

1976

# A study to determine the effectiveness of an enrichment program for selected, highly gifted and talented seventh grade students

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McCORMACK, Robert E., 1934-  
A STUDY TO DETERMINE THE EFFECTIVENESS  
OF AN ENRICHMENT PROGRAM FOR SELECTED,  
HIGHLY GIFTED AND TALENTED SEVENTH  
GRADE STUDENTS.

Iowa State University, Ph.D., 1976  
Education, administration

**Xerox University Microfilms**, Ann Arbor, Michigan 48106

A study to determine the effectiveness of an enrichment program  
for selected, highly gifted and talented seventh grade students

by

Robert E. McCormack

A Dissertation Submitted to the  
Graduate Faculty in Partial Fulfillment of  
The Requirements for the Degree of  
DOCTOR OF PHILOSOPHY

Department: Professional Studies  
Major: Education  
(Educational Administration)

Approved:

Signature was redacted for privacy.

In Charge of Major Work

Signature was redacted for privacy.

For the Major Department

Signature was redacted for privacy.

For the Graduate College

Iowa State University  
Ames, Iowa

1976

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## INTRODUCTION

Educational provisions for the gifted is a growing concern among educators at the national, state and local levels. Inequities seem to exist when comparing the prevalence of programs designed to meet the needs of slow learners, the handicapped and disadvantaged with the number of programs for the gifted and talented. In 1969 the Congress of the United States passed a law, Public Law 91-230, section 806, mandating a study be conducted by the Commissioner of Education. This study was to determine the following:

- 1) the extent to which special educational assistance programs are necessary or useful to meet the needs of gifted and talented children.
- 2) which existing Federal education assistance programs are being used to meet the needs of gifted and talented children.
- 3) how existing Federal educational assistance programs can be more effectively used to meet these needs.
- 4) new programs, if any, needed to meet these needs. (74, p. 9)

The general findings indicated that the few gifted students who have experienced special programs, have shown remarkable improvements in self-understanding and in ability to relate to people as well as in improved academic and creative performance.

Subsequently, state legislatures have passed laws that provide special resources and incentives to local school districts to increase their program efforts on the education of the gifted and talented. As a consequence, local school districts have had to discard their comfortable notion that high ability students will make their own way.

Contrary to today's concerns for the gifted, a review of the literature reveals the low priority given to the identification of the gifted and the satisfaction of their needs. In the study conducted by the Commissioner of Education, it was found that 57.5 percent of the elementary and secondary principals surveyed, indicated they had no gifted children in their schools. Terman (85) regarded the gifted as the most retarded group in education which further emphasizes the lack of existing programs. Gallagher (as cited in 40, p. 1) indicated:

- 1) Gifted children are among our most important national resource.
- 2) Our public education system has not been doing the most efficient job possible for these children.

Ming and Gould further reported,

Failure to identify and properly educate the gifted is not only a disservice to them, but a loss to society. (52, p. 34)

The U.S. Office of Education reported,

Intellectual and creative talent cannot survive educational neglect and apathy. (74, p. 9)

It is possible to establish programs geared to meet the needs of the gifted. As a result, society would benefit by their contributions. Project Talent in California, the Major Works Study in Cleveland, the Walla Walla School Program in Washington and the Illinois Television Project For the Gifted are a few examples of programs that have succeeded in meeting the needs of the gifted. Studies by Martinson (51), Reynolds et al. (72) and Worcester (100) indicated that gifted students can be identified and educated differentially with success. Research also indicated that many gifted children underachieve, performing far

less than their educational potential dictated (29). Plowman (as cited in 40, p. 21) reported:

Programing for the gifted can result in improvement of the total educational program. It can help each person involved to become a more open, more productive, and a more interesting human being.

These researchers seemingly alluded to the need for individualizing the educational process, thereby insuring the development of the learning potentials of not only the gifted but all students concerned.

A search of current literature reveals that several approaches were practiced to educate the gifted. They included acceleration, enrichment, special classes, ability grouping, summer programs and counseling instructional programs. This investigation focuses on enrichment.

#### Purpose of the Study

Equal educational opportunity often is misconstrued and assumed to mean equal or the same education for all. Equal opportunity merely insures an equal starting place in the pursuit of an education. O. L. Davis (as cited in 34, p. 7) commented that

providing equal opportunity for all does not mean offering everyone the same educational environment, experiences or materials; rather it means giving each student individualized attention in accordance with his ability to learn.

Davis (as cited in 34, p. 7) further argued

educating for life in a democracy does not demand that the future physicist, musician or salesman learn the same things at the same time; it does demand that each child be instructed according to his own inherent capabilities.

The Marshalltown School District, as expressed by the actions of the school board, has long since recognized the need for individualized

instruction. As a result, their philosophy embraces the belief that all students, including the gifted, are given instruction that best fits these individual needs. Developments in the Marshalltown Community Schools intended to establish special services and programs for the gifted created a unique opportunity to test the viability of selected practices for the enrichment of gifted education.

The purpose of this study therefore was to test selected types of creative and enriching experiences built into a program for the gifted/talented. This enrichment program was designed to meet the individual interests as determined by the gifted/talented students involved. Secondly, the study was to determine what effect an enrichment program had on a group of selected gifted/talented students.

