



The effects of the implementation of creativity training in the elementary school social studies curriculum
by Claudia Clague Hoy Tweet

A thesis submitted in partial fulfillment of the requirements for the degree of DOCTOR OF EDUCATION
Montana State University
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Abstract:

Experimental social studies curricula and teaching procedures were developed at the McKinley School in Butte, Montana, during the 1977-78 school term with fifth and sixth grade students of comparable classes.

Three groups were selected at each grade level. The Experimental1 groups had creativity training incorporated into their social studies program. The Experimental2 groups had creativity training dispersed throughout the curriculum. The Experimental3 groups acted as a non-treatment group.

Instruction was conducted by regular classroom teachers and the testing was supervised by a school counselor. Tests used were the Torrance Test of Creative Thinking and the Test for Inquiry Social Studies.

Data obtained from pre, post and retention testing were used to generate class means. The class means were compared by the student's t-test to determine if there had been a change in means after instruction. The data indicated that the Experimental1 groups' social studies means were significantly above the Experimental2 and Experimental3 groups' means. The creativity means of the Experimental1 and Experimental2 groups were significantly above the means of the Experimental3 groups on the sub-tests of fluency and originality.

Indications were that creativity skills had been increased by either teaching strategy but that social studies skills were only increased by the Experimental1 procedures.

An Anova was employed to determine if there were interactions between students' intelligence or sex and teaching methods. There was no interaction related to the sex variable. There was some main treatment effect between teaching methods and the intelligence factor with the high and low intelligence groups.

Recommendations from this study considered both the areas of creativity training and social studies. Recommendations for social studies are the inclusion of creativity training within the social studies curriculum and use of the local community for social studies enrichment. Creativity recommendations are the use of creativity training and creative problem solving in a spiral effect throughout the elementary curriculum.

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THE EFFECTS OF THE IMPLEMENTATION OF CREATIVITY TRAINING
IN THE ELEMENTARY SCHOOL SOCIAL STUDIES CURRICULUM

by

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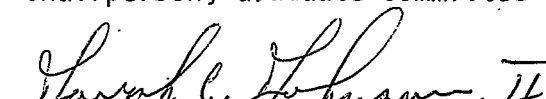
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ABSTRACT

Experimental social studies curricula and teaching procedures were developed at the McKinley School in Butte, Montana, during the 1977-78 school term with fifth and sixth grade students of comparable classes.

Three groups were selected at each grade level. The Experimental₁ groups had creativity training incorporated into their social studies program. The Experimental₂ groups had creativity training dispersed throughout the curriculum. The Experimental₃ groups acted as a non-treatment group.

Instruction was conducted by regular classroom teachers and the testing was supervised by a school counselor. Tests used were the Torrance Test of Creative Thinking and the Test for Inquiry Social Studies.

Data obtained from pre, post and retention testing were used to generate class means. The class means were compared by the student's t-test to determine if there had been a change in means after instruction. The data indicated that the Experimental₁ groups' social studies means were significantly above the Experimental₂ and Experimental₃ groups' means. The creativity means of the Experimental₁ and Experimental₂ groups were significantly above the means of the Experimental₃ groups on the sub-tests of fluency and originality.

Indications were that creativity skills had been increased by either teaching strategy but that social studies skills were only increased by the Experimental₁ procedures.

An Anova was employed to determine if there were interactions between students' intelligence or sex and teaching methods. There was no interaction related to the sex variable. There was some main treatment effect between teaching methods and the intelligence factor with the high and low intelligence groups.

Recommendations from this study considered both the areas of creativity training and social studies. Recommendations for social studies are the inclusion of creativity training within the social studies curriculum and use of the local community for social studies enrichment. Creativity recommendations are the use of creativity training and creative problem solving in a spiral effect throughout the elementary curriculum.

Chapter 1

INTRODUCTION

Today's educators are faced with a variety of problems. They must adjust out-moded educational content and methodology to meet the needs of today's students. Some tried practices may have to be sacrificed and new educational procedures developed to fill in the gulfs the sacrifices have left in the educational scenario.

If the world would always remain the same, it would be best to teach students only the principles underlying the existing order. But things must change so that they can remain the same. The best students are able to obtain from education, is not information, but the method and spirit of exploratory thinking; the ability to face new situations, search and plan to meet changing conditions with new remedies and resources. Educators should distinguish the meat from the bones but on the average they have taken the preference for the bones (DeVito, 1976:49).

Our national survival depends on the ability of today's youth to solve and inquire into tomorrow's problems, even though we cannot know exactly what those problems may be. This calls for an effort to train today's youth to consider social and personal problems creatively. Creative thinking for most students is only an occasional involvement because they are rarely encouraged to engage in it. This situation is even more noticeable in elementary education. A curriculum and instructional method that rewards the projection of students' thinking into creative areas and which at the same time makes clear

the culture's value pattern is required (DeVito, 1976:49).

Although it is important that educators initiate leadership in creative thought, not all educators are receptive to the change which an inquiring student's mind will demand. But constructive creative thought in the classroom is not unreasonable. Man's potential for inquiring creatively is, perhaps, his least tapped potential. Education can develop this creative thought in students by allowing for production of new, original and unique solutions to problems, and by the uncovering of new patterns of ideas (DeVito, 1976).

Creative thinking involvements in education should provide for:

1. Aiding students in acquiring creative traits and inquiry skills.
2. Encouraging student to student interaction.
3. Structuring lessons posed as problems for students to analyze, gather data on, and form generalizations and concepts about.
4. Developing a student's confidence and faith in his/her ability to learn.
5. Prizing independent judgments made upon facts and personal values.
6. Recognizing strengths and limitations in individuals.
7. Allowing for deferred judgment until information is available.
8. Allowing for flexibility in entertaining points of view

other than the individuals'.

DeVito summarized the thoughts of some educators concerned with creative thought development when he pointed out that students should be encouraged to think divergently and creatively and that students should not be willing to accept all knowledge they are exposed to. They should be taught and allowed to think on issues. The timing of educators may be off, in that educators have not worked to produce thinking students, but given the luxury of more time, educators can work for the development of the creative thought mode. The divergent process has been characterized as creative thought, and some educators are currently interested in developing the creative process in students (Torrance, 1970).

It is an accepted principle of education that each individual should receive equal opportunity to develop his/her creative potential. America cannot afford to lose creative thought and potential that has been left unstimulated. Unused creativity is a blatant loss of brain power (Banks, 1973). Scientists seek constantly for new ways to approach the problems of modernization and the space age while politicians work desperately to find creative ways to meet world problems, but educators are leaving much of our natural resource of creativity untouched (Smith, 1966). Erich Fromm, in the "The Creative Attitude," vividly described how education for creativity is nothing short of education for living:

To be creative means to consider the whole process of life as a process of birth, and not to take any state of life as a final stage. Most people die before they are fully born. Creativeness means to be born before one dies. (Fromm, 1959:53-54).

Creativity exists in all individuals. If creativity is nourished, it thrives and flourishes; if it is oppressed, it declines and withers. It is one thing to accept responsibility for nurturing students' creativity, but quite another thing to bring it to fulfillment. The stimulation of creativity, carried on continually, calls for special efforts and a climate that germinates ideas that provide for free expression of thought (Dunfee and Sagle, 1966).

In order to provide for creative development in students, creativity training could be incorporated within the curriculum. Some of the areas of the elementary curriculum are by their nature, more conducive to the inclusion of creative instruction (Dunfee and Sagle, 1967).

A curricular area that is receptive to creativity instruction must provide a rich reservoir of knowledge - words, facts, concepts, and principles - to draw on in implementing the intellectual abilities that are paramount to creativity development. Attitudes such as curiosity about the environment, open mindedness, willingness to try out new ideas, and a willingness to elaborate upon old concepts should be generic to the curricular area in which creativity training is incorporated (Dunfee and Sagle, 1967).

Dunfee and Sagle have used this criteria to evaluate the areas of elementary curriculum that may be receptive to the inclusion of creativity training and have determined that social studies is an appropriate discipline, in which the creativity of students may be developed.

Both the content and the method used to develop learnings in social studies are in themselves germinal of creativity. Consider first the content of the area of learning. Implicit in all social studies content is man's creativeness in transforming his environment and making visible the love for the world in which he lives (Dunfee and Sagle, 1967:207).

There is an elaboration on this statement by Dunfee and Sagle when they conclude that by inclusion of creativity training in social studies, the learning in the area is enriched. The learnings take on new dimensions as creative abilities increase. There is better organization of the thought processes, higher motivation for learning, and meanings become more vivid and realistic. To summarize they state:

There is, in short, a reciprocal relationship between areas of learning in social studies and the creative activities carried on in them (Dunfee and Sagle, 1967:216).

Statement of the Problem

Through the work of Torrance (1967), Parnes (1967) and Smith (1966) it has been shown that teachers can provide creativity training to students. Previous research and curriculum work were directed to

general creativity training.

The problems which this study questioned are:

1. Is there another approach to creativity training and curricula areas in which creativity skills can be stimulated?
2. Is social studies an appropriate and receptive area of the elementary curriculum for the inclusion of creativity instruction?
3. Can creativity training affect students' social studies skills?

In order to review these questions a situation would be required in which creativity training was provided within the social studies curriculum. Alternate situations would be needed in which creativity training was dispersed throughout the curriculum and where no specific creativity training was provided.

By comparing these three programs it might be determined if social studies was a receptive area for creativity instruction and if students' creativity and social studies skills were affected by exposure to a creative approach to social studies.

Need for the Study

The need for this study was explained by considering topics that are pertinent to the nature of the dissertation. The topics presented which established a need for this study are:

1. Ways of meeting students' need of creative expression and education.
2. Testing of the theoretical inclusion of creative thought training in social studies education.
3. Counteracting the lack of research dealing with the feasibility of the inclusion of creative thought training in the elementary social studies curriculum.

Ways of meeting students' need of creative expression. Students have a need to express their creativity and to experience creative learning. Individuals are driven to experiment and test, to correct errors and to modify speculations. Adults and children cannot tolerate too much uncertainty. Even after discovery, there is still disharmony until the discoverer communicates his/her finding to another individual. This is why it is natural for children to want and need to learn in creative ways (Torrance, 1970:13).

In considering the obviousness of the creative need, Torrance stated:

It should be clear that the creative needs are those which lead us to respond constructively to new situations, rather than merely to adapt or adjust to existing situations (Torrance, 1970:15).

In studies conducted by Torrance in the United States and foreign countries, the consensus of opinion of educators and specialists in child growth and development was that the creative needs of students include:

1. A need for a respect of their curiosity.
2. A need to be challenged and attempt difficult tasks.
3. A need to give oneself completely to a task.
4. A need to be honest and to search for the truth.
5. A need to be different, to be an individual.

This listing of student needs can be correlated to steps in the creative process and to educational practices directed to the development of creativity. The programs developed in this study are directed to meeting these needs.

Testing of the inclusion of creative thought training in social studies education. An educator who has developed a theoretical method for the inclusion of creativity training in the elementary curriculum is James A. Smith, of State University of New York at Oswego. Smith has produced methodology for inclusion of creativity training in many of the elementary curriculum components. Smith developed only a model and supplied suggestions for the instructional procedures which were aimed at the development of creative thought in students. He has not given empirical evidence as to field tests of his theories.

In his work Creative Teaching of the Social Studies in the Elementary School (1967), Smith developed basic principles of creative teaching and specific methods to incorporate instruction in the development of creative thought into the elementary social studies curriculum. Smith's instructional method encompassed techniques in

creative social living by: (1) an organization of skills in creative teaching; (2) uses of standard textbooks for creative teaching; (3) value and character development through creative instruction, and (4) procedures for the development of group living skills through creative thought development. Smith elucidated his philosophy concerning the need of creative thought development in social studies when he wrote:

Since the areas of social studies is the part of the curriculum which attempts to teach children the problems of man and his relation to other men (the skills of living together, the methods of identifying, refining, and solving problems, the skills of research, scientific investigation, and the scientific attitude toward life problems), the elementary school must play a vital part in developing the creativity of each child and in helping children find creative ways of living together. Through the social studies program children learn most directly how to take their places as participating, contributing citizens in a democratic society. And in a democratic society individuals and their individuality count! (Smith, 1967, Preface).

The instructional methods and curriculum developed in this study tested many of Smith's principles.

Counteracting the lack of research on the inclusion of creativity training in elementary social studies. Even though there have been procedures developed for the stimulation of students' innate creative abilities, there have been few textbooks that have addressed themselves in this direction (Torrance, 1970). In considering educational research on the use of creativity training, Parnes (1967)

listed studies which occurred between 1959 and 1966. These studies were aimed at investigating the feasibility of developing creative thought processes in students, grades kindergarten through high school. All the studies indicated that creativity could be developed in students, but the creative experiences were general in nature or generic to the fields of creative dramatics, visual arts, music or science. None were described in which training in creative thought processes was approached in the area of social studies.

In dissertation abstracts and ERIC from 1967 through 1976, there were references to over forty studies dealing with the development of creative thought processes in elementary students. These studies dealt with creativity development in a general context, or with specified intelligence levels. One study dealing with the stimulation of creative potential in ninth grade social studies students in Georgia, indicated that student creativity levels were raised by instruction in creative processes and that their social studies problem-solving techniques were expanded (Judge, 1974).

Another study by Hutchenson in 1967 indicated that the only area of the creative skills tested by the Torrance Test of Creative Thinking, which was difficult to change, in elementary students was the area of flexibility (Parnes, 1967).

A study conducted by Gross, 1976, indicated substantial interest by high school teachers of social studies in creative thought

development. The study also noted that some social studies teachers were using an increasing amount of instructional time in creative approaches to social studies, and were including cultural awareness and problem-solving questions related to democratic heritage issues in their social studies inquiries.

In reviewing educational journals, text book reviews, and in interviewing social studies teachers, this researcher did not locate curricula or instructional methods, currently used and tested, which were specifically addressed to the development of creative thought in elementary students through social studies instruction.

Questions to be Addressed by this Study

Major questions concerning students' skills were considered by this study. The skills that were analyzed were related to students' development in both the areas of creativity and social studies.

These questions were:

1. Is students' creativity development affected by the inclusion of creativity training in the social studies discipline?
2. Can students' creativity development be provided for by not including creativity training specifically in the social studies program but by dispersing creativity training throughout the curriculum?
3. What is the effect on students' creative development skills

when no creativity training is provided either within or outside of the elementary curriculum?

4. Are students' skills in social studies changed by the inclusion of creativity training in the social studies instruction?

5. Are students' social studies skills affected by a lack of creativity training in the social studies instruction?

6. What is the effect on students' social studies skills when no creativity training is provided either within or outside of the social studies area?

General Procedures

The procedures of this study follow a chronological order.

Procedure One -

The first procedure was to complete an extensive review of the literature in the areas of creativity training and social studies instruction. This review formed a basis for developing definitions of terms used in the study. The literature from 1954 to 1978 was reviewed by an ERIC search.

Procedure Two -

The following procedure was to obtain a verification from a school district's central administration that the testing and implementations involved in the study could be carried out in the district. This verification was obtained from the administration

in Butte, Montana, and from the principal of the McKinley School in that city.

Procedure Three -

Two instructional plans were developed for the use of creative techniques aimed at the stimulation of creative thought processes in students. One plan called for creativity training to be incorporated within the social studies area. The other plan dispersed creativity training throughout the curriculum.

Procedure Four -

Because the local community was used as a data bank for developing creativity skills in social studies, the cooperation of representatives of local community groups and agencies was obtained.

Procedure Five -

At the beginning of the 1978 school year at the McKinley School, three groups of students were selected. One group had creativity instruction incorporated within the social studies curriculum, a second group had creativity instruction provided but not within the social studies. The final group was not provided with creativity instruction. The described groups were selected at both the fifth and sixth grade levels.

Procedure Six -

After the selection of the student groups, the teachers dealing with the groups were provided with in-service instruction as to their

potential role and instructional methods to be used with the students in their group.

Procedure Seven -

Before instruction procedures were begun, the students in all groups at each grade level were pre-tested in the areas of creativity and social studies skills.

Procedure Eight -

Detailed data gathering mechanisms were established to monitor the instructional experiment.

Procedure Nine -

The procedures in which the teachers had been trained were initiated in the established groups at the fifth and sixth grade levels.

Procedure Ten -

At the end of the experimental period, from November to March, the students in all the groups were post-tested in creativity and social studies. The same tests utilized in the pre-testing experience were used in the post-testing.

Procedure Eleven -

Using the data from the pre-testing and the post-testing, means of all the groups were computed and compared statistically.

After a two-month period, students were again tested on the same tests and retention scores determined. Difference from pre-test to

retention test were compiled and again compared statistically.

Procedure Twelve -

After all data was compiled, a statistical analysis was implemented at Montana State University.

Limitations

Specific limitations were generic to this study.

1. The site of the study was selected where the cooperation of the school district and a specific building principal was obtained.

2. Community data sources were restricted to those which correlate to the social studies materials used for the appropriate classes.

3. The class units of the experiment were established self-contained classrooms.

4. Since the study was conducted in only one city, conclusions were only applicable to that particular city.

5. The instruction was conducted by classroom teachers, and not specialists in the areas of creativity and social studies.

Delimitations

1. The instruction period was from November, 1978 to March, 1979. The period provided full time allotments in which to conduct post and retention testing.

2. The study was limited to one school building.

3. The criteria of the creative process suggested by Smith (1967) were categorized into characteristics of creativity as given by Torrance (1963). The Torrance characteristics were originality, fluency, flexibility, and elaboration of thought.

The observation of these four characteristics was used to evaluate the stimulation of the creative process in students.

Definition of Terms

Creativity. Creativity as defined by Smith was "... the ability to tap one's experiences and to come up with something new. This new product need not be new to the world, but it must be new to the individual" (Smith, 1967:8).

Smith elaborates on this definition by explaining, "Because creativity is a process and a product, attention must be paid to the process if it is to be developed in students" (Smith, 1967:8).

Principles of the General Creativity Process. For the purposes of this thesis, the characteristics of the creativity, as described by Smith (1967), were classified into the categories of expressions of creativity as given by Torrance (1962).

The classification was given as:

Torrance

Smith

1. Something new and different results

1. Originality _____
2. Divergent thinking takes place
3. The outcomes of inquiries are unpredictable.
4. The learner sets his/her own goals.
5. Self-initiated learning is stimulated.
2. Fluency _____
6. Self-criticism is constructively developed.
7. Many new ideas are developed.
8. Open-ended situations are utilized.
3. Flexibility _____
9. Students explore ideas on their own.
10. The process is as important as the product.
4. Elaboration _____
11. Ideas are explored.
12. Motivational tensions provide for elaboration of thought.
13. Pre-conscious thinking takes place.
14. New thinking skills are developed.

15. Creative explorations appear.
16. Ideas are explored to provide an orientation to success.

General Creativity Instruction Procedures. The instructional procedures utilized in this thesis were taken from the work of Smith (1967) and Parnes (1967). These techniques included:

1. Group and individual creative development.
2. Use of the textbook as a resource material.
3. Class discussions.
4. Brainstorming sessions.
5. Use of deferred evaluations and judgment.
6. Encouragement of original and flexible ideas.
7. Encouragement of a profusion of ideas on a central theme.
8. Encouragement of elaboration of ideas.
9. Making unusual ideas useful.
10. Explorations of the community as a data bank for social studies information.

Original Thought. Original thought was defined by Torrance as "thought that is new to the individual, but not necessarily new to a total group" (Torrance, 1963:73).

Fluency of Thought. Fluency of thought denoted an increase in ideas related to a specific topic (Torrance, 1963).

Flexibility of Thought. Flexibility of thought denoted the

ability to change direction of, add to, or delete from a thought (Torrance, 1967).

Elaboration of Thought. Elaboration of thought was characterized by the ability to enlarge upon or expand an idea. It also denoted finding new uses for the idea (Torrance, 1967).

Social Studies Inquiry. The inquiry process of social studies was defined as the learning experience composed of the acquisition of knowledge linked to value clarification experiences (Banks, 1972).

Acquisition of Knowledge. The acquisition of knowledge was defined as a hierarchical classification of intellectual abilities which included knowledge, comprehension, application, analysis, synthesis, and evaluation. This hierarchy followed Bloom's taxonomy (Banks, 1973:124-127).

Value Clarification.

This process involves investigation of a value or type of belief, centrally located within one's total belief system about how one ought or ought not to behave, or about some end-state of existence worth, or not worth attaining (Banks, 1973:407).

Problem Solving. This was defined as the scientific method of investigation which includes:

1. Definition of a problem.
2. Collection of data.
3. Forming tentative conclusions.
4. Developing concepts and generalizations.

5. Testing the concepts and generalizations.

6. Re-evaluation to fit personal conscience or group consensus (Banks, 1973).

Decision Making. This process was defined as a combining of social knowledge and value inquiry to form a rational decision for social action (Banks, 1973:29).

Summary

Creative expression is important in the life and development of each individual. The development of this creative process is particularly important in the education of elementary age children, if they are to keep their innate creativity and mature into creative adults. In order for creative thought expression to be meaningful to elementary children, creativity development should be included in the curriculum.

Social studies by its nature, is considered an appropriate curricular area for the inclusion of teaching techniques directed to the development of creativity in students.

Procedures were proposed in this study to explore the question of the inclusion of creativity training in elementary social studies classes. These procedures were couched in the format of an experimental study to determine the advisability and feasibility of using social studies as a vehicle for the subsuming of creativity

instruction in the total elementary curriculum. Specific limitations, delimitations, procedures, and definitions were presented as they apply to the construction and implementation components of this study.

Chapter 2

REVIEW OF LITERATURE

Introduction

An extensive review of the literature dealing with creativity and the development of divergent thought processes was conducted for the purpose of this paper. The area of social studies was also investigated to determine if this curricular field was receptive to the inclusion of creativity instruction for elementary students.

The goal of this review was to develop, through a critical appraisal of various and numerous writings in both subjects, a greater understanding of what was known about each area and if the social studies and creativity instruction shared a common ground. In order to develop a logical and adequate understanding of the interrelationship between creativity and social studies, various questions were posed by the investigator as the literature was reviewed and critiqued.

The following specific questions were considered:

1. What have leading educators and theorists stated concerning the development of creativity and thought processes?
2. What information and research was available that deals with the concept of creativity?
3. Can creative skills be developed and stimulated in

elementary students?

4. Were there realistic programs developed for increasing students' creative skills?

5. Can creativity instruction be included in the teaching of social studies?

6. Are there methods of social studies instruction which are conducive to the inclusion of creativity instruction?

CREATIVITY RESEARCH

American education has been charged with the responsibility of developing students that are capable of making reflective personal and societal decisions that will influence future directions of world nations (Banks, 1972). A principal goal of the educational program is to ensure that students acquire substantive abilities to synthesize intellectual skills that enable them to formulate meaningful decisions. This concept assumes that individuals are not born with the ability to solve all problems, but that decision-making and creative thinking is composed of a set of interrelated skills that can be identified and systematically developed by educational methods through education (Banks, 1973:4).

Thought Processes Related to Creativity

Education is committed to developing complete thought processes and capabilities in students. Guilford (1956) conducted research into

the structure of human intelligence and divided the components of intellectual functions into multiple abilities classified as: contents, processes and products, and operations. Operations were classified:

Convergent thinking; production of 'right answers' dependent upon the accumulation of information.

Divergent thinking; production of varied, fresh or novel answers dependent on information (Guilford, 1965).

Education has been concerned with the convergent process but may not have given equal emphasis to the divergent mode of thought. Convergent thought is depicted as accumulations of knowledge, comprehension, analysis, applications, synthesis and evaluation processes.

The divergent process is characterized by openness to evidence and operations so that the understanding of knowledge is linked to new and flexible thought forms.

Thought patterns have two basic operational modes:

1. The unconscious, primary mode.
2. The conscious, logical mode.

Convergent processes originate in the logical mode while divergent processes develop in the elaborations of fantasies from the unconscious into the conscious. The divergent process employs the primary mode, but is not overcome by it; so that transfers into the conscious mode are possible for elaboration into logical decisions.

Because activities of the unconscious are also available to the conscious, the "insight" and solutions sensed in the unconscious are later used to analyze, solve problems, test, and refine in the conscious process. This mixture of conscious and unconscious thought is the basis for creative thought. Creative thought is a necessity in the total development of the individual and essential in the educational growth of students.

Smith (1967:9) proposed:

Creativity has become a precious commodity. The schools must play a substantial role in producing this commodity in the citizens it turns out for the democratic way of life.

Problem-Solving Related to Creativity

Man has been described as a complete problem solving mechanism with sequential steps for creative growth. This creative problem-solving phenomena is a prime concept of creativity development. The development of creative problem solving passes through distinct stages:

1. The pre-conscious period of definition of a problem.
 2. The interlude in which the problem solver works over the problem.
 3. The stage in which the solver allows the problem to rest.
 4. The stage of testing the validity of the problem solution
- (Rugg, 1963).

