measure of self esteem was affected the most severely by missing responses. As designed, the measure required a comparison of one day's responses to another day's responses. If a child was absent on either day, a score could not be derived. Because P.S.H. had a high absentee rate, and because there were numerous times during the day when children were out of the room for various programs, a large proportion of the children missed one of the two days. Consequently, this

measure, which was crucial to the research concept, had to be dropped.

Description of the Scoring Used for the Dependent Variables

Scales were developed for assigning numerical values to the seven dependent variables. The measures contained within the scale scores were checked for reliability post hoc using Cronbach's alpha and those results are reported in Table 5. This section summarizes the concept of each scale. A complete listing of the responses used for each scale is contained in Appendix E.

Self esteem. This measure was patterned on a matrix that Kaplan (1974) used in which subjects were asked to locate fifty-eight activities within a 2 x 2 table. The table recorded the importance of an activity in relation to its value to a particular subject. The theory behind Kaplan's measure is that feeling competent at important things is an indication of self esteem. The instrument used in this research attempted to disguise the intention of evaluating the child's self satisfaction with various areas of achievement by asking Kaplan's two questions on separate days. Thirty-eight activities were selected, many of which were used as scale scores for the remaining dependent variables. While some of the activities were more characteristic of the experimental program, others related to schoolwork in general. The child's assessment of the value of the activity and a rating of his or her ability to perform the activity was documented. A self esteem score was derived by adding up the child's self rating of performance at the most valued tasks. For example, suppose a child identified ten activities as being very important. His or her self rating of performance was looked at for those items only. If the rating averaged out poorly on those ten items, a low self esteem score was assigned regardless of the rating of performance on the other twenty-eight items.

TABLE 5
Reliability of the Scale Score Measures
of the Dependent Variables

<i>Variable</i>		<i>Self Rating of Attitude</i>		<i>Self Rating of Performance</i>		<i>Teacher's Rating and Test Score</i>	
		<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>
Architectural Knowledge General Intellectual Skills	Items	6 ^a	6 ^a	6 ^a	6 ^a	8	8
	Cases	178	164	173	113	135	137
	Alpha^b	0.52	0.52	0.51	0.58	0.68	0.74
Cooperative Skills and Values	Items	9	9	9	9	4	4
	Cases	177	171	170	165	170	178
	Alpha^b	0.58	0.76	0.60	0.69	0.82	0.82
Environmental Values	Items	4	4				
	Cases	171	171				
	Alpha^b	0.55	0.55				

TABLE 5
(Continued)

		<i>Self Rating of Attitude</i>		<i>Self Rating of Performance</i>		<i>Teacher's Rating and Test Score</i>	
		<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>
Task Commitment ^c	Items	9	9	9	9	3	3
	Cases	174	165	174	162	170	175
	Alpha ^b	0.59	0.73	0.61	0.74	0.71	0.56
Appreciation of the Creative Process	Items	7	7	7	7		
	Cases	178	169	177	169		
	Alpha ^b	0.54	0.57	0.50	0.64		
Liking School and the Architecture Program ^d	Items		4				
	Cases		90				
	Alpha ^b	0.33					

^aItems include intellectual skills only

^bThe standardized alpha was used

^cA subvariable, commitment to solving a problem was dropped

^dThis measure was dropped entirely

Architectural knowledge and skills. A measure was taken to assess the child's understanding of the technical content of the experimental curriculum. The scale score included responses to a series of questions falling into two categories. One set required how-to information about the field and a familiarity with an architect's work responsibilities and the design process. The other required a knowledge of particular buildings and building uses in the city, and a familiarity with construction materials.

General intellectual skills. Three measures were taken in this area. One scale recorded the child's opinion of the value of academic achievement. Five attributes associated with schoolwork, e.g. being good in arithmetic or penmanship, were assessed for their importance. A second score recorded the child's self rating of achievement in those same five areas. The third measure was a composite score consisting of a standardized reading test score, a score from a standardized spatial abilities test, and the grades given by the teacher in oral and written expression.

Cooperative skills and values. Three measures were taken to assess the child's understanding of the collective values promoted by the experimental curriculum. The child's opinion of the value of nine activities requiring a cooperative, sensitive orientation towards other people was documented as was a self rating of his or her ability to carry out such activities successfully. A third measure was taken from report card grades relating to the child's ability to function alone and with other children within the rules and regulations of school life.

Environmental values. This measure assessed the child's sensitivity to the environmental values presented by the experimental curriculum. A measure was taken of the child's values in relation to the physical environment us-

ing thirteen dilemmas. The dilemmas required an understanding of the necessity for division of labor and interdependency in maintaining the integrity of the physical environment.

Task commitment. The child's attitude toward the value of nine activities requiring determination and a sense of responsibility was documented as was a self rating of his or her ability to work in a directed manner. Six dilemmas were posed which required the child to take a productive approach to problem solving, but this subscale was omitted because it was not a reliable one.

Appreciation of the creative process. The child's rating of the value of seven activities requiring open-ended intellectual activity such as originality in writing and problem solving, and of activities requiring hands-on creativity was contained in one measure. A second measure documented the child's self rating of performance in these seven areas.

Description of the Protocols Used for the Dependent Variables

Data was generated for the dependent variables using standardized tests, special tests, and the child's cumulative record card. One standardized test, the SRA Primary Mental Abilities test in spatial ability was administered as part of this study. Scores from the California Achievement Test which was given citywide in reading, were taken from the child's cumulative record card as were grades given by the teacher in written and oral expression. Math score data could not be used because very few children were tested citywide on a yearly basis.

This section provides a brief description of each protocol. Appendix F contains a copy of the special tests which were administered.

Cumulative Record Card. This is the child's permanent elementary school record. It has yearly entries for absences, tardinesses, social behavior, study habits, and progress in various areas of the curriculum. Data from the record card were used in the task commitment measure, and the measure of cooperative skills and values, and intellectual skills.

The California Achievement Test. This is a two-part test given in one day in vocabulary and reading comprehension. It is a timed, multiple choice test. The score on the California Achievement Test was included in the measure of general intellectual skills.

The Primary Mental Abilities Test. Three sections of this test were given on the first day of testing. The sections administered are constructed as non-verbal, multiple choice problems in which children are asked to select a shape which completes a two-dimensional form or to identify similarities and differences in two-dimensional figures. The test requires speed. The score in spatial ability was included in the measure of general intellectual skills.

The What Should Happen Test. A test which contained a set of moral dilemmas about environment-related issues was given on the second day of testing. The test was designed to measure the child's sense of respect for property, understanding of interdependencies in making things, and commitment to solving a given problem. Eight out of the thirteen dilemmas concerned typical problems which come up in an elementary school building, e.g. what to do when you see someone destroying a bulletin board display. Four dilemmas concerned problems that children encounter in their neighborhood environment, e.g. what to do if you accidentally damage someone else's property. One dilemma concerned taking responsibility for housekeeping

chores. The children were told to imagine that someone was asking them for advice. They were given four possible alternatives and asked to decide which one of the four was the best course of action to take. Answers that indicated giving up or taking a more egocentric point of view yielded a lesser score while answers that showed more determination or altruism yielded a greater score.

This test provided two scores. One represented a portion of the environmental awareness measure. The other score related to commitment to solve a problem which was to be included in the task commitment measure. This is the scale which was not used because of low reliability.

The Environment Tests. The first part of this test was given at the beginning of the third day. It was designed to measure the child's attitude towards preserving the quality of the environment, understanding interdependencies in making things, understanding the design process, and familiarity with architectural tools and methods. Eleven questions were asked, nine of which were multiple choice. The other two required computation. Four of the questions were similar to the moral dilemmas given on the first day except that two of them were related to urban planning ethics, e.g. what to do when a short term cure creates the possibility of a long term environmental hazard as with nuclear power plants. The other seven questions covered specific skills and knowledge used in the architectural class, e.g. knowing what type of glue to use to build a model, or knowing the sequential order of completing an architectural design project.

The second part of the test was given on the fourth day. Twelve questions were asked about a series of slides. Three of these questions were moral dilemmas on the urban planning ethics theme. The others required the

children to identify well-known buildings in their city by name or by use, or to identify building elements, materials, or construction equipment. All the questions on this part of the test were multiple choice.

The Environment test yielded two scores, one in architectural knowledge and another constituted a portion of the environmental awareness score.

The What I Think Test. A second test was given on the third day which contained four-level semantic differential questions to record the child's opinion on what is important. Thirty-eight activities were selected which were characteristic of the experimental program or of the school in general. Some of the activities were used as a score for the child's self rating of performance in intellectual areas, cooperative behavior, task commitment, and appreciation of the creative process. The use of this test for scoring self esteem has already been described.

The What I Feel Test. A second test was given on the fourth day. The children were required to record their level of achievement on the same thirty-eight items that appeared in the previous test. These responses were used as a score for the child's self-rating of attitude towards intellectual achievement, cooperative behavior, task commitment, and appreciation of the creative process, and in deriving the self esteem score.

Several true and false questions were included at the end of the test to record the child's feelings about schoolwork, classmates, and the school administration. These responses were included in the self rating of cooperative abilities and as a measure of involvement. The involvement score is described in detail below.

The Description and Measurement of Involvement

In one analysis, involvement was used as an independent variable to predict improvement in self esteem, architectural knowledge and skills, intellectual skills, cooperative skills and values, task commitment, and appreciation of the creative process. In a second analysis, four independent variables--the child's previous measure of self esteem and academic achievement and the teacher's score on commitment and receptiveness of the program--were used as predictors of involvement. My first problem was to define the concept of involvement. The second was to find a method for applying a numerical score to the conceptual framework.

In the years preceding the research, I had noticed that the most productive kind of enthusiasm involved an ability to work in a disciplined fashion and to find pleasure in the various tasks associated with the program. Most of the children were stimulated in observable ways by my arrival in the room with shopping bags full of new materials. They might applaud or ask if they could help pass out the supplies. However, as the year progressed and the novelty of the program wore off, some children seemed more able than others to sustain an interest in their work. My task was to develop a protocol that would document a serious excitement about the program.

Initially I planned to simply grade the children for their input into the assignments. However it occurred to me that an adult might tend to notice extremes in behavior. The more active children might appear to be more involved because many of the assignments required physical motion. I decided that a score which combined several viewpoints of the child's excitement might minimize the confusion between a physical orientation and real

interest. A protocol was developed which documented the child's opinion, a peer evaluation, and my own. Since it seemed unlikely that the children would have a realistic insight into their own interest, I used a measure of performance as an indirect indicator of involvement in eliciting the children's opinion. The scale may have been a rough approximation of involvement. Nevertheless, since there was a high comparability across the five subscales, we can assume that they picked up something consistent about the child's relationship to the program.

Two questionnaires were used to collect the involvement data. One was administered in March and the other in May. The March protocol recorded the child's opinion of the class, a self evaluation of the child's performance in class, the teacher's evaluation, and my own. In May the children were asked to imagine that an architectural school was looking for candidates. The children were to recommend anyone, including themselves, that they felt would do outstanding work. This questionnaire provided another input for the self evaluation score and yielded a peer evaluation score.

A copy of the two questionnaires is contained in Appendix G along with the scoring procedure.

A measure called excitement about school, which contained unobtrusive data on attendance and a score from the What I Feel test, was originally to be correlated with the involvement measure. However, the excitement measure proved to be unreliable and was dropped.

A Description of the Scoring Used for the Independent Variables

The child's previous self esteem. This was a pre-test score indicating the child's self rating of performance at highly valued tasks. Based on this

score the child was placed into a high, moderate, or low esteem group.

The child's previous academic achievement. This was a pre-test composite score consisting of the standardized reading test score, a score from the standardized spatial abilities test, and the grades given by the teacher in oral and written expression. Based on this score the child was placed into a high, moderate, or low achievement group.

The teacher's commitment to completing program tasks. This score represents an objective rating derived from information obtained during classroom observations, from the teacher's questionnaire, the children's interview, and during general observations made throughout the year. These protocols were used to answer eight questions about the teacher's performance on various assigned and voluntary tasks as well as her general desire to be involved in the project. See Appendix H for a complete listing of the responses used for this variable.

The teacher's receptivity to the goals and ideals of the program. This score was accumulated from classroom observations and the teacher's questionnaire. The protocols were used to answer seven questions indicating how similar or complementary the teacher's pedagogical style was to the one followed here as well as how realistic an understanding she had of the goals of the program. See Appendix H for a listing of these responses.

Description of the Protocols Used for the Independent Variables

The test data which were used to assess self esteem and academic achievement have already been described. This section describes a variety of other protocols which were used to collect data on the independent variables. Appendix I contains a copy of the protocol as it was administered.

Classroom observations. Originally eight classroom observations were planned. However, because of objections from two teachers to the various observers that were selected or to being observed in general¹, nothing could be satisfactorily scheduled until the end of January. Consequently only three observations of each teacher took place. During two of the classes the teacher was asked to prepare a lesson which used the project to teach some area of the curriculum. One of those was completely open, and all the teachers elected to do a scaling lesson. The second time teachers were asked to do a writing lesson. In the third class, the teacher was to either continue the ongoing architectural project or design some hands-on, three-dimensional lesson of her own.

The protocol used to record data from the classroom observation was developed in consultation with the principal. In part it was based on a check-list format used by USMES to document the various intellectual skills and social processes that might be engaged in during their proposed challenges. The observer² also recorded the goal and the goal structure of the lesson activity, as well as the degree to which the teacher used a tactile or visual approach to involving children in the subject matter, and the degree to which a variety of skills could be used to arrive at a successful outcome.

The teachers reviewed the protocol prior to the first scheduled observation so that they could feel as comfortable as possible about what was being recorded.

¹Willingness to participate in the classroom observation was recorded as part of the teacher's score on commitment to completing program tasks.

²Unfortunately I was ultimately the only acceptable observer to everyone. Since the children were accustomed to working with me when I was in their room, I was in a quasi-observer, quasi-participant role.

The teacher's questionnaire. The protocol used to record the teacher's evaluation of the program was based on issues that had arisen during informal discussions with teachers throughout the year. Open-ended questions were posed in six areas to ascertain whether the program extended or interfered with the teacher's pedagogical style. The respondent was asked to describe her initial expectations, the children's reaction to my presence in the classroom, the program's usefulness in teaching curriculum subjects, the effect of the program on normal classroom practices and teaching responsibilities, and her values in relation to mine. Finally, she was asked to outline her own plan for teaching three-dimensional design. Teachers spent from thirty to sixty minutes filling out the questionnaire.

The children's interview. Since it was not feasible to interview the entire experimental group, a sample of sixteen children, eight boys and eight girls, were selected at the end of the year. Four children were chosen from each class, two who rated high on involvement and two who rated low. They were each interviewed in private by a substitute teacher for about twenty minutes. Since the children in one class tended to give similar responses to the interview regardless of the level of involvement, this group was considered to be representative of the entire class. The information from the interviews was used in scoring the teacher's commitment to the program.

The children's logs. All the experimental children were asked to write a log each week between November and April. The logs were to be written right after each architectural session under the direction of the classroom teacher. Some weeks I assigned a theme to everyone. Other weeks the teacher made up a theme. It was my intention that the logs would provide

a broader understanding of the children's view of the collective process and of their contribution to the group effort. I expected to analyze the logs for qualitative data on the children's feelings about themselves as competent workers involved in a worthwhile task. I also thought that the writing, per se, would act as a follow-up activity and provide a method for clarifying what had occurred in class. In this sense, the logs would provide immediate feedback on whether I was getting information across during the class period.

The logs were collected for the first time before Christmas break. It was apparent at that time that the teachers were essentially writing the entries. Most of the logs from one class were identical lists of the lesson activities. I discussed the importance of writing original ideas with the teachers and the children. However, by spring break the quality of the writing had not improved. I decided to schedule a classroom observation of the log writing so that I could gain some insight into the problem. Three of the teachers began the lesson by having the children summarize the activities that occurred during the architectural class. The activities were listed on the blackboard. When the writing session began, the children copied the list and then quickly filed their papers away, unreviewed by the teacher. Only Mrs. A had the children discuss their feelings about the class. While they were writing she provided feedback by reading their entries out loud to the rest of the class. At the end of the session, she collected the work, corrected it, and then had the children rewrite their first drafts.

The output of this class was far superior to that of the other classes, but even so their work did not yield the quality of information I had expected. The level of verbal ability was low so the logs were short--two or three sentences--

and the content too simplistic to provide substantive affective and descriptive data.

For these reasons the logs were not used in a formal way. Instead I have selected a series of phrases from the writing that was done by the children in Mrs. A's class. The phrases, which appear in Appendix J, have been grouped according to the three themes that were most apparent in the writing. These themes--indications of pride and feeling good in relation to the project, indications of an awareness of the architectural profession, and indications of excitement about a successfully completed project--will be related to the research results in the next chapter as will the implications of a word count.

The Relationship of Program Activities to the Data Collection Activities

Table 6 shows when and how testing procedures, observations, interviews, and questionnaires occurred, and how they meshed with the various program events throughout the schoolyear.