Before this study could be initiated, certain educational objectives had to be met. These objectives were:

- 1) To obtain school board approval for the enrichment program.
- 2) To obtain fundings for the enrichment program.
- 3) To select the experimental design that best fits the conditions of the study.
- 4) To identify the teachers that will participate in the study.
- 5) To identify the students that qualify for participation.
- 6) To obtain parent approval for these students.
- 7) To provide training for teachers who will be involved in the study.
- 8) To select the experimental and control groups.
- 9) To develop a schedule of activities to be conducted in the



study.

- 10) To measure the effectiveness of an enrichment program on student achievement.
- 11) To measure the effectiveness of an enrichment program on student creativity.
- 12) To measure the effectiveness of an enrichment program on student self-concept.
- 13) To determine the feasibility of an ongoing program for the gifted student via affective, cognitive and creativity gain scores.

#### The Problem

The problem of this investigation was to determine the effectiveness of an instructional program designed to challenge the many talents and abilities of selected gifted students. Effectiveness of the enrichment program was determined by gain scores in three areas, viz., academic achievement as measured by the S.T.E.P.-S.C.A.T. test, creativity as measured by the Pennsylvania Assessment of Creative Tendency and the Torrance Test of Creative Thinking and self-concept as measured by the Coopersmith Self-Esteem Inventory.

#### Definition of Terms

1. Ability Grouping - the assemblage of students demonstrating similar academic and/or creative talents.
2. Acceleration - the rapid progression of a student through an

academic year program in less time than is normally allowed.

3. Achievement - the progress toward fulfilling the broad, general goals of education. It generally includes the attainment of skills and understandings in certain subject matter areas such as Mathematics, Social Studies, Reading, English Expression and Science.
4. Counseling Instructional Programs - academic experiences that involve interaction of students and trained guidance counselors as they pertain to self-concept and the realization of abilities.
5. Creativity - the engagement in divergent thinking that results in unconventional responses to conventional tasks. It is that part of behavior that is both imaginative and inventive.
6. Education - the formal process of learning brought about through instruction and experiencing. It has its origin in a school setting.
7. Effectiveness - having the capabilities of producing results or the fulfillment of predetermined intentions.
8. Enrichment - the deliberate differentiation of intellectual, social and artistic experiences for the more able student. It allows for a deeper understanding of special interests of the gifted/talented.
9. Gifted/Talented - a multifaceted dimension of human character which includes exceptional high learning ability, creativity, imagination, intellectual flexibility, and originality. It encompasses those abilities associated with the performing arts and physical skills, agilities and dexterity.
10. Individualization - to provide each student with opportunities for obtaining the knowledge, experience and skills which careful

individual study indicates will best prepare him to assume a position in the competitive adult society.

11. Measurement - the orderly acquisition and arrangement of information.
12. Self-Concept - the feeling or understanding an individual has differentiated as definite and fairly stable characteristics of himself. The self as he is known to himself.
13. Special Classes - instructional programs that incorporate unique experiences designed to satisfy unique interests.
14. Summer Programs - activities that utilize the months of June, July and August for educational instruction.

#### Basic Assumptions

The scope of this study was undertaken considering the following basic assumptions:

- 1) Present school programs do not provide for the special needs of highly gifted/talented students.
- 2) The highly gifted/talented students can be identified.
- 3) Achievement, creativity and self-concept can be measured by existing standardized tests.
- 4) Enrichment experiences can be selected from the literature which will, when provided for gifted/talented students, improve academic achievement, creativity and self-concept.
- 5) This enrichment program to be provided, is representative of the best suggestions for enrichment programs in the United States and therefore, generalizations can be made from the

findings.

- 6) All other factors effecting both the control group and the experimental group are equal.

#### Delimitations

The subjects for this study were 42 selected seventh grade students in the three junior high schools of Marshalltown, Iowa. The experimental group, twenty students, were selected from Miller Junior High School and the control group, twenty-two students, were selected from Lenihan and Anson Junior High Schools. Participation in the study was restricted to those students, who, in the judgment of teachers and counselors, were academically and creatively talented and represented the upper limits of academic achievement and creativity of their class.

Variables on which the experimental and control groups were compared were confined to achievement, creativity and self-concept. With the exception of achievement, the data were collected over a one-year time span utilizing a pretest, posttest design. The measurement of achievement took place over a period of one and two-thirds years due to the testing schedule of the junior high schools.

#### Treatment and Sources of Data

The Marshalltown gifted/talented program was established to meet the needs of a selected group of students identified as having above average academic ability and talents. The main thrust of the program was directed towards enrichment activities. Selected students at Miller

Junior High School served as the experimental group whereas the control group makeup came from Lenihan and Anson Junior High School.

A variety of interest areas were designed by the staff of teachers involved in the program. Each student was expected to participate in several enrichment activities in the course of the year. These activities included topics such as computer programming, photography, filming, solar energy, radio broadcasting and critical thinking. Saturdays and after school hours were used for coordinating teacher efforts, field trips and experimentation.

Data were collected in the form of five standardized tests. These tests included the following:

- 1) Renzulli's Scale for Rating Behavioral Characteristics of Superior Students.
- 2) Coopersmith Self-Esteem Inventory.
- 3) Pennsylvania Assessment of Creative Tendency.
- 4) Torrance's Test of Creative Thinking.
- 5) School and College Ability Tests and Sequential Tests of Educational Progress - Form 3A.