This creative thought process is the transformation of an impulse by mental techniques and sign manipulations into a result. All sections of the brain are called upon to work together. The right brain is responsible for the vision, the impulse, the intuition; and the left section for the manipulation of the tools of the language appropriate for expression of the vision. Both brain hemispheres must work together for the development of a new idea. Utilizing both convergent and divergent thought forms builds a feeling of harmony associated with creating a new or unique thought. In reference to this generalization, Ferguson stated:

The view of creativity as a non-intellectual activity fails to take into account the dynamic, unitary, and coherent nature of the brain. Emotion and intellect, freedom and discipline, reason and processes, chaos and order -- all of these apparent opposites can exist in creative harmony in the human brain (1967:241).

Creative thought is necessary for creative problem solving. Its development is pertinent to the growth of creative thought processes in individuals. The machine can "think" logically and solve problems but only the human being can think "creatively". Rugg in 1968 made the statement that,

Only man can create, for only men have the capacity to turn signals into symbols. The higher animals and such clever machines as Grey Walter's 'Spectralatrix' can turn signals into gestural signs. But neither animals nor machines can achieve a symbolic transformation (p. 153).

Man is a complete problem solving mechanism with sequential steps

for creative problem solving growth. This growth aims at the progress through a set of distinct stages which lead to the individual's involvement of the creative process.

Rugg's Creative Process

Rugg (1963) expanded the creative process to include five stages. These stages were given as:

1. The pre-conscious period of definition of the problem.
2. The second interlude in which the problem solver works over the problem.
3. The stage in which the solver allows the problem to rest.
4. The stage of insight into the problem solution.
5. The stage of testing the validity of the solution.

Rugg did not believe the subconscious lies asleep waiting to be called on at certain times or coming to the fore only in dreams, or in times when the organism is off-guard. He believed that the subconscious takes an active part in everyday living. Actually, he seemed to feel that it is the unconscious mind that does most of our thinking. Rugg's theory differs from other writers on the subject of creative thinking in that he held that creative capacities in all sectors of thought are on a continuum of mental activity.

Rugg indicated that the essential quality of the creative person lies in his ability to draw from as many of life's experiences

as possible. His writings emphasized that creative thought happens when people place their minds in a "transliminal chamber", or an area somewhere between the conscious and the unconscious. The more open that the mind is to experiences, the greater the possibility of creativity or of preconscious content in the conscious process.

Necessity of Creative Imagination

All human beings, to a greater or lesser degree, possess the ability to imagine. This imaginative ability can be trained to be used more productively in the creative processes. Rugg explained this concept when he wrote:

The history of civilization is essentially the record of man's creative ability. Imagination is the cornerstone of human endeavor; it is, without doubt, responsible for man's survival as an animal; and it has caused him, as a human being, to conquer the world (Rugg, 1963:ix).

The potential power of creative imagination is all but limitless. The fact that creative imagination is the pristine power of the human mind has long been recognized by the world's great thinkers. Civilization itself is the product of creative thought. Imagination has been responsible for the major discoveries and inventions of world and American society. It can be utilized to solve America's public problems, community problems, domestic problems, and international confrontations.

In order to develop creative imagination exercise of the ability

is necessary. To develop creative imagination, the mind needs not only to exercise, but to be filled with material out of which ideas can be best formed. The richest fuel for ideation is experience.

Firsthand experience provides the basis for imagination that is apt to stay with the individual and bubble up when called upon.

Hobbies, arts, travel, reading and most important training in creative thought development have proven to be valuable sources for the development of creative imagination (Rugg, 1963).

Creative imagination can be considered a problem-solving process in terms of the following procedures:

1. Fact-finding
2. Idea-production and development
3. Solution-finding with evaluation and adoption (Rugg, 1963:111).

This creative ability utilizes the past experiences of the individual in new and unique means. It allows for the formation of new associations of ideas and concepts on which to build generalizations that have not been conceived before by the individual. By use of the imagination in the creative process, the individual produces original thoughts and ideas which in turn expand the imaginative power under development. Imagination is the spark that kindles and renews the flame of creative thought development (Rugg, 1963).

Creative imagination was described by Dayton (1976) in equation

form as:

Creative imagination = outer encounter + inner regression by imagination.

According to Dayton, creative imagination was the facilitator that drew upon the outer environment and personalized experiences for the individual. It is the catalyst that produced a creative production. Research conducted by Dayton indicates that cultivation of the imagination produced creative responses in subjects of higher frequency and larger quantity than in subjects who were not encouraged or trained to use their imagination in problem solving (Dayton, 1976).

Creativity Three S's

Certain characteristics are depicted in the utilization of the creative thought process. These characteristics are described as "sensitivity", "synergy", and "serendipity".

Sensitivity. This concept implies greater awareness, through all the senses, to the environment in which the individual functions. It is the ability to seize on stimuli that is constantly part of the surroundings of the individual and use such stimuli to invoke the creative thought process.

Synergy. The phenomena of synergy has been defined as behavior of integral aggregate systems of behaviors (Parnes, 1972). When two or more elements are associated in a new way the results are more than the sum of the parts and synergy has occurred. This is the essence

of creativity and a building block on which it is built.

Serendipity. Serendipity relies on an awareness of the relevancy of accidental happenings. The accidental happening is utilized toward the completion of a goal by means that have not been brought into focus previously.

The concepts of sensitivity, synergy, and serendipity all require divergent thinking, or the discovery of many alternatives to a problem solution. Research has shown a great deal of evidence to support the theory that the more ideas an individual generates, the more likelihood that individual had of producing a "good" idea for a problem solution (Parnes, 1972). This hypothesis implied that there must be a basis of the convergent thought or a base level of knowledge and understanding. Upon this base, and building from it, comes the divergent thought process that is the thought mode from which creative thoughts grow (Parnes, 1972).

The Creative Personality

The outward manifestations of creative thought are depicted in the personality of the creative individual. The creative person has set characteristics that influence maturation and growth.

In the personality development of the highly creative individual, three characteristics stand out. First, there is a tendency for him/her to gain a reputation of having wild and silly ideas. Second,

his/her work is characterized by a high productivity of ideas "off the beaten track". Third, his/her work is impregnated by humor or playfulness. These characteristics are of considerable importance in assisting the creative child to adjust to educational practices without sacrificing his/her creative ability.

Another consideration of creative characteristics was given by Donald W. MacKinnon (1962). MacKinnon lists the following characteristics of the creative personality:

Creative people do not represent stereotypes.

Creative people are well above average in intelligence.

Creative people possess verbal intelligence, spatial intelligence, or sometimes both.

Creative persons have an unusual capacity to record and retain and have readily available the experience of their life history.

They are discerning and observant in a different fashion; they are alert, capable of concentrating readily and shifting if appropriate; they are fluent in scanning thoughts and producing those that serve to solve the problems they undertake; they have a wide range of information at their command.

Intelligence alone will not tend to produce creativity. Creativity is the relevant absence of repression and suppression as mechanisms for the control of impulse and imagery. Repression operates against creativity, regardless of how intelligent a person may be.

The creative person, given to expression rather than suppression or repression, thus has fuller access to his own experience, both conscious and unconscious.

Openness to experience is one of the most striking characteristics of a highly creative person.

A highly creative person has a closer identification of feminine traits or characteristics in himself than non-creative. He is more open to feelings and emotions.

Everyone perceives and judges, but the creative person tends to prefer perceiving to judging. The perceptive creative person is inclined to be more interested and curious,

more open and receptive, seeking to experience life to the full. ...

A highly creative person is genuinely independent.

The creative person is relatively less interested in small detail, more concerned with meaning and implication. He is relatively uninterested in policing his own impulses and images or those of others.

He has preference for complexity and his delight is in the challenging and the unfinished. ...

Creative persons almost always display a good sense of humor.

Creative people tend to be more self-sufficient, more self-assertive, more self-accepting, more introverted but bold and more resourceful and self-accepting than the average person (MacKinnon, 1962:15-17).

Torrance (1962) studied the personality of the creative child.

The characteristics he listed incorporated the many characteristics listed by MacKinnon. Torrance's listing includes:

Strong affection. Altruistic. Always baffled by something. Attracted to mysterious. Attempts difficult jobs (sometimes too difficult). Bashful outwardly. Constructive in criticism. Courageous. Deep and conscientious convictions. Defies conventions of courtesy. Defies conventions of health. Desires to excel. Determination. Differentiated value-hierarchy. Discontented. Dominating (not in power sense). A fault-finder (1962:39).

Torrance listed further characteristics of the creative child which have a relationship to the child's attitude toward school and performance in the classroom as:

Doesn't fear being thought 'different'. Feels whole parade is out of step. Likes solitude. Industrious. Introversive. Keeps unusual hours. Lacks business ability. Makes mistakes. Never bored. Not hostile or negativistic. Oddities of habit. Persistent. Receptive to ideas of others. Regresses occasionally. Reserved. Resolute. Self-starter. Sense of destiny. Shuns power. Sincere. Not interested in small details.

Speculative. Spirited in disagreement. Tenacious. Thorough. Somewhat uncultured, primitive. Unsophisticated, naive. Unwilling to attempt anything on mere say so. Visionary. Versatile. Willing to take risks (1962:40).

Research on Education for Creative Personality Development

E. Paul Torrance has long been a leader in the movement to include creativity instruction in American schools. Beginning in 1957, Torrance has worked to develop instruction methods for stimulating creative development in students (Torrance, 1962).

Torrance has identified factors that limit the development and use of creative thinking in children. These factors are described as:

1. Elimination of fantasy.
2. Restrictions on the manipulation of ideas and curiosity.
3. Over-emphasis on sex roles.
4. Fear and timidity.
5. Emphasis in school and verbal skills.
6. Criticism.
7. Peer pressure.

Torrance advised that to reduce these inhibiting influences and stimulate creativity, a suitable atmosphere must be provided in the classroom.

Torrance reported that rewarding creative thought produced the

highest results in the various measures taken to develop creative thought processes in children. Rewards were given by:

1. Respectful treatment of questions.
2. Encouraging and valuing imagination.
3. Valuing student ideas.
4. Praise given for producing original, flexible and elaborative ideas.
5. Value placed highly on self-learning (Torrance, 1962).

Recent increases in research on the creative personality and its relationships to education were also presented by Torrance. In Torrance's lists of studies, his indication was that educators are becoming aware of the need for creative development and of encouraging such development in students.

Getzels and Jackson Study

One of the most elaborate studies of creativity was conducted by Getzels and Jackson (1962). Its purpose was to determine the relationship between defined intelligence, as measured by standard intelligence tests and creative abilities. The study compared children who were high in creative skills, but not equally high in intelligence to children rated high in intelligence, but not equally high in creativity. The comparisons found that creative ability and high intelligence are not necessarily correlated. Conclusions were that high creativity included a high degree of intelligence, but that high intelligence does not imply equally high creativity.

The students studied were taken from the University of Chicago area and were all rated at 100 to 140 on the standardized intelligence tests. The creative group ranged from 100 to 120, while the high intelligence group ranged from 120 to 140+.

Getzels and Jackson's conclusions were:

1. Highly creative and highly intelligent children differed in their attitude to personal values, imaginative abilities, personal goals, family backgrounds and their acceptance by parents and teachers.
2. Highly intelligent students were more accepted in their family and school, while highly creative students were tolerated in families and not preferred by teachers.
3. That standardized intelligence tests used to rate gifted students would have excluded seventy percent of the creative individuals.

The intelligence test used was the WISC and creativity was measured by five creative measures: word associations, uses of things, hidden shapes, and fables and make-up problems.

The groups were studied on the basis of their school performance, need achievement, perceptions by teachers, and acceptance by parents. On the question of school performance, the two groups scored equally high in scholastic performance despite a twenty-three point difference in intelligence as tested. The motivations

of the groups seemed to be a deciding factor. Creative students worked for intrinsic rewards where the high intelligence students aimed for external recognition.

The need for achievement of the two groups differed sharply as did their awareness of teachers. The related findings of the study indicated that highly creative students achieve equally as well in academic situations as high intelligence rated students. Highly creative students work from different need achievement base, view themselves as more internally directed, and were more stable in self-concepts.

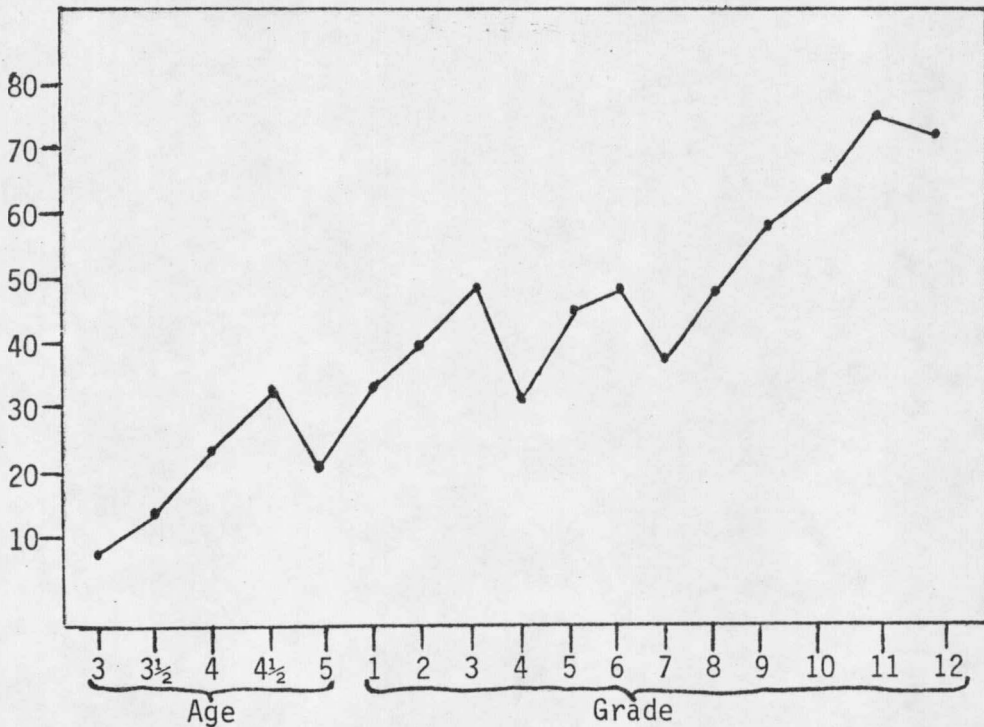
In relating these findings to teaching for creativity, Getzel and Jackson's conjecture was that by developing the creative potential of students, they will reach academically higher achievement levels, use more of their mental capabilities, and develop greater positive self-concepts and personal adjustments.

In recommendations from this study Getzels and Jackson concluded:

Procedures and programs must be fashioned if not for the individual at least for the different groups of students. Finally, without in any way denying that there are better and worse procedures a school itself may adopt indeed without derogating the efficacy of some of the practices we ourselves have pointed to--it would appear that, in the long run, for the procedures and practices to be truly effective, boldness of thinking, free rein in the imagination, and creativity in performance must have the support not only in the school but in the community and culture at large (1962:157).

Creative Development Related to Age Levels

Since creativity requires independence of mind, divergence from group norms or unusualness, it is inevitable that certain ages will be found where the creative process reaches certain peaks and drops into observable valleys of development. Such findings were illustrated by Torrance (1962) and related to changeable periods in childrens natural maturation.



Generalized developmental curve of the creative thinking abilities.

Figure I. Torrance Figure of Education and the Creative Potential (Torrance, 1962:42).

He found that from age three until age four and a-half, there was a steady development of creative skills. There was a substantial drop at age five, an increase until age eight, another drop at age eight and a-half, an increase until age twelve, a strong drop at age twelve to thirteen and a continued rise until age seventeen. After age seventeen there was a leveling off process.

Torrance explained that if the stifled growth at regression points was not dealt with, the regression was prolonged and severe. There was uncertainty, inadequate self-concepts, learning difficulties, behavioral problems, neurotic distortions, or even psychotic breakdowns by students (1962:43). His explanation is:

Meanwhile, my own hypothesis is that the roots of the difficulty stem from the inevitable pressures that are exerted against the expression of creative needs and abilities. The stronger the needs and the higher the abilities, the more severe the pressures are likely to be. As a consequence, at each critical stage of development, many children sacrifice their creativity. For some, this may begin at age five. For others, it comes at age nine, or twelve, or at some later time. As they learn to cope with the new demands of a stage, some children recover while others apparently abandon their creativity, distort it, or hold tight reins on it (Torrance, 1962:43).

Creative Problem Solving

In 1968 a group of educators and industrialists joined together to form a foundation dedicated to the development of creative problem solving in students and those employed by industry in the

United States. This group, headed by Angelo M. Biondi, founded the Creative Education Foundation Inc., at the University of New York at Buffalo. The purpose of the foundation was to pursue research and to produce means of developing and enriching creative education.

One of the group's major premises was that the pursuit and study of creative problem-solving was greatly needed in the American society. Skills developed through creative problem-solving could be directed to solutions of world social problems and to the growth and development of new industry (Biondi, 1972). Through the foundation's research and testing of educational methods, a five-step procedure for creative problem-solving was devised.

The method for creative problem-solving was comprised of:

Fact-finding

Problem-finding

Idea-finding

Solution-finding

Acceptance-finding.

Fact-finding. Fact-finding was directed to the location of specific information relevant to the problem. It was the step of data gathering for the purpose of later making judgments as the most desirable measures to be taken in the solution of the problem.

Problem-finding. Problem solving was one of the more difficult steps because of the mental blocks that may exist in the individuals.

seeking the problem solution. Such blocks could include perceptual inability, over developed preconceived prejudices or the inability to see problems in a fresh perspective. Another block could be emotional, such as: a closed mind, fear, anxiety, jealousy, over-motivation, misdirected tension or negativism. Cultural inhibitions based in apathy, conformity, authority domination, or tensions from group pressure could cloud the picture of the accurate problem perception.

Idea-finding. Idea-finding was developed into specific approaches which produced a quantity and quality of ideas. The approaches utilized in the problem-solving procedure included: broadening the problem, avoiding over-specification, altering words, encouraging quantity of ideas, and determining sub-problems.

Solution-finding. Solution-finding incorporated the ideas or concepts brought forth in the idea-finding procedure and applied them to the problem in view of the restrictions imposed by the problem definition. The solution steps also relied on the principles of deferred judgment, alternating creative and judicial thinking, free-wheeling of ideas, extended effort in idea finding, forcing relationships of ideas, check lists and modifying the original definition of the problem.

Acceptance-finding. Acceptance was the final step in the creative problem-solving procedure. This step required making ideas

presentable to other individuals, providing a complete picture of the idea, sharing of ideas, and providing innovative and stimulating solutions to the problem. The acceptance-finding state was the one in which the individual or individuals involved in the previous problem-solving procedures provided their ideas for evaluation and implementation by others.

The programs developed and adopted by the Creative Education Foundation aimed at the maturation of the total individual by stimulating both convergent and divergent thought processes. By development of the total thinking power of the individual, the ability to creatively solve problems and use the imagination as a tool in the creative scenario is strengthened. Researchers and authorities on creative problem-solving and the creative process have predicted that in the future creativity and the use of all the mental attributes of persons will be a major goal of education.

Parnes has stated this position aptly when he wrote:

I predict that the majority of teachers and administrators in all educational systems, including industry, will have been exposed by the year 2000 to emphasis on creative approaches to educational programs and to the importance of stimulating and nurturing creative behavior as cardinal objectives of teaching or supervising people. Therefore, I anticipate that there will be deliberate training in thinking processes at all educational levels, both through creative studies courses and through re-vamping curricula in all subject matter fields (Parnes, 1972; p. 64).

Parnes' Creativity Program

Another essence of the concept of creativity might be considered as the association of thoughts, facts, ideas, and concepts into a new configuration that has new meaning beyond the sum of the parts. The new connections may relate elements that reside within the mind or out of it. A program to develop such skills was produced by Sidney Parnes in a step by step approach in his Guide to Creative Action in 1967.

The program focuses on a "teleidoscopic" action effect by drawing upon inner reactions and outer environmental stimulus. The "teleidoscopic" action used elements within the structure of the individual that are stimulated by external input that triggered creative responses. Such a relationship requires subject-matter that was relevant to the individual in question.

By stimulation of the creative responses of individuals the self-concept of a creative person was created within the individual. Such an individual saw him/herself as creative and able to solve problems, thus became creative and able to solve problems. It was by use of the creative imagination and creative skills that are developed by systematic programs, that the individual strengthened creative abilities that were unique to each individual (Parnes, 1967).

Parnes strongly proposed the concept that in order to be creative and produce creative responses the individual must be in a

creative atmosphere where the removal of the brakes on creativity have been eliminated. A creative climate required:

1. Accepting the individual as of unconditional worth
2. Providing a climate in which external evaluation was absent
3. Understanding emphatically.

It was this kind of psychological safety and freedom that creative education attempted to provide in order for the student to experience the thrill of discovery.

The importance of incubation for creative thoughts was emphasized by Parnes as a mental process which allows the problem focused upon to germinate by use of deferred judgment and preconscious free associations. Incubation allowed the mind to attend to items of past experience while focusing consciously upon other items in present awareness. The conscious mind was limited in the number of ideas it can attend to at one time but the subconscious mind was capable of much additional activity. Such a situation accounted for the "insights" that are part of the creative experience.

The Parnes creative courses aimed at the growth of creative responses in individuals generally utilized standardized procedures. These procedures were classified as:

1. Doubling experiences
2. Providing practice in creative responses
3. Lessening the resistance to change within the individual

4. Providing for incubation and deliberate process of creative responses.

Such programs were developed by Dr. Parnes at State University of New York at Buffalo from 1949 until 1956. Experimentation was first conducted in the evening division of the university and later in the day programs. Constant revision, adaptation and improvement resulted in new knowledge gained by research and study programs. The combined product was the most current Creative Studies Project (Parnes, 1967).

Research on the Parnes' Programs for Creative Development

Research on the development of creative skills after training to facilitate the creative process was continued by Parnes at the State University of New York at Buffalo. Research for the first seven years dealt with:

1. The effects of a semester's program in deliberate creative stimulation
2. The effects of extended effort in creative problem-solving
3. The effectiveness of the specific creative problem-solving principle of deferred judgment.

Major findings indicated that a semester program resulted in greater production in the quantity of idea-production. The extended effort program in idea-production resulted in a greater proportion

of good ideas among the later ideas produced. Also found was the result that when a large number of ideas were produced there was greater likelihood of the production of more substantial ideas (Parnes, 1967).

Instructional courses given by trained instructors produced higher quantity and quality of ideas with increases in cognitive-skills related to the subject area used in the creative processes instruction.

A comprehensive longitudinal investigation was begun as an on going study. The specific hypotheses tested were:

Students trained in creative studies courses will perform significantly better than otherwise comparable students on:

1. Tests of mental ability, problem-solving and job performance
2. Test of creative application of academic subject matter
3. Nonacademic achievement in areas calling for creative performance
4. Certain personality measures associated with creativity.

A capsulization of the results showed that:

1. The course students showed significant differences over comparable controls in abilities to cope with real-life situational tests, including the production of ideas and evaluation and development.
2. Trained students showed significant differences in applying

creative abilities to specific areas of study.

3. Trained students performed better on semantic and behavioral tests.

4. Most course students reported large gains in their own creative behavior.

Based on these research findings, Parnes presented the following statement:

... the pattern of results on the various test of creative ability permits the generalization that the instructor-taught programmed-groups were superior to those who took the program alone and to both control groups, and the groups that took the program alone were superior to both control groups. ... With respect to student reactions, the instructor-taught students found the course more interesting and felt they gained more from it; however 'both' groups reported equal application of what they had learned and seemed to feel they would apply it equally as well in the future (Parnes, 1967; p. 26).

Development of Creativity Instructional Programs

Studies in creative thinking conducted by Sidney Parnes led to the development of a student guidebook for development of creative behavior. The materials compiled by Parnes dealt with:

1. The philosophy of creativity.
2. The purposes and philosophies of the programs designed to nurture creative behavior.
3. The need for education to deal with the development of creativity.

4. The problems associated with such development.
5. The use of imagination as a teaching tool.
6. The challenge in offering an education in self-discovery.

Other topics covered in the material concern: the nature of creative behavior, its assessment and its relationship to intelligence, research on the nurturing of creative behavior and principles of education and psychology which support methods and techniques Parnes developed to facilitate the creative process.

Objectives outlined by Parnes for the course on creativity were:

1. A consciousness of the vital importance of creative effort.
2. Motivational needs for using an individual's creative potential.
3. Development of self-confidence in the individual.
4. Development of sensitivity to problems by the individuals.
5. Openmindedness to the opinion of others.
6. Development and use of curiosity in individuals.
7. The improvement and utilization of new ideas.

A manual for the course was developed in 1965, and field tested for three years. Methods of instruction were: use of the materials in the handbook, student workbooks, student guidebooks, out of class assignments, and open class discussion. After testing and using the course for five years, adaptations were made in the materials, so that

the materials could be incorporated in the instruction of children to develop their creative potential.

In both Creative Behavior Guidebook (1967) and The Creative Behavior Workbook (1967) which Parnes developed from his work, he suggested a pretest using questions related to every day objects and the unique use of each. Problem solving methods were introduced in the next step and originality, flexibility, fluency, and elaboration of ideas were encouraged.

Problem solving included:

1. Problem definition.
2. Ideas for finding solutions and rules developed by individuals to govern the formation of ideas.
3. Development of criteria and evaluations of ideas.

After the last task there was a post-test administered. Results showed that instruction in creative problem solving improved students' ability to analyze a problem, their ability to organize data, and their ability to produce conclusions (Parnes, 1962:159).