TABLE 6

Scheduling of Program and Data Collection Activities

Throughout the Experimental School Year

Month	Program Activities	Data Collection Activities
<u>September</u>		Selection of the experimental teachers and the control groups.
<u>October</u>	<p>Planning sessions occur between the experimental teachers and the architect. The possibility of improving the kindergarten playground is discussed. A survey of the street bordering the playground is planned as an approach to the problem of improving the playground.</p>	<p>Pre-testing of all experimental and control group children is carried out by the classroom teacher or a substitute teacher.</p> <p>Experimental children are told they will be participating in the architecture program after the testing is complete.</p>
<u>November</u>	<p>First Project: How can the school be beautified? The children decide to survey the other classes to get their opinions. Tulips are planted in front of the school.</p> <p>Second Project: How can the street be beautified? The children discuss the street that borders the kindergarten yard.</p>	

<p>December</p>	<p>The children and their teachers survey the people in the neighborhood to get their ideas for improving the street.</p> <p>The children and the architect measure the street. Then they make scale drawings and build a scale model of the existing conditions.</p>	<p>The children's logs are reviewed for the first time by the architect.</p>
<p>January</p>	<p>The architect discusses the importance of writing original logs with the children and the teachers.</p> <p>The fifth graders take a field trip to see the Famous Music Hall. The children are excited by the visit. An idea for making something musical begins to develop after the trip.</p>	<p>The architect makes the first classroom observation. All the teachers choose to give a scaling lesson.</p>
<p>February</p>	<p>Some of the children have a birthday party for the architect and play "happy birthday" on their homemade instruments.</p> <p>All the classes write entries in their logs about their idea for the Street Orchestra¹.</p> <p>All the classes build models of their ideas for the Street Orchestra.</p>	<p>The architect makes the second classroom observation. All the teachers are asked to do a hands-on, three-dimensional design lesson.</p>
<p>March</p>	<p>Several of the children's designs are selected to be developed for the final project. The architect develops a design in her studio</p> <p>The children see slides of the development process.</p>	<p>The children's logs are reviewed for the second time by the architect.</p> <p>The architect makes the third classroom observation. All the teachers are asked to give a log writing lesson.</p> <p>The first involvement questionnaire is administered to all the experimental children by their classroom teacher.</p>
<p>April</p>	<p>Some of the children make etchings to raise money for the Street Orchestra.</p> <p>The lumber is delivered and construction begins.</p> <p>The Project Interaction group decides to join the architecture classes in working on the improvement of the kindergarten playground.</p>	

March	<p>Several of the children's designs are selected to be developed for the final project. The architect develops a design in her studio</p> <p>The children see slides of the development process.</p>	<p>The children's logs are reviewed for the second time by the architect.</p> <p>The architect makes the third classroom observation. All the teachers are asked to give a log writing lesson.</p> <p>The first involvement questionnaire is administered to all the experimental children by their classroom teacher.</p>
April	<p>Some of the children make etchings to raise money for the Street Orchestra.</p> <p>The lumber is delivered and construction begins.</p> <p>The Project Interaction group decides to join the architecture classes in working on the improvement of the kindergarten playground.</p>	
May	<p>Neighborhood people join the children, parents, and teachers in two all-day Sunday building workshops.</p>	<p>Post-testing of all experimental and control group children by their classroom teacher or a substitute teacher.</p> <p>The second involvement questionnaire is administered to all the experimental children by their classroom teacher.</p>
June	<p>The Project Interaction group begins outdoor work on the garden and mural project.</p> <p>Finishing touches go on the Street Orchestra.</p> <p>Approximately five to eight hundred people attend the inaugural concert of the Street Orchestra.</p>	<p>Cumulative record card and reading test score data are collected on all experimental and control group children by a substitute teacher.</p> <p>The teacher's questionnaire and children's logs are collected.</p> <p>The children's interview is administered to 16 children by a substitute teacher.</p>

¹The Street Orchestra is a climbing structure that contains a number of percussion instruments. It was designed for children as "something" to play and play on. Our idea was to improve the street by improving the playground and opening it up for general use by the neighborhood.

CHAPTER FIVE

THE RESEARCH RESULTS

A Summary of the Expectations and the Research Design

The first intent of this study was to measure the effects of the program on the development of self esteem, architectural knowledge and skills, general intellectual skills, cooperative skills and values, environmental values, task commitment, and an appreciation of the creative process. Improvements in attitudes as well as performance were considered. The measures included scores on factual information relative to the program content, scores from standardized reading and spatial ability tests, as well as report card grades and the child's self report of attitudes and performance.

With the exception of general intellectual skills, improvement was expected to occur in the aforementioned areas as a result of increased positive feelings about self and school in relation to the on-going project. It was anticipated that the information and values presented during the 1½-hour class every week would be assimilated because they would have a special meaning for the children. Improvements in general intellectual skills were expected as a side effect of the program. If the enthusiasm that was generated by the architectural project could increase excitement for school and for learning other basic skills, those skills would also improve.

The children's logs were to be analyzed for affective and descriptive information that would (1) lend support to the rationale that positive feelings and excitement were important features of the project, and (2) support the validity of the actual test data. However, because the assignment was not pursued in a conscientious manner, this analysis could not be done. The

logs written by one class are referred to in this chapter in a tentative, informal way.

An analysis of covariance was performed for each of the dependent variables with adjustments being made for variations in initial competence to see if there was any significant difference in post-test scores between the experimental and control children. Before beginning the analyses, the basic assumptions of ANCOVA were checked separately for the fourth and fifth graders on each criterion variable to see if the adjustments which were being made for each group's beginning competency were permissible statistically¹. In those cases where significant main effects were found, differences between specific involvement groups and the control groups were studied post hoc using Fisher's Least Significant Difference Procedure. This analysis was selected as the most powerful, accepted procedure which can be used when small numbers are being compared (Huitema, 1980).

An Overview of the Improvements

The analyses of covariance showed that experimental children made statistically significant improvements in comparison to the control children in three of the seven areas under consideration, those areas being architectural knowledge and skills, cooperative skills and values, and environmental values. Further, the expectation that children who were the most in-

¹This review showed (1)that there was a linear relationship between the criterion variables and the covariate on the pre-test score on that variable, (2)that there was homogeneity of regression or approximately the same degree of linear relationship between the criterion variable and the covariate, (3)that there was homogeneity of variance or roughly the same amount of variance from group to group, and (4)that there were approximately normal distributions from group to group. The fifth assumption of ANCOVA--that observations be independent--was, of course, met by the nature of the research design.

volved would improve the most was generally confirmed.

More specifically, there were improvements in both fourth and fifth grade children's attitude toward the value of being cooperative ($F = 2.74$, $df = 4/72$, $p < 0.05$ for the fourth graders; $F = 13.63$, $df = 5/77$, $p < 0.00$ for the fifth graders). The fourth grade children rated themselves significantly better in actually being able to cooperate ($F = 2.76$, $df = 4/65$, $p < 0.05$). While the fifth grade children only approached significance in this latter area, they received significantly higher marks on their report cards in those areas relating to cooperative abilities ($F = 2.48$, $df = 5/84$, $p < 0.05$). Both the fourth and fifth grade children made very significant improvements in environmental awareness ($F = 3.62$, $df = 4/58$, $p < 0.02$ for the fourth graders; $F = 8.10$, $df = 5/63$, $p < 0.00$ for the fifth graders). Further the fifth graders improved very significantly in their knowledge of the elements and skills of architecture ($F = 5.02$, $df = 5/92$, $p < 0.00$)¹.

The adjusted means for each area of improvement are presented in Table 7. Refer to Appendix K for the ANCOVA tables.

Improvements in Architectural Knowledge and Skills

Perhaps the most telling result for educators is the improvement shown by the fifth graders in architectural knowledge and skills. Although children with good academic skills tended to score higher than children with poor academic skills (the adjusted post-test means for high, moderate, and low achievers in this area are 8.53, 7.57, and 6.97, respectively), the low achievers who were highly involved in the program were more able to learn

¹I was better at keeping the children's attention in the fifth grade than in the fourth grade during a class discussion. Also, the fifth graders took a field trip for which they were intensively prepared which the fourth graders did not take. It could be for these reasons that only the fifth graders improved in their knowledge of architecture.

TABLE 7
Post-test Adjusted Means for
Measures Showing Significant Improvements

COOPERATIVE SKILLS AND VALUES

<i>Group</i>	<i>Mean</i>	<i>Group</i>	<i>Mean</i>
<u>Self Report of Attitudes</u> <u>Fourth Grade</u>		<u>Self Report of Attitudes</u> <u>Fifth Grade</u>	
Entire Population	28.45	Entire Population	28.03
High Involvement	29.22	High Involvement	30.26
Moderate Involvement	29.52	Moderate Involvement	29.99
Low Involvement	28.41	Low Involvement	29.01
P.S.R. Control	26.10	P.S.R. Control	21.26
		P.S.H. Control	29.42
<u>Self Report of Performance</u> <u>Fourth Grade</u>		<u>Report Card Grades</u> <u>Fifth Grade</u>	
Entire Population	33.86	Entire Population	7.54
High Involvement	36.49	High Involvement	7.65
Moderate Involvement	34.15	Moderate Involvement	8.08
Low Involvement	31.80	Low Involvement	7.88
P.S.R. Control	33.48	P.S.R. Control	7.21
		P.S.H. Control	7.32

TABLE 7
(Continued)

ENVIRONMENTAL VALUES

<i>Group</i>	<i>Mean</i>	<i>Group</i>	<i>Mean</i>
<u>Fourth Grade</u>		<u>Fifth Grade</u>	
Entire Population	78.98	Entire Population	77.85
High Involvement	81.57	High Involvement	78.10
Moderate Involvement	80.40	Moderate Involvement	79.17
Low Involvement	79.60	Low Involvement	75.69
P.S.R. Control	72.78	P.S.R. Control	70.82
		P.S.H. Control	83.52
ARCHITECTURAL KNOWLEDGE AND SKILLS			
<i>Group</i>	<i>Mean</i>	<i>Group</i>	<i>Mean</i>
<u>Fifth Grade</u>			
Entire Population	7.13		
High Involvement	8.91		
Moderate Involvement	7.31		
Low Involvement	6.57		
P.S.R. Control	5.45		
P.S.H. Control	7.15		

this rather technical information than the children who were not involved. In fact, it was the low achievers whose performance was most reflective of involvement (see Table 8).

TABLE 8
Post-test Adjusted Means in Architectural Knowledge
for Fifth Grade High, Moderate, and Low Achievers

Achievement Group	Involvement Group		
	High	Moderate	Low
High Achievers	9.37	8.00	8.27
Moderate Achievers	8.40	6.81	--
Low Achievers	8.98	7.12	4.87

There is some suggestion in the logs written by the children in Mrs. A's class that the project could have had a broader impact on cognitive skills of low achievers if the academic follow-up had been more intense. In this class, where the writing assignment was pursued in a structured manner, it is apparent that there was some relationship between being involved in the architectural work and the effort that went into the log writing. As Table 9 illustrates, the more involved children wrote longer logs more often.

Further, while the total volume of writing was related to involvement group, it was unrelated to the child's previous report card grade in written expression (see Table 10).

TABLE 9

Indices of Effort in Log Writing among
High, Moderate, and Low Involvement Children

Indices of Effort	Involvement Group		
	High	Moderate	Low
Number of Logs Written	13	11	8
Number of Words per Log	78	69	64
Total Number of Works Written	1,014	758	512

TABLE 10

Average Number of Words Written by High, Moderate, and Low
Groups According to Previous Year's Grade in Written Expression

Previous Year's Grade in Written Expression	Involvement Groups		
	High	Moderate	Low
Excellent	--	665	--
Good	936	780	540
Fair	1,212	702	--
Poor	840	--	0

Obviously the quality of the logs has not been assessed. The point that is being made is that some greater quantity of effort was made when children were involved in the project regardless of their academic level. Certainly effort is a start towards improving the quality of performance.

The word count also lends support to the statistical results in relation to

architectural knowledge. Table 8 and 10 indicate that low achievers improved their performance when they were highly involved in the program. In fact, low achievers who were highly involved performed as well or better than high achievers who were not involved.

Improvements in Cooperative Skills and Values

Taking a closer look at the improvements that occurred across both grade levels in the area of cooperation, the data show that not only were there significant differences in actual scores, but that there was a reversal of a developmental trend in both attitudes and actual performance for the experimental children. The P.S.R. control children showed decreases in their scores. The experimental children showed increases. Further, the differences were, by and large, greater in the fifth grade than in the fourth grade (see Figure 5). The fifth grade controls dropped off radically in their valuing of cooperative activity and in their rating of themselves as cooperative people causing a greater difference score for the fifth grade than for the fourth grade. The pattern demonstrated here would seem to support the ideas expressed by Dewey (1916) and Bronfenbrenner (1970) about the need for a more structured approach to prosocial development. It would seem that a critical time for this development is around the fourth and fifth grade as other researchers have suggested (Sears, 1964). Interestingly enough, this is just when education begins to be more focused on intellectual development. For example, the children in the P.S.R. control group were preparing so intensively for the standardized reading and math tests that they were not allowed any time off to take advantage of my offer of an architectural workshop which I was prepared to give in return for their help in taking the tests. Yet Table 11 shows that these children performed in a very similar manner to the experimental

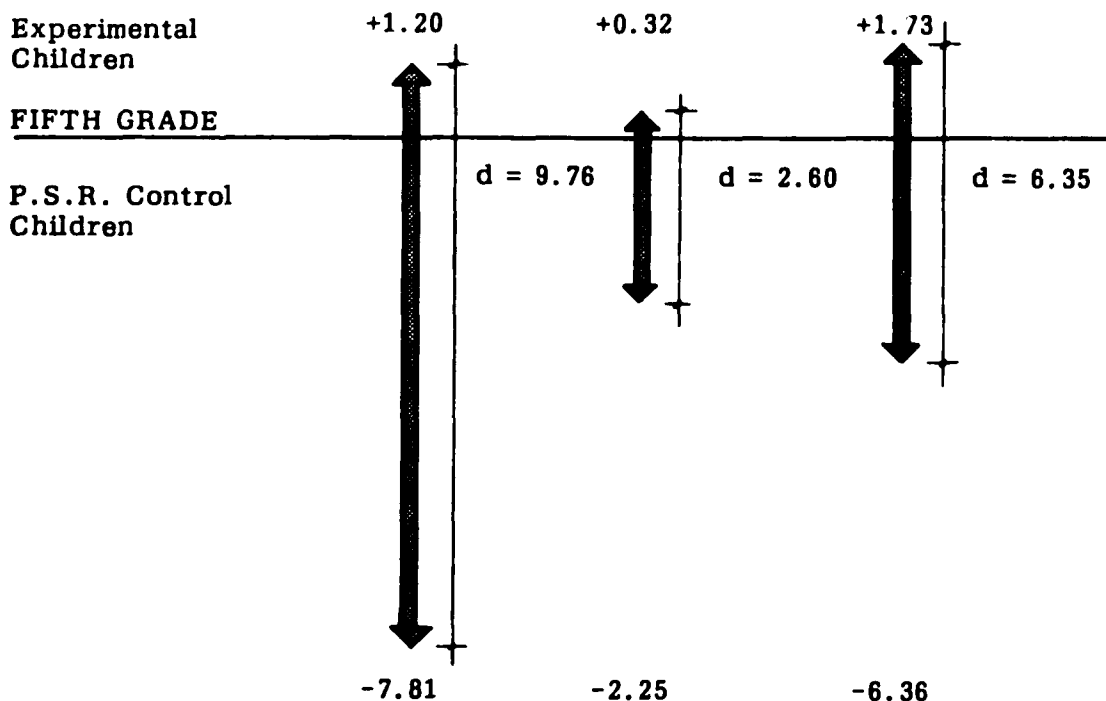
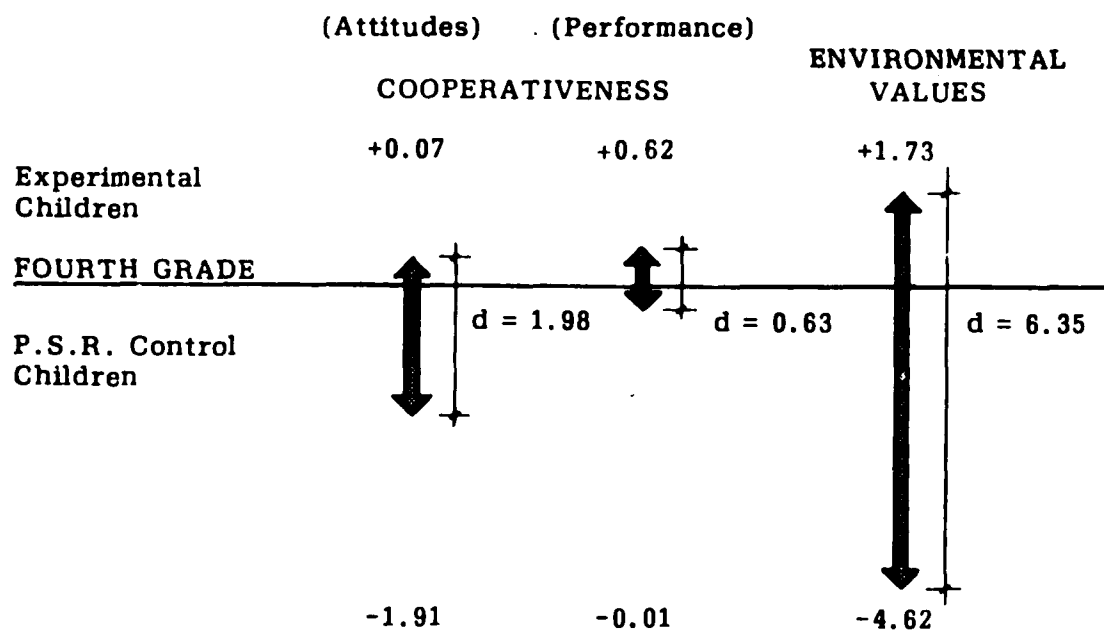


FIGURE 5

Changes from the Beginning to the End of the Year

children who, at that point in the year, were spending a lot of time on the architectural program. Although the program failed to yield significant improvements in general intellectual skills, involvement with the program did not detract from the children's academic performance and there is every indication that the social improvements that were made are ones which do not occur naturally.

TABLE 11

Post-test Adjusted Means in General Intellectual Skills
According to Involvement Group

<i>Involvement Group</i>	<i>Fourth Grade</i>	<i>Fifth Grade</i>
Entire Population	56.12	56.12
High Involvement	57.62	57.05
Moderate Involvement	55.97	54.34
Low Involvement	54.88	56.70
P.S.R. Control	56.70	55.06
P.S.H. Control		57.25

The latter finding is similar to that of the USMES evaluation which showed that while there were no significant differences between USMES and non-USMES children in terms of academic performance, the USMES children clearly made equivalent progress to that of the non-USMES children despite the time that was being given over to that program. Furthermore, they were making significantly more progress in other areas of development (Shann, Reali, Bender, Aiello, and Hench, 1975).

Involvement and Its Effect on Improvement

As described in Chapter Four, the measure used to assess the child's emotional investment in the project included direct and indirect indicators from a variety of sources. Although the inadequacies of the scale have been acknowledged, involvement, as it was measured, did pick up something consistent about self confidence, performance, and improvement. First, the scores of any one child showed very little variability on the five subscales that were used. A child who was rated as an outstanding architectural student by the teachers was so rated by peers and by myself. Generally that child liked the class and thought that his or her work in the class was good. They also perceived themselves as being one of my special helpers. The reverse was true for children who received low involvement scores. Second, the children who were more involved generally showed more improvement. The greatest differences in improvement occurred between high or moderate involvement groups and the control groups, especially the P.S.R. control. There were significant differences in improvements within the experimental group on the fifth graders self rating of cooperative behavior and in environmental values. A listing of the post hoc, between-group differences in each area of significant improvement is presented in Table 12.