## REVIEW OF LITERATURE

## General Findings

Introduction

The American tradition of providing for all youngsters in public education has created a great deal of concern among contemporary educators and parents. During the 50s and 60s, concern centered on the educationally deprived. During the 70s, the gifted and talented are receiving more attention. A review of literature shows that the past 50 years represented a rather slow awakening period regarding gifted education. Terman's (85) longitudinal study, the first of the five publications occurring in 1925, marked the beginning of this era whereas the 1975 statement of policy by the U.S. Commissioner of Education, Terrel H. Bell, seemed to bring into focus the awareness level of today regarding the education of the gifted/talented. Bell's (as cited in 50, p. 1) policy statement encompassed the following:

1. The United States Office of Education recognizes the education of the gifted and talented as being an integral part of our educational system and supports the endeavors of all those who are involved in providing increased educational opportunities for these students.
2. The United States Office of Education is particularly interested in encouraging an investment by the private sector in a cooperative venture with the public sector for the purpose of providing needed specialized services to improve the quality and relevance of instruction for the gifted and talented student.
3. The United States Office of Education encourages states and school districts, wherever possible, within the administration of their programs, to consider action which target upon the special needs of the gifted and talented population.

4. The United States Office of Education and its regional offices of education, in order to implement this policy, will provide technical and supportive services to state agencies, state and local institutions and all individuals interested in gifted and talented education.

These parameters, the work of Terman to the present time, were used to delimit the literature as it pertains to the characteristics of the gifted/talented, their identification and the treatments provided for meeting their needs. For purposes of clarity, gifted, creative and gifted/talented will be used synonymously.

Who are these students who qualify for the label gifted/talented? Authors such as Martinson (51), Vassar (95), Gallagher et al. (25), Hill et al. (33) and Pegnato (57) have made an attempt to define gifted. Although slight differences do exist, they seem to closely parallel one another. In the Public Law 91-230, section 806, the Commissioner of Education was directed to define gifted and talented for purposes of federal education programs. The definition established by his advisory panel (as cited in 71, p. 10) was:

Gifted and talented children are those identified by professionally qualified persons who, by virtue of outstanding abilities, are capable of high performance. These children who require differentiated educational programs and/or services beyond those normally provided by the regular school program in order to realize their contribution to self and society.

His definition (as cited in 71, p. 10) further indicated that:

Children capable of high performance include those with demonstrated achievement and/or potential ability in any of the following areas singly or in combination:

1. general intellectual ability
2. specific academic aptitude
3. creative or productive thinking
4. leadership ability

5. visual and performing arts
6. psychomotor ability

It can be assumed that utilization of these criteria for identification of the gifted and talented will encompass a minimum of 3 to 5 percent of the school population.

In comparison to the U.S. Commissioner's definition, Terman (85), working with California children in the 1920s, described the gifted in more finite terms. He said,

1. The average member of our group is a slightly better physical specimen than the average child. . . .
2. For the fields of subject matter covered in our tests, the superiority of gifted over unselected children was greater in reading, language usage, arithmetical reasoning, science, literature and the arts. In arithmetical computation, spelling and factual information about history and civics, the superiority of the gifted was somewhat less marked. . . .
3. The interests of gifted children are many sided and spontaneous; they learn to read easily and read more and better books than the average child. At the same time, they make numerous collections, cultivate many kinds of hobbies, and acquire far more knowledge of plays and games than the average child. . . .
4. As compared with unselected children, they are less inclined to boast or to overstate their knowledge; they are more trustworthy when under temptation to cheat; their character preferences and social attitudes are more wholesome, and they score higher in a test emotional stability.
5. The deviation of the gifted subjects from the generality is in the upward direction for nearly all traits. There is no law of compensation whereby the intellectual superiority of the gifted tends to be offset by inferiorities along non-intellectual lines. (85, p. 34)

#### Social and personal characteristics

Studies by Abraham (1), Strang (81), Drews (20), Lafferty (46), and Terman (85) indicated that the gifted seem to possess characteristics that distinguish them from their peers. They reported that gifted



students have more positive attitudes towards school, participate in more extracurricular activities, have concerns with more abstract ideas such as religion, morality and world peace, are better satisfied with peer relations and are more confident and aware of their above average abilities.

The United States Commissioner of Education (as cited in 71, p. 16) reported that

in general, gifted children have been found to be better adjusted and more popular than the general population, although there are definite relationships between educational opportunities and adjustment.

This dispels the beliefs about the "mad genius" syndrome that was held by the general populace at the turn of the century. Gallagher (24), in his book reviewed studies by Cair, Crowder, Hildreth, Lightfoot, Mensch and Rasaseshan that consistently showed gifted students having more freedom from problems when compared to their average counterpart. In spite of this consistency, these studies have not settled the issue. The inconsistency noted in these studies seemed to be found in the subgroup, high ability-high creativity. This group did not reflect the same freedom from problems when compared to their average counterparts.

In a study by Lucito (48), fifty-five bright sixth-grade children were compared to fifty-one dull sixth-graders on a task that measured conformity to group judgment. Wrong information was provided to both groups about the length of a line. The results indicated that the bright children, compared to the dull children, seemed less prone to peer group opinions and selected the longest line when asked to do so using their own good judgment.

Contrary to Terman's (85) findings regarding gifted students and their willingness to read more and better books, Abraham (1), Kirschner (45), and Strang (81) reported conflicting findings. Abraham (1) found that gifted students did not voluntarily go beyond the books read by their average peers. Kirschner (45) determined that although they liked to read, the gifted did not like to tackle the more difficult books. Strang (81) found that the amount of reading decreased from junior high to senior high school.