Parnes defined creative behavior as a function of the divergent thought process which utilizes knowledge, imagination and evaluation. He further noted that lack of emphasis on imagination is a pit-fall of the American educational system (1962:99).

The entire work by Parnes was an illustration of the need for development of creative thought and divergent areas of thought

production. Methods have been developed for releasing this creative ability in children and aimed at the cultivation of the creative process before it is stifled permanently. Parnes summarized with the quotation he presents from Arnold Toynbee: "To give a fair chance to potential creativity is a matter of life and death for any society" (Parnes, 1962:8).

Teachability of Creativity

In a survey of 142 studies concerning the teachability of creativity, Torrance (1973) compiled the following results from the documentary reports. The 142 studies were classified into nine categories according to method of stimulations of creative thought. The categories were:

1. Teaching procedures emphasizing the Parnes Creative Problem Solving procedures or modification of them.
2. Problem solving such as general semantics training and creative research methods.
3. Complex programs involving packages of materials.
4. Creative arts as a vehicle for teaching and practicing creative thinking.
5. Media and reading programs designed to teach and give practice in creative thinking.
6. Curricular and administrative arrangements designed to

create favorable conditions for learning and practicing creative thinking.

7. Teacher-classroom variable, indirect and direct control, classroom climate adjustments for creative learning.

8. Motivational rewards.

9. Testing conditions designed to facilitate higher levels of creative functioning or more valid and/or reliable tests of performances.

The most popular approach to teaching children to think creatively was through complete programs involving packages of materials, the manipulation of teacher-classroom variable and the use of modifications of the Parnes creative problem solving training program. The highest results came from the use of modifications of the Osborn-Parnes training program and from relating creativity training to a curricular discipline area. The discipline approach produced the highest single success ratio (Torrance, 1962).

Relevant Research on Creativity Training

Effects of Extended Effort in Creative Problem Solving by Sidney Parnes. This concept was studied by Sidney J. Parnes in 1961. The experiment was designed to test the hypothesis that more good ideas will appear in the last half of a subject's idea output than during the first half. Findings demonstrated that a significant relationship

was found between total quantity and total quality scores. The results were interpreted to indicate that extended effort in producing ideas on a creative thinking problem tended to reward problem solvers with a greater proportion of good ideas among the later ideas produced (Parnes, 1961).

Brainstorming Effect on Problem-Solving Discussion. Much discussion has revolved around the procedures of brainstorming in which ideation and evaluation were separated. A study was undertaken by John K. Bruhart and Lurene M. Jochem in 1964 to provide information as to the effect of the suggested separation of skills. The data showed that with the type of problems and experimental groups used, brainstorming tends to produce both more tentative solutions and more good tentative solutions when evaluation is divorced from ideation.

Garret Split-Brain Research. Current research in brain functioning has indicated that the left hemisphere of the brain, which controls the right side of the body, specializes in logical-analytical thinking and verbalization. The other side of the brain, the right hemisphere, is called the minor or mute side because it cannot verbalize what he/she knows. It is the right side that researchers consider to be the seat of creative thought.

It is by use and development of the right side of the brain that individuals experience creative maturation. It is through

exercise of these creative skills that language and art forms are created and enriched. In this same view, the sense of unity that is part of the creative process bridges the dichotomies of the brain halves and unites cognitive types with divergent thought to function in creative harmony (Garrett, 1976).

The Identification and Stimulation of Creative Imagination by Khatena. Imagination was defined as the chemistry of mental processing where interactive intellectual and emotional forces participate by direct stimulation to energize and propagate the creative process. Such imagination were described as "Onomatopoeia" and "Images". The onomatopoeia resulted in images from the area of visual and auditory perception. The image relationship resulted from empirical observations of the environment.

It appeared that the more people perceive the more they utilize creative abilities and thus strengthened and develop such skills. In turn, the more people perceived themselves as highly creative, the greater the autonomy of their imagery and the more original their images. It was by stimulation of the creative imagination and practice of it that the skills of creativity related to the imagination were developed and matured (Khatena, 1978).

This was the position adopted by Calvin Taylor when he stated:

There is potential for creative greatness in America. Now all we must do is convince people (Taylor, 1962; p. 183).

The Future of Creative Education. This concept was discussed by Paul D. Plowman (1978) and guidelines proposed for the educator who was directed to the stimulation of creativity in students. The transformation to a new emphasis on creativity to a new educational society would produce some trauma but would result in a newly discovered human and physical energy. The change would put human fulfillment as the priority ahead of political, economic and military aggression and acquisition (Plowman, 1978).

Major emphasis of the new educational system would be on:

1. School plants developed to meet specific student needs.
2. Early identification and development of student talents.
3. Student-teacher relationships which emphasized student growth and independence.
4. Programmed individualized educational plans.
5. Student support services directed to the development of mental and emotional stability.
6. Community based and community involved learning situations.
7. Integrated learning experiences for students.
8. Inservice education for teachers which stressed the creative as well as the intellectual needs of students.
9. Closely monitored student progress reporting.

Educators who worked for the complete development of students could not escape their responsibility to provide students with

creative experiences which would shape the students' future. This position was stated by Plowman when he recently wrote:

Today, you and I are deciding how our tomorrow will be. Let us move with compassion and enlightenment toward a tomorrow in which the richest riches of our nation, our people, are perfected in all the creative aspects of their being (Plowman, 1978; p. 97).

Discipline Approach to Creativity Training

In order to make creativity instruction meaningful to students, many authors have advocated the discipline approach (Crabtree; 1967). This type of creativity instruction allowed for cognitive development of intellectual skills while utilizing the creative imagination and inquiry skills to develop creativity competencies. By cultivating creative power, the educator would utilize the tools he/she has at his disposal. The tools of the teacher are the curricular disciplines dealt with when working with students. Some of these curricular areas are more open ended and receptive to the inclusion of creative thought training than others.

SOCIAL STUDIES RESEARCH

After considering the literature dealing with creativity and the instructional methods devised for releasing the creative potential, the area of social studies was researched for the purpose of determining if it would provide a vehicle by which creative

instruction could be incorporated into the elementary school curriculum.

Social Studies Instruction

Some social studies programs have produced methods of instruction and curricula which address themselves to lateral or creative modes of thought. Reflective or inquiry based programs deal with this area of thought process. Reflective thinking is an active examination of testable propositions concerning knowledge or values for the purpose of forming a decision. This issue has been the subject of investigations by Charlotte Crabtree (1967). She provided support for reflective thinking practices from two social studies persuasions. One premise dealt with the application of analytic tools of the social science by participation in discovery, verification and reconstruction of knowledge. This was the expository mode. The other approach was the hypothetical study within the social sciences with a goal of decision making.

The hypothetical mode was a method of verification of knowledge and values by students. Outcomes of the hypothetical mode are:

1. Knowledge was discovered to be not final.
2. Theories were found to be for convenience and their heuristic value obtained in predictions and the inquiries they launch.

3. Continuing investigations revised theories, refined, or discarded them.

4. Engaging in inquiries produced autonomous learning, recall, transfer, and intellectual growth (Crabtree, 1967).

The literature on social studies curricula indicated that both convergent and divergent thought processes should be utilized in the explanation of facts and the development of understandings in the hypothetical mode. A well managed curriculum and instructional method enabled structuring of ideas based on fact, while encouraging explorations and verifications of data through divergent thought. Kenworthy (1973) proposed the inclusion of creativity training in the social studies curriculum by explaining the social studies educator's goal as: "It is our claim as social science educators that we are preparing pupils to live more effectively or more wisely in the future, as well as helping them to live creatively today" (1973:8).

Inquiry Social Studies

Social studies educators aim to develop inquiry in social studies. This is a means of developing divergent thought. The inquiry challenges students' thinking by casting doubt on a belief held by a substantial number of individuals and investigating a problem in order to verify or question the premise. John Dewey

wrote many years ago: "Unless there is something doubtful, the situation is written off at a glance, it is taken on sight; i.e., there is merely perception, recognition, not judgment. ..."
(1961:121).

The doubt developed by inquiries takes the form of controversy within the mind and invokes divergent thought. Current research has produced evidence to indicate the concept learnings achieved through inquiry are remembered longer and are better transferred to new situations (Bruener, 1961). Creative thinking can be dealt with in inquiries by providing procedures that encourage question-asking, prize exploratory thought, use trial and error techniques for problem solving, allow for thinking a situation through and establish the understanding that not all problems have immediate solutions (Smith, 1967). The aggregate strategies of inquiry provide a base for reinforcement of all thought modes. The divergent modes require awareness. It is an awareness of previously unnoted relationships. This awareness is developed by the ordering of ideas that are disorganized and seemingly unrelated, and by the use of a constellation of knowledge, attitudes, abilities, and skills that are interrelated. Divergent or lateral thought processes exist in all individuals but are unique in quantity and quality to each. Therefore, inquiries in social studies utilize the frame of reference of each student in devising solutions to problems that are acceptable

to the individual.

Hypothetical Social Studies Instruction to Develop Creative Thought

Crabtree proposed that instruction in the hypothetical mode evidenced production of critical and creative thinking with no disadvantage to the conceptual content acquired (1967). Teaching operations in the hypothetical mode of inquiry require:

1. Establishment of focus.
2. Definition of terms.
3. An open search.
4. Collection of data.
5. Development of an hypothesis.
6. Extension of the hypothesis.
7. Drawing an inference.
8. Judging the reliability of the inference drawn (Crabtree, 1967:77-122).

Crabtree presented evidence to document the fact that when children have opportunities to discuss and explore original ideas relevant to the subject being studied, creative thinking occurs most frequently. She took the same position that Taba (1971) emphasized. In the Taba theories for teaching social studies, a teacher-produced climate of creative thought acceptance invoked originality of thought and fluency of deliberations.

Taba devised specific teaching strategies for forming generalizations into a hierarchy. Generalizations were categorized as

High-order generalizations - these have universal application and are termed laws or principles.

Intermediate-level generalizations - these generalizations apply to particular regions, cultures, or

historical areas.

Low-level generalization - these generalizations are based on data from only two or three small samples, groups or regions (Taba, 1971:75).

Creative thought processes were used in forming original ideas and new generalizations, creating new patterns of mental play, organizing materials for new uses, forming personal or social generalization, imposing original ideas, or extending new organizations of thought related to social studies questions. Such thinking was characterized by adventuresome thought and risk taking.

Social studies curriculum and instruction which aimed at maturation of creative thought should not be expected to achieve strict scientific objectives. It should aim at growth and extension of thought processes. This type of curriculum involved affective acts and thoughts of students and is directed to creative development (Engle and Longstreet, 1972:14-20). The concentration in this type of curriculum and instruction was on the development of mental skills concerned with thoughts that are powerful, original, and flexible. Its goal was to enable the students to use the skills gained and practiced in creative situations on later decision-making situations.

Models for Creative Social Studies Instruction

The creative thought modes for decision making were described by Engle and Longstreet (1972:21-23) as being based upon:

1. Descriptive and prescriptive models from the subverbal impressions that arise out of a conglomerate of experiences.
2. Models that consider the aesthetic productions of the surrounding world.
3. Models from religion, philosophy, traditions and cultural beliefs.
4. Perceptual models for decisions from the social sciences.
5. Temporal thought models found in philosophy, logics and mathematics.
6. Prescriptive and descriptive models heuristically developed when needs are presented to be acted upon in large or small confrontations.

By presenting the listed models for decision making, Engle and Longstreet proposed the need to develop complete thought methods instead of a concentration on the accumulation of facts to be processed through convergent channels. By changing the direction of social studies education from a stringent focus on convergent thought to a targeting on the complete thought process, these educators have made the vital point that education must consider all the areas of student's mental operations and refrain from merely dispensing information. They proposed an emphasis on what is to be done with the information and how the garnered facts will influence realistic problem-solving.

Analysis of Social Studies Procedures

In providing instruction in the convergent skills, or ordering and accumulation of facts, a means of increasing man's intellectual power and controls of the environment was provided. Until now this mode of instruction provided tools for decision making that have been societies' most complete and powerful avenue for education in essential life skills. There is a need to provide instruction in the divergent mode to balance the emphasis on the convergent process. This is illustrated by current trends in social studies. Questions of human dignity, major societal and cultural values are currently finding focus in new social studies curricula. Banks states:

An important question that we have the responsibility to answer is: How do we distinguish between a rational and an irrational decision. ... Our theory assumes that most social actors who make decisions, using delineated processes will act in ways that are consistent with human dignity and major societal mores, goals and values. ... these new goals and values will not violate the idea of human dignity and justice (Banks, 1972:448).

Topical Approach

In 1972, the topical approach to social studies was presented by Engle and Longstreet and linked to the development of creative thought processes.

Curriculum development clearly involves more than designs for organizing content. It must involve development of total thought processes. The total curriculum complex must be logical, powerful, open structured,

flexible, and personally relevant, i.e., the process of content selection must permit wide variations as well as logical sequencing. The choices of media must be flexible while congruency with teaching objectives maintained (1972:40).

Engle and Longstreet's design allowed for student input and uses of students' creative thought. This enabled students to develop relationships between personal and societal questions.

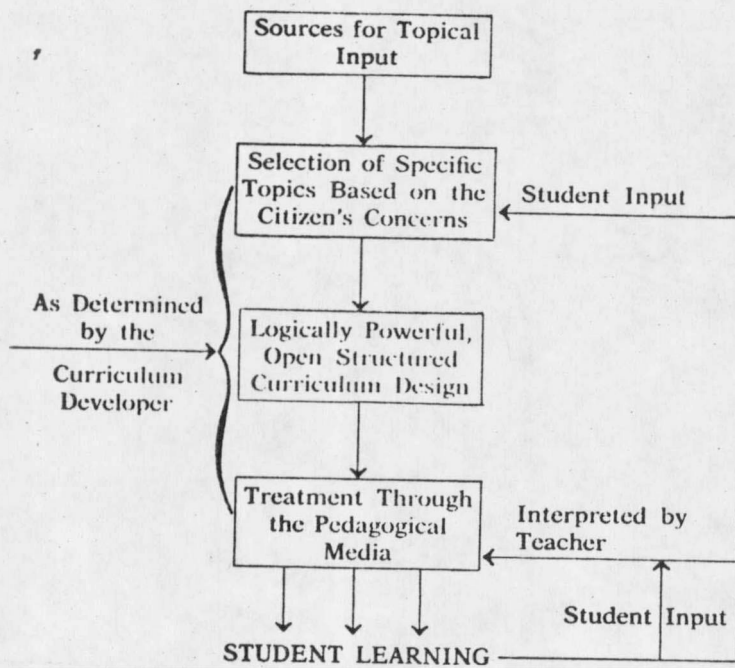


Figure II. Topical Diagram of a Successful Social Studies Curriculum (1972:41).

The design dealt with content in a rigorous fashion but ensured more immediate, individually oriented relevancy. It was based upon sources of citizens' decision-making modes and was a balanced treatment of personal and societal sources. The research conducted by Engle and Longstreet on their design indicated that there was encouragement for forming generalizations and original thought patterns, of question formations by students, and considerations of socially oriented decisions. This approach has been accepted by open-education and utilized in some elementary social studies classes. It provided an example for John Dewey's declaration:

... reflective thinking, as distinguished from other operations to which we apply the name of thought, involves (1) a state of doubt, hesitation, perplexity, mental difficulty, in which thinking originates, and (2) an act of searching, hunting, inquiring, to find material that will resolve the doubt, and settle and dispose of the perplexity (1961:116).

Critical Thinking Approach

Related to the topical method of social studies instruction is the instructional method for critical thinking developed by Isodore Starr (1963). This process used the steps of:

1. Identification of an issue or topic
2. Gathering, organizing and evaluating relevant data
3. Analysis of the issues or topics
4. Formulation of ideas and generalizations on the topics or

issues

5. Drawing warranted conclusions
6. Testing conclusions
7. Re-evaluations of issues or topics.

Starr's method of skill development related to the components of problem solving described by Jerome Bruner in 1947. Bruner's theories for instruction in social studies were later linked to inquiry based social studies education by Hunt and Metcalf (1970). All of these methods and hierarchies of skill development are related to and aim at the accomplishment of the same goal--creative problem solving, but may precede under varied formats of instructional methodologies.

Inquiry Approach to Social Studies

One of the most current methods of social studies instruction was presented by Banks and Clegg in 1973. It is an inquiry approach which combined acquisition of knowledge with value clarification.

Banks presented the knowledge component as consisting of:

1. Problem solving
2. Hypotheses formulation
3. Conceptualization
4. Collection of data
5. Evaluation and analysis of data

6. Deriving of generalizations and theories
7. Inquiry begun anew.

These steps included the same steps that were used by Starr and Taba in their formations of social studies instructional methods. Added to this strong direction for the incorporation of knowledge, was the added process of value clarification. Banks stated:

Note that in the inquiry model, doubt and concern cause the inquirer to formulate a problem. The problem that he or she formulates does not emanate from a vacuum, but is shaped by his or her theoretical and value orientation. Like the social scientist, the elementary-school child will need to draw knowledge to be able to ask intelligent and fruitful questions. . . . Thus, social inquiry is cyclic rather than learned and fixed (1973:57).

Banks cites other authorities who deal with value clarification and presented the model on the following page.

Independent thinking has been a main objective of social studies education but a variety of factors have proven such thinking difficult to develop in students. There has been disagreement on the part of educators as to the distinction between the elements of the basic skills composing thinking and what strategies are needed to develop both convergent and divergent thought. Assumptions have been made that thinking on issues cannot take place until a sufficient body of information is accumulated by the knowledge acquisition process. An equal assumption is that thought is an automatic by-product of studying content, and assimilating the end products of

someone else's thought. The inquiry approach attempts to attack this assumption by developing both convergent and divergent thought processes for individual problem solving.

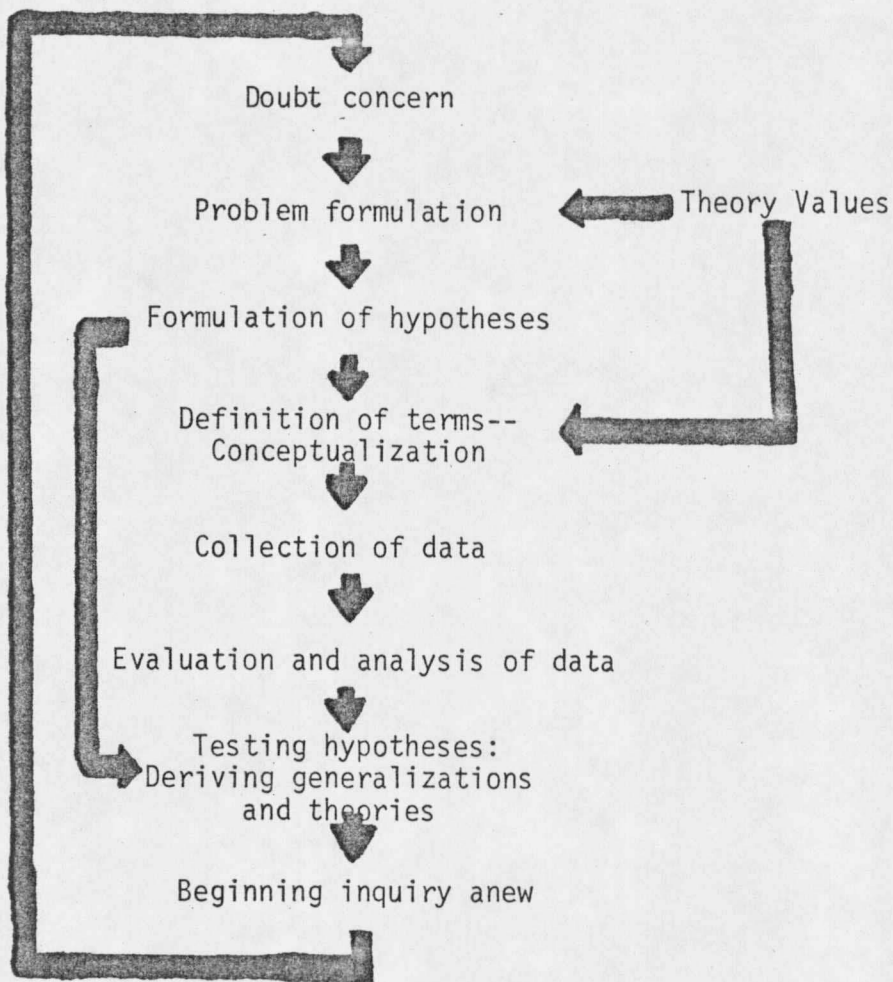


Figure III. Bank's Method of Social Inquiry (Banks, 1973:31).

Heuristic Strategies

In many of the current learning theories, as they address themselves to the question of social studies education, there was a mention of heuristic strategies. The areas of heuristics is concerned with the development of strategies that capitalize upon the use of knowledge, skill, and experience in producing new ideas for problem-solving. An heuristic method is a strategy which employs the creative thought process and encourages the learner to develop new and unique approaches to problems. The approaches developed on a particular problem can later be applied to other problems.

These developed strategies are devised so that they can be adjusted and found applicable to a variety of learning situations and problem solving experiences. In a compact view, heuristics are general principles that are meaningful and useful.

Current Social Studies Research

Few of the social sciences have developed programs which attack the problem of the inclusion of creativity training in a social studies curriculum. Although such inclusion has been advocated by some social studies educators, the major emphasis in social studies has been on the development of cognitive abilities and the memorization of facts (Crabtree, 1962). There have been some recent developments and research projects directed at opening the field of social

studies to more creative programs and programs focused on the growth of creative skills in students.

Creativity in Economics. The creativity in economics education was developed by the California Council for Economic Education based in Los Angeles. This program produced a document which presented a variety of creative activities for young people to help them not only understand some of the principles of economics, but to enjoy the study of the field. The book used was not a comprehensive or in-depth view of the science of economics or social science, but was a quick survey of some of the important aspects of understanding the American economic system. The concepts taught included production, money, banking, credit, prices, business, advertising, occupations, government, taxes, lobbying and insurance.

Man: A Course of Study. A recent study on typical curricular instruction in social studies and a more innovative approach was conducted by John Holmes and Rose Marie Davis in 1972 in the Oregon school systems. Their study compared the effects of a traditional sixth grade social studies curriculum with the Man: A Course of Study (MACOS) approach. Students were pre-tested and post-tested and the scores analyzed statistically. The instrument used was the Torrance Tests of Creative Thinking. Sixth grade students, using a traditional social studies curriculum of Latin America,

were compared to students using the MACOS program for study in the same area of Latin America. The creativity developed was compared. Students were also compared on social studies abilities. A pattern emerged that indicated the MACOS materials may have produced greater creative verbal abilities (Holmes and Davis, 1972).

Areas of student development which were researched were: knowledge of anthropology, and general social studies skill mastery. No significant results were located in the social studies.

Miscellaneous Studies. Various miscellaneous studies dealing with the use of creative teaching techniques directed at the increasing of students' creative skills have been developed under the auspice of the United States Department of Education. One of these studies took place in Otsego, New York, and compiled a list of local resources for creativity and social studies skill development which were available to the teachers of Otsego County in 1976 (U. S. Department of Education, 1976).

Another study was developed to investigate the effect on social studies skills of the inclusion of creative dramatics in the social studies curriculum. The site of the study was the Philadelphia School District and the time allotment was from 1970 to 1971. Results indicated that there was an increase in creativity skills related to body movements, but students' social studies skill level remained constant (U. S. Department of Education, 1973).

Creative activities for students were researched by studies dealing with the Chinese Culture, and Cross Cultural Task Cards. Neither of these studies reported significant results (U. S. Department of Education, 1972).

Another study sponsored by the United States Department of Education investigated the question of environmental education as related to creative thinking. In the area of nonverbal creativity, the girls in the experimental group, but not the boys showed an increase in creativity factors (U. S. Department of Education, 1972).

These studies were sponsored by governmental assistance and included various areas of the social studies curriculum. Many were related to lower income and Native American peoples, or directed to the growth of only one component of the area of creative abilities.

SUMMARY

After considering the literature on creative process and how it can be developed through educational practices, and reviewing the social studies curriculum, it became apparent to this researcher that education for creative thought is not only possible but a desirable goal. The work of Torrance, Parnes, and Getzels and Jackson have made it apparent that there is a need in education for the development of creative skills and abilities in students. Although there has been considerable work done in developing reasons

why creativity is necessary and methods devised for its inclusions in curriculum, there have been few field tests of the theory of creative education in some areas of the elementary curriculum.

By its nature, social studies should be an open-ended discipline. It allows for creative and divergent thinking. Many of the authors researched have advocated inclusion of creativity instruction in the social studies curriculum. Some learning theorists have also advocated the inclusion of creative training in the present curriculum. The philosophy of social studies indicates that it is a fertile area for the development of creative thought skills.

Chapter 3

PROCEDURES

Introduction

This project was undertaken to develop and test instructional methods for the inclusion of creativity training in the elementary social studies curriculum. Information was compiled to determine if there were changes in student skills in creativity and social studies when creativity training was a part of the social studies instruction compared to student skills when creativity training was not incorporated into the social studies area. The inclusion of creativity within the social studies curriculum gave the training a purpose and goal; whereas the dispersion of the creativity training throughout the general curriculum supplied no particular goal or direction for the training.