There were, however, some between-group irregularities which need further discussion. In certain areas, the high involvement group ranked lower than some other groups--a finding which perhaps could be attributable to the particular make-up of the high involvement group at each grade level. Specifically, the class which experienced a great deal of chaos during the post-testing period comprised 54% of the total high involvement group in the fifth grade. It could have been that these children were more af-

TABLE 12

Post-hoc Between-group Differences for
Measures Showing Significant Improvements

COOPERATIVE SKILLS AND VALUES
(Child's Self Rating of Attitudes)

<i>Involvement Groups</i>		<i>T</i>	<i>Significance</i>
<u>Fourth Grade</u>			
Moderate Involvement—P.S.R. Control	74	2.93	0.005
High Involvement—P.S.R. Control	74	1.91	0.050
<u>Fifth Grade</u>			
High Involvement—P.S.R. Control	77	6.42	0.0005
Moderate Involvement—P.S.R. Control	77	5.90	0.0005
P.S.H. Control—P.S.R. Control	77	6.05	0.0005
Low Involvement—P.S.R. Control	77	3.83	0.001
COOPERATIVE SKILLS AND VALUES (Child's Self Rating of Performance)			
<i>Involvement Groups</i>	<i>Number</i>	<i>T</i>	<i>Significance</i>
<u>Fourth Grade</u>			
High Involvement—Low Involvement	65	2.81	0.005
High Involvement—P.S.R. Control	65	1.75	0.050

TABLE 12
(Continued)

ARCHITECTURAL KNOWLEDGE AND SKILLS

<i>Involvement Groups</i>	<i>Number</i>	<i>T</i>	<i>Significance</i>
<u>Fifth Grade</u>			
Moderate Involvement—P.S.R. Control	84	3.07	0.005
Moderate Involvement—P.S.H. Control	84	2.91	0.005
ENVIRONMENTAL VALUES			
<i>Involvement Groups</i>	<i>Number</i>	<i>T</i>	<i>Significance</i>
<u>Fourth Grade</u>			
High Involvement—P.S.R. Control	58	2.44	0.010
Moderate Involvement—P.S.R. Control	58	3.09	0.005
Low Involvement—P.S.R. Control	58	2.48	0.010
<u>Fifth Grade</u>			
P.S.H. Control—P.S.R. Control	63	5.52	0.0005
Moderate Involvement—P.S.R. Control	63	3.69	0.0005
P.S.H. Control—Low Involvement	63	2.45	0.010
High Involvement—P.S.R. Control	63	3.27	0.001

affected by the change in class routine than the less involved ones, thus depressing the total high involvement score in several areas for the fifth grade. Another class, which worked very poorly as a team was most likely to get lectures from me on its lack of cooperativeness, comprised 73% of the high involvement group in the fourth grade. Possibly these children were the most sensitive to my reprimands and rated themselves lower on cooperativeness, thus depressing the total high involvement score in this particular area for the fourth grade.

The most unexpected results in between-group differences occurred in relation to the P.S.H. control. This group scored the highest of all the groups on environmental awareness. They also outranked the low involvement group on cooperativeness. These data led to a post hoc investigation into the nature of that class on my part. After speaking at length with the classroom teacher, I realized that these children may have been coincidentally more exposed to the values and goals of the architecture program than the experimental children were. The class engaged in activities, e.g. dancing and gardening, which required a cooperative social exchange. The teacher said that her ultimate teaching goal was to create a noncompetitive atmosphere in which children "became aware of each other and of society." Apparently there were almost daily discussions in her class on risk-taking in relation to admitting a mistake. She wanted the children to realize that all people are capable of making a mistake and that it is the ability to fix a mistake that really matters. Quite a few of the environmental awareness measures required assuming responsibility for a mistake so another person would not suffer. Given their daily focus on these values, it would seem that this class could hardly be considered a control group.

Despite the above inconsistencies, it is reasonable to say that, in general, the involvement scale tapped something relevant about the child's relationship to the project and to improved performance in areas salient to the program.

A Summary of the Improvements

It is evident from the results that children were able to make improvements in those areas which were most salient to the project regardless of the child's previous performance record. When there was some tangible, practical reason for learning, improvement occurred. Teamwork, for example, was probably the most essential requirement of the project. Children who could not work cooperatively were not selected for special assignments as often as the children who could, especially during the second semester. Acquiring some architectural knowledge was also essential. Without it certain tasks simply could not be carried out. In the area of environmental values, the children were confronted, in a first hand way, with what it meant to have to rely on someone else's integrity to respect something which was very important to them. Thinking about this issue in relation to their own situation evidently helped them to gain an understanding of another person's perspective in the instances posed on the environmental values test.

This project seems to have provided the sort of concrete medium which Dewey (1916) described as essential to meaningful learning. Practical knowledge was acquired in relation to the specific tasks at hand and values improved because information was presented within a social context that demonstrated the usefulness of those values. Furthermore, since improvement was unrelated to previous academic performance, it could be conjectured

that the process followed here touched on a different motivational system than past academic experiences.

A Methodological Problem

The basic premise of this study was that children would feel good about themselves and their capabilities as a result of being successful contributors to a tangible product, and further, that these feelings would lead to improved performance in certain specified areas. The sense that this process was somehow happening was quite convincing from within the real situation, yet one of the most difficult tasks of the research was to conceptualize and objectively measure this idea. In retrospect, I believe that a number of behaviors should have been identified as indirect indicators of investment or engagement and pride in working on the project. If a numerical scoring system had been developed such as the one used by Loo and Kennelly (1979) or Vaillant and Vaillant (1981), then the recurrence of certain behaviors among the different involvement groups could have been recorded in a systematic fashion.

Unfortunately the approach that was taken here looked not at what the children did but what they said they did or felt. As motivation researchers have realized, it is difficult if not impossible to get an objective account of feelings from a subject (Cofer and Appley, 1964). Getting an account of feelings from children who have minimal verbal flexibility is even more problematic.

In an attempt to minimize the problem of communication, two of the three measures that were used--self esteem and excitement--used multiple choice questions. Only the third measure--the logs--required individual insight into the situation. However, all three of these sources of information had

methodological problems. The measurement of excitement included the child's assessment of the architecture program, the school, schoolwork, and attendance records. A composite post-test score was to be correlated with the degree of involvement. However, since these four measures did not correlate with one another, the composite was not used as a scale. Individually none of the measures, except for attendance, was substantial enough to be looked at singly. Attendance was reviewed separately, but there was neither a correlation between attendance and involvement nor any significant improvement in attendance as a result of being in the program. During the year I questioned a number of children about their high number of absences. In many instances the children claimed that they were required to stay at home to attend to some chore. This may or may not be true, but it is possible that a child with a high absentee record would continue to be absent despite a real engagement with one particular school activity. At any rate, the specific indicators chosen for excitement seemed to be inappropriate to record what are probably the most attracting qualities of the artistic process, i.e. the immediate captivation of materials and colors, or seeing something that you have imagined in a concrete form.

A second source of information was the self esteem measure. As indicated in Chapter Four, insufficient data were collected for this measure. Because responses were required on two different days, only a few children completed the measure. Even if there had not been this methodological problem, the instrument itself probably was not designed to pick up the benefits of what was actually occurring. The test was a measure of one's total self rating of performing "important" tasks. The measure did not focus on the feelings of pride that may have been associated with creating a Street Orchestra, or with being part of a special group effort--the sort of feelings

of connectedness and identity which Rosenberg (1979) describes. Instead this measure called for a broad kind of self confidence. In order to improve, a child would have to feel competent in a general sense because the protocol touched on a whole variety of experiences that might occur during the course of the day. It seems unlikely that a single, limited experience could have changed the child's total outlook.

The third source of information was the logs. This format seems the most promising one to pursue in the future. Even though the content of the logs was ultimately limited by the children's lack of verbal ability, they do offer some indication that the initial hypothesis merits further investigation. The most noticeably recurrent theme in a variety of unsolicited letters as well as the assigned logs, a theme which was most frequently mentioned by parents and teachers, is that of feeling good about self and the project. Appendix J, Part I contains a listing of phrases which are pertinent to this issue of pride and feeling good in relation to the project.

Of course it is possible that, in a school so oriented to art, everyone had learned to use a particular vocabulary and to place a special importance on the benefits of art projects. Despite this possibility, there are other indications, which will be discussed at the end of the chapter, that this program had a special significance in terms of the quality of activity it generated in the school community.

Measures Which Were Unaffected by the Program

Three measures--task commitment, appreciation of the creative process, and general intellectual skills--showed no significant improvement. It would seem that there was no improvement in the first two areas because the protocols which were used failed to capture what was happening in the

real situation. The creativity protocol, as it was designed, confused the process of physically making something with the process of thinking in an open-ended manner. That the program offered direct opportunities for the former, but only indirect encouragement for the latter is obvious. The impact of meeting an architect, or learning how an architect works was not touched on by this measure. Yet there is some indication in the logs that these experiences were meaningful ones to the children. Appendix J, Part II contains a listing of comments which indicate that the children did develop an awareness of and admiration for the architectural profession.

The task commitment measure suffered from a similar problem. It failed to capture the special quality of the kind of commitment that is associated with artistic endeavor. The phrase, "on charrette," was introduced to the children because it seemed to be the best way of describing that irrational dedication to perfecting an idea that builds up in anticipation of seeing a completed product. In my view, the passionate quality of a real charrette existed at P.S.H., and it is certainly possible that some character development occurred as a result of this exposure. The logs indicate that my perception was accurate. Appendix J, Part III contains a listing of phrases on the theme of excitement about a successfully completed project. Unfortunately, the instrument used measured a much more ordinary, almost puritanical concept of working hard and being responsible--one that most children begin to be more and more exposed to around the fourth grade.

The Ecological Analysis

The second intent of this study was to describe the ecological conditions which allowed various children to benefit from the program. It was antici-

pated that children who were not doing well in their other schoolwork or who had a poor self image might be more attracted to this sort of work than the children who were competent in their academic work. If this was the case, these children would most likely show the largest improvements. It was also anticipated that the teacher's attitude toward the project and her participation in it would have an added effect on the child's involvement and, therefore, on the child's improvement. As explained in Chapter Four, the teacher's involvement was established from information obtained from a series of open-ended protocols completed by the children and the teachers, and from my own observations. The children's involvement was established in a similar manner. A multiple regression analysis was to be used to describe an ecological relationship between involvement and the child's previous level of academic achievement, the child's previous feelings of self worth, the teacher's commitment to the project, and the teacher's receptiveness to the program goals.

For several reasons, this second intent could not be accomplished within the study. First, a broader range of factors than the ones outlined above would have been necessary in order to say something meaningful about the etiology of improvement. A possible approach to arriving at a more holistic model for describing the conditions of motivation for this particular population will be discussed in Chapter Six.

Second, there were methodological problems with two of the four factors that were selected for investigation. The problem with the self esteem scale has already been discussed. In addition, academic achievement simply was not an effective predictor of involvement. In the two years which preceded the research, it seemed to me that the children who were doing a lot of

the work towards the end of the year were low achieving children. This, in fact, proved not to be the case when I used a more objective method for rating involvement. As Table 13 indicates, the adjusted post-test means show that the achievement groups were quite heterogeneous with respect to involvement, and the post-test means on the various measures showed little correlation with academic achievement. In effect, both low and high achievers stood an equal chance for benefitting from the program. Although this finding failed to confirm an expectation, I realized that the program served to integrate rather than separate children of varying academic ability.

TABLE 13

Average Participation Score for
High, Moderate, and Low Achievers at Each Grade Level

<i>Achievement Group</i>	<i>Average Participation Score</i>
<u>Fourth Grade</u>	
High Achievers	17.71
Moderate Achievers	17.29
Low Achievers	17.37
<u>Fifth Grade</u>	
High Achievers	23.18
Moderate Achievers	21.67
Low Achievers	22.55

On the other hand, involvement was highly correlated with the teacher's rating as a committed participant. The teacher who ranked "1" on commit-

ment to the program and "2" on receptiveness to program goals on a scale of 1 to 4 had students who participated significantly less than students of teachers who ranked "3" and "4" on both those variables ($F = 4.62$, $p < 0.0043$). Apparently a child whose teacher gets involved is more likely to get involved and, therefore, improve.

Although the above finding points out that there is a logical relationship between the teacher's effort and the child's performance, there is little else that can be said about the conditions for motivation from an analysis of the data which were collected.

Unexpected Measures of Success

As stated in Chapter Two, the architectural residency, as an ongoing program within the school, had a much broader set of intentions than could be scientifically explored within the limitations of a doctoral research project. However, before proceeding to a discussion of future implications, it would seem appropriate to reconsider those larger goals in light of the research results and other informal data.

Four goals were identified in Chapter Two. Two of them concerned an attitude toward interpersonal relationships within the school and school administration. The principal and the committee which was responsible for organizing the program were dedicated to creating a sense of family and of "our" school. The opportunities for exploring this orientation was intensified by a concurrent program, Project Interaction¹, which specifically intended to bring parents of varying backgrounds into a better working relationship with teachers. The architecture program seemed to offer an especially appropriate medium for involving staff, children, and the general community

¹See Chapter Two, page 43.

in a creative partnership. We anticipated that many people would be able to assume different roles within the total group effort according to their interests and availability at a given time. Team members could participate in the actual production or maintenance of the object itself, or in a variety of supporting managerial roles, e.g. fund raising, gathering supplies, scheduling events, or making presentations.

Some unexpected data can offer evidence of our success in providing a medium which engaged various people in the management of a school activity. The most concrete evidence is the increased financial support from the parents. Their financial commitment in the third year was almost four times what it was in the first year. Not only had they assumed the portion of my fee which had originally been paid by the federal government, they had increased my daily rate, the number of days, and the amount of money spent for supplies. In addition, there was a lot more adult participation in the work. As noted in Chapter Two, many more parents and neighborhood people attended the Sunday building workshop, and more women did actual construction tasks. In the last year more children were affected by the program because a project evolved which included gardening, mural making, performances, and an ethnic pot luck supper. The parents also became increasingly involved in the educational direction of the program. In the year following the research, a group of parents were involved throughout the year beginning with the initial planning of classroom activities with teachers. They then made themselves available as regular volunteers to work in the classroom alongside the teacher.

In short, the adults were engaged in more responsible, creative roles over the years. How the children perceived this involvement is an interesting

question which the research can not answer. The possibility that adult approval of school activities might influence the child's attitude toward those activities is explored further in the next chapter.

A third goal of the program was to improve the school's image in the community. Again, there was increased financial support which seemed to indicate that the neighborhood approved of our efforts. During the second year, when there was the most active fund raising effort, we received several grants from community organizations. Interestingly enough, one of those grants came from a group that was reputed to have less than friendly feelings towards the school and its lower income population.

However, the most convincing evidence of our success in engaging people in improving the quality of the school environment was the lack of any significant vandalism against the finished projects during the three-year period. Why or how this happened is left unanswered by this research. Certainly I received numerous informal reports that children, parents, the custodial staff, and a variety of other "friends" were "looking out" for the projects. Whether this looking out process contributed to the children's increased environmental awareness is unclear from the available data. The environmental values protocol asked the children for remedies for existing, negative situations. In fact, the program's day-to-day experience was more concerned with being able to initiate a positive change and then take responsibility for maintaining that change. It would be interesting to understand if and how participation in self-initiated environmental change affects one's self concept and pride.

The final goal of the program was to provide a theme approach to the curriculum. This goal was really dependent on the teacher's commitment to de-

vising integrative lessons. A great deal of inventiveness would have been required to do this on a day-to-day basis. That this was unlikely to happen was evident during the time that P.S.H. was participating in the USMES program. The architecture program had a greater disadvantage than the USMES program. With USMES, the teachers expected a curricular approach. With my program, they were expecting an art activity. Using an art form as a catalyst for something else is sometimes seen as a threat to the essential nature of the art itself (Remer, 1981). As a result there were both methodological and ideological resistances to the theme approach that I as a visiting artist could do little to counterbalance. The classroom observations and log assignments demonstrated that there was little investment on the part of most of the teachers to exploit the academic potential of the project. I suspect that the children saw our work as an escape from regular schoolwork rather than as being central to it as I had intended. Certainly the sort of generalized academic improvements which were expected did not occur.

CHAPTER SIX

A DISCUSSION

I proposed to show in this thesis that low achieving children can be motivated to improve socially, creatively, and intellectually when they are given an opportunity for exploring their special talents in relation to a larger group. The program set out to encourage the development of a range of social skills and values which are frequently overlooked in the educational process. However, I also expected to gather evidence of the program's effectiveness in accomplishing more traditional academic goals. Even though I intended to draw attention to some of the broader aspects of human development, I hoped to show that specific cognitive skills could be enhanced when the child's growth was pursued in a holistic and purposeful manner.

At the outset of the research, a hands-on, collective project was in-progress. As a result of my observations of daily classroom experiences, I extrapolated a theoretical model based on motivation. This particular scenario was selected because the children's excitement about the program was a highly evident feature of their behavior. An investigation of the literature revealed that the ongoing program had any number of qualities which are described as motivating. Program activities allowed the children to initiate a large-scale environmental change--a change which won them the admiration of peers and adults. It gave participants an opportunity to use a range of skills and to take a position of responsibility in solving a given problem. The project stimulated children to rely on their own imaginations in creating space and solving problems. It engaged them in an adventurous, physical activity and enabled them to experience the excitement and tension of a charrette.

Finally, the program appeared to be a practical demonstration of the theoretical concepts put forth by Dewey (1916), Bronfenbrenner (1970), and Sampson (1981). All three of these writers are concerned with social motivation in its broadest sense. Each focuses on the role that social situations play in giving meaning to particular events. Each articulates a need for paying more attention to structuring the nature of social situations. While Sampson calls for greater accountability among psychologists, Bronfenbrenner and Dewey look to educators to improve the social context of learning. Both Bronfenbrenner and Dewey stress that children could gain an understanding of the habits and goals of society through interpersonal experiences with peers. They suggest that prosocial values develop when there is a combination of peer pressure and adult supervision--that it is the task of educators to devise situations in which children can experience the consequences of their actions in a supervised peer group. The architectural program presented here was an applied instance of the kind of interpersonal relationships which Dewey and Bronfenbrenner prescribe. The children pursued individual interests by taking the initiative for a variety of different tasks, but all of their efforts were directed towards the accomplishment of a single, highly visible goal. The tangible nature of the goal gave the children immediate feedback of their contributions to the group.

In short, the project struck a balance between individual exploration and collectivity. The literature suggests that these kinds of experiences improve self esteem and self confidence by helping the child develop a sense of competence and industriousness in relation to other people. Since confidence and self esteem are key factors in performance I expected that the children would improve in the things I was teaching them. If children were excited by the work they were doing, the information and values

which were being presented during the 1½-hour class would be assimilated because they would have a special meaning and relevance to the children.

Since these two subject areas were central to our classwork, it seemed reasonable to expect that the participants would learn something about architecture and that they would have some greater understanding of their personal responsibility for maintaining the quality of the physical environment. The children would be working together with each other and with adults on a single large project, so certainly they would learn to be more cooperative and to value cooperative work. I expected that the intensity of the charrette experience would increase the children's appreciation for persistence in achieving goals and give them a better understanding of the nature of the creative process. Certainly being part of such a successful project would help children who participated to feel better about themselves.

I also expected that the enthusiasm that was generated by the architectural project might have an added effect of increasing excitement for school and learning, thereby making it possible for children to improve cognitive skills.