To further define the uniqueness of personality of the gifted, D'Heurle et al. (18) conducted a study comparing high ability and low ability students in arithmetic, reading and spelling. He determined that those students who were outstanding in arithmetic seemed to be spontaneous and free in their behavior. They seemed to be secure, confident, got along with parents, had good peer relations and assumed a leadership role within the group. In contrast, the high ability readers were more introverted, had difficulty expressing their feelings, showed more intense anxiety and were less secure with their parents. The high ability spelling group tended to be more placid and calm, were least competitive of the three groups and were the least negative and aggressive. Drews (20) and Gallagher (25) summed up the general feelings of most researchers when they indicated greater differences among gifted people than general lists of characteristics would suggest. Gallagher (25, p. 19) further stated

The one factor that youngsters labeled gifted have in common is the ability to absorb abstract concepts, to organize them more effectively and apply them more appropriately than does the average youngster. Apart from that, however, the range

of other variables, such as social abilities and personality, is almost as great as one would find in a random selection of youngsters of a given age.

### Identification

The identification of the gifted/talented is a difficult process. The review of current literature revealed several techniques that were used including the administration of individual intelligence tests, group intelligence tests, teacher rating scales and scores on creativity tests. One very important need is evident at this point, the development of a more sophisticated technique for screening the gifted/talented.

Goldberg (28, p. 8), in her review of literature, stated

The individual intelligence tests which, though far from surefire predictors of academic success, come closest to providing a valid and reliable measure of many facets of intellectual functioning.

She further related that group intelligence tests, when used in place of individual tests of intelligence, miss some students that should be included and included some who should not be categorized as gifted.

In the report by the U.S. Commissioner of Education on gifted, it was stated

A number of studies have shown that individual tests identify gifted children much more accurately than do group measures. Half of an identified gifted population remained unidentified with group tests alone. (71, p. 18)

The report further stated

group test ratings tend to be higher for the below average individual, while, for the above average, group test scores are lower than those obtained on the individually administered Binet test scale. Data provided by a test publisher showed that the discrepancy between group scores and individual scores increased as the intelligence level increased. (71, p. 18)

Although the individual intelligence test was more positively endorsed, this type of test was more time consuming and costly. Chambers (11), in a study using the Wechsler Intelligence Scale for Children, found that by using the following four subtests, Vocabulary, Information, Block Design, and Similarities, 60 percent of the nonintellectually superior children were eliminated and 100 percent of the gifted were included. It appeared, however, that a more finite procedure had to follow this technique to make the final selection.

Hill et al. (33) described a study utilizing teacher judgment, cumulative grade average and IQ scores for the identification of the gifted. In the final selection process, 90 percent of the twenty-four selected could have been identified by teacher ratings alone. Contrary to Hill's et al. (33) findings, the U.S. Commissioner of Education (71) and Pagnato (57) found that teachers' ratings were not effective or efficient in the screening process. Evyator (22) described some negative characteristics of gifted such as being lazy, loneliness, having a feeling of superiority, not studying with enough depth and is an underachiever. As a consequence, teachers' ratings would overlook gifted students who demonstrated this type of behavior. Gallagher (25, p. 18) supported this contention in his statement:

Many children who have a high aptitude for reasoning and conceptualization are not performing well in school. Albert Einstein, Thomas Edison and Winston Churchill would constitute three classic cases that would not be labeled gifted by teacher nomination.

Gallagher et al. (25, p. 17) summed up the literature concerning selection techniques in chart form:

<u>Major Identification Procedure</u>	<u>Percentage Using</u>	<u>Percentage of Experts recommending</u>
Teacher observations and nominations	93	75
Group achievement test scores	87	74
Group intelligence scores	87	65
Previously demonstrated accomplishments	56	78
Individual intelligence test scores	23	90
Scores on tests of creativity	14	74

It appeared the method most recommended by the experts was the one that was least used, excluding tests of creativity.

### Creativity

The purpose for bringing creativity into the discussion is to expand the concept of giftedness. The research of Guilford (31), Torrance (92), Getzels and Jackson (27), and Passow and Goldberg (56) cannot go unrecognized when discussing giftedness. Their studies attempted to bring to focus the differences found between populations of high intelligence and those labeled creative. The U.S. Commissioner of Education (as cited in 71, p. 20) reported that

Studies of the creativity measures and their relationship to intelligence measures have produced a preponderance of evidence that the use of a common term "creativity" is misleading, since the measures bear no more relationship to one another than they do to measures of intelligence.

Guilford's (31) "Structure of Intellect" model demonstrates the complexity of human thought, including divergent-thinking which is often thought of as the basis of creativity.

Taylor (84, p. 72) attempted to separate giftedness and creativity with the following definition of creativity:

Creativity -- the importance of divergent thinking, especially in production of ideas, fluencies, flexibility and originality. Humor, fantasy and playfulness with ideas are also among the characteristics of the truly creative person. Other traits mentioned include curiosity, manipulation and restructuring of ideas and questioning ability. Personality characteristics mentioned are autonomy, independence, femininity of interests, dominance, self-assertion, self-acceptance, resourcefulness, radicalness, and complexity of personality.

Getzels and Jackson (27) suggested that unless conventional identification practices are supplemented by measures of creativity, a group of truly gifted students able to produce originality and novelty in the learning process as well as mastery of the course content, will have been missed.