Site of the Research

The research took place in Butte, Montana, from November until March of the 1978-1979 school year. Butte is one of the oldest major cities of Montana and considered a mining community. Founded in 1864 by gold seeking miners, the city is located in southwestern Montana. It has become a mining center for the copper industry.

The population of the city is comprised of descendents of various cultural groups. These groups included Slavic, Irish, English,

Finnish, and Oriental peoples. Their descendents still preserve much of the former culture and heritage of their forefathers. The city represents a mixture of diverse and varied cultural elements.

The city has played an important role in the development, history and expansion of the State of Montana. In the period from 1880 until the late 1930's, Butte dominated the politics and economics of the state. It was the center of the labor movement, and provided a source for local folklore and traditions (James, 1976).

With the decline of the copper industry and the transfer from underground mining to open pit operations, the culture and economics of the city changed as did its influence upon the State of Montana. Much of the early cultural tradition and environmental settings were replaced by a smaller and more cosmopolitan population. Some historical sites and information were preserved that acted as a data source for student investigations. These materials supplemented the creativity and social study skills that were under investigation in this study.

The McKinley School. The school testing site of this study was the McKinley School. The McKinley has an approximate enrollment of six hundred students with three or four classrooms at each grade level. It was one of the first schools established in Butte.

Students in the McKinley come from a district of the city that is adjacent to Montana College of Mineral Science and Technology and

borders on the central business district of Butte. The school is located in one of the older residential districts of the city where there is rich heritage of early mining operations coupled with the cultural and ethnic heritages of older neighborhoods.

Population Descriptions

McKinley School Population. Students at the McKinley represented a cross section of students of the city of Butte. There are representatives of families that are highly affluent, due to the concentration of professional persons in the area. There are also representatives of less affluent families due to the district's close proximity to the central business area and the availability of low income housing. There is a representation of various parent age groups because of the presence of older established residents compared to student families from Montana Technical College. The educational level of the area is a mixture of professional persons, personnel of the staff of Montana Technical College, employees of the Anaconda Company in both blue and white collar occupations, business persons and skilled and semi-skilled workers.

Mean home property value of the McKinley district is \$43,500 compared to mean home property level of the city of Butte at \$43,000 as given by the Butte-Silver Bow County Treasurer's Office. School district records indicate that Standard Achievement scores of the

McKinley students are comparable to Standard Achievement scores of the total school district. The data were obtained from testing conducted late in the 1977-1978 school year.

Fifth and Sixth Grade Population. During the 1978-79 school year, the McKinley School had three fifth and three sixth grades. Enrollments in each class were approximately 20 students. The classes were assigned randomly at the end of the 1977-78 school term. Due to drops in enrollment and closure of a neighboring school, the classes were readjusted at the beginning of the 1978-79 school year. Class assignments were made to establish class groups that were equally balanced on the basis of sex, intelligence level, and achievement abilities.

Based on school district records of previous years, no tests of creativity had been administered to either the fifth or sixth grade students and neither group had been exposed to directed creativity instruction, as defined in this study. In conferences with teachers of the school who had taught the students, it was confirmed that creativity training had not been systematically included in previous curricula that had been used for student instruction.

The three classrooms from each grade level were chosen and utilized in establishing the experimental groups called for in the study. Those students not enrolled for the pre-testing and post-testing required by procedures of this study were deleted from

the population.

Teacher Population. Teachers of the McKinley School were all certified teachers of the State of Montana. The teachers in the fifth grade held Bachelor of Science degrees in Elementary Education. They had from nine to fifteen years teaching experience and differed from each other in experience by six years. Teachers in the sixth grade fell within nine years teaching experience of each other and had from eight to seventeen years teaching experience. Two of the sixth grade teachers held Masters Degrees in Education. All teachers were tenured and had received excellent evaluations from their principal. The average teaching experience of the six teachers in the McKinley building was 12 years.

Observer. Observations were made at set intervals in each classroom by an observer knowledgeable in expressions of creativity in students and in creative instructional procedures. The observer was a former teacher, elementary principal, and high school vice-principal with forty years of teaching experience prior to retirement. The observer had been retired five years from the educational profession prior to his inclusion in the study.

Observations were made to provide information on the progress of the experiment and to validate that teachers were maintaining the integrity of their teaching roles. Creative responses observed were classified into the categories of originality, fluency, flexibility,

and elaboration. These categories were those tested in the pre-testing of creative skills by the Torrance Test of Creative Thinking.

The observer was not informed of the particular role of each group or teacher. Observations were made in all three classrooms at each grade level. The observer was trained by the researcher in the noting of the four category responses and in observing the stimulation or non-stimulation of such responses by the teachers as they fulfilled their particular role.

DESIGN OF THE STUDY

Presentation of Data

The data collected throughout this study is presented with sixth grade data preceding the data concerning the fifth grade. Although this does not follow the usual grade arrangement, it is used in this study for the convenience of the reader. This adaptation to the reader's convenience was for the following reasons:

1. The instructional procedures were begun first in the sixth grade and followed within a week in the fifth grade. This follows the chronological organization of the study.

2. The testing program provided by the counselors utilized the testing of the sixth grade classes prior to the fifth grade classes. With this testing schedule the data was formulated on data cards and data sheets with the sixth grade information

preceding the fifth grade information.

3. Instruction provided to the groups by community personnel was presented first to the sixth grade and later to the fifth grade. This arrangement was also followed in the in-service program.

Group Assignment

Assignment of Students in Comparable Groups. After assignment of fifth and sixth grade students to classrooms in the Spring of 1978, the assigned classes were considered on the basis of comparability of: intelligence levels, standard achievement scores, sex and age. This consideration was conducted before the beginning of the 1978-79 school term. Data was collected on each student and on each class to determine if the mean intelligence and achievement levels of the classrooms were comparable. The classes were also analyzed to determine if they were equally distributed on the basis of sex and age levels. It was determined that the classes were comparable on the four stated criteria.

None of the comparisons between any of the classes reached the .05 significance level.

Assignment of Teachers. After comparability of classes had been established at the fifth and sixth grade levels, the teachers of each class were interviewed by the researcher to determine their interest and previous training as regarding the creativity training

of students and social studies teaching skills. The role of each teacher in the experiment was explained and teachers asked to comment on the total experiment and the role each student group would be asked to play.

The most compatible matches of teachers to experimental roles was made on the above stated criteria of teacher skill, teacher attitude and the researcher's professional judgment. The most advantageous matches were made between the teachers' knowledge and philosophy of creativity training and the group roles. This procedure for experimental studies followed the suggestions for quasi-experimental study designs (Wood, 1976).

Assignment of Group Roles. After determining the comparability of the student groups and the assignment of teachers to specific roles, the classroom groups were assigned so that each grade level contained classroom groups which fulfilled one of the following positions:

1. Experimental One Groups - (E_1). This group had creativity student training incorporated within the social studies curriculum. Their creativity training and much of their social studies work was conducted in the class investigation of the history and culture of the local community.

2. Experimental Two Groups - (E_2). This group had creativity training dispersed throughout the curriculum with student training

not concentrated in a particular area.

3. Experimental Three Groups - (E_3). This group acted as a non-treatment group and there was no deliberate effort to incorporate creative training in the curriculum. The group followed the normal procedures of the teacher and the required district curriculum.

In-Service Training to Teachers

In-service training was provided to the teachers of each group involved in the experiment as fitted to the particular group's role in the study. The training was appropriate to the conditions for creativity training of students as part of the social studies curriculum and creativity training of students dispersed in the general curriculum and outside of the social studies area. The teachers of the non-treatment group were encouraged to engage in normal classroom activities and make no directed approach to creativity training as outlined in this study.

In-service instruction was conducted weekly and arranged at the convenience of the teachers in after-school sessions. Specific lesson plans for each group, with the exception of the E_3 (non-treatment) group were developed by the researcher. These plans were presented to the teachers and their reactions solicited. Plans were sometimes modified on the suggestions of the teachers and with the consent of the researcher. After the lessons had been presented to

the students and at the next in-service session, information was collected regarding the effect of the lesson and students' reactions to the plan. If the lesson required the production of a product by students, the products were collected by the researcher for later evaluation.

In-service sessions concentrated on use of creative problem solving, creative training as outlined by Smith (Smith, 1967) and creativity development as illustrated by Parnes (Parnes, 1976). The suggestions of Torrance (Torrance, 1967) were also incorporated into the lesson plans and into procedures presented to the teachers for student instruction.

Persons outside the school staff who were utilized in the instruction of the E_2 groups and the E_1 groups were contacted by the researcher and arrangements made for their participation in student instruction. The confirmation of these persons and their role in the student instruction was confirmed at in-service sessions. Instruction was provided first to the sixth grade.

The total in-service program was conducted during the prescribed time periods of the study and followed a developmental approach for both teachers and students. Sessions were tape recorded and the tapes audited for purposes of verification of the integrity of the experimental treatments.

Testing Procedures

Pre-Testing. Each group of students at both grade levels were tested on the Torrance Test of Creative Thinking (TTCT) by certified counselors of the school district. Students were also tested on the Test for Inquiry Social Studies (TISS) by the same counselors. The testing took place before the experimental procedures and in-service sessions were implemented with teachers and students.

Tests were scored by the counselors and the results arranged on student score distribution sheets for each classroom group by student identification number. The pre-test scores were used to establish the comparability of students in areas of creativity and social studies. The results of this testing is reported in Chapter Four of this study.

Post-Testing. At the end of the experimental period (November to March 31), the students in all groups were again tested on the TTCT and TISS. This testing was conducted by the same counselors and under the same classroom conditions.

Retention Testing. After a two month period (March to May), students were again tested on the same two tests and under the same conditions. The testing was conducted under the same previous testing conditions and by the same personnel.

Testing Instruments

Creativity Test

Testing for determination of students' creativity skills was conducted by using the TTCT test developed by E. Paul Torrance as a sequel to the original Minnesota Test of Creative Thinking.

In the complete battery of Torrance creativity tests there are both verbal and figural activities. Either the verbal or figural tests may be administered separately and norms are available for each test. Torrance reports a .98 coefficient of correlation between verbal and figural forms of the test.

The Figural Form A was used in testing students' creative skills prior to the implementation of the instructional procedures of this study, and at the end of the study. The Figural Test yields scores to determine students' skills in originality, fluency, flexibility and elaboration. These four components are considered a vital part of the creative abilities of any individual.

Picture Construction, Incomplete Figures Activities and Repeated Figures Activities are the testing situations used to determine the originality, fluency, flexibility and elaboration scores.

Picture Construction consists of having the students use a tear drop shaped piece of colored paper in order to produce an original response by trying to think of something that no one else in the group will produce by using the same shape. Elaboration is

encouraged by asking individuals to add ideas that will make their picture tell a complete story. A limit of ten minutes is provided for the individual to complete his/her picture.

The Incomplete Figures Activities builds on the Gestalt psychology, of individual tensions to complete a figure in the simplest and easiest way possible. Each figure is scored for flexibility, originality, elaboration and fluency. Ten figures are presented and a limit of ten minutes provided for completion of all ten figures.

Repeated Figures Activities is similar to the Incomplete Figures Activities. The stimulus material in Form A is thirty sets of parallel lines. The common element tested is the ability to make multiple associations to a single stimulus. In the Repeated Figures Activity a deliberate attempt is made to stimulate all four types of divergent thinking and to determine fluency scores by the number of figures completed, flexibility scores by the number of categories into which the scores fall, originality by unusual ideas and elaboration by detail and interesting ideas added. A limit of ten minutes is set for the completion of the Repeated Figures Test.

This triad of testing activities represents four different aspects of creativity, or four different creative tendencies. The complexity of the figural tasks is varied through the instructions. In the first task, the principle motivation is for originality. In the second activity, flexibility or variety of response is added to

originality and elaboration. Fluency enters as the last activity to develop with originality, elaboration and flexibility the creativity scenario for the individual being tested (Torrance, 1974).

By testing and evaluations of these four basic creativity skills a composite picture is presented of the individual's skills and competencies. Such a picture illustrates where the individual is in creative abilities and provides a base from which to judge if instruction in creative skills has increased individual or group creative levels.

Validity and Reliability of the Creativity Testing Instrument.

The validity and reliability of the TTCT is established in the manual for the test with specific data given for each grade level.

Mean reliability coefficients for the Figural Form A test, that was utilized in this study, was presented in the Norms and Technical Manual for the TTCT.

Reliability. The mean reliability coefficients ranged .88 to .94 on a test retest procedure.

In use of interscorer reliabilities attained by use of counselors and classroom teachers, the following table was presented:

Coefficients of Correlation

Fifth grade:	Fluency .99	Flexibility .95	Originality .88
	Elaboration .96		
Sixth grade:	Fluency .99	Flexibility .98	Originality .98

Elaboration .96 (Torrance, 1974, p. 19).

Construct Validity. Validity coefficients ranged from .88 for originality to .96 for fluency scores (Torrance, 1974).

The mean reliability of the TTCT test was also provided in the testing manual for the test. There was reported a coefficient of correlation of reliability in excess of .90.

Social Studies Test

The Test for Inquiry Social Studies was used with the fifth and sixth grade students as a measure of the application of inquiry or creative problem solving skills at higher cognitive levels of thinking.

The test was designed in 1976 as part of a doctoral dissertation at the University of Nebraska at Omaha by Dr. Sharon Muir. The test consists of forty multiple-choice items with a 45-60 minute time element. It is unique in that the need for prior knowledge has been minimized and it allows students to apply creative problem solving with higher cognitive thought as defined in Bloom's Taxonomy of Educational Objectives: Cognitive Domain. The relationship of the inquiry process and creative problem solving to higher cognitive thought is established in the social studies literature dealing with the development of the test (Muir, 1976).

This test also follows the procedures used in the Follett Social

Studies series which students involved in the study utilized as a textbook. The Follett series developed both the knowledge component and value clarification exercises to teach basic social studies skills. The series also required the use of problem solving skills and creative thinking processes.

TISS Validity and Reliability Data. The validity of the test was established by interjudge process using various teachers and university consultants of the mid-western area of the United States. The content validity was reported in the manual for testing instructions as:

Content Validity -- was by interjudge process. The reliability of the test was reported in the same manual by grade level. Dr. Muir states that the test represents graduated levels of Bloom's Taxonomy.

Reliability Coefficients -- .85 at the fifth grade level
.82 at the sixth grade level

Since the test required reading ability there was consideration given to the readability level of the test. The total readability level was reported with a breakdown of readability scores by grade level.

Readability levels

Average level of difficulty by use of the Fry readability formula -- 5.7 (Muir, 1976).

This data was present for the total test in use with both fifth and sixth grade students.

Fifth grade average difficulty was established at 5.3 and Sixth grade average difficulty at 5.9.

Use of this test was considered in this study because of the need of a testing instrument that measured social studies skills and creative problem solving abilities. Standardized tests surveyed provide for only the testing of cognitive understandings and the retention of knowledge and factual data.

STUDENT INSTRUCTION

Both E_1 and E_2 groups shared various creativity instructional procedures.

Common Creativity Instructional Treatments for E_1 and E_2 Groups

Creativity instruction was developed in the following manner.

1. Development of individual creativity skills.

The principle of the creative process, as given by Smith, was used by teachers to encourage student originality, fluency, flexibility and elaboration of thought. These four criteria formed the major thrust of the instruction.

*Attention was given to providing motivational tensions through

*Creativity Skills

teacher questions about an issue, allowing students to investigate issues on their own, and to set goals for investigations.

*There were art activities, creative writing, graphing, charting, and deferred judgment techniques employed in investigations.

*Students were encouraged to engage in constructive criticism of themselves and class members.

2. Development of group creativity skills.

Creativity instruction with groups of students utilized the techniques developed by Parnes in Creative Behavior Guidebook (1967). These techniques were originally developed for adults, but was modified to be used with elementary students. Modifications are as follows:

*Observing

*Developing unique solutions to problems

*Brain storming

*Group thinking

*Reserving judgment until additional information is obtained

*Reserving placing a judgment on an individual's own or other's idea.

3. Physical environment for instruction.

A suitable design of the classroom was established with working spaces where materials for creative activities are easily available to the students.

*Much of the organization of the room was left to the decisions of the students.

*Brainstorming and group thinking were utilized to determine the physical arrangement of the classroom and the consideration of creativity questions.

4. Psychological conditions appropriate for the development of creative thinking.

For a creative atmosphere to prevail in the classroom certain considerations must be present so that students may freely express their ideas. The creative atmosphere listed in this study included:

- a. *Rewarding achievement and encouraging individuality, uniqueness, originality, and independence of thought.
- b. *Developing an atmosphere in the classroom which was encouraging to student exploration of problems and allowed for individual and group mistakes.
- c. *Developing respect for each student's and group's creative endeavors.
- d. *Using open-ended questioning by teachers and students.
- e. *Planning highly motivational procedures so that students become involved in their learning, and providing opportunities for open student discussions.
- f. *Fostering skills of outlining, summarizing, evaluating, synthesizing, critical thinking, deferring judgment until facts are

located, visualizing, retention of information, and using imagination.

g. *Helping students set goals and arrive at generalizations rather than memorization of facts.

h. *Developing an absence of threat for experimental ideas.

i. *Accepting different ideas from students (Smith, 1967).

5. Use of imagination and visualization.

Students were encouraged to expand their imagination and visualization abilities. This procedure was followed with the E₁ group in the social studies inquiries. Visualization and imagination were developed with the E₂ group by encouraging them to use these abilities in their creativity sessions that were not related to social studies areas.

Common Social Studies Instructional Procedures for Experimental₁ and Experimental₂ Groups

Inquiry procedures followed the materials presented in the Follett textbook for the particular grade levels. Inquiries were developed to acquire knowledge, develop hypotheses, test hypotheses and produce social action. Value clarification was incorporated into inquiries as the second component of the inquiry process.

Common Textbook Procedures

The standard text of the Butte School District is the Follett social studies series entitled "Exploring Our Worlds," (1976). There

is an introductory chapter of general social science concepts. Each of the other units of the text deals with specific social studies concepts.

Experimental Procedures Linking Creativity Instruction with Social Studies Instruction

1. The inquiry instruction of the E₁ group followed the procedures outlined in the teacher manual of the Follett series, the Banks Method and incorporate creativity training.

2. Creativity training was conducted with the addition of brainstorming, group thinking on an issue, forcing relationships between seemingly unrelated ideas and concepts, making checklists of ideas for the determination of the most unique and different ideas, and investigation of the local community as it relates to the topics under discussion.

Value clarification activity considered the questions in the text and also questions related to the text as they apply to the local community.

Teachers praised the unusual, unique, and different ideas of students, by rewarding them with verbal and written praise, and listing their ideas on displayed materials for the students to receive extra credit for such ideas.

3. Creative written expressions and creative oral expressions of the group were highly valued, and students were given written and

oral praise as rewards for their efforts. Creative art was rewarded in the same manner.

4. Value clarification activities were conducted as outlined in the teacher's manual at this grade level. There were additional value clarification questions regarding the students' investigations of their local community.

Investigations of the Local Community. This procedure of the study was a combined effort of the fifth and sixth grade students in the E₁ groups. It was initiated after November, when students became comfortable with inquiry approaches to teaching and when they had been exposed to creativity instruction. This procedure combined creativity instruction and social studies instruction with the E₁ group.

At the sixth grade level the local community was investigated as part of the study of immigration, ethnic groups, and career development.

At the fifth grade level the study was linked with Unit 10, "The Civil War Divides the Nation," and Unit 11, "Exploring the Rocky Mountain States."

Procedure for Investigations of the Community. Visitations of the E₁ groups were made to manufacturing and industrial sites in the Butte area for the purpose of data collection. Representatives of the firms made classroom visitations to supply students with

information.

Noted historians of the area were interviewed. Senior citizens and representatives of ethnic groups visited classrooms to provide students with information concerning the founding and development of Butte. The political heritage of the area was investigated by visits to the Butte-Silver Bow Courthouse.

The link between the founding and development of Butte and the Anaconda Company was researched. Students participated in field trips to the Anaconda Company facilities, and representatives of the Anaconda Company visited the classrooms to provide information to students.

Library and research materials that related to the history of Butte were supplied to the students. These materials were distributed for use by students who established classroom libraries through brain-storming sessions.

Specific teaching sequences are presented in the appendix to this study.

Procedures for Creativity Instruction in the Experimental₂ Groups

1. Creativity instruction in the fifth and sixth grade was related to the creativity experience of the students arranging their own room setting and to the Smith (1967) creativity exercise as outlined previously.

2. Brainstorming sessions were related to areas not comprised in the social studies curriculum.

3. Parnes (1967) creativity instructional techniques used were: problem-solving processes, finding of new and original ideas for a problem, associations of ideas in unique ways, forcing relationships between seemingly unrelated ideas or concepts, and making checklists of ideas for determining the most unique or different ideas.

4. The creativity experiences were carried on for a ten to fifteen minute period on a topic that is chosen by the teacher or the students. The topics were not related to the social studies area of instruction.

5. The creative ideas and expressions of the group were rewarded by the instructor with verbal praise and written expressions of praise.

6. Creative written expression and creative oral expressions were valued highly and rewards given by the teacher to the students for their ideas. Art activities that were related to the topics discussed by the group, that were unique and versatile, were highly praised by the instructor so that the students received adequate feedback for their efforts.

7. Materials produced by students which relate to their creativity instruction were collected and displayed.

Specific teaching sequences are presented in the appendix to this study.

Procedures for Social Studies Instruction with the Experimental₂ Groups

The E₂ groups were instructed in their social studies curriculum by use of the Follett materials. They were not exposed to specific creativity instruction as part of the social studies program. The knowledge component in social studies was supplied by teacher instruction, teacher lecture, textbook material, and enrichment materials as deemed necessary.

Value clarification exercises were those outlined in the textbook materials.

Non-Treatment Group

The non-treatment groups were not exposed to creativity instruction as outlined in this study. The teachers of the groups were instructed to conduct their normal procedures for instruction in the time period of the experiment. The groups' level of previous creativity was established by the pre-testing procedures utilizing the TTCT.

The social studies instruction of the non-treatment group came directly from the textbook and followed normal curriculum requirements. The groups' social studies levels were previously established through use of the pre-test of the TISS.

Teachers of the groups were also interviewed at conferences between the researcher and the teachers to determine if instruction in the classroom was influenced by the creativity and social studies procedures used with the other experimental groups. No influence was detected.

ORGANIZATION OF DATA

The data gathered during the course of the experiment and at the end of the experimental period was organized and presented in the following manner.

1. Pre-test scores.

The pre-test scores of individual students and group means on the TTCT and the TISS were compiled. A frequency distribution for each group on each of the two tests was used to compute a class mean. Means of the classes were compared by use of the student's t-test.

2. Conferences with Teachers and the Observer.

At the conferences with teachers, information concerning individual students and the progress of the experiment was tape recorded. The information, date, and title of the particular group to which the information pertained was noted. The conferences were conducted so that E_1 and E_2 teachers, and non-treatment teachers were not interviewed together to insure that integrity of the experiment

was maintained.

At the conferences with the outside observer, the information was tape recorded concerning observations of teacher stimulation of originality, fluency, flexibility and elaboration of creative responses by the teachers of the E_1 and E_2 experimental groups. There were also recordings made of the lack of the described stimulation in the non-treatment group.

3. Post-testing scores.

The post-testing scores of all the students on the TTCT and the TISS were determined. A frequency distribution for each group was compiled, group mean computed and comparisons made from, to determine pre- to post-testing differences.

4. Differences from pre-test to post-test were computed for each student and each group, and class means presented and compared for statistical significance.

5. Retention Scores.

Retention scores from pre-test to post-test and from pre-test to retention test were determined. A frequency distribution and mean were presented for each group and compared for statistical significance.

6. Anova Analysis.

The scores from the retention testing were subjected to an Anova to determine if there were any interactions between the teaching

procedures employed with each group and the characteristics of students' intelligence or sex.

STATEMENT OF HYPOTHESES

The hypotheses of this study deal both with the areas of creativity and social studies.

Hypotheses Dealing with Creativity

1. There is a difference in the creativity scores of students instructed in creativity skills incorporated within the social studies curriculum (E_1) when compared with the creativity scores of students instructed in creativity training that was dispersed throughout the curriculum (E_2).

2. There is a difference in creativity scores of students instructed in creativity dispersed throughout the curriculum (E_2) as compared to the creativity scores of students who were not provided with specific creativity training as described in this study (E_3).

3. There is a difference in the creativity scores of students instructed in creativity skills in social studies (E_1) as compared to scores of students not instructed in any specific creativity skills (E_3).

Hypotheses Dealing with Social Studies

1. There is a difference in the social studies scores of students

instructed in social studies in which creativity training was incorporated (E_1) as compared to the scores of students instructed in creativity training that was dispersed throughout the curriculum (E_2).

2. There is a difference in the social studies scores of students instructed in creativity dispersed throughout the curriculum (E_2) as compared to students' scores who were not provided with specific creativity training (E_3).

3. There is a difference in the social studies scores of students instructed in creativity training in social studies (E_1) as compared scores of students not instructed in any specific creativity training as detailed in this study (E_3).