Finally, because all the children did not participate equally in the program, I expected that improvement would be related to the level of involvement, and that the children who became most involved would be the low achieving, low self esteem children whose teacher provided a good role model of participation.

The Substantive Successes of the Program

The program was successful in enabling children to make statistically significant improvements in several areas. The fifth graders learned the things

I taught them about architecture and both the fourth and fifth graders became more aware of their personal responsibility in maintaining the environment. The fourth graders felt that they learned to behave more cooperatively and the fifth grade teachers gave the children in their classes higher grades in areas relating to cooperative behavior. Both fourth and fifth graders learned to value cooperative effort. In general, all the improvements were correlated with the level of involvement. As anticipated, there were more high participants in those classes where the teacher provided a good role model for involvement. However, there was no correlation between previous achievement and involvement. The program was not a compensatory experience for low achieving children as I predicted. Rather it was an experience in which low and high achieving children could work together and benefit equally.

The most important aspect of the results is that children acquired some skills and insights which, in my view, are essential to survival in the real world, but which are not usually addressed by the traditional school curriculum. A basic proposition underlying the organization of the experimental curriculum is an acknowledgement that people do not live in isolation from one another; social existence requires a high level of interdependency. This project was designed to give children insight into the nature of cooperative participation within a segment of society. The program was shown to be effective in teaching children to value group effort and to feel more confident about participating in group activities. Since the tasks were voluntary, it is possible that the children were learning something about making choices and were gaining some insight into their strengths and weaknesses in contributing to the class and the school.

In addition to the general insights that the children gained about themselves as social persons, they gained an awareness of their individual responsibility to determine the quality of the physical environment. This awareness was experienced in an abstract, intellectual way on the written test, and in a hands-on, applied way in relation to the final product. Obviously, it is important for urban children to develop a sensitivity to the environment and to the reciprocal nature of actions taken within it. There simply is not enough space in an urban context for a laissez-faire attitude toward the environment. Yet there are very few opportunities in city life which allow children to exercise control over their environment in a positive manner. This program provided that opportunity. Further, it equipped the children with the technical skills that are needed to make physical changes.

Teaching environmental values through built environment education has attracted the interest of many educators in recent years. Many schools which participated in the Architects-in-Schools program across the country reported success similar to the one experienced here in counteracting vandalism by providing children with the skills and resources to create or improve their physical surroundings. The result of this project serves to strengthen a trend which is already in progress in primary and secondary education: using the design/construction process as a means of increasing environmental awareness and effectively improving the physical quality of schools. The improvements realized by high and low achievers in the technical aspects of the subject matter serve to illustrate the vitality of this content area to all children.

There are some questions, however, which are left unanswered about the broader impact of the interdependent, group approach which was taken in this project: Did the experience of working with other adults and children at a self-selected task alter the child's perception of his or her ability to perform in a competent manner--to find a niche--no matter what the situation? If so, what is the long range effect of repeatedly reassuring the child of his or her ability to define a role within any given environment? Erikson (1968) describes childhood competence as an industriousness in "doing things beside and with others--a first sense of division of labor." Further, Vaillant and Vaillant (1981) have shown that the ability to be successful in performing a variety of roles in childhood is the best predictor--better than intelligence or social class--of adult productivity. Does the kind of endeavor described here ultimately increase competence and, therefore, the potential for productivity and creativity in adulthood.

Suggestions of Other Successes

An apparent success of the program was in being able to attract and hold the interest of children and adults over a period of years. The research results show that the project was not a compensatory experience for low achieving children as I thought it would be. Rather, high and low achievers were attracted to the process. Furthermore, as time went on, the attraction of the project elicited a more focused response from the children. In the beginning of my residency, the children's excitement about meeting a new person and working with new tools and materials was characterized more by jumping around than it was by intense interest or concentration. By the experimental year, however, the children had become much calmer and more able to direct their physical energies towards completing the assignments. There was less shrieking and running around. If I needed to get everyone's

attention to give instructions, it was easier to get the children to stop and listen. I am not sure whether this change was due to an improvement in my classroom management techniques, or whether it was, as some of the teachers suggested, that the children were gaining a clearer insight into the reward structure of the program. Whatever the reason, the quality of the excitement improved over time.

In addition to an improvement in the children's involvement, the parent's participation increased over time. They began to make a larger financial commitment and to take on more responsibility in completing the final project. Furthermore, each year the parent group became more representative of the school's lower income population. Prior to my arrival, lower income parents had not been very visible in school activities. It seems that the project, in conjunction with Project Interaction, provided a way for those parents to participate in the life of the school.

In essence, many people, adults and children, who do not normally get involved in school activities, were attracted by this work. As time went on the attraction did not wear off. Rather the input that various individuals made improved in quantity and quality. Evidently, there was something about this experience which set it apart from other academic experiences. I would suggest that it was the nature of the architectural process and the school's ingenuity in responding to its requirements¹ which gave the project a real life, non-academic importance. The result was that adults and children alike who were not previously involved in other school projects became engaged by this process.

¹ See Chapter Two for a discussion of the ways in which institutional life was altered in order to accommodate this program.

Educational researchers have frequently addressed the issue of making learning less abstract--more relevant to the daily experiences of children. Some writers, including Dewey and Bronfenbrenner, have suggested that the community be used as a resource for learning the kinds of skills which will be required in later life. Dewey specifically suggests that school life offer an introduction to the requirements and expectations of the larger society. Others writers have been concerned with promoting a more direct, hands-on approach to learning. The developers of the USMES program, for example, based their curriculum on real problem solving because they believed that real problems had a compelling quality that abstract problems lacked. They recognized that being able to solve a real problem was an important skill in itself, but they also were convinced that real problems made school life more interesting and vital. Certainly the open education approach can be explained according to a real life scenario. By asking children to decide, to plan, and to make choices, open education advocates are attempting to duplicate the kind of challenges and ambiguities that are encountered in everyday existence.

This study offers additional evidence for taking a more open-ended, real-life approach to the curriculum. It suggests a practical application of the Dewey/Bronfenbrenner theory of learning from community life. It outlines a problem-solving approach which can attract the interest of both adults and children. A major benefit of the building activity was that it brought parents, teachers, children, and neighborhood people together in a more natural relationship to one another. Although the same purpose might have been accomplished in many ways, the following examples illustrate how this particular project helped to minimize some of the boundaries that exist between the artificial structuredness of school life and the open-ended spon-

taneity of everyday day. In this instance, the project:

- (1) required many ad-hoc skills. Because the situation required many people to perform in different ways, no one person could always be the teacher.
- (2) attracted the interest of older participants. Most adult participation in elementary school maintains the caretaker/child relationship. Adults participate in things which are essentially child-centered. In this project, adults and teenagers could participate on their own terms. In some cases, people joined in who were unrelated to the children in the program.
- (3) created an after-hours life at the school. It was a very conscious intention on our part to schedule outdoor construction activities when the school was closed so that potential vandals would realize that our work was not a Board of Education effort. By scheduling school activities during after-hours, we were able to communicate our message. However, we were also able to bring about a more informal relationship between the school staff and the surrounding community. The potluck supper which occurred at the end of the experimental year was an indication that a very positive relationship had developed.
- (4) required on-going participation in the maintenance of the projects. Even though our end-products were built on school property, everyone was asked to participate in looking out for the welfare of the various objects. According to many hearsay reports, parents and children visited the school during holidays or on long weekends and after heavy storms to see that everything was safe. When things needed repair, the parents got together and did the work. In essence, individual people were taking on what is typically a custodial responsibility for maintaining the

school's physical environment. The result of their effort was that there was no significant vandalism against our work.

While these responses may be specific to this particular project, there are undoubtedly many other techniques that a school staff might investigate in order to make learning more open-ended and more relevant to the coping processes that are required by the ongoing, spontaneous nature of everyday existence. A valuable social exchange took place between this particular community and school as a result of exploring a problem which was relevant to both their needs. A dynamic outcome was achieved in terms of providing an example of community life. Certainly the process followed here suggests that some of the rigid hierarchical boundaries that educational institutions draw between the child and the learning environment can and should be relaxed.

The Possible Effect of Parental Involvement

In the last chapter, I suggested that the skills which were learned were the ones which were essential to participating in project activities. Implicit in this suggestion is an assumption that the project held some value for the children. Certainly that was true, but what made this project seem so worthwhile? Obviously few children have an opportunity to learn about architecture, and the students that were chosen to participate were aware that they were being exposed to something that was not being offered to all the other children. Their viewpoint was further confirmed by the actions of the principal. According to the interview data, the children concluded that the project was of special importance because they frequently saw the principal working on it or taking pictures of their progress. In a like manner, the parents' involvement may very well have increased the perceived

worthiness of the program. In fact, it is reasonable to believe that parental involvement was an important factor in the quality of the involvement and the improvements that were attained, especially among low achieving children. Intervention approaches typically place an emphasis on improving the performance of disadvantaged children in earlier years. Parental involvement is considered crucial to a successful intervention (Rhine, 1981). This study indicates that it might be possible to break into a cycle of failure at a later age. Could not the parental participation in the project have contributed to how the children reacted to the requirements of the work and ultimately enabled low achieving children to make improvements which were equivalent to high achievers?

Unfortunately, there is a certain degree of hostility between parents and school administrators especially in lower income communities. Even though individual parents may develop a good working relationship with individual teachers, the parents as a group are all too often in an adversary position with respect to the educational policies of the school. Coming into P.S.H. with a repertoire of experiences in other urban schools, I was impressed by the degree of warmth and trust that I observed between the parents and the school administration. I frequently heard parents say that they thought their children were learning in a way that would help them in later life. Even though the parents who were expressing approval may not have been the particular parents of the experimental children, I suspect that the approval of a group of adults had some impact on those children for whom school tends to have negative connotations.

The question of how parental approval of the schooling process influences performance is an important one and it needs further investigation. This study indicates that the teacher acts as a model of industriousness for the

children in her class. Are not the parents also models of how the children respond to the requirements of schoolwork? Would not an outward demonstration of parental support for an educational process enhance the child's perception of school and of learning? The literature on cooperation shows that positive interpersonal relationships have a clearly beneficial effect on performance. It would seem that parents, especially in elementary school, play a vital role in communicating a sense of supportiveness in the school community. This project provided a mechanism for including parents as supportive partners in the educational process. What effect does their presence have on motivation and performance?

What Were the Shortcomings of the Program?

It was more than a little disappointing to realize that the program had no carry-over effect on the standardized tests in reading or spatial ability. The exposure to cognitive skills was simply too limited and disconnected from other academic work. Unfortunately, there does not seem to be a simple solution to making a better connection. Many educators are aware of the potential that all the arts provide for discovery and excitement in the classroom, but some real problems may be encountered in using art as a stimulus for academic work. First is the problem of maintaining a delicate balance between the spontaneity of the art and the discipline of acquiring basic skills. If academic work dominates, the playful engagement of the artistic process will be lost. This seems to be true of some of the reading-through-the-arts approaches. If the artwork dominates, the children will not make the desired cognitive improvements, as this study points out. Second, assuming that a balance can be achieved, the classroom teacher is then faced with the task of tailoring a curriculum which can fit around the spontaneity of the art process. This calls for an extraordinary amount of dedication, inventive-

ness, and organization on the part of the classroom teacher. Devising a standardized art/study curriculum might alleviate the demands placed on the teacher, but the result would undoubtedly be a very forced approach to both subjects.

Probably there is no simple recipe for learning through the arts. It is simply a long process on the part of imaginative teachers to provide children with repeated exposures to new and exciting ways of working and thinking. In the long run, some children inevitably will be affected.

The Limited Scope of the Research Design

Another inherent weakness of the research was that only one experimental condition was investigated using an experimental pre-test, post-test design. In retrospect, I realize that it would have been quite impossible to develop an ecological approach from such a limited view. Since I was investigating one condition, I could not select a broad range of variables and then study their relative importance in different situations. In order to develop a holistic model for tapping into a variety of motivational systems, a number of situations need to be explored and evaluated. Even if I had looked at one situation over a longer period of time, using a quasi-experimental time series design, the kinds of issues observed could have been broader. In reality, to compensate for the limited scope of the research design, I have been bringing in a great deal of unexpected and informal data collected over the three-year period to give the discussion a broader time perspective.

In Chapter One, I criticized motivation research because a lot of investigation in that area is based on limited, laboratory conditions. Environmental researchers have the benefit of beginning with real and meaningful situations, but they have the disadvantage of needing to reduce those complex realities

to an artificial system of numerical scores. There is a translation process in environmental research which is ignored in an experimental design. Two questions are created by an ecological investigation: One, have you identified the most salient characteristics of an existing situation or have you created the characteristics that you are interested in creating in an intervention? Two, are you using a measuring process that will capture those characteristics? In my opinion, deCharms (1976) is unsuccessful in addressing both those questions. His intervention did not have inherent in it the qualities that could illustrate the conditions of personal causation in a practical way to the child. Then he chose to use artificial methods of measurement --content analysis of abstract stories and questionnaires--which may very well have been insensitive to the nature of the situation he did create.

The present study deals more successfully with the saliency question and less successfully with measurement. Because I had been at the school for two years prior to the research, I had the opportunity to follow the procedure recommended by Glaser and Strauss (1967) for generating a theoretical approach which was grounded in the reality of the ongoing situation. The conceptual idea evolved during the course of my daily experiences. The two years which preceded the formulation of the research expectations provided a period of trial and error in finding an appropriate schema for identifying the essential qualities of the program. However, I can not say that I was as successful in measuring the situation that I created. As indicated earlier, I measured what the children said rather than what they did. I also lost sight of my own belief that learning takes a long time. In a zealously to demonstrate an instant outcome, I have repeated the error that I accuse the measurers of academic achievement of making. It is the process of developing a feeling of competence through repeated experiences of success that I

am interested in. Yet, the research design looked for evidence of immediate effects on performance.

An ecological approach to motivation obviously needs to be more process oriented. The major shortcoming of this design was that it assessed a single situation from an outcome oriented perspective. Just as a laboratory situation can not simulate the kind of diverse motivations that occur in real life, it is not possible to gain a real understanding of various modes of motivation by looking at a single experience or a single space in time. A time series design would be more appropriate, and the following factors are suggested as relevant to an ecological model:

(1) The child's previous success record. In this study, I expected that the child's previous academic performance would be an important factor in involvement. While the data showed no relationship between previous academic performance and involvement, it should be remembered that the children in this school were generally on the lower end of a city-wide achievement test. It could also be relevant that standardized testing was not given a high priority at P.S.H. Perhaps a more comprehensive study would have shown that there was some relationship between involvement and the child's previous record, especially if the measure of success included test scores in relation to expectations within a particular school or family.

(2) The teacher's input. It appears that the teacher's attitude toward the work was an important one in helping the children to get involved. Of course in this particular case, I was looking at the teacher's reaction to a very special circumstance within the school. What about the teacher's reaction to the day to day requirements of school and teaching? It might be important to look at these teacher reactions in relation to stu-

dent attitudes and performance.

- (3) The relevance of an experience to the child's real life. The literature suggests that a real-life approach to learning is more interesting to children. If this is true, then it must also be true that certain experiences are more relevant than others to some children's real lives. A broader study could look at the relationship between the child's home interests and his or her ability to become involved in a number of different kinds of school experiences.
- (4) The recurrence of exposure over time. It seems unlikely that a single learning experience could determine the total direction of a child's life. Probably a whole series of opportunities occur, one at a time, finally to add up to some effect on the course of human development. Vaillant and Vaillant (1981) suggest that exposure during childhood to work responsibilities affects adult well-being. It would be important to use this research to develop a method of assessing different children's degree of exposure to liberating experiences.
- (5) The parent/school relationship. Even though many of the parents who got involved in this project were not the parents of the experimental children, there is reason to believe that their presence may have had some important effect on the children's perception of the school. This study does not offer objective evidence in this area, but the extent of parental involvement and financial support serves as evidence that there was something about the project that was important to parents. At a minimum, their support assured that the program would function more efficiently. Other effects might be uncovered if this line of investigation were pursued.

Unanswered Questions

Although this was an important initial consideration, the research leaves unanswered the question of whether the program helped children gain some insight into their special skills. In Chapter One, I stated that this research was posited on the opposite ends of the likeminded/individuality continuum. A goal of the program was to increase the child's sense of belonging to a group and to help them develop group goals which fit within a larger social framework. The measures in cooperation and environmental awareness indicate that we were successful in reaching this goal. The counterbalance of the goal of connectedness to a social context was a desire to accommodate individual differences. Open education advocates achieved this aim by encouraging children to pursue individual study interests. I wanted the children to work together, but also to develop a sense of division of labor and of the importance of the uniqueness of their contributions to a group effort. None of the measures that were used give any insight into whether children acquired an understanding and acceptance of their own special qualities or whether they learned to respect another child's differences. Unless some evidence can be presented in this area, the group approach risks the criticism that it promotes conformity and a lack of individuality.

Bronfenbrenner (1970) points out the concern of progressive Soviet educators such as Novikova and Korolev with uniformity and dependence in a system of collective socialization. How is it possible to arrive at a likemindedness--to develop a "we think"--without impinging on the freedom of thought which our political system assures? For example, I showed that the experimental children acquired a sense of awareness about the environment. However, their newly acquired awareness was based on my value system. Someone might argue, and rightly so, that I have no right to impose my values

on children .

Unless there is some confidence that a group approach such as this one can be balanced with an accomodation of diverse opinions and individual differences, it is unlikely that collective socialization would ever be acceptable in a democratic society .

The program raises another question, i.e. why were boys more attracted than girls to this activity? Is there something about the natural constitution of males and females that leads to them to certain interests and behaviors? Or could it be that girls, even at this early age are socialized to believe that certain tasks are unsuited to them? Piaget (1965) observes that, while little boys tend to play games which require mutual agreement on a multitude of rules, little girls are less concerned with conformity and the codification of a consistent social structure. Could it be that girls are cognitively less capable of acquiring a sense of interdependency and division of labor? Or is it that certain games and play styles are sex-typed from a very early age?

Perhaps these questions can never really be answered. Since sex difference data are particularly vulnerable to the interpretation of the researcher, each side of the biological-versus-social debate must be content to build up the logic of its respective argument. Unfortunately this study can offer little concrete evidence in either direction because there were too few subjects to make a meaningful statistical analysis of sex differences. However, I did make some observations over the three-year period which I offer without comment:

(1)Challenge-seeking: At the end of the first year, I asked the children to answer the following four questions:

(a)What did you like most about the architecture program?

(b)What did you like least?

(c)What was the hardest thing I asked you to do all year?

(d)What was the easiest thing?

Many of the children made an unintended connection between the first two and the last two questions. In those instances, a typical boy's response read, "I liked the challenge of building," or "I liked making models best because it was the hardest thing we did all year." A typical girl's response was, "I liked sanding best because I didn't have to do anything but rub," or "I liked when we made the models because it was easy to do."