In the first major study using creativity testing (27), high ability and high creativity groups were compared. There was a mean difference of 23 IQ points (High IQ-150,--High Creativity-123). Both groups were superior to the general population as measured by standardized achievement tests. The results of this and similar studies conducted by Flescher (23) and Torrance (91) indicated that high ability did not necessarily insure possession of high creativity and high creativity did not insure high ability. Generally speaking, however, both high ability students and high creativity students did excel in achievement over their average counterparts. Getzels and Jackson (27) study further distinguished the preferred characteristics of the two groups. The high ability group favored high marks, pep, character and goal directedness and desired to possess now those qualities which will lead to success in later life. The creative group favored wide range of interests, emotional stability and above all a sense of humor and were less likely to select

present aspirations in terms of remote success goals. Teachers showed a preference in having the high ability group member in their class as compared with the high creativity group member.

Torrance (91), in a study involving elementary students possessing both characteristics of high ability and creativity, found these students to be most dominant, having the wild ideas and yet the good ideas, often selected as the best friend and was a most desired member of the class as viewed by the teacher.

Torrance (91, p. 12) suggested that

apparently they are able to engage in divergent thinking and express divergent ideas without arousing severe pressures whether by peers or by teachers.

#### Motivational Factors

##### Family and socio-economic factors

Terman's (85) monumental study produced a vast array of information concerning the gifted and their socio-economic makeup. His study included 643 subjects whose parents, at least the majority, represented English, German, Scotch, Irish and Jewish descent. Only 0.3 percent of his subjects were of black descent.

The Cleveland Public Schools' study conducted by Barbe (6) substantiated Terman's (85) findings to some extent. In both cases, however, the subjects were drawn from a large city environment as opposed to a rural environment.

Hughes and Converse (37) fault Terman (85) from the standpoint of the number of gifted in his study. They claim that students who possess

140 IQ and above represent 1.1 percent of the total population. Consequently, Terman's (85) initial canvass for gifted included 159,812 students and should have produced over 1700 subjects. Hughes and Converse (37) felt that certain socio-economic and racial groups were not fully represented.

Jenkins (as cited in 28) found an incidence of nearly one percent of gifted blacks in segregated Chicago schools in the early 1940s.

On the basis of the studies conducted by Barbe (6), Hughes and Converse (37), and Jenkins (as cited in 28), it appears that Terman's (85) study was not all inclusive and representative in terms of minority group representation. Perhaps a more current longitudinal study should be initiated.

The U.S. Commissioner's (as cited in 71) report on the gifted indicated that the socio-economic origin of the gifted is varied. It concluded that

Even though the major studies have not employed detailed community searches, giftedness has been found in all walks of life. (85, p. 17)

Terman's (85) study showed that the parents of his subjects represented the following socio-economic groups: 31.4 percent professional, 50 percent semiprofessional and business, 11.8 percent skilled, 6.6 percent semiskilled and 0.13 percent common labor. In contrast to this, the Cleveland Study (as cited in 6) and the National Merit Scholarship Corporation (54) showed that 40 percent came from professional or managerial group, 30 percent semiskilled and clerical and less than 1/3 came from the laboring class group. Drews (19), in the Lansing, Michigan study,



conceded the point that professional families contribute more than their share to the number of gifted students. However, the study showed that the lower socio-economic groups were more equitably represented.

Parental relationship is another influencing factor on the gifted and development of their achievement values. Strodbeck (82), Kahl (43) and Chance (12) reported in their studies that the father image, family democracy and parental aspirations all had an effect on determining achievement values in the offspring. If the father was domineering, the offspring was less likely to believe in his or her own ability to control their destiny. A passive father, one that just wanted to get by, had a tendency to influence his offspring in the same way. As a consequence, fewer gifted students with these parental influences went to college.

#### School and peer group

The school and the peer group can act as a significant force to direct the motivation of high ability students. Wilson (98) reported that students of comparable IQ and family background performed quite differently when enrolled in schools whose makeup was largely middle-class versus those with lower class makeup. High ability students in the latter showed less inclination to achieve than did their counterpart in a middle-class school. Wilson's (98) findings concerning the peer group, seemed to parallel the findings of Strodbeck (82), Kahl (43) and Chance (12) only from the dimension of the peer group influence.

Studies by Coleman (15) and Tannenbaum (83) are parallel in determining acceptable traits of characteristics as described by the peer

group. In both cases, being smart in school was not looked upon as a desirable characteristic. Tannenbaum (83) reported that being athletic and smart is a combination that is admirable in the eyes of the peer group whereas being nonathletic and smart was a handicap. Studiousness, unless encouraged, will not be allowed to develop without the pains of peer group rejection.

Social stereotyping plays an important part in the development of gifted boys and gifted girls. Walberg (97), Gallagher, Aschner, Jenne (25) and Astin (5) reported that boys were more expressive in classes and tended, as was expected, achieve higher scores on mathematics and science aptitude tests. Girls tended to do better in social sensitivity and artistic activities. The literature supported the contention that the role of the gifted girl is the same as her average counterpart, namely, subject to sex role stereotyping. Therefore, patterns of intellectual development reflect society's sex role expectations.