A Null Hypothesis was formulated statistically for comparisons of social studies means and creativity means in the various testing situations.

STATISTICAL ANALYSIS

Student's t-test

The null hypotheses of this study were tested by use of the student's t-test to determine statistical significance. In addition to the use of the t-test comparison group means, the retention data was also subjected to a two way analysis of variance (ANOVA) to detect possible interactions between variables of intelligence or

sex as related to teaching methods.

Level of Significance

The Null hypotheses for the analysis of creativity and social studies skills were tested at the .05 level of significance. This level was chosen to provide a degree of assurance against a Type I (Alpha) error or a Type II (Beta) error occurring.

Two Way Analysis of Variance

After analysis of the Null hypotheses by use of the student's t-test, the retention data was scrutinized to determine if there were interacting factors between the sex of the students or their intelligence levels and the particular teaching methods employed with the groups.

The Two-Way Analysis of Variance permits the simultaneous investigation of two experimental variables. One of the variables analyzed was the method of teaching and the other variable was either sex or intelligence.

Analysis Related to Sex. In analyzing the relationship of the student's sex to the teaching methods, students were designated as either 1 (female) or 2 (male) in each instructional group. Analysis was made by use of the ANOVA to determine if male students or female students reacted more favorably to a particular instructional procedure. The analysis was made with the E_1 , E_2 and E_3 .

groups. The analysis formed the basis for later considerations of the questions of whether males or females were more acceptable to the teaching procedures.

Analysis Related to Intelligence Levels. The intelligence score of each student was obtained from the permanent records of the school district. The score of students within the established intelligence levels was compared to the mean of the particular group of which they were members. This comparison was a method of comparing the students' intelligence level to the instructional method. Each variable was analyzed in this manner.

The student groups, as stated previously, were designed as E_1 , E_2 and E_3 based upon the experimental teaching methods the groups had been exposed to. The mean data for each group obtained from the testing program was compared to data for each group's intelligence level. Intelligence levels were designed as high, medium and low as follows:

High	--	110 and above
Medium	--	103 - 109
Low	--	102 or lower

The intelligence data was taken from the Otis Quick Score Test of Intelligence given to all students in the school district. The choice of the numerical divisions allowed for one-third of the total population at each grade level to fall in the high area, one-third of

the total population to fall in the middle area and one-third of the total population to fall in the low area.

Due to a program of School District Number One, students with an I.Q. of one hundred and twenty or above are transferred to an Accelerated Learners Program and Students with an I.Q. below eighty-five are instructed in a Resource Room situation. The students involved in this study did not include Accelerated Learners or Resource Room students who had been re-assigned with parental consent.

PRECAUTIONS TAKEN FOR ACCURACY

Information obtained from the teachers and the observer at conferences was tape recorded and presented to them at the following conference as a check for accuracy. This was done to subjectively monitor the progress of the study. Lessons presented by community personnel were also recorded to verify the presentation and its content.

The testing required in the study with the TTCT and the TISS was conducted by the same certified counselors. The same counselors also scored the tests given at each testing situation. Scores were checked and recorded on data cards for individual students by identification number. These student data cards were verified against student score sheets when the information was key-punched at the Data-Processing Center of the Butte School District.

The statistical analysis required by this study was facilitated on the Xerox Sigma 7 computer at Montana State University. The Statistical Package for the Social Studies (Nie, 1975) was used. The analysis was under the direction of the researcher's major advisor.

MANAGEMENT OF VARIABLES

Variables within this study were managed by considering the following situations:

1. The academic change in students was managed by the fact that school experiences were generally the same for both groups with the exception of the experimental situations of this study. Events which occurred outside the school were beyond the control of the researcher.
2. In the situations where a student left school or the group he/she was initially assigned to, so that post-testing was not possible, the score of the students were deleted from the analysis.
3. Since both experimental and control groups were at specific grade levels, the maturation of each group should have been nearly equal.
4. The influence of the pre-test upon the post-test was lessened by the time span between test administrations. The testing was conducted by the same counselors.

5. After the visits to the classrooms made by the observer described in this chapter, interviews took place between the observer and the researcher. The observer noted that the teachers conducting the experiment were complying with the guidelines of the study and were fulfilling their individual roles, as outlined for them. He noted the stimulation of creative skills in the programs of the E_1 and E_2 groups. He also noted that no directed creative experiences, as described in the design of this study, were being conducted in the E_3 groups. A letter to this effect from the observer, to the researcher, is contained in the appendix.

This information was concerned with the period from the pre-testing program until the post-testing program.

6. Complete management of the teacher variable was not possible within the constraints of the study. The variable was managed as closely as possible by using teachers of approximately the same educational preparation and years of teaching experience. Particular lesson plans were prepared for each group by the researcher and the teachers verified, at conferences, that they were using the plans for student instruction. The observer also verified the use of the plans and the fact that the teachers were adhering to the guidelines of the study.

SUMMARY

This study was designed to test the concept of the inclusion of creativity training in the elementary curriculum. Two experimental groups and a non-treatment group were established in the sixth and fifth grades of the McKinley School, of Butte, Montana. The experimental period was from November until March of the 1978-79 school year.

The E₁ groups of this study had creativity instruction incorporated into their social studies program. The E₂ groups were given a general approach to creativity training by use of commercial programs and instructional procedures recommended by authorities on creativity. The non-treatment groups, E₃, were not provided with creativity instruction as described in this study.

Specific data collection methods were used which included pre-testing and post-testing. A retention test was also used. The testing instruments were the Torrance Test of Creative Thinking (TTCT) and the Test for Inquiry Social Studies (TISS). Verification of instruction was determined at conferences with teachers, evaluations by an observer, and evaluations by the principal of the school.

Precautions for accuracy and for the preservation of the integrity of the experiment were taken within the control of the researcher.

Chapter 4

STATISTICAL ANALYSIS OF DATA

Introduction

The experimental curriculum developed in this study was aimed at providing information on whether social studies was a fertile ground in which to develop creativity. In order to test this idea a school was selected and three experimental groups were established at the fifth and sixth grades. Classes were assigned as E₁, E₂ or E₃ dependent on the instructional methods utilized with the groups.

Before the beginning of instruction, the groups were verified as comparable on demographic data and on pre-tests with the Torrance Test of Creative Thinking (TTCT) and the Test of Inquiry Social Studies (TISS). After the instructional period the groups were post-tested to determine if the instruction had produced any changes in students' scores. The same instruments were again administered after a retention period.

The establishment of the groups, the assignment of teachers and the three instructional procedures were described in the preceding chapter of this study.

Organization of Chapter Four

Chapter four is organized around the presentation and discussion of data concerning the following items.

1. The establishment of comparable groups used a composite analysis of both the students' demographic data and the results of the pre-test scores. This information was analyzed statistically by use of a t-test to detect class differences.

2. The post-test scores for each class were compared by statistically analyzing the pre-test to post-test difference.

3. The change from pre- to post-test was also analyzed by inter-group comparisons of change scores.

4. The retention test results were analyzed to determine if there was a significant difference from pre-test to retention test in any particular group.

5. The net change from pre-test to retention test was analyzed by inter-group comparisons.

6. The post-test scores were compared to the retention scores to determine if there was a statistical difference between post and retention scores.

7. A Two-way Analysis of Variance (Anova) was used to compare students' intelligence quotient or sex to teaching method. This comparison was utilized to locate possible interactions.

In each of these sections the information was organized with sixth grade comparisons presented before fifth grade comparisons. This format was explained in Chapter Three.

At no point in the analyses are fifth grade scores compared to

sixth grade scores. This procedure follows the design of the study.

Establishment of Comparable Groups

To provide verification of the comparability of the three groups at each grade, a statistical analysis was applied to the demographic data collected from students' permanent records and to the test scores on the pre-tests.

The following tables contain the results of this analysis. The .05 level of significance was chosen as the critical level and the statistical tool utilized was the Student's t-test for comparisons of mean scores.

Demographic data. Class means were determined for the variables of intelligence, standard achievement stanine, age and sex. The variable of sex is nominative, thus a Chi Square comparison was used to determine if the number of males to females was significantly different in any class. The Chi Square analysis for the six classes did not show any significant differences in the classes on the sex variable.

An analysis of the demographic data for the sixth and fifth grades determined that the classes were comparable. No significant t value or Chi Square was located on any of the variables at the .05 level.

TABLE I. Comparison of Sixth Grade Demographic Data

	I.Q.		S.A.T.		Age		Sex
	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	
E ₁ N=21	106.62	11.80	6.4	1.62	11.18	36.2	E ₁ - Female 10 Male 11
E ₂ N=20	106.95	9.78	5.9	1.05	11.09	38.3	
d.f. 38	t = .97 p = .92		t = 1.00 p = .32		t = .75 p = .46		
E ₂ N=20	106.95	9.78	5.9	1.05	11.09	38.3	E ₂ - Female 10 Male 10
E ₃ N=20	103.14	6.32	5.7	.00	11.18	36.40	
d.f. 38	t = 2.39 p = .06		t = .93 p = .36		t = .76 p = .45		
E ₁ N=21	106.62	11.80	6.4	1.62	11.18	36.2	E ₃ - Female 10 Male 10
E ₃ N=20	103.14	6.32	5.7	1.00	11.18	36.40	
d.f. 39	t = 1.16 p = .24		t = 1.73 p = .09		t = .31 p = .97		
N = 61							

TERMS: t = Student's t-value d.f. = degrees of freedom
p = probability I.Q. = intelligence
S.A.T. = Standard Achievement Stanine

TABLE II. Comparison of Fifth Grade Demographic Data

	I.Q.		S.A.T.		Age		Sex
	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	
E ₁ N=21	104.14	9.34	5.19	1.36	10.17	4.68	E ₁ - Female 10 Male 11
E ₂ N=22	106.27	7.90	5.90	1.57	10.09	55.5	
d.f. 41	t = .80 p = .43		t = 1.60 p = .12		t = .47 p = .64		
E ₂ N=22	106.37	7.83	5.90	1.57	10.09	55.4	E ₂ - Female 11 Male 11
E ₃ N=22	111.31	19.89	6.22	1.06	10.22	39.86	
d.f. 42	t = 1.1 p = .28		t = .78 p = .44		t = .88 p = .38		
E ₁ N=21	104.14	9.34	5.19	1.36	10.17	46.8	E ₃ - Female 11 Male 11
E ₃ N=22	111.31	19.89	6.22	1.06	10.22	39.68	
d.f. 41	t = 1.52 p = .42		t = 2.06 p = .06		t = .42 p = .68		
N = 65							

TERMS: t = Student's t-value

d.f. = degrees of freedom

p = probability

I.Q. = intelligence

S.A.T. = Standard Achievement Stanine

PRE-TESTING

Pre-testing Comparability. All the experimental groups at both grade levels were pre-tested on the Torrance Test of Creative Thinking (TTCT) and the Test for Inquiry Social Studies (TISS) to provide further verification of the comparability of the groups. The following tables present the information obtained from the pre-testing.

The variables tested are designated as:

TISS - Social studies score on the Test of Inquiry Social Studies

Creativity sub-tests obtained from the Torrance Test of Creative Thinking

Flue. - Fluency

Flex. - Flexibility

Org. - Originality

Elab. - Elaboration.

The pre-test scores were later used to compile change scores (pre- to post-test) and net change scores (pre- to retention test).

Discussion of Comparability of Groups. The pre-test data concerning the comparability of the experimental groups located no significant differences in the groups at their particular grade level.

POST-TESTING

Introduction

After the instructional period, students in all six classes were

TABLE III. Pre-test Comparability Data
for Sixth Grade Classes

	Social Studies		Creativity							
	TISS		Flue.		Flex.		Org.		Elab.	
	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.
E ₁ N=21	21.57	6.18	17.5	4.92	15.04	4.94	23.4	8.45	57.7	24.54
E ₂ N=20	20.9	5.28	18.6	6.68	18.20	6.01	21.9	6.58	63.5	22.14
d.f.=38	t = .37		.61		1.84		.61		.81	
	p = .71		.54		.07		.55		.42	
E ₂ N=20	20.9	5.28	18.6	6.68	18.20	6.01	21.9	6.58	63.5	22.14
E ₃ N=21	21.0	7.39	16.5	4.04	17.85	5.47	28.4	9.45	52.35	15.5
d.f.=39	t = .49		1.17		.19		1.98		2.01	
	p = .96		.25		.84		.07		.06	
E ₁ N=21	21.57	6.18	17.5	4.92	15.04	4.94	23.4	8.45	57.7	24.54
E ₃ N=20	21.0	7.39	16.5	4.04	17.85	5.47	28.4	9.45	52.35	15.5
d.f.=39	t = .27		.66		1.72		1.79		2.31	
	p = .78		.52		.09		.08		.06	

TABLE IV. Pre-test Comparability Data
for Fifth Grade Classes

	Social Studies		Creativity							
	TISS		Flue.		Flex.		Org.		Elab.	
	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.
E ₁ N=21	18.4	4.72	20.9	6.68	16.57	5.41	26.0	8.47	62.95	18.80
E ₂ N=22	18.14	4.68	18.5	5.66	15.86	3.86	23.8	6.30	70.04	19.92
d.f.=41	t = .170		1.22		.50		.98		1.19	
	p = .86		.22		.62		.33		.24	
E ₂ N=22	18.4	4.68	18.5	5.66	15.86	3.86	23.8	6.30	70.04	19.92
E ₃ N=22	18.5	3.78	20.5	7.35	18.72	5.93	30.5	10.84	61.6	20.64
d.f.=42	t = .25		.98		1.89		2.07		1.42	
	p = .81		.33		.07		.06		.16	
E ₁ N=21	18.4	4.72	20.9	6.68	16.57	5.41	26.0	8.47	62.95	18.80
E ₃ N=22	18.5	3.70	20.5	7.35	18.72	5.93	30.5	10.84	61.6	20.64
d.f.=41	t = .56		.17		1.24		1.51		.26	
	p = .96		.87		.22		.14		.78	

again tested on the TTCT and the TISS. The testing was conducted using the same procedures as described previously. The test dates were in late March. This section is organized by presenting:

1. Comparisons of pre- to post-test scores for each group.
2. Inter-group comparisons of change scores (pre- to post-test change).

Student Population. Only the scores of students enrolled during the pre-testing and post-testing were included and used to compute class means. Data of students who had not been involved in the pre-testing or who had entered the classes less than ninety days prior to the post-testing were deleted from the analysis. No students had left the school at the post-testing, so the number remained the same as the pre-test population. One hundred twenty-six students were post-tested. The class n's are listed in the data tables.

Discussion of Pre-test Means Compared to Post-test Means. The means of each group's pre-test mean was compared to the same group's post-test mean. This comparison was made to determine if there was a difference in students' social studies or creativity scores after instruction.

The information is presented by grade level for the three experimental groups. The class number, mean and standard deviation are presented for both the pre- and post-tests. A mean difference with its standard deviation between the pre- and post-test scores is

included also. The t value presented in the table is the " t " calculated for the difference between the pre- and post-test. It is not the " t " for the mean difference.

Astericked entries indicate " t " values above the .05 level of significance.

Discussion of Sixth Grade Pre-test to Post-test Scores

In order to facilitate discussion of the sixth grade scoring, the information presented in the preceding tables is discussed by sub-test and by relating the information for each experimental group to the particular sub-test.

Sixth Grade TISS Scores. In the area of social studies the E_1 class increased their pre-test mean of 21.57 to a class mean of 26.8 for the post-test. This produced a t statistic of 6.17 which was significant. The E_2 group increased their mean from 20.89 to 24.8 which resulted in a t statistic of 2.89 which was also significant. The E_3 group did not generate a significant difference.

Sixth Grade Fluency Scores. On the creativity fluency sub-test the E_1 group increased their mean score from 17.5 to 22.1. This increase was significant at the .004 level. The E_2 group increased their mean score from 18.6 to 25.4. This was a significant increase. The E_3 group did not produce a significant increase in this area.

The fluency variable required varied responses to the same

TABLE V. Pre-test to Post-test Comparisons of Sixth Grade Scores

		Social Studies				Creativity					
		TISS		Flue.		Flex.		Org.		Elab.	
		pre	pst	pre	pst	pre	pst	pre	pst	pre	pst
E ₁ N=20	\bar{X}	21.57	26.8	17.5	22.1	15.04	19.85	23.4	37.5	57.7	61.90
	S.D.	6.18	5.25	4.92	5.93	4.94	5.94	8.45	10.04	24.54	19.90
	<u>mean dif.</u>	<u>5.15</u>		<u>4.50</u>		<u>4.75</u>		<u>14.3</u>		<u>4.10</u>	
	d.f.=19	S.D.	3.73		6.04		9.20		12.96		24.18
	t		6.17		3.33		2.02		4.93		.75
	p	.000*		.004*		.07		.000*		.46	
E ₂ N=20	\bar{X}	20.89	24.8	18.6	25.42	18.20	22.47	21.9	41.16	63.5	67.21
	S.D.	5.28	6.22	6.68	8.45	6.01	5.83	6.58	8.32	22.14	15.76
	<u>mean dif.</u>	<u>3.90</u>		<u>7.00</u>		<u>3.95</u>		<u>18.89</u>		<u>3.26</u>	
	d.f.=18	S.D.	5.3		12.15		9.20		10.26		27.56
	t		2.89		2.50		1.87		8.03		.52
	p	.01*		.02*		.08		.000*		.61	
E ₃ N=21	\bar{X}	21.0	21.64	16.5	18.30	17.85	19.44	28.4	30.35	52.35	54.65
	S.D.	7.39	4.68	4.04	5.78	5.47	6.61	9.45	9.65	15.1	12.13
	<u>mean dif.</u>	<u>1.10</u>		<u>1.55</u>		<u>1.39</u>		<u>2.05</u>		<u>3.75</u>	
	d.f.=19	S.D.	6.18		6.56		7.73		11.42		17.22
	t		.79		1.05		.81		.83		.97
	p	.44		.30		.43		.43		.34	

stimulus. The E_1 and E_2 groups increases indicated that their abilities in fluency had increased.

Sixth Grade Flexibility Scores. The flexibility sub-test requires diverse responses to the same stimulus. None of the experimental groups generated a significant change from pre- to post-test on this sub-test.

Sixth Grade Originality Scores. On the sub-test of originality, the E_1 group's increase was from 23.4 to 37.5. The E_2 group's increase was from 21.9 to 41.15. Both these changes were significant. The E_3 group did not produce a significant change from pre- to post-testing.

The results indicated that the E_1 and E_2 groups had increased their abilities to produce new and unique responses to a given set of established stimuli.

Sixth Grade Elaboration Scores. The ability of an individual to expand or elaborate upon an idea was tested by the last creativity sub-test. On the elaboration test, none of the groups produced a significant change in scores.

Instructional Methods Relate to Group Scoring. The scores of the E_1 group indicated that their TISS scores may have been influenced by the use of creativity training in social studies. This group's fluency and originality scores also seem to have been influenced by the creativity training they were exposed to. The E_2 group's

increases in fluency and originality could also be attributed to the creativity training provided to them. As shown in the table, the E₃ group generated no significant change from pre-test to post-test.

Discussion of Fifth Grade Pre-test to Post-test Scores

The same comparisons used at the sixth grade were utilized with the fifth grade scores. The format for the comparisons was the same as that described for the sixth grade.

Fifth Grade TISS Social Studies Scores On the TISS social studies test the E₁ group increased their score from 18.4 to 22.4. This was a significant difference. The E₂ group did not produce a significant difference in scores. There also was not a significant difference detected in the E₃ group's scores.

Fifth Grade Fluency Scores. On the creativity fluency sub-test the only experimental group which achieved a significant difference was the E₂ group. This group increased its pre-test score from 18.5 to a post-test score of 22.31.

Fifth Grade Flexibility Scores. None of the classes generated a significant difference in scores on the sub-test of flexibility. This fact was also noted with the sixth grade scores.

Fifth Grade Originality Scores. On the originality sub-test only the E₂ group reached a significant change. This group increased

TABLE VI. Pre-test to Post-test Comparisons of Fifth Grade Scores

		Social Studies				Creativity					
		TISS		Flue.		Flex.		Org.		Elab.	
		pre	pst	pre	pst	pre	pst	pre	pst	pre	pst
E ₁ N=21	\bar{X}	18.4	22.4	20.9	20.7	16.57	19.23	2.60	26.7	62.9	64.91
	S.D.	4.72	5.55	6.68	5.12	5.41	7.10	8.47	11.90	18.80	16.28
	<u>mean dif.</u>	<u>3.76</u>		<u>.48</u>		<u>2.80</u>		<u>.48</u>		<u>1.14</u>	
	d.f.=19	S.D.	3.52		3.84		7.27		9.17		14.06
	t	4.90		.57		1.77		.24		.37	
p	.000*		.96		.09		.82		.71		
E ₂ N=22	\bar{X}	18.4	20.35	18.5	22.31	15.86	22.09	23.8	40.27	70.04	74.10
	S.D.	4.68	4.30	5.66	5.05	3.86	5.78	6.30	14.86	19.92	14.10
	<u>mean dif.</u>	<u>2.60</u>		<u>3.18</u>		<u>6.36</u>		<u>16.64</u>		<u>5.14</u>	
	d.f.=20	S.D.	4.51		5.57		9.05		16.44		20.67
	t	2.59		2.67		2.16		4.74		1.16	
p	.09		.01*		.06		.000*		.25		
E ₃ N=20	\bar{X}	18.5	19.23	20.5	21.86	18.72	21.28	30.5	34.28	61.6	62.47
	S.D.	3.70	3.72	7.35	5.38	5.93	5.29	10.84	10.79	20.64	20.75
	<u>mean dif.</u>	<u>.428</u>		<u>1.82</u>		<u>2.28</u>		<u>3.23</u>		<u>.14</u>	
	d.f.=19	S.D.	4.04		5.16		6.39		11.18		10.16
	t	.49		1.33		1.64		1.32		.64	
p	.63		.30		.12		.20		.95		

its pre-test score of 23.8 to a post-test score of 40.27. The t value was significant at the .000 level.

Fifth Grade Elaboration Scores. None of the fifth grade groups produced a significant difference from pre- to post-testing on the elaboration sub-test. This fact was also noted with the sixth grade groups.

Instructional Methods Related to Group Scores. From the information presented on the fifth grade table, it could be inferred that the creative instruction incorporated into the social studies program of the E_1 group may have influenced their increased TISS score, but not their performances on the creativity sub-tests. The E_2 group's increases on the sub-tests of fluency and originality could also have been influenced by the instructional methods used with the group but their social studies scores were not influenced significantly.

The E_3 group, which received no specialized social studies or creativity instruction, did not produce significant changes from pre- to post-test.

Comparison of Experimental Groups' Post-test Means to the Normed Test Means

Normed test means are provided for both the TTCT and the TISS. The following comparison of post-test means to normed means is to provide further information in relating the experimental groups' scores to established norms. There was no statistical analysis of

this comparison.

Sixth Grade Comparison

	TISS	Flue.	Flex.	Orig.	Elab.
	<u>\bar{X} pst.</u>	<u>\bar{X} pst.</u>	<u>\bar{X} pst.</u>	<u>\bar{X} pst.</u>	<u>\bar{X} pst.</u>
E ₁	26.8	22.1	19.8	37.5	61.9
E ₂	24.8	25.4	22.5	41.2	67.21
E ₃	21.6	18.3	19.4	30.4	54.6
Norm.	22.8	20.2	15.8	29	75.8

Fifth Grade Comparison

	TISS	Flue.	Flex.	Orig.	Elab.
	<u>\bar{X} pst.</u>	<u>\bar{X} pst.</u>	<u>\bar{X} pst.</u>	<u>\bar{X} pst.</u>	<u>\bar{X} pst.</u>
E ₁	22.4	20.7	19.2	26.7	64.9
E ₂	20.4	22.3	22.1	40.3	74.1
E ₃	19.2	21.9	21.3	34.3	62.4
Norm.	18.4	21.8	16.0	28.1	73.8

On all the sub-tests except elaboration the E₁ and E₂ groups at both grade levels reached post-testing scores near or above the normed means for the TTCT and the TISS.

Inter-group Comparison of Change Scores

Previous comparisons were between the pre- and post-test scores

of the same group. In essence the group was compared to itself before and after instruction.

Change scores from pre- to post-test were calculated for each group. The change score for an individual group was compared to another group's score at the same grade level.

The comparisons were made to gain information as to the effect of the instructional procedures used with a group when one group was compared to another group which received a different instructional approach.

Discussion of Sixth Grade Change Scores

The discussion of the sixth grade change score information followed the same format as used with the discussion of the post-test scores. Each variable was discussed as it pertained to the particular group.

Sixth Grade TISS Scores. The E_1 group achieved a significant TISS change score when their mean score of 5.15 was compared to the E_3 group's mean of 1.10. The E_2 group did not generate a significant difference when compared to the E_1 or E_3 groups. The training and the experiences provided to E_1 group may have influenced their change in pre- to post-test scores.