(2)Adult encouragement: Frequently I asked the various teachers to select special helpers. Unless I remembered to give specific instructions to pick an equal number of boys and girls, most teachers would choose a group comprised totally of boys. Nor was I free of favoritism towards the boys, especially at the end of the year when my own responsibilities became unmanageable. Even though I realized that the girls most likely needed more encouragement and patience to help them overcome the negative messages that they may have received elsewhere about being able to do this work, I found myself picking boys. They were easier to manage--I could be tougher on them without bringing about tears or pouting. When they worked, the boys played around, but the playing around was about the work. The girls would chit-chat about other things: I had trouble keeping their attention on the task at hand.

(3)Being dainty: Even today, children seem to connect "frogs, snails, and puppy dog tails" with little boys and "sugar, spice, and everything nice" with little girls. I remind you that, instead of seeing me as an ex-

ample of a tough, strong woman, some of the children simply assumed that I was a man.

The tasks that we performed all year required a willingness to get dirty and become physically involved. Towards the end of the year, aggressive physical action was a necessity. I could not help but notice how more apt the boys were than the girls at taking hold of the tools and getting themselves in a ready position. As soon as something needed to be climbed or maneuvered into place, the boys volunteered. Too frequently the girls assigned themselves to cleaning up or admiring what the boys had done.

(4) Similarity of playstyle to workstyle: One Memorial Day about eight fifth and sixth grade boys (none of the girls I invited showed up) and I worked on a neighbor's front porch in order to catch up on our schedule. Along with an assortment of work apparatus, we brought a picnic lunch, some song flutes, and a ball and bat. That day work and play occurred interchangeably. As I watched the boys--sometimes at work on a carpentry task, sometimes standing patiently at some invisibly marked location waiting for the ball to come that way, sometimes trying to work out a round on the song flutes--it seemed that their team relationships remained consistent. Different activities attracted their interest at different times throughout the day, and then everyone would converge on that activity. There were two boys who were a bit bigger and older who organized everything, dishing out instructions in a rather democratic fashion. Initially the boys would argue about who would do what, but once the tasks were allotted, each boy stuck to his assignment until the general interest changed to the next activity.

Apparently a group of sixth grade girls heard about this day of working, playing music, and playing ball. They organized themselves and insisted on working together as a group. For a brief time, they were outstanding, but then most of the girls seemed to lose interest in being on the team. A few girls joined the larger clique of boys, but the boys did not include them in their task assigning routine, and they generally made fun of the physical motions that the girls made.

The Problem of the Research Versus the Program

Throughout the thesis I refer to the internal conflict that I experienced in being the researcher, the teacher, and the friend all at one time. In closing, I would like to add some things on this conflict from an epistemological perspective.

It was my responsibility as a researcher to add to scientific knowledge concerning the etiology of learning in low-achieving children. In order to do this in some reasonable time period and within the resources that were available to me, I selected a very static, cause/effect model. In addition, I used quantitative data collection protocols which could be administered by a teacher or substitute teacher at one time to an entire class of children.

It was my concurrent responsibility as a teacher to make ongoing predictions about what would and would not work at any given time with certain children in my various classes. Being able to make such spontaneous predictions requires a very flexible, interpretative model. During the year of the research, I was keenly aware of having an inflexible agenda and of being constrained in my reactions to things that were going on in the classroom. Having an agenda of expectations was definitely a handicap to my own inventiveness in responding to daily situations. Using an interpreta-

tive model, the research design might have brought the dissertation goals more in line with the instructional ones. However, it is obvious that such a model would have been more time consuming, requiring open-ended protocols and trained observers. The logs serve as a reminder that reliable phenomenological data is difficult to collect.

EPILOGUE

The question to be asked now is, "What has this project contributed to the development of social science research?" Although there may be many flaws in my methodology, the process I used here contains some definite suggestions for future work. My method of allowing an extended amount of time to sort out the complexities of an on-going situation seem a far more sensitive approach to applied research than the model which has most often been pursued of beginning with an apriori set of assumptions. Glaser and Strauss suggest that theory which is generated as a fit between an existing situation and previous knowledge has the advantage of being understood by people in the situation as well as by theoreticians. By definition, applied research has a special interest in producing a theoretical outcome which can offer a meaningful explanation of the behaviors being studied to clients and users in a given setting. If the experimental conditions and the theory do not have some basic relationship to one another, it is possible that the theoretician will get results that are without significance to the layman's perception of the situation. DeCharms was interested in a concept of personal causation, but the children who participated in his research may have thought that they were learning to be actors or story tellers.

In reflecting on my thesis, I have concluded that the best match between the theoretical context and the daily situation centered around the child-in-society, school-in-community theme. The design of the program grew out of a desired interchange between the school and the surrounding neighborhood. The literature provided a solid pedagogical and psychological justification for exploring that need. It suggested criteria for a child-in-society format and outlined expectations for results. Because of the theoretical in-

vestigation in relation to the practical needs of the school, a process evolved that brought children into an active and diversified social relationship with other children and with adults in the community. Protocols were designed to measure the children's understanding of that process and the results were significant. After the fact, not only can I say that children improved in environmental awareness and in their ability to be cooperative, which, after all, are abstract concepts defined by the protocols I used, I can offer an effective approach to improving school/community relations and giving children a meaningful occupation within the neighborhood. The research makes a contribution to child development theory, but it also served to resolve an expressed need within the empirical setting. The hands-on community involvement process which was explored can now stand on its own without reference to the particular theoretical framework of the research. This could not be said of deCharms' storytelling process.

Undoubtedly there are many research ideas that could grow out of the child-in society, school-in-community approach to education that is suggested by the thesis. I will offer two ideas for which there is the strongest evidence in the data.

The most obvious direction suggested by the results is a longitudinal study. As I indicated in Chapter Six, it is unlikely that the real effects of a program of this sort happen immediately. Such an experience as this one has to tie into a series of other enriching experiences. What are the circumstances which enable people to respond to enriching experiences and make a change in their life circumstances? Are there situations in which an exposure such as this architectural program is detrimental to the child's expectations for school? Once I presented this project to some first year college students. A young boy commented afterwards that a program like this one could make

children dissatisfied with the routine anonymity of high school. He went on to explain that he felt like a freak in high school because he liked doing creative things. Certainly some of my former students have expressed the feeling that school is boring now that I am not their teacher. I would be curious to know how these kind of stories turn out in the long run.

A second question indicated by the data concerns the role of the elementary public school as a potential training ground for adults as well as children. Involvement in elementary school life is especially important for women because, in many instances, it serves as a transition experience for someone who has been at home with young children and is thinking about beginning or resuming a career. Several weeks ago, I interviewed four women who had been active in their children's elementary schools in preparation for a talk that I was giving. The women explained that the principle role the volunteer mother plays as a participant in her child's education is an advocacy one. However, they continued, the advocacy role has more drawbacks than benefits. The mother learns a number of political and managerial skills that can be useful as a stepping stone to higher education or work opportunities. Nevertheless, there are very few women who are able to cope with being in the position of trying to get professionals to do a better job of educating children.

The advantage of the architectural program is that it involved parents in the educational process. As I suggested in the discussion, I suspect that the open participation of parents in the educational process enhances the child's perception of school and learning, and provides children with a significant role model for working in school. It would be interesting to devise a longitudinal study to investigate the effects of involvement versus non-involvement.

ment, and to see if there is a difference between advocacy involvement and instructional involvement.

In closing, I would like to make one final comment on my personal involvement and bias in conducting the research. A requirement of social science is that knowledge be sufficiently general so that it may be applied to any number of situations. In order to solve this requirement, experimental conditions are frequently simplified to the point that they no longer apply to the reality of life. In architecture, each solution is unique to a specific circumstance. Although the solution may be guided by a set of aesthetic or technical theories or a view of historical solutions, any given outcome is ultimately a subjective one. For this reason, architects are accused of pursuing personal taste in lieu of an accommodation of human needs.

I would suggest that environmental research has to fall someplace in between the two extremes defined by social science research and architectural practice. Freire (1968) maintains that action requires both an objective and a subjective perspective. If environmental research is to be used for real problem solving, it must be sensitive to the uniqueness of a situation, while, at the same time, maintaining an objective vision of that situation. Probably each solution will be somewhat different and give a somewhat different insight into environmental theory. The study described in my thesis could never be replicated, nor did I intend it to be so. My purpose was to present an environmental problem solving process in a manner that would allow another researcher to extract principles and make predictions about the success of his or her own process. In my opinion, this is a valid and necessary approach to applied environmental research.

APPENDIX A
YEAR PLAN FOR THE EXPERIMENTAL PROGRAM

Introductory Lessons

We talked about improving the school. The children decided that it would be best to ask the rest of the children in the school how they would like for their school to be improved.

The children were to survey the school. All the classes agreed on four questions to ask everyone. Each class surveyed one grade level.

* * * * *

We converted the survey responses into percentages. In the fourth grade we estimated the division of a "pie" using the percentages. In the fifth grade the percentages were turned into degrees.

The children were to draw a circle graph and shade it in different colors.

* * * * *

We selected graphs from each class, and a representative team made up of children from all the classes made a bulletin board display of the graphs showing the responses at each grade level.

The survey results: Seventy percent of the children at P.S.H. would like for the architecture students to plant flowers.

* * * * *

One hundred assorted spring flower bulbs were purchased. The children

went outside eight at a time. The earth was spaded, and each child planted a bulb.

* * * * *

Survey Lessons:

We decided that we would like to improve the street that our school is on. In order to do that we realized that we would have to (1) survey the people who live on the street to find out what they would like, and (2) survey the street itself so we would know exactly what it looks like.

The children were to develop a questionnaire. Each class would take a portion of the street and decide on a way of contacting the residents.

* * * * *

We spent several lessons on the physical survey. The fourth graders were responsible for all of the information that was needed for drawing a plan of the street. The fifth graders worked on the elevations of the buildings. After we studied the measuring instruments, children went out six at a time to work on the physical survey. We measured the total length and width of the street. Then we located all the smaller elements--street lamps, fire hydrants, driveways, crosswalks, trees, houses. We drew an elevation of each house and guessed how tall it was by standing next to it.

* * * * *

We found out that the street was 584 feet long. Besides the school building, the street contained nine two-family houses, one sixteen-family apartment building, and one four-family apartment building. We calculated that the model would be 73 inches long if we used the scale $1/8" = 1'-0"$.

The fourth graders made a tiny drawing of the entire street on graph paper. Then they drew the street in scale on thick corrugated cardboard. Some children constructed the sidewalk out of strips of mat board and glued it on the corrugated cardboard while other children made cars, trees, street lamps, fire hydrants, and people. Each fourth grade class completed one street model.

The fifth graders made scale drawings of their house elevations and of P.S.H. using graph paper. They glued the elevations onto cardboard. The building shape was cut out and turned into a three-dimensional model. Each fifth grade class made one set of models to represent all the buildings on the street.

* * * * *

Each fifth grade class glued its buildings onto one of the street models which the fourth grade classes had made. The fourth graders added the miscellaneous small items and the two models of the existing conditions were complete.

The Field Trip

The fifth graders had access to several school buses. The Famous Music Hall was having an anniversary celebration, so we decided that a visit to this building would make a nice field trip.

The two experimental fifth grade classes and a third fifth grade class met in the auditorium and we discussed the architectural characteristics of the building.

The children made a model of the building using the technique that we had

developed earlier in the year. They also prepared a graphic presentation of the building's history.

When we arrived at the music hall, the orchestra was rehearsing. We listened to part of the rehearsal, and then the building manager gave us a tour of the entire building.

We took slides during the tour. When we got back to school, the fifth graders made a presentation of their trip to the fourth graders using the slides.

* * * * *

Brainstorming for an Idea

We discussed how we could make something for our street that would be like the music hall we had visited.

We discussed what a place would be like where children could make music while playing.

We discussed what makes a musical sound.

* * * * *

The children designed and made some percussion instruments. Mrs. A's class learned to play "Happy Birthday" on their home made instruments and had a surprise party for me.

* * * * *

Each child wrote a short story called, "Our Class Had an Idea." The stories described what a music hall would look like if it were open to the street and children could come and play in it. The name, Street Orchestra, came out of the stories.

* * * * *

The children worked in small teams one day to build a cardboard model of their idea for a Street Orchestra.

The children in each class developed criteria for evaluating the designs. The children used the criteria to review all the designs. Several models were selected as being suitable for the playground.

Design Development

I developed a design which integrated the ideas from the models which were chosen. I made a working drawing and a scale model of the final idea. Each stage of the development process was photographed and the slides were shown to all the classes.

* * * * *

Some of the children built a scale model based on my working drawing. Other children studied the drawing and then specified the materials. Still other children made etchings which were sold to raise money for the supplies.

Construction

A few of the children who had been involved in specifying the materials called up a lumber yard and placed the order for the materials. A group of children got the cash from the Parent's Association for the delivery. The lumber was delivered and paid for, and construction began.

APPENDIX B
A SAMPLE LESSON PLAN

This lesson was given as an introduction to The Survey Lessons. It was designed to make the children aware of how little they usually observe about the physical environment.

At the beginning of the lesson, I asked, "Children, how many of you know the house that is right on the corner of Magnolia Avenue and 18th Street-- the one which is just across the street from our school playground?" There was some discussion about the exact location of the house and then practically everyone raised their hands.

I continued, " How many children pass that house everyday on the way home?" Again there was some discussion about which way you would turn when leaving the school building. About half the students raised their hands.

"So," I asked, "would you say that you know this house very well?" Most of the children responded with an emphatic, "Yes!"

"Good!" I said, "Then you will be able to answer my questions about this house. Could you each take out a piece of drawing paper and pencil. We are going to have a little test. I am going to ask you some questions. You may write the answers on the far right hand side of your paper. Later on you are going to draw a picture on the left hand side on the paper."

"Here are the questions:"

(1)"What color is the house?" (It is gray.)

- (2) "How many stories high is the house?" (It has three stories as do most of the houses in the vicinity.)
- (3) "Do the people who live there own a dog?" (There is a dog house in the side yard and a "Beware of Dog" sign on the front door. A dog can usually be heard barking. Most of the children answer this question correctly.)
- (4) "Do you know if the people who live there have a car?" (A car is practically always parked in the driveway.)
- (5) "Is the front porch closed in or open?" (It is closed in with storm windows, and serves as a room.)
- (6) "Is there a tree in the front yard?" (There is a huge tree right on the corner which shades the sidewalk.)
- (7) "Is there a fence around the front yard?" (Yes--it keeps the children out of the front yard as they crowd on that corner after school. However many children apparently have not noticed the fence.)

"Now children, could you please draw a picture of the house that will show me exactly what it looks like." The children have been complaining throughout the test that the questions are unfair. The request for the drawing increases their agitation. A lot of the children are convinced that they do not know how to begin, but I point out that they have some of the information in their test answers. Eventually the drawing began.

At the end of the session, the children were assigned to go to the house and grade their test papers. This, they said, was really unfair!