#### Administrative Provisions

The identification of the gifted/talented student is a complex problem in itself. The organizational implications designed to challenge the abilities of these identified students also creates a definite problem for the building principal who recognizes the needs of the gifted/talented. The literature described several approaches that included ability grouping, acceleration, enrichment, summer programs and special counseling. Gallagher (24, p. 271), in determining the objectives for embarking on some type of administrative change for the gifted, listed the

following:

1. Reduce the range of talent and achievement in a group to allow the teacher a better opportunity to focus his efforts.
2. Reduce the amount of time that the gifted child, student, adult must spend in the total educational process.
3. Bring the best-prepared personnel into touch with these students.

These objectives, although adequate, are not all inclusive and representative of the programs that are in existence today.

In order to determine the crucial elements of a program for the gifted and talented, Renzulli (69, p. 218) surveyed twenty-one experts in the field of education. The three elements most frequently mentioned

were the teacher, with selection and training seen as major issues; the curriculum and how it can be made purposefully distinctive, and the student selection procedures for the particular program in question.

#### Ability grouping

In order to fully understand all of the ramifications of ability grouping, it is necessary to examine the legal aspects of this administrative provision.

Ability grouping, by definition, discriminates among students on the basis of the student's capacity to learn. According to Kirp and Yudof (44), the courts allow for different kinds of educational opportunities for students with differing abilities. However, when ability grouping discriminates by providing experiences that are not equitable, then it has been judged illegal. Kirp and Yudof (44, p. 680) further reported the judgment of the courts in the statement:

the court concludes that aptitude tests are the primary basis for sorting; that "there is substantial evidence that defendants presently lack the techniques and the facilities for ascertaining the innate learning abilities of a majority of district school children . . . [and that] lacking these techniques and facilities, defendants cannot justify the placement and retention of these children in lower tracks on the supposition that they could do no better, given the opportunity to do so" [269 F Supp at 488].

Two studies conducted by Justman (42) and Abramson (2) suggested that grouping by ability had little positive academic effect on the gifted. Abramson's (2) study compared freshman college students with varying grouping practices in their high schools to those students with no grouping practices. The results indicated no significant differences could be attributed to grouping practices. What differences were apparent were related to IQ as opposed to grouping. Justman's (42) study compared gifted students in a narrow-range ability group to gifted students in a broad-range group. He also used acceleration as a variable; the narrow-range group was accelerated as opposed to the control group which was not accelerated. The results indicated that the gifted, narrow-range ability group performed better on achievement tests than did the control group. The drawback to Justman's (42) study was the gifted group, although they did better on achievement scores, did not necessarily do better because of the grouping procedure but more because of acceleration. His (42, p. 36) conclusion being

the amount that a gifted child will learn is far more related to the amount of knowledge to which he is exposed than to any other single factor.

Passow and Goldberg (56) described an interesting side effect that he found when bright students were moved from a broad-range ability group

to a narrow-range group. The bright students' self-estimates were lowered and seemingly reduced the amount of snobbery and conceit that existed.

Bent et al. (7) described the Peoria-Rockford study in which two administrative provisions were compared, namely, enrichment in regular classes and grouping into special classes. Students were selected on the results of group IQ scores, achievement tests, scores in reading and academic grades. The nominees were then given the Stanford Binet. Students in Peoria were matched with those in Rockford. A t test was used to determine the equality of the group. The STEP test was used in a pretest/posttest design with an interval of one year. The results indicated that the students involved in special classes scored higher than those students in regular classes. However, the gain scores were not statistically significant. Students selected for this study were also set up on a matched-pair basis. The apparent weakness of this study, was that students were selected on a matched-pair basis. The comparative groups were not completely matched on all criteria. The use of the t test to determine equality of the groups also had limitations as a statistical treatment (as compared to analysis of covariance, for example).

#### Partial grouping

Some schools have instituted partial grouping in which gifted children are in special classes for part of a school day and in regular classes the rest of the day. West, Sievers, Mann, and Torrance (as cited in 28) determined that there was acceptance on the part of nongifted students but the gifted students found that in special classes, there

was less social stress and more cooperative effort than in groups with a broad ability range.

Goldberg (28), Passow and Goldberg (56), and Justman (42) and Hague (as cited in 28) in their report of the New York City schools study found the following:

In general, teachers seemed to be more successful in handling several ability levels simultaneously in a single subject than they were in treating several subjects with equally satisfactory results even for one ability level. (28, p. 38)

The New York Study involved eighty-six fifth grade classes. Five levels were determined using nonreading group IQ test scores. Classes were then organized so that some classes contained (1) all high ability students, (2) high ability and next highest ability, (3) total ability spectrum, (4) no gifted students in any classes (5) average ability only and lastly, low ability students only. The study was for two years duration and involved self-contained classrooms. The specific findings include the following:

1. For all five ability levels taken together, and across all subject areas, achievement increments were statistically significantly greater in broad-range than in medium and narrow-range classes.
2. The presence of gifted students in any given classroom regardless of the ability range of the class had a positive effect on the achievement of the non-gifted pupils in science and to a lesser extent in social studies. (as cited in 28, pp. 37-38)

Drews (19) in a study involving 432 ninth grade English students in Lansing, Michigan, compared homogeneous and heterogeneous ability groups. When ability was held constant, no significant differences in achievement between the groups were found. Drews (19), contrary to the

New York Study (as cited in 28), found that slow learning pupils produced significant differences in favor of homogeneously grouped classes.

Goldberg (28, p. 41) summed up the general findings of research regarding ability grouping when he reported

Ability grouping is by no means a sufficient condition for insuring greater academic achievement at any ability level. At best, it provides a framework within which enhanced learning may be more effectively planned and executed. The crux of the problem of providing more meaningful learning experience lies not in the grouping pattern used, but in what goes on in the classroom.