Sixth Grade Fluency Scores. None of the groups produced a significant mean change score when the scores were compared by the

TABLE VII: Sixth Grade Class Comparisons of Change Scores
(Pre to Post by t-Values)

	Social Studies		Creativity							
	TISS		Flue.		Flex.		Org.		Elab.	
	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.
E ₁	5.15	3.73	4.50	6.04	4.75	7.02	14.3	12.95	4.1	24.18
E ₂	3.89	6.03	5.55	13.49	3.14	9.63	17.15	12.67	.20	30.12
d. f. = 37	t = .78		.32		.59		.70		.45	
	p = .44		.75		.55		.49		.65	
E ₂	3.89	6.03	5.55	13.49	3.14	9.63	17.15	12.67	.20	30.12
E ₃	1.10	6.18	1.55	6.56	1.39	7.73	2.05	11.41	3.75	17.22
d. f. = 37	t = 1.45		1.19		.63		3.96		.46	
	p = .15		.24		.53		.000*		.65	
E ₁	5.15	3.73	4.50	6.04	4.75	7.02	14.3	12.95	4.1	24.18
E ₃	1.10	6.18	1.55	6.56	1.39	7.73	2.05	11.41	3.75	17.22
d. f. = 38	t = 2.51		1.47		1.43		3.17		.53	
	p = .02*		.15		.16		.003*		.96	

inter-group analysis. The E_1 and E_2 groups' scores were above the E_3 group's score but not significantly larger.

Sixth Grade Flexibility Scores. None of the sixth grade groups generated a significant change score on the flexibility sub-test.

Sixth Grade Originality Scores. Both the E_1 and E_2 groups reached significant changes in scores when they were compared to the E_3 group. The creativity training and experiences provided to the E_1 and E_2 groups may have influenced this change in scores.

Sixth Grade Elaboration Scores. In the analysis of the sixth grade groups' elaboration scores, none of the groups reached a significant change score. It appears that the instructional methods employed with the E_1 and E_2 groups did not influence significantly their development from pre- to post-testing or their change on the elaboration sub-test.

Discussion of Fifth Grade Change Scores

The discussion of the fifth grade change scores followed the same method that was utilized in discussion of the sixth grade information.

Fifth Grade TISS Scores. In comparing the E_1 and E_2 groups' TISS social studies scores, a significant difference was not detected between the groups. The E_2 group's change was not significant

TABLE VIII. Fifth Grade Class Comparison of Change Scores
(Pre- to Post-test by t-Values)

	Social Studies		Creativity							
	TISS		Flue.		Flex.		Org.		Elab.	
	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.
E ₁	3.76	3.52	.48	3.84	2.80	7.27	.47	9.18	1.14	14.05
E ₂	2.50	4.51	3.18	5.57	6.36	7.04	16.64	16.44	5.13	20.67
d. f. = 39	t = 1.10		2.13		1.63		3.95		2.16	
	p = .27		.04*		.11		.000*		.09	
E ₂	2.50	4.51	3.18	5.57	6.36	7.04	16.64	16.44	5.13	20.67
E ₃	.41	3.94	3.59	5.10	2.18	6.26	3.09	10.93	.14	9.91
d. f. = 39	t = 1.64		.25		2.03		2.26		4.35	
	p = .11		.82		.06		.003*		.001	
E ₁	3.76	3.52	.48	3.84	2.80	7.27	.47	9.18	1.14	14.05
E ₃	.41	3.94	3.59	5.10	2.18	6.26	3.09	10.93	.14	9.91
d. f. = 41	t = 2.93		2.06		.30		.85		.27	
	p = .005*		.06		.76		.40		.79	

when compared to the E₃ group's. There was a significant difference between the E₁ and E₃ groups' scores on the TISS. This difference between E₁ and E₃ groups was also detected at the sixth grade level.

Fifth Grade Fluency Scores. There was a significant difference between the E₁ and E₂ groups on the sub-test of fluency. The difference was in favor of the E₂ group. In comparing the E₁ change score to the E₃ change, no significant difference was found. The comparison of the E₂ to the E₃ group also produced no significant difference.

Fifth Grade Flexibility Scores. As with the sixth grade, none of the groups generated a significant gain score on the sub-test of flexibility. The instruction methods used with the E₁ and E₂ groups did not seem to influence their flexibility scores.

Fifth Grade Originality Scores. On the sub-test of originality the E₁ group did not achieve a significant change score when compared to either the E₂ or E₃ groups. The E₂ group did produce a significant gain when compared to either the E₁ and E₃ groups. This information seems to indicate that the creativity training used with the E₂ group was effective with them.

Fifth Grade Elaboration Scores. None of the experimental groups at this grade level generated a significant elaboration gain score. This situation was also noted at the sixth grade.

Instructional Methods Related to Group Gain Scores

Based on the results of the tests, it appears that the creativity instruction incorporated into the social studies curriculum was effective with the E_1 social studies scores but not necessarily on all their creativity scores. The dispersion of creativity training throughout the curriculum seems to have effected the E_2 group's creativity scores but does not seem to have influenced their social studies scores. The E_3 , non-treatment, group produced no significant changes in either social studies or creativity scores.

RETENTION TESTING

Introduction

After a two month period, the TTCT and the TISS were again administered to all groups at both grade levels. The teachers verified that they had not conducted creativity training or creative social studies programs during this period.

The student population was approximately the same. Two students had left the school and were dropped from the experiment. The total number of students completing the study was one hundred and twenty-four.

The data obtained from the retention testing is presented in succeeding pages by:

1. Comparisons of pre- to retention test scores

2. Comparisons of net change (pre- to retention) by class
3. Comparisons of means from post-tests to retention tests.

Comparisons of Pre-test to Retention Test Means

Retention scores were calculated for each group by class assignment and a class mean determined. In considering the retention scores, differences that were noted are discussed as they apply to a particular class or sub-test. The t values presented were calculated on the difference between pre-test and post-test scores, not on the mean difference figure presented in the table.

Comparison of Sixth Grade Pre-test to Retention Test Means

On the TISS the E_1 retention test mean was significantly higher than the group's pre-test score. The t value of 6.00 was significant at the .000 level. The E_2 group also achieved a significant difference in scores with a t value of 3.89. The E_3 group did not reach a significant difference in pre- to retention scores.

Sixth Grade Fluency Scores. The pre- to retention test differences in scores for both the E_1 and E_2 groups were significant. The E_1 mean t value was 3.17 while the E_2 t value was 4.04. The E_3 t value was not of a significant nature.

Sixth Grade Flexibility Scores. The E_1 group generated a significant difference from pre- to post-test. The t value was 3.28 and was significant at the .004 level. This was the first

TABLE IX. Comparison of Sixth Grade Pre-Test to Retention Test Means

		Social Studies				Creativity					
		TISS		Flue.		Flex.		Org.		Elab.	
		pre	ret	pre	ret	pre	ret	pre	ret	pre	ret
E ₁ N=20	\bar{X}	21.47	27.94	17.5	22.5	15.04	21.35	23.4	35.4	57.7	58.8
	S.D.	6.18	4.94	4.92	7.43	4.94	7.92	8.45	9.70	24.5	10.65
	<u>mean dif.</u>	<u>6.00</u>		<u>4.94</u>		<u>3.01</u>		<u>12.15</u>		<u>1.00</u>	
	d. f. = 19	S.D.	4.69	6.96	8.49	10.71	25.9				
	t	6.00	3.17	3.28	5.07	.172					
p	.000*	.005*	.004*	.000*	.87						
E ₂ N=20	\bar{X}	20.9	25.15	18.6	27.8	18.2	22.4	21.9	43.4	63.5	70.5
	S.D.	5.28	5.96	6.68	5.96	6.01	5.8	6.58	8.7	22.1	15.53
	<u>mean dif.</u>	<u>3.89</u>		<u>9.37</u>		<u>3.84</u>		<u>21.16</u>		<u>6.58</u>	
	d. f. = 19	S.D.	6.59	10.12	8.85	10.43	28.03				
	t	2.57	4.04	1.89	8.85	1.02					
p	.02*	.001*	.08	.000*	.32						
E ₃ N=20	\bar{X}	21.0	21.6	16.5	19.6	17.85	19.4	28.4	29.5	52.35	53.5
	S.D.	7.39	4.06	4.04	5.8	5.47	5.89	9.45	8.75	15.1	11.06
	<u>mean dif.</u>	<u>1.05</u>		<u>2.85</u>		<u>1.30</u>		<u>1.20</u>		<u>2.6</u>	
	d. f. = 20	S.D.	6.22	6.45	7.05	10.33	17.91				
	t	.75	1.98	.82	.519	.65					
p	.46	.06	.42	.61	.53						

N=60 pre = pre-test ret = retention test mean dif. = mean score difference

significant difference found in any of the groups on the flexibility sub-test. None of the other sixth grade groups produced a significant difference in flexibility.

Sixth Grade Originality Scores. The originality score of the E₁ group showed a significant t value of 5.07. The E₂ groups' originality score was also significant in the comparison of pre- to post-test. The E₂ t value was 8.85 and significant. The E₃ group did not attain a significant difference in scoring.

Sixth Grade Elaboration Scores. As in the post-test situation, none of the experimental groups achieved a significant difference in elaboration. This variable appeared to be somewhat difficult to effect change in, with this particular group of students.

Instructional Methods Related to Retention Scores. It appears from the sixth grade retention information, that the E₁ and E₂ groups' TISS social studies scores, from pre to retention testing, may have been influenced by the instructional procedures used with the groups. These same groups' fluency and originality differences from pre to retention were also significant. The flexibility score of the E₁ group was the only significant score located on this sub-test. It appears that the creativity training provided to the groups influenced their creative development.

The E₃ groups, who participated in none of the creativity training, did not generate a significant difference in pre to

retention testing.

Comparison of Fifth Grade Pre-test to Retention Test Means

The scoring results established in the pre-test to post-test of the fifth grade was not followed on creativity sub-tests with the retention test scores. The differences between the post-testing and the retention testing results is discussed with each variable as it relates to a particular group.

Fifth Grade TISS Scores. On the social studies test the E_1 t value was 2.84 and significant at the .04 level. The E_2 group also produced a significant t of 3.89. The E_3 group did not generate a significant difference in the pre to post-test scores.

Fifth Grade Fluency Scores. The E_1 group achieved a significant difference in scores in the retention testing on the fluency sub-test. This group had not reached a significant level at the post-testing. The E_1 t value was 3.63 and significant at the .002 level. The E_2 group also reached a significant difference in scores. Their t value was 4.73. The E_2 had previously established a significant fluency difference in the post-testing program. The E_3 group did not generate a significant score in this area.

Fifth Grade Flexibility Scores. The E_1 group produced a significant t value of 3.63 on the flexibility sub-test. This was the first time a significant difference was detected at the fifth grade

TABLE X. Comparison of Fifth Grade Pre-test to Retention Test Means

		Social Studies		Creativity							
		TISS		Flue.		Flex.		Org.		Elab.	
		pre	ret	pre	ret	pre	ret	pre	ret	pre	ret
E ₁ N=20	\bar{X}	18.4	24.28	20.9	26.33	16.57	23.2	26.0	39.33	62.9	70.67
	S.D.	4.72	5.66	6.68	8.70	5.41	7.86	8.47	13.69	18.8	12.23
	<u>mean dif.</u>	<u>5.67</u>		<u>5.61</u>		<u>6.81</u>		<u>13.09</u>		<u>6.90</u>	
	d.f.=19	S.D.	8.86		7.08		8.57		9.59		22.66
	t	2.84		3.63		3.63		6.26		1.39	
p	.04*		.002*		.002*		.000*		.000*		.18
E ₂ N=22	\bar{X}	18.4	21.13	18.5	23.2	15.86	23.2	23.8	42.4	70.04	69.72
	S.D.	4.68	4.32	5.66	5.09	3.86	5.3	6.30	13.6	19.92	13.58
	<u>mean dif.</u>	<u>3.27</u>		<u>4.09</u>		<u>7.27</u>		<u>18.77</u>		<u>.77</u>	
	d.f.=20	S.D.	3.94		4.05		6.08		15.41		21.18
	t	3.89		4.73		5.60		5.71		.17	
p	.001*		.000*		.000*		.000*		.000*		.86
E ₃ N=22	\bar{X}	18.5	20.0	20.5	19.4	18.72	20.71	30.5	32.23	6.16	60.19
	S.D.	3.70	3.16	7.35	4.20	5.93	4.69	10.84	9.61	20.64	19.23
	<u>mean dif.</u>	<u>.52</u>		<u>2.38</u>		<u>1.71</u>		<u>2.19</u>		<u>1.71</u>	
	S.D.	3.95		5.92		6.90		10.14		10.19	
	t	.606		1.61		1.13		.98		.77	
p	.55		.17		.27		.33		.45		

N=64 pre = pre-test ret = retention test mean dif. = mean score difference

level on the flexibility sub-test. The E₂ fifth grade group generated a t value of 5.60 which was significant at the .000 level. The fifth grade E₃ group produced no significant difference in scores. This increase by the E₁ group and by the E₂ fifth grade groups might indicate that with the additional time allowed by the retention period, the creativity training the groups had received began to effect their abilities in flexibility.

Fifth Grade Originality Scores. Both the E₁ and E₂ groups produced significant t values on the originality sub-test. The E₁ value was 6.25 which was significant at the .000 level. The E₂ t value was 5.71 which was significant at the .000 level also. The E₃ group did not produce a significant difference in scores.

Fifth Grade Elaboration Scores. As in the post-test none of the experimental groups generated a significant difference in scores. The E₃ group did produce a decrease in scores from 61.60 to 60.19.

Instructional Methods Related to Retention Scores. In discussing the instructional procedures utilized with the fifth grade groups, it appeared that the creativity training provided to the E₁ group influenced their social studies scores and some of their creativity scores. The E₁ group did produce a significant retention score in fluency which they had not displayed in the post-test results. This group may have needed a longer period of time to

incubate the creativity training and apply it.

The E₂ scoring was the same as at the post-test for creativity. This group did seem to apply their creativity training to the social studies area. The group also generated significant scores in flexibility.

The drop in elaboration by the E₃ group was the only decrease in scores located on the retention tests. This decline may be an indication of the creativity decrease found in students at the fifth to seventh grade that has been described by Torrance (Torrance, 1967).

Comparison of Inter-group Net Change Scores

As was used with the post-test scores of the six experimental groups, the retention scores of the groups were compared by analyzing one group's pre to retention mean to another group's mean.

This procedure was used to determine if a particular group instructed by a specific method, scored differently than a group instructed by a different method.

The pre-test to retention test comparison is used to measure the net change in scores generated by a particular group.

Discussion of Sixth Grade Net Change Scores

The following tables are organized for each grade level with the sixth grade information presented first as has been the pattern throughout this chapter.

TABLE XI. Inter-Group Comparisons of Net Change Scores for the Sixth Grade

	Social Studies		Creativity							
	TISS		Flue.	Flex.	Orig.	Elab.				
	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.
E ₁ N=20	6.30	4.69	4.95	6.96	6.25	8.49	12.14	10.7	1.00	25.98
E ₂ N=20	3.00	7.56	7.80	12.1	3.05	9.31	19.3	13.1	3.35	30.8
d.f.=38	t = 1.65 p = .11		.91 .37		1.13 .26		1.88 .07		.26 .36	
E ₂ N=20	3.30	7.56	7.80	12.1	3.05	9.30	19.3	13.1	3.35	30.87
E ₃ N=20	1.05	6.23	2.85	6.45	1.30	7.05	1.20	10.3	2.60	17.20
d.f.=38	t = .89 p = .38		1.61 .11		.67 .06		4.84 .000*		.94 .93	
E ₁ N=20	6.30	4.69	4.95	6.96	6.25	8.49	12.14	10.7	1.00	25.98
E ₃ N=20	1.05	6.23	2.85	6.45	1.30	7.05	1.20	10.3	2.60	17.20
d.f.=38	t = 3.01 p = .005*		.98 .33		2.00 .05*		3.29 .002*		.23 .82	
N = 60										

Sixth Grade TISS Scores. The only significant difference located in the social studies were found between the E_1 and E_3 groups' scores. The t value was 3.01 and significant at the .005 level. There was not a significant difference between the E_1 and E_2 groups or between the E_2 and E_3 groups.

Sixth Grade Fluency Scores. There were no significant net change differences between the groups on the fluency sub-test. The largest difference was between the E_2 and E_3 but the t value only reached the .11 level.

Sixth Grade Flexibility Scores. In comparing the E_1 to the E_3 group, the first significant inter-group difference in fluency change scores was detected. The t value for the comparison was 2.00 and significant at the .05 level. No other inter-group comparisons on the flexibility sub-test were significant.

Sixth Grade Originality Scores. On the sub-test for originality the E_1 group score was significantly above that of the E_3 group's score. The E_2 group also surpassed the E_3 group in originality net change.

Sixth Grade Elaboration Scores. No group produced significant net change score in the area of elaboration.

Discussion of Fifth Grade Net Change Scores

The fifth grade net change scores are presented in the following.

TABLE XII. Inter-Group Comparisons of Net Change Scores for the Fifth Grade

	Social Studies		Creativity							
	TISS		Flue.		Flex.		Org.		Elab.	
	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.
E ₁ N=20	5.66	4.82	5.62	7.08	6.80	8.57	13.09	9.58	6.90	22.66
E ₂ N=22	3.27	3.94	4.09	4.05	7.27	6.08	18.77	15.41	.77	21.81
d.f.=40	t = 1.79		.87		.20		1.44		.99	
	p = .08		.38		.84		.57		.37	
E ₂ N=22	3.27	3.94	4.09	4.5	7.27	6.08	18.77	15.41	.77	21.81
E ₃ N=22	.50	3.86	3.22	5.83	1.64	6.74	2.09	9.90	1.64	9.95
d.f.=42	t = 2.36		.57		2.90		2.42		.48	
	p = .02*		.57		.006*		.05*		.603	
E ₁ N=20	5.66	4.82	5.62	7.08	6.80	8.57	13.09	9.58	6.90	22.66
E ₃ N=22	.50	3.86	3.22	5.83	1.64	6.74	2.09	9.90	1.64	9.95
	t = 3.88		1.21		2.12		3.69		1.61	
	p = .000*		.23		.06		.001*		.11	
N=64										

table. The same format for presentation and discussion used with the sixth grade is followed with the fifth grade scores.

Fifth Grade TISS Scores. The fifth grade E_1 group generated a significant net change score when the group was compared to the E_3 group. The t value of the change was 3.88 and significant at the .000 level. The E_2 group also produced a significant change when compared to the E_3 group. The E_2 value was 2.36 and significant at the .02 level.

Fifth Grade Fluency Scores. None of the groups produced a significant t value, when the groups were compared by inter-group analysis on the fluency sub-test.

Fifth Grade Flexibility Scores. In comparing the E_2 to the E_3 groups on the flexibility sub-test there was a significant difference of 2.90 at the .006 level. This was the first significant fifth grade comparison on the flexibility sub-test. This seems to follow the information presented in the comparison of the E_2 group's pre- to post-test difference. None of the other flexibility comparisons were significant.

Fifth Grade Originality Scores. Both the E_1 and E_2 groups generated significant net changes when compared to the E_3 group. The E_2 value was 2.42 and significant at the .05 level. The E_1 value was 3.69 and significant at the .001.

Fifth Grade Elaboration Scores. As with all the previous

comparisons, there were no significant t values detected on elaboration comparisons. The E₃ group did show an elaboration decline, but the decline was not at a significant level.

Instructional Methods Related to Net Change Scores. From the net change information, it appeared that the creativity training provided for the E₁ and E₂ groups influenced their TISS scores. The sub-test of fluency displayed some significant comparisons. The flexibility sub-test showed a significant comparison for the first time. This may indicate that the flexibility skills can be influenced by creativity training but that a longer period of time may be needed.

The significant changes of the E₁ and E₂ groups in originality seemed to indicate that creativity training directed to this component was effective.

The elaboration sub-test did not seem to be influenced by the creativity training provided to the E₁ and E₂ groups.

Comparison of Post to Retention Test Scores

Post to retention test scores were compared to determine if the creativity and social studies levels attained by the experimental groups had been maintained through the retention period of two months.

There were no significant differences in comparing any of the groups' post to retention t scores. This indicated that the

TABLE XIII. Sixth Grade Post-test to Retention Test Comparison

		Social Studies		Flue.		Creativity		Elab.			
		TISS				Flex.		Org.			
		pst	ret	pst	ret	pst	ret	pst	ret		
E ₁	\bar{X}	26.80	27.94	22.1	22.5	19.85	21.35	37.5	35.4	61.9	58.8
	S.D.	5.26	4.94	5.94	7.43	5.94	7.92	10.04	9.70	19.9	10.65
	t	1.96		.494		1.08		.884		.72	
	p	.07		.62		.30		.39		.48	
E ₂	\bar{X}	24.78	25.15	25.42	27.8	21.5	22.4	41.6	43.4	67.21	70.5
	S.D.	6.22	5.95	8.45	5.96	5.83	5.38	8.32	8.7	15.8	15.5
	t	.79		1.66		.33		1.86		1.02	
	p	.45		.12		.75		.10		.14	
E ₃	\bar{X}	21.7	21.6	18.3	19.6	19.4	19.4	30.4	29.5	54.7	53.5
	S.D.	4.68	4.05	5.77	5.80	6.61	5.90	9.68	8.75	12.1	11.06
	t	.16		1.98		.39		1.31		1.46	
	p	.88		.06		.69		.21		.15	

pst = post-test

ret = retention

TABLE XIV. Fifth Grade Post-test to Retention Test Comparison

		Social Studies		Flue.		Flex.		Org.		Elab.	
		TISS									
		pst	ret	pst	ret	pst	ret	pst	ret	pst	ret
E ₁	\bar{X}	22.4	24.3	20.7	26.3	19.3	23.2	26.7	39.3	64.9	70.76
	S.D.	5.54	5.66	5.12	8.69	7.09	7.86	11.89	13.69	16.28	12.23
	t	1.51		3.07		2.01		4.88		1.41	
	p	.14		.006*		.07		.000*		.17	
E ₂	\bar{X}	20.36	21.1	22.36	23.2	22.9	23.2	40.3	42.4	74.1	69.7
	S.D.	4.30	4.32	5.05	5.08	5.78	5.3	14.8	13.6	14.07	13.6
	t	1.39		.92		1.08		.52		1.38	
	p	.17		.36		.29		.60		.18	
E ₃	\bar{X}	19.2	20.0	21.85	19.4	21.28	20.7	30.5	32.2	62.47	60.19
	S.D.	3.7	3.2	5.38	4.20	5.29	4.69	10.84	9.61	20.75	19.2
	t	.38		.73		1.25		1.48		1.99	
	p	.71		.47		.22		.15		.06	

pst = post-test

ret = retention

creativity and social studies post-test levels attained by the E₁ and E₂ groups had been maintained.

Discussion of Sixth Grade Post to Retention Period. A review of scores of the sixth grade indicated no significant changes in scores. Both the E₁ and E₂ had maintained the general level of skills attained at the post testing. There was no decline of scores in either of these groups. On some of the variables there was a slight gain in scores, but not to a significant level.

The E₃ groups' scores followed the general pattern they had established in the post-testing. This group did display a slight decline in the areas of fluency and elaboration. This decline might be an indication of the decline of creativity skills at the fifth through seventh grades Torrance noted (Torrance, 1967).

Discussion of Fifth Grade Post to Retention Period. At the fifth grade a different situation was detected than located at the sixth grade. The E₁ group generated a significant gain in post to retention test comparisons on the sub-test of fluency and originality. This group's scores were not significant in these areas in the post-testing. This situation might indicate that the fifth grade E₁ group required a longer period to internalize the instructional methods to which they were exposed.

The E₂ and E₃ groups did not produce any significant differences between post and retention scores. The E₃ group did display a slight

decline in scores in the areas of flexibility and elaboration. This may also be an indication of the Torrance finding which was commented upon in the discussion of sixth grade findings.

TWO-WAY ANALYSIS OF VARIANCE

Introduction

Analysis of Variance (Anova) was employed using the retention data. The comparisons were made on the total student population at each grade level.

The Anova was used in an attempt to locate interaction between variables by a simultaneous comparison of two or more variables. The comparisons in this study were of sex or intelligence to teaching methods using TISS, Fluency, Flexibility, Originality and Elaboration as dependent variables.

Comparison of Sex to Teaching Methods

The comparison of the sex of a student to his/her score in social studies or creativity was used to determine if males or females could achieve higher test scores when instructed with a particular method. The data obtained by this analysis indicated no significant interaction between sex and any of the dependent variables examined. This information is summarized in Table XV.

The table entries present a total F statistic and corresponding probability values for an entire Anova where sex and method of

instruction were the independent variables. Table entires indicate the grade levels and dependent variables used in the comparisons.

TABLE XV. Comparison of Students' Sex to Teaching Methods

	TISS	Flue.	Flex.	Org.	Elab.
<u>Retention Tests</u>					
Sixth Grade					
F Value	1.04	.05	.102	1.52	1.83
Prob.	.31	.81	.75	.21	.18
Fifth Grade					
F Value	.38	2.71	7.28	.065	2.65
Prob.	.53	.10	.27	.80	.11
<u>Net Gains</u>					
Sixth Grade					
F Value	.014	.84	.185	1.08	3.41
Prob.	.91	.36	.66	.30	.08
Fifth Grade					
F Value	2.91	2.09	3.71	3.61	3.41
Prob.	.14	.15	.07	.07	.27

The lack of significant interactions found in this study may reinforce the work of Torrance (Torrance 1967) and Parnes (Parnes 1967). These two investigators presented evidence that males as

well as females can reach higher creativity levels when both are instructed in creativity skills.