APPENDIX C
PHOTOGRAPHS ILLUSTRATING THE WORK PROCESS

FIGURE 6

Architect Working with a Fifth Grade Girl on a Drawing

Photograph Herbert Shapiro



FIGURE 7

Mother Helping Fifth Grade Children with Assignment

Photograph Herbert Shapiro



FIGURE 8

Fifth Grade Children Working in their Classroom on Construction

Courtesy S.E. Sutton



FIGURE 9

Mothers Working with Children to Excavate for Foundations

Courtesy S.E. Sutton



FIGURE 10

Neighborhood Residents Attend Unveiling Ceremonies

Photograph Herbert Shapiro



FIGURE 11

The Kiosk Which Was Completed During the First Year

Photograph Martin Bough



FIGURE 12

The Street Museum Which Was Completed During the Second Year

Photograph Martin Bough

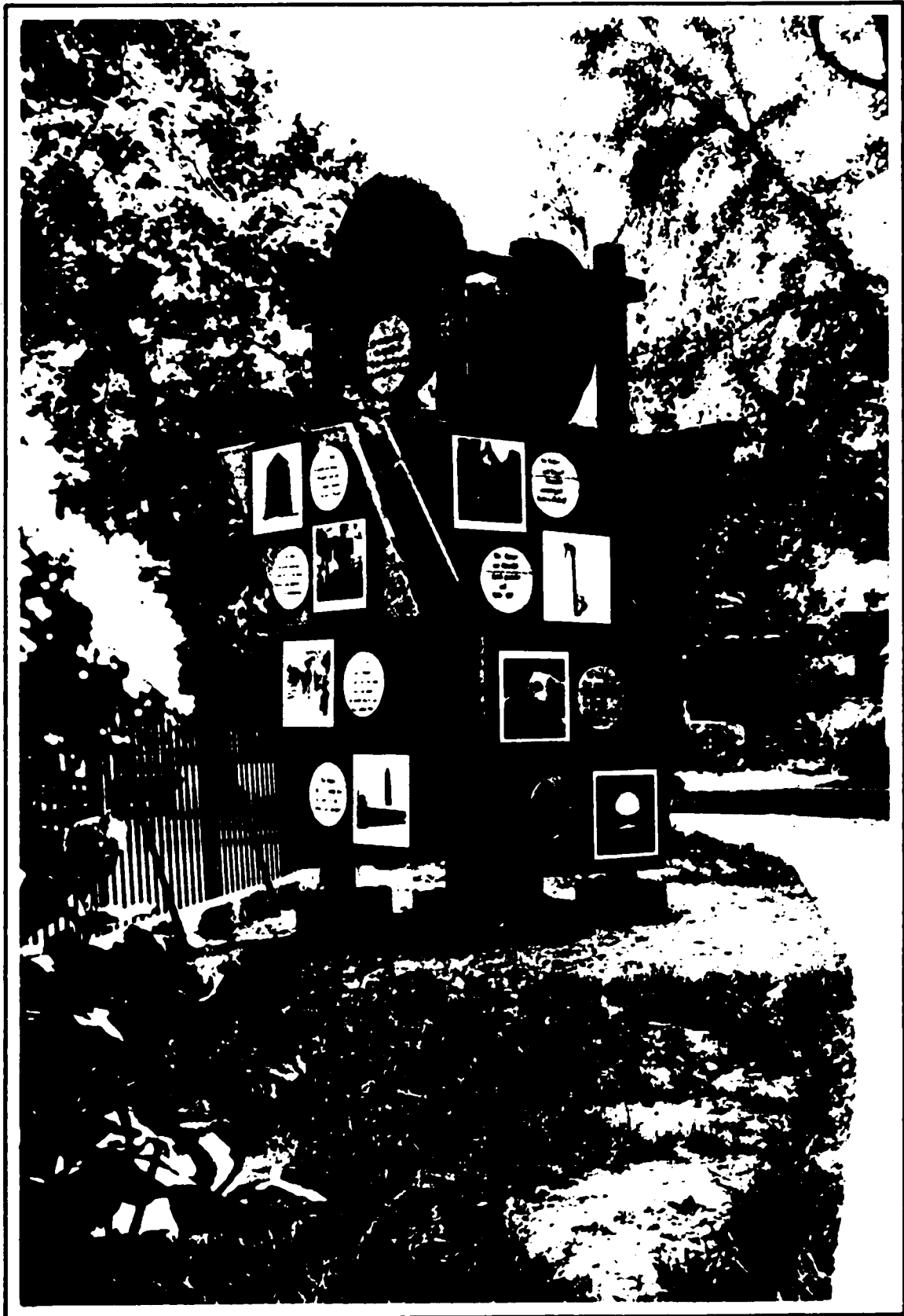


FIGURE 13

The Street Orchestra Which Was Completed During the Experimental Year

Photograph Martin Bough



FIGURE 14

Children Finish Construction of the Street Orchestra

Photograph Martin Bough



FIGURE 15

Fifth Grade Girl Plays the Street Orchestra's Xylophone

Photograph by Martin Bough



FIGURE 16

Fifth Grade Boy Plays the Street Orchestra's Gong

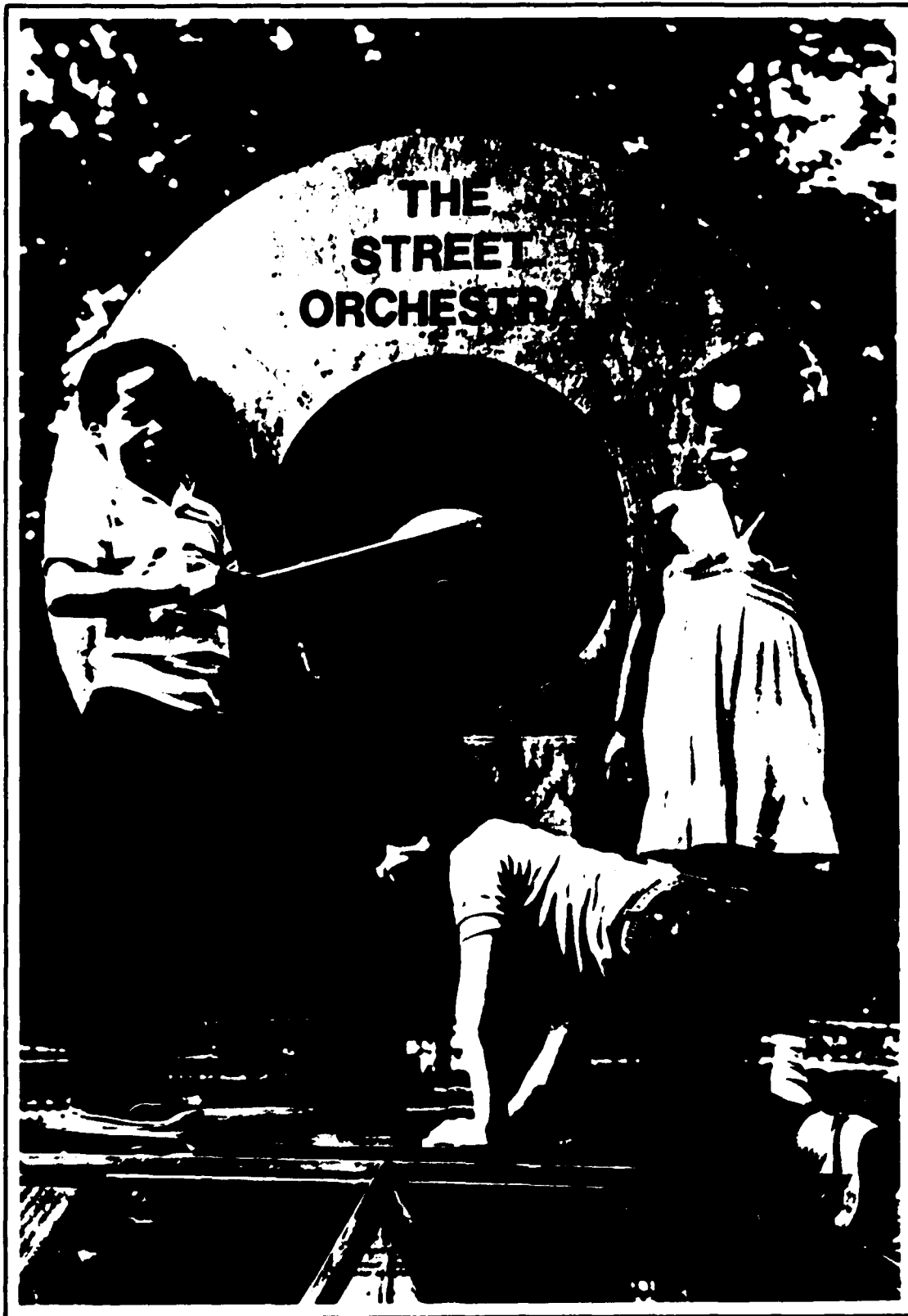
Photograph by Martin Bough



FIGURE 17

Kindergarten Children Playing on the Street Orchestra

Photograph by Martin Bough



APPENDIX D
ABBREVIATIONS USED IN SCORING

Appreciation of the Creative Process

- (APPV) Child's rating of the importance of creative work
(APPP) Child's rating of his or her creative abilities

Architectural Knowledge and Skills

- (ARCHSKL) Child's knowledge of the elements and skills of architecture

Child's Involvement

- (INVOLV) Child's evaluation of the class
Child's rating of his or her performance in the class
Peer rating of child's performance
Teacher rating of child's performance
Architect rating of child's performance
- (EXCITE) Child's rating of school
Attendance records

Cooperative Skills and Values

- (COOPV) Child's rating of the importance of being cooperative
(COOPP) Child's rating of his or her cooperative abilities
(CSCOR) Cumulative record card grades relating to cooperative abilities

Environmental Values

- (ENVV) Child's sense of responsibility towards the environment

General Intellectual Skills

- (INTV) Child's rating of the importance of academic work

- (INTP) Child's rating of his or her academic abilities
- (ISCOR) Standardized reading and spatial abilities scores
Cumulative record card score in oral and written expression

Self Esteem

- (SELFEST) Child's rating of his or her competence at "important" tasks

Task Commitment

- (COMV) Child's rating of the importance of good work habits
- (COMP) Child's rating of his or her work habits
- (TSCOR) Cumulative record card grades relating to work habits
- (COMS) Commitment to solving a problem

Teacher's Involvement

- (TEACC) Teacher's commitment to completing program tasks
- (TEACR) Teacher's receptiveness to the goals and ideals of the program

APPENDIX E
RESPONSES USED FOR SCORING THE DEPENDENT VARIABLES

Appreciation of the Creative Process

- (APPV) How important is:
- (1) Making something beautiful?
 - (2) Being careful and neat?
 - (3) Thinking up an idea that no one has ever thought of before?
 - (4) Doing scientific experiments?
 - (5) Writing down ideas so that other people can understand them?
 - (6) Thinking up terrific solutions to class problems?
 - (7) Making things that people admire?
- (APPP) How good are you at:
- (Each of the items listed under (APPV)?)

Architectural Knowledge and Skills

- (ARCHSKL) (1) Understands concept of drawing in scale.
- (2) Can make scale conversion.
 - (3) Understands model making techniques.
 - (4) Understands how to reproduce architectural drawings.
 - (5) Knows the steps of the architectural design process.
 - (6) Can identify important buildings in the city by use and/or name.
 - (7) Can identify important architectural elements
 - (8) Can identify construction equipment.

- (9) Can identify construction materials.

Cooperative Skills and Values

(COOPV) How important is:

- (1) Wanting to make a lovely gift for someone?
- (2) Contributing your ideas to a class discussion?
- (3) Listening to other people's ideas?
- (4) Liking to work together with your classmates on big projects?
- (5) Helping a classmate with schoolwork?
- (6) Helping your parents around the house?
- (7) Cooperating with classmates?
- (8) Helping the teacher?
- (9) Listening when the teacher asks?

(COOPP) How good are you at:

(Each of the items listed under (COOPV)?)

(CSCOR) Grades taken from the cumulative record card on the following:

- (1) Gets along well with other children.
- (2) Obeys school rules and regulations.
- (3) Is satisfied with a reasonable amount of attention
- (4) Shows self control

Environmental Values

(ENVV) What should you do when:

- (1) You see something that is messed up in the school building?
- (2) You accidentally mess up someone else's property?
- (3) Your friends want you to join them in messing up someone else's property?

- (4) You see another child messing up something in the school building?
- (5) Dumping garbage someplace saves money, but risks poisoning someone in the distant future?
- (6) Installing a nuclear power plant makes a lot of electricity, but there is a very small chance that it will cause a big accident?
- (7) A proposed highway will allow people with cars to travel around fast, but its construction will mean that a lot of other people will have their houses torn down?
- (8) A big shopping center will create a lot of business and jobs, but it will also bring a lot of traffic and noise into a quiet residential neighborhood?
- (9) A group of people have completed different kinds of jobs in order to get one project finished. Who should
 - (a) be rewarded?
 - (b) feel the proudest?
 - (c) feel the most responsible?

General Intellectual Skills

- (INTV) How important is:
- (1) Getting the right answers to arithmetic problems?
 - (2) Spelling words correctly on tests?
 - (3) Memorizing things?
 - (4) Having good penmanship?
 - (5) Getting good grades?

(INTP) How good are you at:
(Each of the items listed under (INTV)?)

- (ISCOR) (1) SRA Mental Abilities Test
(2) California Achievement Reading Test
(3) Grades taken from the cumulative record card in
(a) Oral Expression
(b) Written Expression

Self Esteem

(SELFEST) When the response on the What I Think Test = 4, compute the response on the What I Feel Test for that activity.

Task Commitment

- (COMV) How important is:
- (1) Doing a little more than you're asked to?
 - (2) Doing your best no matter what the job is?
 - (3) Figuring out what needs to be done without being told?
 - (4) Being patient?
 - (5) Assuming responsibility when needed?
 - (6) Making an idea come out perfectly?
 - (7) Continuing to try when things aren't working out?
 - (8) Making do with whatever you have to work with?
 - (9) Changing your mind when things aren't working out?

(COMP) How good are you at:
(Each of the items listed under (COMV)?)

(CSCOR) Grades taken from the cumulative record card on the following:
(1) Participates in class.

(2) Work and study habits.

(3) Carries out responsibilities

(COMS) What should you do when:

(1) Working on a project causes conflict.

**(2) You are making something and you don't have a particular
tool or material**

(3) A special project interrupts your normal routine.

(4) No one has assigned you a specific task to do.

APPENDIX F

SPECIAL TESTS USED FOR MEASURING THE DEPENDENT VARIABLES

Note: Score appears in brackets after the response choice.

Variable name appears in parenthesis before the question.

What Should Happen Test (Administered on Day Two)

(Tester reads out loud)

I'm going to read you a number of stories in which children have to decide what to do. Imagine that you are being asked for advice. I am going to read you four choices of what you might tell someone to do if he or she is in this situation. You are to write down the letter for the best choice. For example, suppose Bob had promised his teacher he would help her clean up the room after lunch. While he is eating, a bunch of his best friends come up and ask him to join them in a game of tag. What would you advise Bob to do?

Your choices are:

- a. He should go play because he can help his teacher later on in the day.
- b. He should explain to his friends that he has something else he wants to do and then go to the room to help his teacher.
- c. He should explain to his friends that he will get in trouble if he doesn't show up to help his teacher.
- d. First he should find another kid to help the teacher, and then he can go to play with his friends.

What do you think the best answer is? Good! So what letter would you write down? Good!

I am going to read each set of choices two times. Wait until the second time around before you write down your choice. And, even if you don't hear the perfect answer to the problem, pick out the best one available. You should have an answer to each problem even if it's not exactly what you would do.

(ENVV)

1. A bunch of kids took their oranges and apples out to eat on the playground after lunch. Some of the peelings got thrown all over the playground. A little later some other kids came along to play. What do you think they should do when they see the peelings?
 - a. They should run and get the custodian since it's his job to keep the school clean. [1]
 - b. They should clean up the peelings because someone may think they did it. [3]
 - c. They should tell the principal that kids threw stuff all over the playground. [2]
 - d. They should clean up the peelings and then write a note to the principal explaining what happened. [4]

(ENVV)

2. One day Danny is playing around in the parking lot when he notices that one of the hubcaps on a teacher's car is almost falling off. Usually Danny would never take a hubcap off a car, but since this one is already loose, he decides to play toss with it. After awhile the hubcap gets all dented and he can't fit it back onto the car. He tosses it in the bushes and hurries back to his class. How do you think Danny should feel?
 - a. He should feel guilty because someone may have seen him. [3]

- b. He should feel guilty because he ruined some teacher's hubcap. [4]
- c. He should forget all about it since the cap was already loose. [1]
- d. He should feel nervous because he may be suspended. [2]

(COMS)

3. The principal decides to have a "fire prevention week." He asks Tanya's class to make several nice posters about preventing fires. Her class starts working on the posters, but before long some kids get in a big fight about who is going to do what. What do you think the class should do?

- a. They should sit down and decide on how to divide up the chores. Then everyone should start working on his or her part of the job. [4]
- b. The kids who were fighting shouldn't be allowed to continue working on the posters. [2]
- c. Everyone should stop working on the posters because this activity is disrupting the class. [1]
- d. The teacher should pick out a few of the best kids in the class to make the posters and everyone else should continue with his or her regular work. [2]

(ENVV)

4. Sam is walking home with some other kids one day when they start pulling up flowers in someone's yard. Sam's mother had told him not to do that, but everyone is having such a great time that Sam is tempted to join in. What would your advice to Sam be?

- a. He should join his friends because they'll think he's a sissy if he doesn't. [1]
- b. He should remind his friends that they could get into a lot of trou-

ble like that. [3]

- c. He should hurry away because someone may see him with the group and tell his mother. [2]
- d. He should remind his friends how they would feel if someone ripped up something of theirs. [4]

(ENVV)

5. Suppose Maggie's class decides to fix up their classroom. They split up into committees and each committee works on some different job. One committee paints the room while another committee makes a new design for arranging the desks. A third committee volunteers to move all the furniture into the new design. When the room is all redecorated, the principal comes by to look at it. What do you think he should do?
- a. He should give a reward to the committee that painted the room since that job was the most fun. [1]
 - b. He should give a reward to the committee that made the design since that job was the most creative. [1]
 - c. He should compliment everyone for working together to complete a fine project. [4]
 - d. He should give a reward to the committee that moved the desks because that job required the most strength. [1]

(ENVV)

6. Laverne's class has just worked very hard for several days to put up a display on a bulletin board in the hall. She and a friend are sent out on an errand. The friend goes to take a look at the display and decides to draw a few cartoons on it. What would you advise Laverne to do?

- a. She should hurry back into the classroom so it won't look like she did it. [1]
- b. She should convince her friend to stop because she's ruining the class's work. [4]
- c. She should convince her friend to stop because they could both get caught. [3]
- d. She should hurry and get the teacher. [2]

(ENVV)

7. Suppose Gina spills soda on her seat just as she is leaving the movie theatre. It is already past the time that she is supposed to get home. What do you think Gina should do?
- a. She should hurry home before she gets in trouble for being late. [2]
 - b. She should get a paper towel and wipe off the seat before someone sits in it. Then she should call home and say she'll be late. [4]
 - c. She shouldn't worry about it because the soda will dry up soon enough. [1]
 - d. She should get a paper towel and clean it up because someone may have seen her and then she'll get in double trouble. [3]

(COMS)

8. Suppose Jonathan's parents ask him and his sisters to clean up the house while they go out to shop. Usually his parents give each one of the kids a specific job to do, but this time they are in a hurry. They rush off without explaining anything. What do you think Jonathan and his sisters should do?
- a. The oldest kid should assign everyone a job and they should go ahead and get started. [3]

- b. They should all wait till their parents get back since they don't know exactly what they're supposed to be doing. [2]
- c. They shouldn't worry about it since their parents shouldn't have hurried off without giving them instructions. [1]
- d. They should each pick a job that they like the most and get the house cleaned up as best they can. [4]

(COMS)

9. Suppose Freddie's class is designing a mural to be part of a big display in the auditorium. After the mural is designed, the teacher realizes that there isn't going to be enough paint. What do you think Freddie's class should do?
- a. They should stop working on the mural and do something else. [1]
 - b. Each kid should bring in his or her allowance and chip in to buy some more paint. [4]
 - c. Each kid should ask his or her parents for some money to buy some more paint. [3]
 - d. They should make a smaller mural. [2]

(COMS)

10. Alicia goes to a school that is very old and dreary looking. One year the student council votes to try to fix up the school to look prettier. Each class is asked to think up ideas for doing this. Alicia is worried that this project is going to take up too much time from her schoolwork. What do you think Alicia should do?
- a. She should spend as much time as she needs to think up her best idea and then go back to her work. [4]
 - b. She should assume that there are enough other children to do the job. [1]

- c. She should tell the teacher that the student council has no right to ask the children to fix up the school. [2]
- d. She should complain directly to the student council that it's not the children's responsibility to fix up the school. [3]

(COMS)

11. The sidewalk in front of the building where Sarah lives is very dirty and there's a lot of graffiti all over the storefronts. The shopkeepers on her block are planning to ask everyone in the building to volunteer to help them clean up the block one Saturday and Sunday, but these are the days that Sarah usually plays with her best friend. What do you think Sarah should do?
- a. If the storekeepers ask her, she'll have no other choice but to join in. [2]
 - b. She should just explain to the storekeepers that she has something else to do if they ask her to volunteer. [1]
 - c. Since she would be making a big sacrifice, she should offer to work only if she gets a small reward. [2]
 - d. If the shopkeepers ask her, she should gladly volunteer to work. [4]

(COMS)

- 12 Terrence's class is working frantically to build a bookcase for their room. Their teacher needs a screwdriver to finish the job and asks Terrence to go to the teacher next door to borrow one. The teacher next door says she has a screw driver, but she can't lend it out to the other classes. What do you think is the best thing for Terrence to do?
- a. Get mad at the other teacher. [1]
 - b. Come back and tell his teacher she'll have to forget about finishing

the bookcase. [1]

- c. Go around and ask other teachers for a screw driver. [3]
- d. Find out if there's something else in the room that the teacher could use instead of a screwdriver while someone else goes to look around for another one. [4]

(ENVV)

13. One day Harold and his friend are playing on their way home from school. Harold accidentally knocks a big hole in the fence that goes around someone's yard. He knows that there is a little dog that usually plays in the yard. What would you advise Harold to do?
- a. He should go home as fast as he can before someone sees him and tells his parents. [1]
 - b. He should ring the doorbell and tell what happened since the people who live there might find out what he did anyway. [3]
 - c. He should ring the doorbell and tell what happened because the little dog could wiggle through the hole and get hit by a car. [4]
 - d. He should act as if nothing happened. [1]

* * * * *

Environment Test, Part I (Administered on Day Three)

(Tester reads out loud)

The professor who made up this test is interested in knowing what children think about buildings and other things in the environment. Some of the questions have a right or wrong answer, but other questions are just opinion. There may be some questions that you don't know the answers to, but don't worry about that. Just write down the best answer you can think of, and be sure to write down something for every question.