### Acceleration

Acceleration is defined as the movement of a student through the educational process in less time than it takes for the average student. In their respective studies, Shannon (78), Pressey (67), Ostrander (55), Clark (13) and Rusch (74) concluded that acceleration was a very satisfactory method of challenging able students. Terman and Oden (86, p. 281) stated that

It is our opinion that nearly all children at 135 IQ or higher should be promoted sufficiently to permit college entrance by the age of 17 at least, and that the majority of this group would be better off entering at 16. Acceleration of this extent is especially desirable for those who plan to complete two or more years of graduate study in preparation for a professional career.

The School Math Study Group (77) described a study that compared three groups of able junior high school students. The groups were matched by IQ, reading levels, arithmetic achievement and teacher recommendation. One group was accelerated, one group received enrichment activities and the third group acted as the control group. At the end of

three years, the accelerated group scored significantly higher on the STEP math test, form 1A, as compared to the enrichment or control group. This result was also true when teacher-made math tests were used.

In a similar study, Arends and Ford (4) reported that an experimental group scored significantly higher on six out of nine scores on the STEP test, form 3A. The experimental group received enrichment activities as well as acceleration. The researchers in this case failed to differentiate and consequently cannot conclude that the results were due to a combination of both rather than purely enrichment or purely acceleration.

In separate studies, Mirman (53) and Braga (9) investigated the social effects of acceleration. Mirman (53) found, when he compared 128 high school seniors in Los Angeles, that accelerated students participated in more extracurricular activities, had a strong liking for school. When compared to nonaccelerants, no significant differences existed between the two groups in social adjustment. Braga (9) compared achievement, parent and teacher attitudes and teacher rating scales as they applied to accelerated and nonaccelerated elementary students. He found no significant differences between the two groups. However, teachers generally were opposed to acceleration.

Gallagher et al. (25, p. 100) in his review of literature stated

The recent research on acceleration has done nothing to change the generally favorable portrait of these methods for moderately shortening the educational career of talented youth. The advantage of saving a year or two from a long investment in educational time does not seem diluted by social or emotional difficulties.



Reynolds, Birch and Tuseth (72, p. 17) supports Gallagher's (24) contentions in their statement

It may be concluded, from the research . . . that early admission to school of mentally advanced children who are within a year of the ordinary school-entrance age and who are generally mature is to their advantage. There are few issues in education on which the research evidence now available is so clear and so universally favorable to a particular solution.

The general findings of research indicate positive results when gifted students are accelerated. However, the major opposition to acceleration, as described by Plowman and Rice (63), come from parents and teachers. Parents argued that acceleration prematurely thrusts the child out of the parental nest at least one year earlier than parental anticipation. Teachers expressed the difficulty in screening five-year-old applicants for an accelerated program and the emotional stress placed on the child as their major concerns. Negative attitudes reflected by parents and teachers seemingly are the only deterrents to adoption of acceleration programs on a wide scale.

### Counseling

The purpose of special counseling for the gifted focuses on self-concept, heightened aspiration and the relationship to the peer group. Hutson and Olsen (39) reported on the program for Placentia Unified School District, Orange County, California. It included critical thinking activities and self-development for planning and organization. The study was void of statistical evaluation. However, the students involved reflected a positive feeling concerning the program. Jackman and Bachtold (41) obtained similar results from California Project Talent.

The study utilized a group discussion format. The objectives included the development of communicative skills, to learn to respect others and to discuss and evaluate ideas. The results showed the students as favoring the project.

Mallinson (49) and Purkey (68), in separate studies, found no significant difference in achievement, self-concept, social and personal adjustment when they compared a counseled group with a noncounseled group.

### Enrichment

In terms of administrative provisions, enrichment activities overlap other administrative provisions such as acceleration and summer programs. Consequently, this review attempts to treat enrichment from a general viewpoint.

Pinellie (58) described enrichment as the provision of opportunity for experiences that supplement the learning activities of a classroom. Hill (34, p. 9) reported the objectives of an enrichment program included

1. to increase ability to analyze and solve problems.
2. to develop more profound, worthwhile interests.
3. to stimulate originality, initiative and self-direction.
4. to increase social conscience resulting from interaction with peer groups through cooperative activities.

In separate studies, Skipper (79), Powell and Munsey (66) and Robeck (73) found statistically significant differences when they compared enrichment groups and nonenrichment groups. Powell and Munsey (66)

reported in the San Diego Study that after providing enrichment activities in the form of fine arts works, outside speakers, and outside activities for the gifted, posttest gains were significant as compared to the control group. Skipper's (79) study in the Dayton Public and parochial schools found that participation in the "Living Arts Program" produced gain scores of a significant nature on certain tests of creativity. His analysis of variance, pretest-posttest design produced significance at the .01 level on measures of Places Visited Scale, Performance Scale and Involvement with Community Scale. Robeck (73) reported that participation in special Saturday classes resulted in significant gains ( $p < .01$ ) on standardized achievement measures for elementary school students. His study also showed significant gains in standardized achievement measures for students participating in a full-time class for gifted and a special interest class for the gifted.