Comparisons of Students' Intelligence Levels to Teaching Methods

The established divisions for intelligence were described in Chapter Three. The linear points of the intelligence scales used to determine high, medium and low levels were one hundred ten and above as high, one hundred two to one hundred ten as medium and one hundred two and below as low. These division points were used to place an approximate one-third of the total population in each area.

Anova was used to determine whether there was an interaction between intelligence and instructional method as measured by the dependent variables: TISS, Fluency, Flexibility, Originality and Elaboration.

The same format used in the comparison of sex to teaching methods was used to present the comparison of intelligence to teaching methods. Table entries present a total F Statistic and corresponding probability values for the entire Anova comparison where the independent variables are sex and intelligence. Entries indicate grade levels and the established dependent variables.

Discussion of the Anova for Intelligence and Teaching Methods.

In the Anova summarized in Table XVII, the only significant results were obtained for the dependent variable TISS in the sixth grade.

TABLE XVI. Comparison of Students' Intelligence to Teaching Methods

	TISS	Flue.	Flex.	Org.	Elab.
<u>Retention Tests</u>					
Sixth Grade					
F Value	5.03	.759	2.00	.02	.32
Prob.	.01*	.47	.14	.97	.12
Fifth Grade					
F Value	1.08	1.14	2.0	.18	2.82
Prob.	.38	.33	.7	.84	.07
<u>Net Gains</u>					
Sixth Grade					
F Value	5.924	1.95	2.23	1.82	1.29
Prob.	.01*	1.25	.11	.17	.31
Fifth Grade					
F Value	1.74	2.15	2.75	2.09	2.71
Prob.	.81	.80	.08	1.3	.08

This information was further analyzed by examining a breakdown of the results by intelligence levels and instructional method in a post-hoc analysis. The breakdown separated into cells each intelligence level by treatment group. The entries in the cells are the mean scores for the TISS as shown in the table. In the Anova which compared intelligence to treatment group, the means of the E_1 high and low intelligence groups were above the means of the E_2 and E_3 high and low intelligence groups in each particular intelligence category. Table XVII presents the breakdown data.

TABLE XVII. Retention Test Mean Scores for the Sixth Grade

	<u>E_1 Group</u>	<u>E_2 Group</u>	<u>E_3 Group</u>
low	26.0	22.17	21.6
medium	26.1	32.4	21.0
high	31.4	28.5	23.3

Net Gain Means from Pre-Test to Retention Test

	<u>E_1 Group</u>	<u>E_2 Group</u>	<u>E_3 Group</u>
low	4.2	1.6	1.1
medium	2.6	1.9	1.7
high	5.3	2.7	2.2

Conclusions from the Anova

The differences detected in the Anova for intelligence and teaching methods indicated a main treatment effect and not an interaction. It seems reasonable to account for the difference in performance by the differences in teaching methods.

Based upon the results of the Anova, it could be definitely stated that there were no significant interactions between sex and teaching methods. There were also no significant interactions detected between intelligence and teaching methods. Any significance detected in the consideration of the intelligence groups was attributable to the main treatment effect related to teaching methods.

Graphic Presentations of the Anova Comparisons for Intelligence

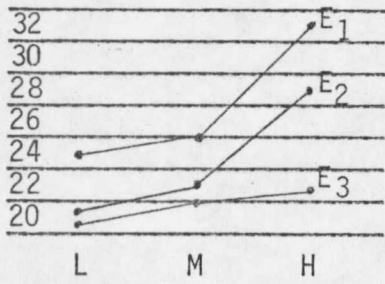
Graphic information is presented on the following pages to illustrate the findings of this study. The graphs incorporate the information obtained on the tests.

Summary of Anova Discussion

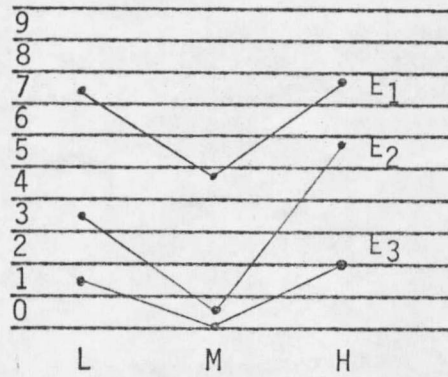
Based upon the review of the Anova, it could be definitely stated that there was no interaction between intelligence and creativity or social studies skills. If such a relationship does exist, it was not detected in this study.

There was also no interaction found between students' sex and creativity or social studies skills.

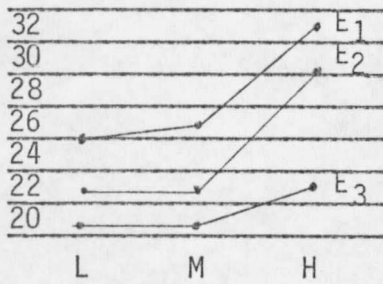
Post-test



Change Scores (Pre to Post-tests)



Retention Scores



Net Change Scores

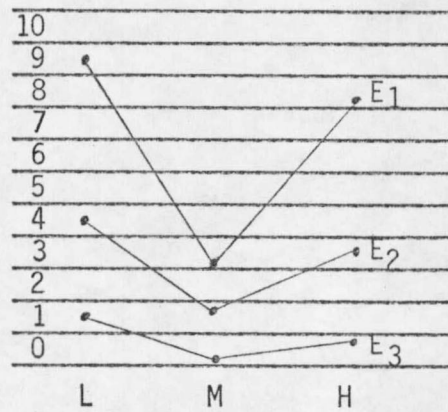


Figure IV. Graphic Comparisons of Intelligence Groups Related to TISS Scores

There was some main treatment effect located between intelligence and TISS scores. This finding may indicate that creativity training incorporated into the social studies curriculum was helpful to high and low intelligence students. Further research could verify this finding.

SUMMARY

The information compiled in Chapter Four considered the results of the testing program employed with all experimental groups involved in this study.

Information was compiled on:

1. Establishment of comparable groups on demographic and pre-test data.
2. Results of post-testing for all groups at both grade levels.
3. Results of retention testing for all experimental groups at both grade levels.
4. Anova comparisons of students' sex or intelligence to the teaching methods.

The E_1 or E_2 groups increased their test scores for the TISS and TTCT. In none of the testing situations was the E_3 groups' scores significantly above the E_1 or E_2 group's scores at either grade level.

The Anova analysis indicated that there was no interaction between students' sex and the teaching methods. There was some main

treatment effect located between students' intelligence levels and social studies scores. Interaction was not found between students' intelligence levels and the creativity scores.

Chapter 5

DISCUSSIONS AND RECOMMENDATIONS

Introduction

The procedures discussed in the preceding chapters of this study dealt with the effect on students' creativity levels and social studies skills when creativity training was incorporated within the social studies curriculum. In order to make such comparisons six experimental classrooms were established.

The first class had creativity training and instruction added to the social studies curriculum. A second group had creativity training dispersed throughout the general curriculum. The third class served as a non-treatment group without special emphasis on creativity or social studies training. The three types of classroom organizations were established at both the fifth and sixth grade level for a total of one hundred twenty-six students who took part in the study.

Instruction was conducted by regular classroom teachers on the direction of the researcher and with lesson plans prepared by the researcher. The additional materials used for instruction included Creative Action Handbook written by Sydney Parnes and materials dealing with the history and culture of the city of Butte.

Students were tested on the Torrance Test of Creative Thinking

(TTCT) and the Test of Inquiry Social Studies (TISS) prior to the beginning of the instruction. At the end of the instruction, students were again tested on the same tests to determine if there had been any change in students' creativity skills or social studies skills. After a period of two months the students were tested on the same instruments to ascertain if there had been a retention of creativity and social studies skills. An Anova comparison was made between student's sex or intelligence and teaching methods.

Organization of Chapter Five

This chapter is organized around the following components:

1. The hypotheses and statement of the problem were reviewed in light of the information obtained from the data and subject information.
2. A general discussion dealing with the results of all the testing programs was presented.
3. General conclusions are discussed as they relate to a particular group or test.
4. Recommendations for further research are presented for both the area of creativity and social studies.
5. Implications for education and curriculum are presented for both creativity and social studies.

Summary of Hypotheses as Related to the Data Analysis

The hypotheses presented in this study deal with both the areas of creativity and social studies. Each hypothesis was reviewed and accepted or rejected on the basis of accumulated evidence.

The hypotheses concerning creativity are discussed prior to those concerning social studies. The hypotheses considered are the alternatives to the null.

Creativity Hypotheses.

1. There is a difference between the creativity scores of students instructed with creativity training incorporated into the social studies curriculum (E_1) when compared to creativity scores of students instructed with creativity training dispersed throughout the curriculum (E_2).

Change Score Comparisons (Pre-test to Post-test)

	<u>Sixth Grade</u>	<u>Fifth Grade</u>
Fluency	-- rejected	accepted ($E_2 > E_1$)
Flexibility	-- rejected	rejected
Originality	-- rejected	accepted ($E_2 > E_1$)
Elaboration	-- rejected	rejected

Net Change Score Comparisons (Pre-test to Retention Test)

	<u>Sixth Grade</u>	<u>Fifth Grade</u>
Fluency	-- rejected	rejected
Flexibility	-- rejected	rejected

Originality -- rejected rejected

Elaboration -- rejected rejected

2. There is a difference between the creativity scores of students instructed with creativity training dispersed throughout the curriculum (E_2) when compared to the creativity scores of students who were not provided with creativity training (E_3).

Change Score Comparisons (Pre-test to Post-test)

	<u>Sixth Grade</u>	<u>Fifth Grade</u>
Fluency	-- rejected	rejected
Flexibility	-- rejected	rejected
Originality	-- accepted ($E_2 > E_3$)	accepted ($E_2 > E_3$)
Elaboration	-- rejected	rejected

Net Change Score Comparisons (Pre-test to Retention Test)

	<u>Sixth Grade</u>	<u>Fifth Grade</u>
Fluency	-- rejected	rejected
Flexibility	-- rejected	accepted ($E_2 > E_3$)
Originality	-- accepted ($E_2 > E_3$)	accepted ($E_2 > E_3$)
Elaboration	-- rejected	rejected

3. There is a difference between the creativity scores of students instructed with creativity skills incorporated within the social studies curriculum (E_1) when compared to the creativity scores of students who received no creativity instruction (E_3).

Change Scores Comparisons (Pre-test to Retention Test)

	<u>Sixth Grade</u>	<u>Fifth Grade</u>
Fluency	-- rejected	rejected
Flexibility	-- rejected	rejected
Originality	-- accepted ($E_1 > E_3$)	rejected
Elaboration	-- rejected	rejected

Net Change Score Comparisons (Pre-test to Retention Test)

	<u>Sixth Grade</u>	<u>Fifth Grade</u>
Fluency	-- rejected	rejected
Flexibility	-- accepted ($E_1 > E_3$)	rejected
Originality	-- accepted ($E_1 > E_3$)	accepted ($E_1 > E_3$)
Elaboration	-- rejected	rejected

Social Studies Hypotheses.

1. There is a difference between the social studies scores of students instructed with creativity training incorporated within the curriculum (E_1) when compared to the social studies scores of students instructed with creativity training dispersed throughout the curriculum (E_2).

Change Score Comparisons (Pre-test to Retention Test)

	<u>Sixth Grade</u>	<u>Fifth Grade</u>
hypothesis	-- rejected	hypothesis -- rejected

Net Change Score Comparisons (Pre-test to Retention Test)

Sixth Grade

hypothesis -- rejected

Fifth Grade

hypothesis -- rejected

2. There is a difference between the social studies scores of students instructed with creativity dispersed throughout the curriculum (E_2) compared to scores of students who received no creativity instruction (E_3)

Change Score Comparisons (Pre-test to Post-test)

Sixth Grade

hypothesis -- rejected

Fifth Grade

hypothesis -- rejected

Net Change Score Comparisons (Pre-test to Retention Test)

Sixth Grade

hypothesis -- rejected

Fifth Gradehypothesis -- accepted
($E_2 > E_3$)

3. There is a difference between the social studies scores of students instructed with creativity instruction incorporated within the social studies curriculum (E_1) when compared to students' scores who had received no creativity training (E_3).

Change Score Comparisons (Pre-test to Post-test)

Sixth Gradehypothesis -- accepted
($E_1 > E_3$)Fifth Gradehypothesis -- accepted
($E_1 > E_3$)

Net Change Comparisons (Pre-test to Retention Test).

Sixth Grade

hypothesis -- accepted
 $(E_1 > E_3)$

Fifth Grade

hypothesis -- accepted
 $E_1 > E_3)$

Review of the Statement of the Problem

The Statement of the Problem given in Chapter One, looked at the question of whether social studies is a receptive area for the inclusion of creativity training. The problem statement also addressed, the question of what would be the effect on students' creativity and social studies skills if creativity were incorporated within the elementary social studies curriculum.

The findings of this study provided some information on these questions. It seems social studies did provide a fertile ground for instruction in creativity skills. Students' social studies skills were increased and skills in many of the creative areas were also increased by use of creativity training in social studies instruction.

Some information on how students' social studies skills and creativity levels would be changed by a general approach to creativity stimulation was also located. With the students of this study, some creativity skills were increased by dispersing creativity training throughout the curriculum, but their social studies skills were not changed significantly.

Creativity skills were changed by either of the methods used with the E_1 or E_2 groups, but if the purpose of teaching was to increase creative thinking in social studies, it seems that the creative instruction should be included on the social studies curriculum.

Discussion of Subjective Information

At conferences between the researcher and the teachers, there was a collection of subjective information that could not be subjected to statistical analysis. The general tone of the information was that students in the E_1 and E_2 groups were enthusiastic about the experiences provided for them. The students seemed willing and eager to engage in the creativity exercises and the educational experiences outside of the classroom.

The use of community personnel was appreciated by the students and students seemed to regard these persons as experts whose knowledge and skill could be used to increase their own knowledge and skill in an area. When the community representatives were questioned, they all spoke of their positive attitude toward their experiences with the students. The senior citizens particularly enjoyed the opportunity to communicate with the students.

In reviewing the subjective information, this researcher concluded that the use of creative teaching techniques was well accepted by the students and that the use of community personnel had been of

benefit to both the students and the lay persons who had participated in the study.

An interesting spin-off of the study was detected in the late increase in creativity skills of the E_1 fifth grade group. This increase was of a significant nature at the period of the retention testing. This fact seemed to indicate an up-turn in the group's creative abilities. Perhaps this was an indication of the incubation effect suggested by Rugg (Rugg, 1963), in which a longer period was needed for creative skills to develop in some individuals. Rugg also advocated a period when no suggestion of the problem is presented to the students, so that the students can "incubate" the problem and find a solution or develop skills necessary for creative problem solving.

Another situation associated with the retention testing was the apparent decline in creativity skills of the fifth and sixth E_3 groups. Torrance had noted this decline earlier with ages related to creative development (Torrance, 1963). This decline was not noted with the E_1 or E_2 groups at either the fifth or sixth grade. It may be that the creativity training, to which the E_1 and E_2 groups had been exposed, could have lessened this creative decline located in the E_3 groups.

Post-testing Results

The results of the post-testing indicated that the E₁ groups at both the grade levels gained in social studies skills. This gain was attributed to the creative methods used in their instruction. Other variables within the parameters of this study did not seem to have influenced the changes exhibited by the E₁ groups. By including creative instruction within the social studies curriculum the students appeared to have taken a greater interest in the material and to have been more enthusiastic about engaging in the activities used to develop social studies competencies. The use of the native culture and history seemed to have made the instructional procedures more realistic to the students and to have supplied them with references they could relate to the general social studies curriculum. Testing indicated that the creative skills of the groups had increased when compared to the E₃ students who had participated in any direct creativity training.

Students of the E₂ groups generated test scores which indicated that their creativity skills had increased. The training and experiences provided to these students was the type typically used in standard creativity programs. Although the groups' creativity levels increased, their social studies skills did not show significant gains at both grade levels. This finding seemed to indicate that creativity training dispersed throughout the curriculum increased general

creativity levels, but not necessarily increased creative thinking in a particular curricular area.

Post-Testing Conclusions. Conclusions from the post-testing could be listed as:

1. E_1 students significantly increased their social studies skills as tested by the TISS. The fluency and originality skills of these students also increased significantly.
2. Students in the E_2 groups increased their creative skills of fluency and originality significantly. Their social studies scores did increase during the instructional period, but not to a significant point at both grade levels.
3. The students in the E_3 groups showed little gain in either creativity or social studies. One fact detected was the decline in creativity scores of these groups.
4. Flexibility scores showed a late increase at the retention testing. This indicated that students required a longer period to develop their skills in the flexibility area.
5. The elaboration scores of all the groups showed little change from pre to retention test. This component of creativity seemed difficult to effect change in, with these particular students.

Retention Test Discussion

The most relevant fact from the retention testing, to this

researcher, was that the E_1 and E_2 groups test scores had remained generally the same during the two month retention period. This indicated that the groups had retained their creative and social studies abilities during this period.

Retention Test Conclusions.

1. In analyzing the retention scores of the E_1 groups at both grade levels, it appeared that the changes in social studies scores justified the use of creative problem solving in social studies. With these particular students, their creative thinking skills and inquiry skills were increased to a significant level and remained there. The use of creative training in the classes' investigation of their native community may have influenced these changes.

2. Regarding the creativity sub-tests, it appears that creativity training can be employed in social studies to improve creative thinking procedures and the skills needed for an inquiry approach to the social studies curriculum. The creativity training provided for the E_1 students seems to have influenced their specific and total creativity abilities.

The use of community personnel, who were experts in their particular area, could have made the social studies and creativity training more realistic to the students. Use of the natural environment of the students could have influenced their willingness to

participate in and enjoy the procedures by which they were instructed. This use of the natural environment of students is strongly advocated by Smith (Smith, 1967).

3. The retention scores of the E_2 groups also indicate that these groups increased creativity levels had remained somewhat the same from the post-testing.

Graph Presentations of Test Data

For the convenience of the reader the pre, post and retention scores of all the experimental groups have been plotted on the following graphic presentations. The points on the graphs are not set at exact calibrations but only attempt to give the general direction of the trends in scoring.

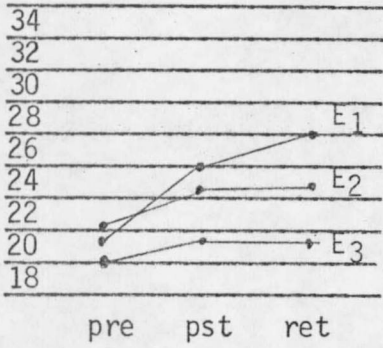
Anova Discussion

No interaction was found between the sex of the students and teaching methods. It appeared that the sex of the students did not influence their abilities in creative areas or in social studies skills. If sex is a factor of student performance, it was not detected with this particular group of students.

There was some main treatment effect located between intelligence levels and teaching methods in social studies. From the limited evidence compiled in this study, there seemed to be some indication that high and low intelligence students benefit from the

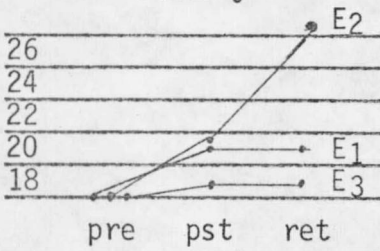
Sixth Grade

TISS

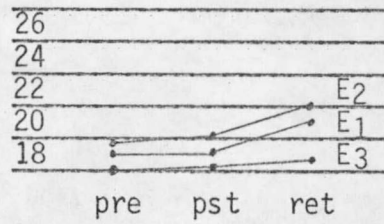


CREATIVITY VARIABLES

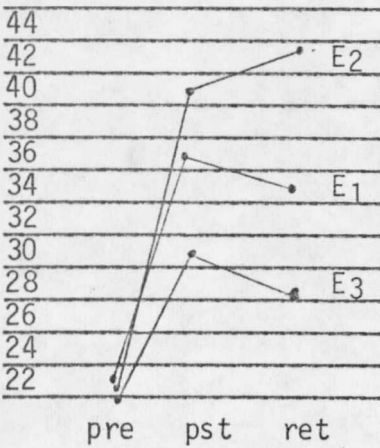
Fluency



Flexibility



Originality



Elaboration

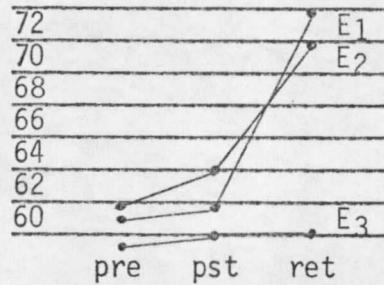
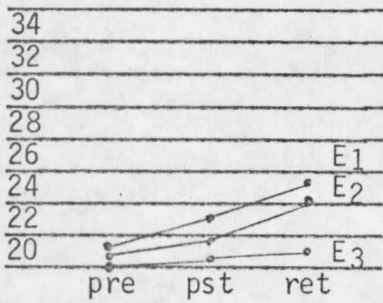


Figure V. Graphic Comparisons of Pre to Post to Retention Means for Each Class

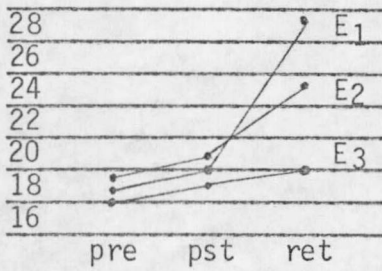
Fifth Grade

TISS

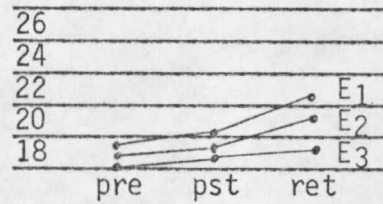


CREATIVITY VARIABLES

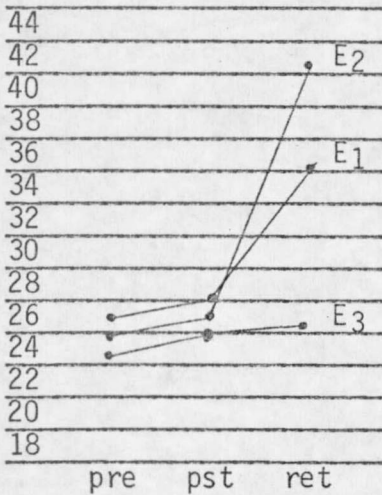
Fluency



Flexibility



Originality



Elaboration

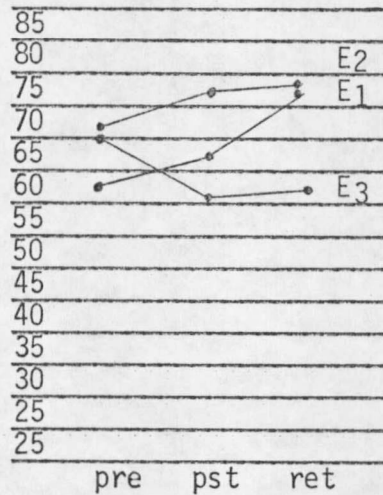


Figure VI. Graphic Comparisons of Pre to Post to Retention Means for Each Class

inclusion of creativity training in social studies instruction.

A connection between intelligence and creative teaching methods was not determined. Although higher intellectual students achieved higher scores on some of the creativity sub-tests, they did not achieve high scores on all the sub-tests related to creativity. There was no pattern established.

This information seems to support the contention presented by Torrance (Torrance, 1967), that intellectual abilities are not necessarily a guide to creative abilities.

RECOMMENDATIONS DERIVED FROM THE STUDY

General recommendations derived from the objective data and the subjective information accumulated during the course of this study considered both the areas of creativity training and social studies instruction and curriculum.

Social Studies Recommendations. The use of the social studies area could be used as a vehicle for subsuming the procedures of creativity training into the elementary curriculum. Social studies provided, in this study, a fertile ground for the inclusion of creativity training in the total elementary curriculum. The local community should be used for enrichment experiences directed to reinforcing and developing social studies skills and competencies.

Creativity Recommendations. Creativity training should be

incorporated within the elementary curriculum beginning with the lower grades and proceeding to the upper elementary levels. The training should be spiraled throughout the total curriculum using precisely developed exercises and/or spontaneously developed procedures and methods. The social studies area appears to be a receptive discipline for the inclusion of creativity training, but other curricular disciplines should prove more useful to the inclusion of creativity programs depending upon the type of students, school locality, teaching staff, school district philosophy and educational facility.

RECOMMENDATIONS FOR FURTHER RESEARCH

The research recommendations derived from this study are presented under two headings. Those which apply to future research in social studies and those which apply to creativity research.

Social Studies Research.

1. One area of examination might concern the concept of whether the creative instructional methods used with the E₁ students involved in this study could be used with students who have a different community environment. The historical background and cultural base of the city of Butte provided various opportunities for students to employ social studies and creativity skills provided for them in classroom instruction. Further research might consider the question

of whether such procedures could be implemented in situations where the historical and cultural diversifications were absent.

2. Another question, that might be investigated by further research, is that of student age. With students of a higher age level the procedures utilized in the social studies area might produce differing results than detected in this study.