(ARCHSKL)

1. Suppose you are an architect and you want to draw a very big building. However, you only have a very small piece of paper. What would you do?
 - a. Decide that this is an impossible idea. [0]
 - b. Get a camera and take a picture that would make the building look small. [0]
 - c. Draw the building to scale. [1]
 - d. Get a bigger piece of paper. [0]

(ENVV)

2. One time a group of parents had a terrific idea for building a clubhouse for their children to play in. They hired an architect to draw up floor plans for the clubhouse. After the drawing was finished, the architect searched all over the neighborhood for just the right carpenter to build the clubhouse. When the carpenter was finished with the construction, the children painted beautiful decorations all over it. After awhile the job was complete and everyone in the neighborhood came to admire it. In fact, a newspaper reporter came to write a story about the clubhouse.

The reporter asked, "Who is responsible for making this lovely clubhouse?" What do you think is the best answer to this question?

- a. The parents should say they are responsible because it was their idea in the first place. [1]
- b. The architect should say she is responsible because the work couldn't have been done without her plans. [1]
- c. The carpenter should say he is responsible because he actually built the clubhouse. [1]
- d. Everyone helped a little so everyone should take the credit. [4]
- e. The parents should take the credit because they paid for the job. [1]

(ARCHSKL)

3. If someone told you to draw in the scale, $1'' = 1'-0''$, and you wanted to measure off something that was $2'-0''$ long, how long a line would you make on your paper? (2" yields [1])

(ARCHSKL)

4. How about if you wanted to measure off something that was $3'-6''$ long? ($3\frac{1}{2}''$ yields [1])

(ENVV)

5. A chemical company has a lot of garbage they want to get rid of. They say that the cheapest thing to do is to dump it in a big field where no one lives. Some people don't want the company to do that because they are afraid that in many, many years the garbage will leak out of the field and get into people's drinking water and poison them. The chemical company says not to worry about this because it may not happen, and even if it does, it will be a long time off and chances are that there will be a new medicine out to cure the poison. What do you think is the

best thing to do in this case?

- a. Since it's so much cheaper to dump the garbage in the field, the chemical company should go ahead and do it and worry about the poison later. [1]
- b. Since it wouldn't be fair to risk poisoning anyone, even many years from now, the chemical company should be willing to pay a higher price to get rid of the garbage some other way. [4]
- c. Since it's foolish to worry about things before they happen, the chemical company should go ahead and dump the garbage, but to be safe, they should hire a scientist to work on a cure for the poison. [2]

(ARCHSKL)

- 6. Suppose you wanted to build a very neat, pretty cardboard model. What would you use to hold the pieces of cardboard together?
 - a. Staples. [0]
 - b. Elmer's Glue. [1]
 - c. Rubber cement. [0]
 - d. Scotch tape. [0]

(ARCHSKL)

- 7. Suppose you are an architect and you had made a drawing of a building on a piece of tracing paper. If you wanted to make several copies of the drawing, what would you do?
 - a. Draw the building over several times. [0]
 - b. Make zerox copies. [0]
 - c. Make blueprints. [1]
 - d. Make photostats. [0]

(ENVV)

8. Imagine that it's several years from now and this neighborhood has really run out of electricity. People can't run their airconditioners or use their washing machines, or even look at television. A nuclear energy company has a plan to turn a large park into a nuclear power plant. They say it will make enough electricity so that people will be able to use all their favorite appliances again. Another group is afraid of the nuclear power plant. They say it could explode and kill everyone. At the very least, they say it will spoil the park. This group would prefer to install several large windmills and solar collectors on the tops of the buildings. The only thing wrong with their plan is that the windmills and solar collectors won't make very much electricity so people will still not be able to use all their appliances. If it were up to you to decide what to do, what would you do?

a. I would take over the park and build the nuclear power plant.

Chances are that nothing will happen and, in the meantime, people will have as much electricity as they want. [1]

b. I would leave the park alone, but I would find another place nearby to build the nuclear power plant. [2]

c. I would build the windmills and solar collectors and explain to people that they can only use their appliances when absolutely necessary. [4]

d. I would leave the solution up to the engineers who are experts in this kind of thing. [2]

(ENVV)

9. A group of children decide to fix up their classroom. They split up into committees and each committee works on some different job. One com-

mittee cleans the room, while another committee makes a new design for arranging the desks. A committee volunteers to move all the furniture into the new design, and the other committee makes decorations and hangs them up. When the room is completed, the principal comes by and compliments the class on their good work. Which committee do you think should feel the proudest of how the classroom project turned out?

- a. The committee that made the decorations since they made everything look pretty. [1]
- b. No one committee since everyone helped out. [4]
- c. The committee that made the design since that's the most creative job. [1]
- d. The committee that cleaned the room because that was the nastiest job. [1]

(ARCHSKL)

10. If you wanted to build a new room in your house or apartment, the best thing for you to do is to:
- a. Make sure you have the owner's permission. [0]
 - b. Make sure you have permission from the Building Department. [0]
 - c. Draw up a floor plan for the room. [0]
 - d. All of these things. [1]

(ARCHSKL)

- 11 Suppose an architect gets a big commission to design a building. I have written some of the jobs that the architect will have to do on the blackboard. I would like you to write down the letter of the first thing the architect should do...the second thing...up to the fifth thing.

- a. Show the client the design. (4 yields [1])
- b. Draw up the design (3 yields [1])
- c. Get a contractor to build the building. (5 yields [1])
- d. Measure the property. (2 yields [1])
- e. Interview the client. (1 yields [1])

* * * * *

Environment Test, Part II (Administered on Day Four)

(Tester reads out loud)

This is another test to find out what children think about buildings and the environment. This time I am going to show you some very pretty slides and ask you questions about what you are seeing. (Turn out the lights and begin the slides.)

(ARCHSKL)

12. One of these pictures shows a famous, old concert hall where symphony orchestras from all over the world play concerts (show slide (1) and slide (2)). If you think the concert hall is the first picture, write down (1). If you think it is the second picture, write down (2). (2 yields [1]).

(ARCHSKL)

13. This is a picture of another very old building in this city (show slide). What do you think is inside this building?
- a. A post office. [0]
 - b. A library. [0]
 - c. A museum. [1]
 - d. A court house. [0]

(ARCHSKL)

14. What is this part of a building called (point to the column in the picture).

It is called:

- a. A beam. [0]
- b. A column. [1]
- c. A porthole. [0]
- d. A stud. [0]

(ENVV)

15. Lots of people drive cars and would like for there to be big highways so they could go from place to place very quickly. Sometimes little houses like these (show slide (1)) have to be torn down so little roads like this one (show slide (2)) can be turned into big highways. Some people think it's okay to tear down the houses because they want to drive on the highways and because the houses are usually very old anyway. Other people disagree. They think people should ride in buses and trains and leave the little houses alone. If it were up to you, what would you decide to do?

- a. I would decide to tear down the old houses and build a nice new highway. [1]
- b. I would ask people to ride on the train so they wouldn't need a highway. [4]
- c. I would build the highway where there weren't any houses. [3]
- d. I wouldn't care one way or the other. [1]

(ARCHSKL)

16. Here are two buildings that look similar (show slide (1) and (2)).

Which one of these buildings is called the Famous Building? Is it (1) or (2)? (2 yields [1])

(ARCHSKL)

17. Here is a picture of something which is used to build buildings (show slide). The proper name for this is:
- a. A hoist. [0]
 - b. A helicopter. [0]
 - c. A rafter. [0]
 - d. A crane [1]

(ENVV)

18. A company that builds lots of big buildings built this giant shopping center in our city (show slide (1)). The company thinks this was a good idea because people can come there to buy lots of stuff and because lots of people will have jobs working in the store. The people who live in the neighborhood disagree. They say the store causes there to be a lot more traffic and noise. Besides, they say, it's bigger than any other building around (show slide (2)). Who do you think is right?
- a. I think the company is right because the store makes a lot of jobs for people and it's good business to buy and sell things. [1]
 - b. I think the neighborhood people are right because it would be better to keep a place where people live quiet and pretty. [4]
 - d. It really doesn't make any difference. Now that the building is there, people will get used to it. [1]

(ARCHSKL)

19. Here are two other buildings that look very similar (show slide (1) and (2)). Which one of these slides is a picture of the Happy Building? Is it (1) or (2)? (2 yields [1]).

(ARCHSKL)

20. What do you think is inside this building (show slide)?

- a. A big garden. [1]
- b. A big church. [0]
- c. A big swimming pool. [0]
- d. A library. [0]

(ARCHSKL)

21. What material do you think this building is built out of (show slide)?

- a. Marble and wood. [0]
- b. Concrete and wood. [0]
- c. Marble and steel. [1]

(ARCHSKL)

22. True or false, this is a picture of people listening to a concert in the Famous Music Hall (Show slide)? (False yields [1])

(ENVV)

23. Lots of people need places to live so a company that builds big apartment houses wants to build a very tall apartment building where this park is (show slide (1)). The people living across the street in these houses (show slide (2)) are complaining because they say the big apartment building will block their view and ruin the park. If you were the architect, what would you do?

- a. I would design a very nice, tall building just like the company wants. [1]
- b. I would quit and find another job because this one is going to be a problem. [1]
- c. I would convince the company to leave the park alone and build some apartments someplace else. [4]

What I Think Test (Administered on Day Three)

(Tester reads out loud)

Some things are more important than others to some children. The professor who is studying how children learn would like to have your opinion on how important or unimportant different things are to each one of you. I have a list of things I am going to read to you. For each thing I read, you will answer either (a), (b), (c), or (d) according to how important you think that thing is (have a list on the blackboard). If you think the thing is important, write down (a). If you think it is sort of important, write down (b), and so forth. For example, suppose you thought the first question was not too important, what would you write down? Good! Does everyone understand? Of course, everything can't be very important, so you will probably have some (a's), and some (b's), and some (c's), and even some (d's).

- How important is:
- (a) Very important yields [4]
 - (b) Sort of important yields [3]
 - (c) Not too important yields [2]
 - (d) Not at all important yields [1]

- (INTV) 1. Getting the right answers to arithmetic problems?
- (COOPV) 2. Wanting to make a lovely gift for someone special?
- (COOPV) 3. Contributing your ideas to a class discussion?
- (EXCITE) 4. Being excited about your class projects?
- (COMV) 5. Doing a little more than you're asked to do?
- (INTV) 6. Spelling words correctly on spelling tests?
- (APPV) 7. Being able to make something beautiful?
- (COOPV) 8. Listening to other people's ideas?

- (APPV) 9. Being careful and neat?
- (COMV) 10. Doing your very best no matter what the job is?
- (APPV) 11. Being able to think up an idea that no one ever thought up before?
- (COOPV) 12. Liking to work together with your classmates on big projects?
- (COMV) 13. Figuring out what needs to be done without being told?
- (COOPV) 14. Being willing to help out a classmate who doesn't understand some schoolwork?
- (COOPV) 15. Helping your parents out around the house?
- (INTV) 16. Taking tests?
- (APPV) 17. Doing scientific experiments?
- (COOPV) 18. Cooperating with classmates?
- (COMV) 19. Being good at things that require you to be patient?
- (COMV) 20. Assuming responsibility when you are needed?
- (INTV) 21. Being able to memorize things?
- (APPV) 22. Being able to write down ideas so other people can understand what you mean?
- (APPV) 23. Thinking up terrific solutions to class problems?
- 24. Being good at things that require you to be strong?
- 25. Pleasing the teacher?
- (COMV) 26. Making an idea come out perfectly?
- 27. Seeing the funny side of things?
- (INTV) 28. Having good penmanship?
- 29. Being able to make a useful gift for someone special?
- (COMV) 30. Trying even if things aren't working out?
- (COMV) 31. Making do with whatever you have to work with?
- 32. Being able to make things with your hands?

- (COMV) 33. Being able to change your mind when things aren't working out?
- (APPV) 34. Making things that people admire?
- (COOPV) 35. Helping the teacher?
- 36. Being able to fix things?
- (COOPV) 37. Listening when the teacher asks the class to pay attention?
- (INTV) 38. Getting good grades on your report cards.

* * * * *

What I Feel Test (Administered on Day Four)

(Tester reads out loud)

Some children are better than others at doing certain things. For instance, sometimes someone is very good at spelling, but not very good at all at helping out around the house. I have a list of things I'm going to read to you. For each thing, you will answer either (a), (b), (c), or (d) according to how good you are at that thing (have a list on the blackboard). If you are very good, write down (a). If you are better than a lot of other kids, write down (b), and so forth. For example, suppose you are better than a lot of other kids on the first thing, what would you write down? Good! Does everyone understand? Of course some people are experts at everything, but most people are good at some things and not so good at others, so probably you'll have some (a's), and some (b's), and some (c's), and some (d's).

How good are you at: (a) Very good yields [4]

(b) Better than a lot of other kids yields [3]

(c) Just fair yields [2]

(d) Not at all good yields [1]

(INTP) 1. Getting good grades on your report card?

(COOPP) 2. Listening when the teacher asks the class to pay attention?

----- 3. Fixing things?

(COOPP) 4. Helping the teacher?

(APPP) 5. Making things that people admire?

(COMP) 6. Changing your mind when things aren't working out?

----- 7. Making things with your hands?

(COMP) 8. Making do with whatever you have to work with.

- (COMP) 9. Trying when things aren't working out?
 ----- 10. Making useful gifts for other people?
 (INTP) 11. Penmanship?
 ----- 12. Seeing the funny side of things?
 (COMP) 13. Making an idea come out perfectly?
 ----- 14. Pleasing the teacher?
 ----- 15. Being strong?
 (APPP) 16. Thinking up terrific solutions to class problems?
 (APPP) 17. Writing down ideas so other people can understand them?
 (INTP) 18. Memorizing things?
 (COMP) 19. Assuming responsibility when you are needed?
 (COMP) 20. Being patient?
 (COOPP) 21. Cooperating with your classmates?
 (APPP) 22. Scientific experiments?
 (INTP) 23. Taking tests?
 (COOPP) 24. Helping classmates out who don't understand their school-
 work?
 (COOPP) 25. Helping your parents out around the house?
 (COMP) 26. Figuring out what needs to be done without being told?
 (COOPP) 27. Working with classmates on big projects?
 (APPP) 28. Thinking up ideas that no one has ever thought up before?
 (COMP) 29. Doing your very best no matter what the job is?
 (APPP) 30. Being careful and neat?
 (COOPP) 31. Listening to other people's ideas?
 (APPP) 32. Making beautiful things?
 (INTP) 33. Spelling words correctly on spelling tests?
 (COMP) 34. Doing a little more than you're asked to do?

- (EXCITE) 35. Being excited about your class projects?
- (COOPP) 36. Contributing ideas to a class discussion?
- (COOPP) 37. Making lovely gifts for other people?
- (INTV) 38. Getting the right answers on arithmetic problems?

Please answer true or false to the following questions:

- (EXCITE) 39. Most of the time I love going to school.
- (EXCITE) 40. Most of the time the work we do in school is very interesting.
- (EXCITE) 41. Most of the children in my class get along very well together.
- (EXCITE) 42. For the most part, teachers in this school are very helpful
when children don't understand something.
- (EXCITE) 43. For the most part, the principal and the teachers in this
school are very fair in their treatment of children.
- (EXCITE) 44. Most of the time I feel that the teachers in this school really
like children.

(False yields [1], true yields [2])

APPENDIX G

RESPONSES AND PROTOCOLS USED TO SCORE INVOLVEMENT

Responses for Scoring Involvement

(INVOLV) Child's opinion of the architecture class

- (1) How interesting is the class?
- (2) What is the best and the worst thing about the class?

(Possible score: [+7] to [-2])

Child's rating of his or her performance in the class

- (1) How hard do I work in the architecture class?
- (2) How does my work turn out?
- (3) How much do I participate in the architecture class?
- (4) How often do I get picked for special architecture projects?
- (5) Would I be a good/poor candidate for architecture school?

(Possible score: [+16] to [+1])

Peer rating of child's performance

- (1) Who in my class would be a good/poor candidate for architecture school?

(Possible score: [+6] to [-6])

Teacher rating of child's performance

- (1) Does child show outstanding interest during the architecture class:

- (2) Does child react poorly during the class?

(Possible score: [+6] to [-6])

Architect rating of child's performance

- (1) To what extent does the child find a task, concentrate on completing a given task, find a position in the group, use tools well, and work cheerfully?

(Possible score: [+12] to [0])

(Highest possible total score: [+47])

(Lowest possible total score: [-13])

(Highest score attained: [+44])

(Lowest score attained: [+ 3])

* * * * *

- (EXCITE) (1) Being excited about class projects.
- (2) Liking to go to school.
- (3) Thinking schoolwork is interesting.
- (4) Thinking classmates get along well with each other.
- (5) Thinking teachers are helpful.
- (6) Thinking the principal and the teachers are fair.
- (7) Thinking the teachers like children.
- (8) Days present at school.
- (9) Thinking there are more good things than bad things about the architecture program.

Children's Involvement Questionnaire, I

Name _____ Room No. _____

(Child's evaluation of class)

1. Usually the architecture class is

[4] very interesting [3] somewhat interesting
[2] somewhat boring [1] very boring

(Child's rating of his or her performance in the class)

2. During the architecture class I usually work

[3] as hard as I can [2] not too hard [1] as little as possible

(Child's rating of his or her performance in the class)

3. Usually the projects I work on come out

[4] very nicely [3] okay
[2] not very nicely [1] poorly

(Child's rating of his or her performance in the class)

4. When we have a class discussion with Ms. Sutton, I usually raise my hand

[3] a lot [2] not too much [1] hardly ever

(Child's rating of his or her performance in the class)

5. In comparison to other children in the class, how often does Ms. Sutton pick you to work on special projects?

[3] a lot [2] not too much [1] hardly ever

(Child's evaluation of the class)

6. What is the worst thing about the architecture class? _____

What is the best thing about the architecture class? _____

(Count [3] for an all positive response, [0] for both positive and negative responses, and [-3] for an all negative response.)

(Teacher rating)

[+6] Check if child shows outstanding interest

[-6] Check if child reacts poorly

Children's Involvement Questionnaire, II

Name _____ Room No. _____

(Teacher reads out loud)

Just suppose some people from an architecture school came to P.S.H. to our class and said, "Boys and girls, we are looking for the best possible students to admit to our architecture school. We want to find children who are very interested in studying architecture and who are hard workers. Whom would you recommend we consider for admission?"