3. Research could investigate the degree of learning students had obtained regarding the history and culture of their native community. Pre and post-tests could be given to determine any changes in students' knowledge as the result of instruction aimed at increasing their knowledge of the local community. This research could be carried on with specific teaching sequences at various grade levels.

4. Social studies research could also investigate if there was a relationship between increased scores on the TISS test and Standard Achievement scores in social studies.

5. The attitude of students before and after instruction in their native culture and history could be measured and compared. This could be a longitudinal study to try and locate any long-term effects of instruction aimed at increasing students knowledge and understanding of the ethnic and cultural base of a community.

6. Still another concept related to both the areas of social studies and creativity is the use of community personnel in the

instructional role. Research could investigate the effect on student learning of instruction given by lay persons, expert in a particular field. This proposed research could also look at the question of the attitude of the community representatives to their instructional roles.

7. Another research question could be an evaluation of the benefit to students from contacts with senior citizens. Part of the instruction of the E_1 group in this study was conducted by senior citizens. A class exposed to this type of instruction could be compared to a class who had not received contacts with senior citizens as instructors in a particular skill.

Creativity Research.

1. The creativity training provided to the E_2 group, of this study, could be given to students at various grade levels. Classes could be compared to determine at which grade level the training was most effective.

2. The question of economic backgrounds, as related to creativity development, could be investigated by using groups of varied economic levels. The instruction for the groups could be the same so that comparisons could be made as to the effect of creativity training upon a particular group of students at a stated economic level.

3. The same procedures suggested in the above research recommendation could be used with students of varied intelligence levels.

With the same instruction provided to various intelligence groups, there could be some determination of which intelligence level benefitted most from the creativity training.

4. Flexibility was difficult to effect change in during the progress of this study. Additional research on this component might yield differing results. A concentrated effort in flexibility could be the subject of future research.

5. Elaboration could also be the subject of further research. This component of the TTCT showed no significant change during the progression of this study. The effect of a concentrated instructional plan aimed at the development of elaboration skills could be the subject of additional research. One group receiving such instruction could be compared to another group receiving the typical creative instruction used in this study.

6. A longitudinal study of the effect on students' creative development through high school could be conducted. A base grade could be chosen for instruction and the students monitored until their high school graduation. In the period between initial instruction and graduation, no specific creativity instruction should be provided.

7. The concept of incubation might be of interest to researchers. With a longer period without instruction this phenomena might be detected. It appeared from this study, that the E_1 groups

were beginning to increase their creativity scores at the retention testing. Additional research on incubation with elementary students might detect the incubation effect on creativity skills. Planned, short periods without instruction might locate incubation in students. These short, non-instructional periods could be used throughout an entire study.

EDUCATIONAL IMPLICATIONS

The educational implications derived from this study are considered under the headings of social studies and creativity.

Social Studies Implications.

1. Creativity training in the social studies curriculum could be used to improve both creative thinking skills in social studies and general creative abilities. The information obtained from this study seems to justify the use of creativity training in the social studies area.

2. Senior citizens could be used in various instructional roles in the social studies. With the E₁ groups in this study, some of the instruction in the ethnic and cultural base of the community was provided by senior citizens. Such persons could be invited to the classroom to explain cultural difference and topics on which the senior citizens were experts. This procedure could provide students with information not available to them through traditional teaching

procedures and provide the senior citizens with means of establishing a positive relationship with today's schools and students.

3. The home community of the students could be used as a data bank for information related to social studies concepts, learning and skills. The use of community information and data could make the acquisition of social studies skills more meaningful to students.

4. The use of community personnel experts in particular fields could provide instruction in mini-courses to students. Such mini-courses could concentrate on various social studies learnings and skills.

Creativity Implications.

1. Social studies could be used as a base for creativity instruction. Such instruction could be aimed at the development of both social studies competencies and creativity skills.

2. Other areas of the elementary curriculum could be used for creativity instruction. Reading, language arts, art and dramatics could serve as a base for creative training.

3. Creative thinking and creative problem solving could be incorporated into the general elementary curriculum. This incorporation could be in a specific area or dispersed throughout the general curriculum.

4. The use of creative problem solving could be incorporated in each grade level and progress through a series of levels as

students developed their problem-solving skills. A program of creative exercises could be developed which would begin in kindergarten and spiral throughout the total elementary curriculum. Initial activities could be geared to the kindergarten child and progress through a difficult level to the higher elementary grades.

5. A creative investigation of the home community could begin with creative procedures in kindergarten and progress by more difficult investigations to the higher elementary levels. This procedure could be used in successive years, or be implemented in one year by each grade level being assigned a particular activity. The total project could culminate in a school writing their own history of a community.

SUMMARY

Chapter Five of this study dealt with: a review of the hypotheses of the study, discussions of the problem statement and subjective information, recommendations for further research and discussions of educational implications.

The hypotheses dealt with both the areas of creativity and social studies. These hypotheses were either accepted or rejected on the basis of the compiled evidence from the testing program. The statement of the problem and subjective data were discussed in order to provide the reader with additional information that was pertinent

to the study.

Graphic illustrations of the trends from pre to retention tests were provided for the convenience of the reader.

The recommendations for further research considered both the areas of creativity and social studies. Along with these recommendations, education implications were discussed for both creativity and social studies.

The discussions of testing results applied to only the student scores compiled in this study. Recommendations for research and educational implications were more general in nature and could be applied to expanded generalizations dealing with creativity and social studies.

The experimental teaching procedures described in the preceding chapters took place at the McKinley school in Butte, Montana, during the 1977-78 school year. The population of the experiment were fifth and sixth grade students. The time period extended from November until March.

Three experimental groups were selected at each grade level for a total of one hundred twenty-six students who were involved. Teaching procedures were conducted by regular classroom teachers under the direction of the researcher. The Experimental₁ groups had creativity training incorporated into their social studies program. The Experimental₂ groups had creativity training dispersed throughout

the curriculum but not used in the social studies area. The Experimental₃ groups acted as non-treatment groups without emphasis on creativity or creative social studies instruction.

The testing program for the experiment was conducted by certified counselors of the school district. The testing conditions remained the same during all the testing situations.

The data obtained from the pre-testing, post-testing and retention testing were used to determine t values for the various groups in both the areas of creativity and social studies. Change scores (from pre-test to post-test) and Net change scores (from pre-test to retention test) were determined and compared by the Student's t-test. The retention test data was subjected to an analysis of variance. The t-tests were conducted to determine if there had been a change in students' social studies or creativity skills during the course of the experiment. The Anova was undertaken to detect possible interactions between students' intelligence or sex and the developed teaching procedures.

Discussions of the results of the experiment were based on the objective data obtained from students' scores and subjective information obtained throughout the duration of the experiment. Recommendations for further research and educational implementations of the results of the experiment were presented for both the areas of creativity training and social studies.

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2

APPENDICES

Appendix A

Instructional Sequences

Teaching Sequences for the Experimental₁ Groups

Experimental₁ Groups. Both the E₁ groups at each grade level worked jointly on investigation of the history and culture of the city of Butte. The groups followed the social studies suggestions of Smith, Parnes, and Torrance. The investigations utilized the creativity skills previously described on the section Common Creativity and Common Social Studies Instructional Methods.

To supplement social studies skills and provide for creative training, the groups began an investigation of the local history in November of the 1978-79 school year. The initial experience of the groups was a field trip to the Berkley Pit copper mining site. This activity served as a stimulation activity for the investigation of the local history of mining and how it related to the development of the city. This experience was used to develop map skills, graphing skills and the noting of historical events as related to time lines. Skills of brainstorming, creative writing and art were outcomes of the trip.

Mining History. Early in December of the year, representatives of the Anaconda Company presented to the fifth and sixth grade students with information concerning the part the Anaconda Company played in the growth of mining in the area. Detailed information was presented regarding the "gold era", the "silver era" and the present "copper era". Students were also supplied with library

information concerning mining operations and history concepts. Social studies skills were presented which dealt with time line skills, data collection, value clarification exercises and additional graphing and map skills. Information was provided for students in conjunction with creative thought training as it was related to the mining heritage of the community. Representatives of the Anaconda Company also depicted the operations of the concentrator unit of the mining operation and illustrated such operations with a slide presentation. The students utilized this information to prepare written reports and draw scale models of the concentrator. Another element of mining was presented to students by lectures and slide presentations which dealt with past and present underground mining operations. This information was again used by students in written work and creative brain storming sessions.

Environmental Concepts. As a final graphic illustration of the components of mining operations, students were given a verbal presentation of safety and environmental programs of the Anaconda Company. The data supplied to students formed a core of information from which they drew in order to engage in creative group thinking sessions, deferred judgment programs and creative problem solving as it related to the community of Butte and the operations of the Anaconda Company in the area.

Geological Information. In conjunction with the previous

informational sessions, students were made aware of the geology of the area and how copper deposits have affected the growth and development of the city. In the sessions dealing with geology, representatives of the mining company illustrated for students the mineral deposits surrounding their community and how such deposits have and are affecting community growth and stability. Geology information was again used by the students in the previously mentioned creative thought situations. Creativity training was added to the social studies investigations by developing creative writing projects, interviewing the Anaconda Company representatives and later transcribing their comments, and in brain storming sessions related to the information presented.

Ethnic Concepts. During this period there was also an investigation of the ethnic culture of the city. Representatives of three dominant cultures in the city, Irish, Finnish, and Italian, came to the school to acquaint students with the cultural backgrounds of the city. These presentations were used to stimulate sociological concepts and ethnic appreciations. Creative skills were added to the instructions with the use of individual and group writing activities, observation skills, deferred judgment as to ethnic cultures and investigations of the physical environments of the older ethnic neighborhoods.

Local Personalities. In the historical and sociological

development of Butte, various characters and personalities have emerged which were unique to the city. In order to acquaint students with such personalities and to develop an historical acquaintance with the personalities, a history professor from the Montana Technical College in the city visited the students and supplied them with information concerning the personages and their influence upon the city. Students later made reports and drew characterizations of the personalities they had learned about. The students also developed time line sequences to depict where each personality fitted into the total time line development of the city and its culture.

Historical Architecture. Butte has a metropolitan character that is not found in most cities in Montana. Its past is involved with many of its historical buildings and sites. Butte has fifty buildings that are of historical importance in both the architectural sense and in the historical sense. In order to develop this knowledge and appreciation in the fifth and sixth grade students, instruction was provided as to the history and development of the central business district of the city.

This instruction was provided by use of Historical Uptown Butte (DeHaas, 1977), and the historical supplements published by the Montana Standard, Mountain Moods (Montana Standard, 1978).

The buildings that are part of the central business district are from one to eight-story structures. Many are built to accommodate

the hilly nature of the surface of the city. Buildings boast highly decorated cornices, parapet wall, cast iron or stone balconies, scrolls, medallions, metal and stained glass windows, grills of metal work, gable roofs, and hardwood carving.

Students were conducted on a walking tour of the Central Business District by teachers involved in the experiment. For research purposes, students brainstormed the procedures of the tour and at the conclusion of it mapped their route and wrote reports on buildings of interest to them. During the progress of the tour, students also visited the Montana Standard to view old newspaper copies and to gather additional information about the architectural and historical basis of the business district.

The Butte Historical Society presented a slide show illustrating historical buildings of the central business district to the students. In conjunction with the slides, students were allowed to view and handle albums of photographs of historical buildings and sites and newspaper collections related to their study of the uptown business district and its historical importance.

Library Materials. Students used various library materials in their study of the local community. Because of the unique nature of the city, there are numerous publications dealing with the history and ethnic culture of the community. These publications were used for research purposes and the writing of student reports.

Local Government. In order to provide a creative problem experience for the E_1 students and to link such an experience to their investigation of the city of Butte, students in both grade levels were presented with the question of how they could develop an understanding of past and present city organization and government. The students worked through the creative problem solving steps of Fact-Finding, Problem-Finding, Idea-Finding, Solution-Finding and Acceptance-Finding. These were the same steps on creative problem solving that the E_2 group had used in their instructional sessions dealing with creative processes. The E_1 students also brainstormed the ideas of the government investigation in small groups and whole class situations.

The students in the E_1 groups determined by the problem solving sessions and the brainstorming techniques, that in order to gain maximum experience and knowledge, a trip to the Butte-Silver Bow Courthouse and interviews of county officials would be the most advantageous method of collecting data.

This trip was taken by both students and teachers after county officials had supplied some background information to students. Students collected information concerning the history of the building, the present governmental structure, past structures and present office holders. Later reporting activities and art activities were incorporated into the student's governmental study. This activity

was the last planned activity for the E₁ students before the period of the post-testing was begun.

Teaching Sequences for the Experimental₂ Groups

Creative Problem Solving. Both the E₂ groups at the fifth and sixth grade levels were presented with creative skills dispersed through the curriculum but not concentrated in the social studies area. Much of the work conducted with these groups focused in developing the Creative Problem Solving of Noller, Parnes and Giondi (Noller, Parnes, Giondi, 1976).

The Creative Problem Solving program was devoted to the learning and development of the creative process skills through a five-step creative procedure which emphasized:

Fact-finding

Problem-finding

Idea-finding

Solution-finding

Acceptance-finding

Students were instructed in Fact-finding by gathering and analyzing data in preparation for defining the problem. This was presented in oral and written exercises developed around specific themes as suggested in the Creative Actionbook (Noller, Parnes, Giondi, 1976).

Problem-finding was used to analyze problematic areas in order to locate the problem and followed the suggested activities of the program. Such problems included:

How to improve the schoolbus discipline problem.

How to contribute to the improvement of the school.

How to plan what a student might do in the future.

These problems were used to stimulate not only the Problem-finding area of the program but also to provide for Idea-finding.

Solution-finding was presented by students writing some of their answers to the problems in creative writing exercises, brainstorming sessions and deferred judgment situations related to the problems.

Acceptance-finding required the adoption and development of a plan of action for implementing the chosen solution. This step of the program was provided by open-ended questioning by students and teachers, brainstorming, use of imagination and visualization skills and developing a threat-free environment for the presentation of ideas.

Programmed Creative Instruction. In order to make the steps in creative problem solving meaningful to students, exercises from Creative Actionbook (Noller, Parnes, Giondi, 1976) were implemented with students. These exercises included those in visualization of pictorial materials, increased emphasis on observation, deferred

judgment programs, fact-finding procedures and alternate idea production exercises. The use of the exercises was linked to creative writing and original art development in students.

The use of manual creative skills was stimulated by the use of creative wooden puzzles which challenged the students to reconstruct the puzzle after it had been disassembled by them. This exercise involved visualization, and memory skills in recalling the original construction of the puzzle and in reconstructing it to the prior shape.

Creative imagination was stimulated by the use of Scamper exercises as developed through the Think Product materials. Students were asked to imagine an object as described by the instructor and later to draw or describe the object. Students were also given opportunities to report orally to members of their group, as a whole, or to smaller work groups concerning the objects they had developed in their imagination by use of the creative imagination exercises. The exercises were later expanded to involve creative problem situations and solutions to problems by creative imagination. The solutions developed by creative imagination were later subjected to brainstorming sessions by the group and by small combinations of students.

Art Instruction. In order to provide students with creative art instruction, members of the Montana Art Institute engaged in an

instructional program of lessons in which students were taught by local artists in skills of sketching, line drawing, perspective, and the use of charcoal and colored chalk and paint. Instruction was provided for an hour period once a week in each of the E₂ classrooms for a total of four hours of instruction. Artists provided information concerning the use and manipulation of the media and the techniques of drawing and composition.

Creative Writing. Instruction in creative and research writing was provided to students in the E₂ groups by a member of the local newspaper staff. The procedures of data gathering and reporting information were illustrated by the writer giving students group and individual instruction in the skills of written creativity and in news reporting. Instruction was provided for hour periods in both fifth and sixth grade classrooms four times during the progress of the experiment. Students' written efforts were displayed and given verbal reward by instructors and building personnel.

In conjunction with the development of writing skills, students were provided opportunities to make critical judgments of their own and their peers compositions. This procedure was used to develop creative problem solving skills and to allow for personal appraisals of efforts. The skills in evaluation were applied to later writing efforts and to the students' attempts for improvement of writing skills and data collection.

Film Presentations. As a supplement to formal art instruction, students were provided with two films: Why Man Creates and In Praise of Hands. These two films illustrated the creative process in visual form and outlined the steps in the process. The films also depicted the use of artistic skills for the attainment of basic needs, art expressions and individual personal and skill growth. The films were used to give the students another view of the varied aspects of the creative process.

Second Language Experiences. In their programs of creative writing, students happened upon the idea of how students wrote who spoke another language. They employed brainstorming techniques and listing techniques in order to determine ways they could learn to write in another language. Creative problem solving techniques were also employed in connection with the problem.

A local religious leader, who was fluent in Spanish, volunteered to conduct a series of Spanish lessons aimed at the development of some conversational Spanish and students' abilities to express thoughts in Spanish. The students were introduced to the necessary words they would need to conduct small conversations and to write short sentences. Students used the experience to develop a small Spanish vocabulary and relate it to their written work and creative problem solving.

Investigation of Professional Writers and Artists. Students had

previously been exposed to writing experiences conducted by a local newspaper and to art experiences conducted by local artists. In order to learn more about newspaper writing and the artistic presentations, students in the E_2 groups used creative problem solving techniques and developed a plan by which they would tour the local newspaper office and the Art Chateau of their city. This activity was later used in creative writing assignment and art work. The field trip was the last of the planned activities for the E_2 students.

Appendix B

Letters of Verification

200

April 24, 1978

Mr. William Milligan
Superintendent
School District Number One
Butte, Montana

Dear Mr. Milligan,

Since my sabbatical leave period is nearly completed, I would like to inform you and the school board of district one of what has happened during this time.

I will complete my course work toward the Doctor of Education degree this coming summer and am in the process of preparing the initial proposal for my dissertation. The dissertation will deal with an experimental testing of creativity education organized around a social studies approach. I have spoken to Dr. Tim Sullivan of the McKinley and he has agreed to allow the procedures of the dissertation to be conducted in his building during the 1978-79 school year. The students involved would be fifth and sixth graders. The time period of the experimental teaching would be from October until March.

If you, or the Board, have any questions or concerns regarding this matter, please contact me at Montana State University, or at my Butte home on weekends.

I wish again to thank you and the board for the opportunity given me in this sabbatical period.

Sincerely yours,

Claudia A. Clague

201

Butte Public Schools
office of the superintendent

ono 792-8315 — ext. 37 or 38

butte, montana 59701

April 26, 1978

Mrs. Claudia Clague
1819 C Street
Butte, Montana 59701

Dear Mrs. Clague:

I am pleased to see that you are completing your course work, and I do approve the experimental testing of creativity education which you will conduct at the McKinley school during the 1978-79 school year. I am sure that this project will enhance education, at least in Butte, Montana.

We are looking forward to having you back on "board."

Sincerely,

William C. Milligan

William C. Milligan
Acting Superintendent

WCM/es

202

April 26, 1978

Tim Sullivan, Ed.D.
McKinley School
W. Park St.
Butte, Montana 59701

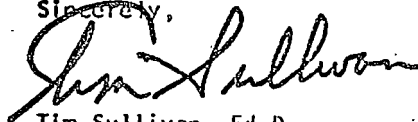
Mrs. Claudia Clague, Graduate Student
Department of Elementary Education
Montana State University
Bozeman, Montana 59715

Dear Claudia:

I met with the fifth and sixth grade teachers in the McKinley School concerning your proposed social studies program for next year. I am happy to inform you that two fifth and two sixth grade classes will participate in your research concerning social studies through the creative process development.

We are happy that you have chosen our school and will contact you sometime this quarter.

Sincerely,



Tim Sullivan, Ed.D.
Principal

TS:pl

ANACONDA 

May 3, 1978

Ms. Claudia Clague
Graduate Teaching Assistant
Elementary Education
Montana State University
Bozeman, Montana 59717

Dear Ms. Clague:

As a result of your visit April 24, 1978, The Anaconda Company endorses the program and will lend all the support we are able.

The program would consist of a series of six lectures to be given to the 5th and 6th grade students at McKinley Grammar School. Talks will be given separately to each of the grades and will be under one hour in length. As I explained, we have a rule that no one under 18 is to be admitted on tour of Anaconda Company properties. This precludes the follow-up of seeing the entire operation. However, we can have a field trip to the viewing stand, where the children can see pit operations in action.

I am sure that you realize the time and effort that will be spent by the persons in preparing these lectures, particularly in view of the fact that they must be given at the level of children. For this reason, we are not averse to giving this same program at other schools in addition to the McKinley. After determining the level of success with the initial lectures, it may be possible to expand this to other schools; especially because this program will run from October, 1978, to March, 1979, there will be ample time.

Proposed Program

1. History of Butte and Ethnic Background.
2. Geology.
3. Underground Mining.
4. Pit Mining.
5. Concentrator Operations.

Ms. Claudia Clague -- 2

May 3, 1978

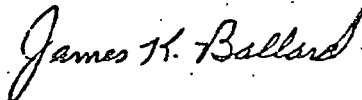
6. Environment and Safety.
7. Field Trip to Viewing Stand.

The Anaconda Company welcomes the opportunity to work with you on this program and wishes you every success.

Please notify me when you have selected starting dates so that the individuals can target their lectures.

We hope to have appropriate slides, etc., to illustrate the lectures.

Sincerely,



JKB:ds

JAMES K. BALLARD
Director of Special Investigations

May 1, 1979

Tim Sullivan, Ed.D.
Principal
McKinley School
W. Park St.
Butte, Montana 5970.

Dr. Eric Strohmeyer
Education Department
Montana State University
Bozeman, Montana 59715

Re: Creativity Study, Social Studies

Dear Eric:

I am writing this letter to commend Claudia Clague for her recent work at the McKinley School in Butte, Montana.

You are aware that Claudia conducted a creativity study entitled A Study of Creativity Instruction Related to Elementary Social Studies Education. The work was completed using all of the fifth and sixth grade classes in our school. Some of the classes were in a control group while the others were in an experimental group at each grade level.

As mentioned in Claudia's original plan, the McKinley School was well suited for this experiment because our school houses a representative cross section of the city and we have recently adopted the new Follett Social Studies series.

All teachers who worked with Claudia were enthused with the very positive activities that she introduced into our social studies curriculum. The majority of the intermediate teachers enjoyed participating in the bi-weekly conferences in an effort to discuss student involvement, progress, etc.

When the final results concerning creative development were presented to the staff, we all felt that our taking part in the study was very worthwhile. You are aware that significant progress was noted.

Claudia met with our staff and presented her study in a very professional manner. I am sure that you will see many of our younger teachers taking graduate work at M.S.U. based solely on the enthusiasm for solving problems created by Claudia.

The McKinley School intermediate grade staff and I wish Claudia Clague the best of luck in the completion of her dissertation.

Sincerely,

Tim Sullivan, Ed.D.
Principal

A handwritten signature in cursive script that reads "Tim Sullivan". The signature is written in dark ink and is positioned to the right of the typed name and title.

TS:pl

April 3, 1979
Butte, Montana

Elementary Education Office
Montana State University
Bozeman, Montana

Dear Sirs:

I have participated in the education experiment of Claudia Clague as it concerned her doctoral dissertation study. I have observed in the classrooms which were part of the study. To the best of my observations I could attest to the fact that the classroom teachers and students were fulfilling their described roles as outlined in the dissertation guidelines.

Sincerely yours,

Lawrence Buckley
Lawrence Buckley

Personnel Press

191 Spring Street
Leighton, Massachusetts 02173
Telephone (617) 861 1670

XEROX

June 6, 1978

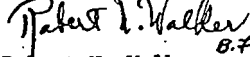
Claudia A. Clague
Department of Elementary Education
Montana State University
Bozeman, Montana 59717

Dear Ms. Clague:

The Torrance Tests of Creative Thinking are essentially the successors of the Minnesota Test of Creative Thinking although the overlap is not perfect. I'm sending a complimentary specimen set (and returning your check herein). If the tests you need are included in the TTCT, they are yours of course, available for purchase. If they are not, we have no interest or rights in them and are in no position to approve copying. I presume the approval would have to come from the copyright holder which I recall to be the Bureau of Educational Research, University of Minnesota. Personnel Press holds copyright only to those tests published under the title of Torrance Tests of Creative Thinking.

Please write again if we can be of more help.

Yours truly,



Robert N. Walker
Manager

rnw/bf
Enc. Check
P.P. Catalog



The University of Nebraska at Omaha
 Box 688 Omaha, Nebraska 68101 402/554-2733

College of Education
 Department of Elementary and Early Childhood Education

April 25, 1978

Claudia A. Clague, CTA
 Department of Elementary Education
 Montana State University
 Bozeman, Montana 59717

Dear Ms. Clague:

How thrilling that someone actually researches the literature! And that you have read about my dissertation!!

Enclosed is a sample copy of the Test for Inquiry Social Studies, Grades 5 and 6. While the instrument had good reliability and validity among fourth graders, my informal observations led me to believe that it is too frustrating to use with that age group.

I believe most of the information on test situations, reliability and validity are explained on the administration guide which is also enclosed. If you have other questions, just write me. Sets of 30 tests cost \$6.50 including postage and handling.

Sincerely yours,

Sharon Muir

Sharon Muir
 Assistant Professor

enc. 1

mh

MONTANA STATE UNIVERSITY LIBRARIES



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