Please write down as many names as you like including your own.

(Peer evaluation of child's performance: give [+1/5] to each child on the list)

(Child's rating of his or her performance: give [+3] when child's own name appears on the list)

(Teacher continues)

Then suppose the committee were to say, "On the other hand, we realize that architecture school is just not for everyone. Some people aren't suited to this kind of work. Whom would you recommend that we definitely not consider for admission to our school?"

Please write down as many names as you like including your own.

(Peer evaluation of child's performance: give [-1/5] to each child on the list)

(Child's rating of his or her performance: give [-3] when child's own name appears on the list)

(Architect rating)

(Consider: Ability to find a task

Ability to concentrate on work

Ability to find a position in the group

Sensibility in using tools

Cheerfulness exhibited during work assignments)

[12] Superior

[9] Outstanding

[6] Excellent

[3] Better than average

APPENDIX H
RESPONSES USED FOR THE INDEPENDENT VARIABLES

Self Esteem (See Appendix E)

Academic Achievement (See Appendix E)

Teacher's Involvement

(TEACC) Teacher's commitment to completing program tasks

1. Did teacher attend the Sunday workshop?

[2] Yes

[1] No

2. Did teacher see to it that children finished assignments?

[3] Always

[2] Sometimes

[1] Never

3. Did teacher offer class's help in whatever way it was needed?

[3] Always

[2] Sometimes

[1] Never

4. During the observation of the log writing lesson, did the teacher

[2] Yes [1] No Read and correct the logs?

[2] Yes [1] No Read completed logs aloud?

[2] Yes [1] No Encourage children to write their own feelings
and ideas.

5. Did the children say the teacher usually had them write their logs a second time?
- 2 Yes
 1 No
6. Did the teacher say she used the project to teach curriculum areas?
- 2 Yes x Count number of areas mentioned.
 1 No
7. Did the children say the teacher did architectural projects in addition to assigned work?
- 2 Yes x Count number of projects mentioned.
 1 No
8. Did the teacher request to be assigned to the program?
- 2 Yes x Count number of positive reasons.
 1 No x Count number of negative reasons.
9. Did the children say the teacher chose to be in the architecture program?
- x Yes (Count number of affirmative answers)
10. Was the teacher outwardly a willing participant in the classroom observations?
- 2 Yes
 1 No
11. Did the teacher say the the program changed the usual conduct of her class?
- 3 Positive change
 -3 Negative change

(TEACR) Teacher's receptiveness to the goals and ideals of the program

1. In the observed classes, were the children encouraged to participate in the design of the lesson?
[3] A lot
[2] Somewhat
[1] Not at all

2. Did the teacher incorporate hands-on work into the observed lesson when it was not specifically intended as an architectural activity?
[3] A lot
[2] Somewhat
[1] Not at all

3. Did the observed lessons allow the children to use a range of skills?
[x] Count number of skills used.
[x] Count number of categories covered.

4. What was the predominant goal structure of the class during the observed lesson?
[3] Cooperative
[1] Individualistic
[1] Competitive

5. How frequently did the teacher mention issues that were similar to the goals of the architecture program in describing her own teaching goals?
[x] Count the number of issues mentioned.

6. In describing her perception of the program goals, how frequently did the teacher mention issues that were relevant ones?
[x] Count the number of issues mentioned.

7. Did the teacher feel her own goals were

[5] Very enhanced by

[4] Enhanced by

[3] Not affected by

[2] In conflict with

[1] Very much in conflict with

the program goals?

8. How frequently did the teacher mention themes which were in keeping with the approach taken in this program in projecting how she would teach an architecture course?

[x] Count the number of similar themes mentioned

For (TEACC)

Highest score possible: [27 + x]

Lowest score possible: [7 + x]

Highest score attained: [29]

Lowest score attained: [11]

For (TEACR)

Highest score possible: [14 + x]

Lowest score possible: [4 + x]

Highest score attained: [32]

Lowest score attained: [6]

APPENDIX I

PROTOCOLS USED FOR MEASURING THE INDEPENDENT VARIABLES

Classroom Observation

Teacher's Code _____ Date _____ Time of Day _____

Architectural Activity _____ Curriculum Integration _____

Number of children participating _____

(TEACC)

1. Describe the lesson goal (What occurred? What was the end result?)

[Use to answer questions regarding log writing]

(TEACR)

2. Describe the goal structure.

[3] Cooperative [1] Individualistic [1] Competitive

(TEACR)

3. Check off the skills which the children used during the lesson.

Mathematics

_____ Counting / Ordering / Tallying

_____ Addition / Subtraction

_____ Multiplication / Division

_____ Ratios / Fractions / Percents

_____ Approximation / Measurement

_____ Categorization / Sets / Comparisons

_____ Graphing

_____ Geometry / Scaling / Mapping

Probability / Statistics

Science Concepts and Processes

Mechanics

Properties of Matter

Strength of Materials / Structure

Social Science and Processes

Bargaining / Negotiation

Sharing / Cooperation / Group Work

Sympathy / Empathy

Attitudes / Values

Language Arts

Reading / Library / Research

Writing Reports / Letters

Oral Reports / Presentations

Listening / Responding

Designing / Conducting Surveys

Productivity

Problem Solving / Decision Making

Planning Ahead

Taking Action

Neatness / Dexterity / Coordination

Other (describe _____)

(Count [1] point for each check mark and [1] point for each category)

(TEACR)

4. Describe the lesson motivation (Did the children have prior knowledge of what was to go on? Were any visual or tactile materials used? Did the lesson allow for manipulation of materials?). _____

[Use to answer question regarding hands-on approach]

(TEACR)

5. Describe the children's participation in the lesson (Could each child contribute in some way? Did lack of skills prevent some children from participating? Were more advanced children challenged?). _____

Rate degree of variation in styles of participation allowed by lesson:
[3] for a lot, [2] for a moderate amount, and [1] for a minimum amount.

(TEACC)

6. Was the teacher a willing participant in the observation?

[2] Yes

[1] No

Teacher Questionnaire

Your answers to the questions which follow will constitute a valuable part of the research that has been carried out this year. Although I realize the awkwardness of this particular situation, please try to be as candid as possible. You may be assured that the information will be reviewed objectively and kept in strict confidentiality.

As always, your time and effort in completing this work is greatly appreciated.

PART I

(TEACC)

Did you request to be assigned to the architecture program?

[1] Yes If yes, say why [count number of positive reasons]

 No If no, say why [Count number of negative reasons]

(TEACR)

What were your teaching goals in relation to this program? [Count number of similar goals]

In what way did the program meet these goals? _____

In what way did it not fulfill your goals? _____

PART II

When you found out your class would participate in the architecture program, how did you relate that information to the children? _____

As the year went on, did you "prepare" the children for their weekly session with the architect?

____ Yes If yes, say how _____

____ No If no, say why _____

What, if any, was the children's expressed anticipation of the weekly session (give examples)? _____

How would you describe the children's relationship to the architect? _____

PART III

(TEACC)

Did you use the ongoing architectural activities in any way to teach the required curriculum areas apart from the assigned curriculum observation?

[1] Yes If yes, briefly describe lesson(s) [Count types of lessons mentioned] _____

____ No If no, say why _____

PART IV

(TEACC)

Did this program involve any additional work or preparation for you outside your normal work requirements?

 Yes If yes, how did you feel about this? [Decide whether answer is positive (count [1]) or negative (count [-1])]

 No

PART V

(TEACR)

How would you describe the architect's teaching methods and goals?

[Count each relevant perception]

(TEACR)

Would you say that your goals in the classroom were

[5] Very enhanced by

[4] Enhanced by

[3] Not affected by

[2] In conflict with

[1] Very much in conflict with

The architect's goals. Please discuss _____

PART VI

(TEACR)

Suppose you were invited to develop an architectural curriculum. What

sorts of lessons/projects would you be interested in proposing? [Count
each theme which is similar to the style of this program]

Children's Interview

Child's Name _____ Room No. _____

(Interviewer says)

Hello! I am doing a project about the architecture program that you were in this year. I need to ask a few, very special children some questions about being in this program. Would you mind helping me out with my project by answering a few questions?

Good! Now, I want to tell you that your answers will be an absolute secret between you and me. I promise not to tell anyone what you've said so you can tell me just exactly what you feel. Okay?

PART I

(TEACC)

Can you remember how you first found out you were going to be in the architecture program? Who told you?

[1] Teacher _____ Can't remember
_____ Architect _____ Other

Remember back to that day? What did you think being in the architecture program was going to be like? (probe: what did you think you would learn? Did you think you would like it? be good at it?) _____

Did you tell your parents?

_____ Yes What did they say? _____
_____ No

PART II

Do you remember the very first day Ms. Sutton came to your class? What did you think about her then? (probe: did she seem mean? nice? boring?)

Now that you've gotten to know Ms. Sutton better, what do you think about her? _____

When Ms. Sutton used to come to your class, did she ever talk to you about herself? (probe: did she tell you about her work? where she lives? her family?)

____ Yes What are some of the things you learned about her? _____

____ No

Suppose someone asked you to write a story about Ms. Sutton, what would you write? (probe: can you make up a story for me?) _____

PART III

(TEACC)

Did your class ever work on architecture projects when Ms. Sutton was not there?

[1] Yes What did you do? [Count each activity mentioned] _____

How did you like doing this? (Count [2] for a very positive response, [1] for a positive response) _____

No Would you have liked to do this? _____

What kinds of things did you learn in the architecture class? _____

There are so many things to learn in school. Do you think (the things named above) are important enough to spend class time on?

 Yes Why? _____

 No Why not? _____

What was the nicest thing that you did in school all year? _____

The worst thing you did? _____

How did you like working on the architecture logs?

 Positive

 Negative

(TEACC)

Did you spend a lot of time writing logs in your class?

 [1] Yes

 No

(TEACC)

Did Mrs. (teacher) usually ask the children to rewrite their logs a second time?

 [1] Yes

 No

PART IV

(TEACC)

What do you think Mrs. (teacher) felt about the architecture program?

(Probe: how important is it to her?) (Count [2] for each indication that the program was very important, [1] for each indication that it was important)

(TEACC)

Do you think Mrs. (teacher) chose to be in the architecture program?

(Count [1] for affirmative answer)

What do you think the principal feels about the architecture program?

(Probe: how important is it to him? how do you know this?) _____

APPENDIX J
THEMES FROM THE CHILDREN'S LOGS

The following are unedited quotes.

Part I: Indications of Pride and Feeling Good in Relation to the Project

Feeling you have done something well.

"I think the picture we made was really pretty."

"Mine (the street orchestra model) came out great!"

"I was happy when Ms. Sutton said she liked my diary a lot."

"I kept thinking I was wrong in my work, but I wasn't. Ms Sutton said I did everything right. I am glad of that."

"I was proud of myself because we all did a good job."

"I felt very smart answering Ms. Sutton's questions."

"I felt good because I did everything well."

"I felt good because I was making my model right."

"I feel good everytime Ms. Sutton comes to our classroom and I feel good everytime I answer a question."

"I felt fabulous because mine was the best."

"When we finished Ms. Sutton said we were smart and I felt proud."

Feeling you have learned something special or been grown up.

"I thought architecture was going to be a hard job, but it is easy to do."

"At first I thought we couldn't do it (build the street orchestra), but now I think we can."

"It (building the house models) was very hard, but the class managed it."

"I learned something big today."

"It was hard, but I did it. The houses came out beautifully. I feel proud of the work we did."

"I hope I can do this next year because then I can be smarter."

"I liked building the magic palace, and it was the first time I was ever in charge."

"I felt happy because I got picked for a special job."

Feeling you are part of a special group.

"I felt like a special girl to have the President give my architect teacher a letter."

"I felt proud and happy because we are the only class I know that has a box from Washington."

"I felt special to be in such a nice class."

"I think our school is the best school in the neighborhood."

"I think it was fun working with you even though I was not in this class from the beginning because I didn't know someone black could think of something so magnificent."

"When Ms. Sutton came in today I felt special because she picked our class to do architecture with her."

Liking the school, teachers, or classmates.

"I really like my school because it's creative. I can just picture people saying, 'what a creative school.'"

"I think Ms. Sutton and Mrs. A are sensational ladies."

"I think Ms. Sutton is the best architect teacher in the world. She understands us kids."

"This is what I think of you. I think you are a nice person to be with."

You make me think I was somebody special. I felt really good about that project we did, and by the way, I will really miss you when you're gone. But like I said, you are a nice person and I think you should know that. I think you showed me how to share and to care for others, and I enjoyed working together with you. Deep inside of me I felt like I did well and worked hard."

Part II: Indications of an Awareness of the Architectural Profession

Showing admiration for an architect's work.

"Today Ms. Sutton told us about her job. I never knew that being an architect is so hard."

"I learned that it takes a lot to be an architect. It is not so easy to be an architect. It takes a lot of time, but being an architect can be fun."

"Today we learned that Ms. Sutton is the best decorator in history."

"I really think Ms. Sutton is fabulous. She is a mastermind in architecture."

"I learned how architects do their projects and where their ideas come from and how they figure out what materials to use. So you see we are doing a great thing here."

"I always liked your work. Now I know you're black and I LOVE your work."

Feeling like an architect.

"I felt like a real architect."

"Everytime Ms. Sutton comes in I start feeling like an architect--a real big one too!"

"When I was making my house I was thinking I was an architect."

Aspiring to be an architect.

"I like Ms. Sutton so much that I'm thinking about being an architect."

"I never knew how hard it is to be an architect. You're the first real architect I knew. Thank you for teaching me about architect's work because I think when I grow up I'll be one too."

"I hope I learn more and remember it so I can become a real architect."

"My opinion of this job (making a cardboard model) is that one of the children will be an architect when he or she grows up."

Part III: Indications of Excitement about a Successfully Completed Project

Imagining how nice something will turn out.

"I think the prints are going to come out great. I hope they do."

"I wish my house will come out the best."

"I think the street orchestra is a wonderful idea and I hope other people will think so also. I wonder what it's going to look like when it's finished."

"I sure hope the street orchestra will be a success."

Anticipating the completion of some project.

"I can't wait to finish my house."

"I can't wait to start building the street orchestra."

"I put all my hopes into finishing this (the street orchestra)."

Anticipating admiration

"I can just imagine the street orchestra in the small yard. I can just see people walking through and saying. 'what a pretty street orchestra!'"

"Our class is going to make a street orchestra. People will come and

ask things about it. It will be wonderful. Almost everyone will see it."

"I can't wait to see the street orchestra. When we finish it people and children will come and enjoy themselves and they will say that it is a wonderful job."

"I want the street orchestra to be the best thing we ever made. Then our school will be popular."

APPENDIX K
ANCOVA TABLES

TABLE 14

ANCOVA For the Fourth Grade for Variable (COOPV)

(COOPV) Child's rating of the importance of being cooperative

(COOPV) Post-test by (GROUP) with (COOPV) Pre-test

<i>Source of Variation</i>	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Significance of F</i>
Covariates (COOPV)	278.63	1	278.63	18.90	0.00
Main Effects (GROUP)	121.24	3	40.41	2.74	0.05
Explained	399.87	4	99.97	6.78	0.00
Residual	1,061.30	72	14.74		
Total	1,461.17	76	19.23		

TABLE 15

ANCOVA For the Fifth Grade for Variable (COOPV)

(COOPV) Child's rating of the importance of being cooperative

(COOPV) Post-test by (GROUP) with (COOPV) Pre-test

<i>Source of Variation</i>	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Squares</i>	<i>F</i>	<i>Significance of F</i>
Covariates (COOPV)	219.12	1	219.12	12.14	0.00
Main Effects (GROUP)	984.46	4	246.12	13.63	0.00
Explained	1,203.58	5	240.72	13.33	0.00
Residual	1,390.37	77	18.06		
Total	2,593.95	82	31.63		

TABLE 16

ANCOVA For the Fourth Grade for Variable (COOPP)

(COOPP) Child's rating of his or her cooperative abilities

(COOPP) Post-test by (GROUP) with (COOPP) Pre-test

<i>Source of Variation</i>	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Squares</i>	<i>F</i>	<i>Significance of F</i>
Covariates (COOPP)	404.37	1	404.37	26.45	0.00
Main Effects (GROUP)	126.38	3	42.17	2.76	0.05
Explained	530.75	4	132.69	8.68	0.00
Residual	993.82	65	15.29		
Total	1,524.57	69	22.10		

TABLE 17

ANCOVA For the Fifth Grade for Variable (CS COR)

(CSCOR) Cumulative record card grades relating to cooperative abilities

(CSCOR) Post-test by (GROUP) with (CSCOR) Pre-test

<i>Source of Variation</i>	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Significance of F</i>
Covariates (CSCOR)	28.83	1	28.83	45.48	0.00
Main Effects (GROUP)	6.26	4	1.56	2.48	0.05
Explained	35.08	5	7.02	11.07	0.00
Residual	53.24	84	0.63		
Total	88.32	89	0.99		

TABLE 18**ANCOVA For the Fourth Grade for Variable (ENVV)****(ENVV) Child's sense of responsibility towards the environment****(ENVV) Post-test by (GROUP) with (ENVV) Pre-test**

<i>Source of Variation</i>	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Squares</i>	<i>F</i>	<i>Significance of F</i>
Covariates (ENVV)	579.92	1	579.92	11.88	0.00
Main Effects (GROUP)	530.03	3	176.68	3.62	0.02
Explained	1,109.95	4	277.49	5.69	0.00
Residual	2,830.65	58	48.80		
Total	3,940.60	62	63.56		

TABLE 19

ANCOVA For Fifth Grade for Variable (ENVV)

(ENVV) Child's sense of responsibility towards the environment

(ENVV) Post-test by (GROUP) with (ENVV) Pre-test

<i>Source of Variation</i>	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Squares</i>	<i>F</i>	<i>Significance of F</i>
Covariates (ENVV)	725.39	1	725.39	18.98	0.00
Main Effects (GROUP)	1,237.93	4	309.48	8.10	0.00
Explained	1,963.27	5	392.66	10.27	0.00
Residual	2,407.71	63	38.22		
Total	4,370.99	68	64.28		

TABLE 20

ANCOVA For the Fifth Grade for (ARCHSKL)

(ARCHSKL) Child's knowledge of the elements and skills of architecture

(ARCHSKL) Post-test by (GROUP) with (ARCHSKL) Pre-test

<i>Source of Variation</i>	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Significance of F</i>
Covariates (ARCHSKL)	2.39	1	2.39	0.37	0.54
Main Effects (GROUP)	128.58	4	32.14	5.02	0.00
Explained	130.97	5	26.19	4.09	0.00
Residual	589.56	92	6.41		
Total	720.53	97	7.43		

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