Contrary to the findings of Skipper (79), Powell and Munsey (66) and Robeck (73), the Central Arkansas Education Center (10) produced results in a reading program that were not statistically significant. The experimental and control group were comprised of sixth graders. The experimental group was exposed to cassette tapes, current newspapers, magazines, etc., with the hypothesis that reading skills would improve.

Goldberg (28), Passow and Goldberg (56) and the School Math Study Group (77) produced similar results when they compared enrichment activities and acceleration techniques. In both cases, a three-year study was conducted and the accelerated group scored significant gains on standardized math achievement tests.

Some general findings were reported by Barbe (6, p. 1) in Cleveland "Major Works" Study. He reported his findings as

1. that enrichment of the program and special classes for the academically talented are sound and rewarding education practices,
2. that special emphasis on the value of further education for gifted students brings gratifying results, and
3. the lasting values for these young people justify the time spent in imaginative planning.

In a follow-up of the participants in the "Major Works" Study, 77 percent responded to the questionnaire. Of this group, 85 percent expressed approval of the enrichment program. Barbe (6) further reported that 60 percent of the participants indicated better than average social adjustment, 91.3 percent of the men went to college and 75 percent of the men entered professional or managerial positions.

#### Summer programs

The general reactions to summer programs for the gifted were found to be favorable as expressed by Hogan et al. (35) and Ryder (75). Hogan et al. (35, p. 8) reported that

when the summer enrichment sample is compared with a sample of youngsters their own age, they present a picture of unusual personal soundness, social effectiveness and maturity of interests.

His study also indicated that attitudes towards school do not change. However, convergent and divergent thinking scores increased. Divergent thinking scores increased especially when supplemented by creative problem solving.

Winston (99) established a six-weeks summer program for fourth

and fifth graders. The focus of his study was problem solving. He administered the Hermon-Nelson Test of Mental Maturity, established an experimental and control group and used a t test to insure that the groups were equal. The Language Arts and Science subtests of the STEP test were used in a pretest-posttest design. Winston (99) determined by use of an analysis of variance test that gain scores in Science and Language Arts could not be attributed to the summer program.

#### Summary

The past fifty years represents a slow awakening period in education regarding the gifted. It has been determined that the gifted have outstanding and versatile abilities, great capacities to learn and are socially well-adjusted. They originate socially and economically from all walks of life.

Identification of the gifted is difficult due to the many talents they possess. The single, most recommended technique for identification is an individual intelligence test. It is the general feeling of most experts, however, that a many-faceted approach be used in the identification process. Basic intelligence measures should be utilized as well as measures of creativity, leadership, and psychomotor skills.

Parents and peer group relations are influential in the overall development of the talents of the gifted. The peer group influence can create an environment in which the gifted will mask his natural talents and regress towards the average performance levels. If the parental group is democratic and if the father strives to succeed, the gifted

offspring will be more free and willing to attain true self-fulfillment.

When comparing ability grouping, acceleration, counseling, enrichment and summer programs for the gifted, we find contradictions. In all cases, the success of the administrative provision is dependent upon the differential treatment of curriculum, stimulating and challenging teaching techniques and accurate student selection procedures.

Ability grouping becomes administratively cumbersome because gifted students have greater diversified or individual variations from gifted child to gifted child and from subject to subject. Besides, grouping is probably discriminatory and therefore illegal under present U.S. law.

Acceleration, although it produces sound results in terms of academic growth, is least accepted by parents and teachers of the gifted. Personal and social adjustment to a different age group, in general, does not create problems for the accelerant, but lay adults won't believe it.

Counseling procedures used to bring out a more realistic self-concept for the gifted student, meets with wide approval by the gifted. There is little statistical evidence to select this method of meeting the needs of the gifted over the other techniques or administrative provisions.

Enrichment activities call for more diversification of teaching techniques as compared to the other administrative provisions. It comes closer to answering the challenge of a differentiated curriculum and

it also insinuates different teaching strategies. When comparing enrichment to acceleration, acceleration contributes more to achievement testing results.

Summer programs are closely aligned to enrichment programs. Its purpose can be that of enrichment as well as to insure gains in achievement brought about through acceleration. Summer programs provide for greater flexibility in terms of how it can be utilized as opposed to the other administrative provisions.

## METHODOLOGY

The major purpose of this investigation was to measure the effectiveness of an enrichment program for a selected group of gifted/talented seventh grade students of Marshalltown, Iowa.

## Selection of the Sample

Due to the nature of this study, selection of the experimental and control groups was accomplished with the aid of teachers, standardized tests and cumulative folder information as opposed to random sampling. Final selection of participants in the study came under the direction of ten staff members of Miller Junior High School. These ten represented the teaching staff for the experimental group to be housed at Miller Junior High School.

Sixth-grade teachers in the Marshalltown School System were hired for one day during the summer preceding the initiation of the gifted/talented program. Their purpose was to rate their departing sixth graders, future seventh graders, by using the Renzulli's Scale for Rating Behavioral Characteristics of Superior Students. It was decided to use the top ten percent as potential candidates for the program.

Permanent records were also researched for the purpose of obtaining group IQ scores. The majority of the sixth-grade students had taken the Lorge-Thorndike group intelligence test. A score of 130 or above was used as the acceptable lower limit for candidacy to the program.

Teacher and administrator evaluations were also used to indicate



high potential in the areas of music, drama, athletics and art. In that manner, inclusion of the talented student who might not otherwise be identified via academic accomplishments alone was obtained.

Final determination of the participants was based on the information collected. The ten staff members who would direct the gifted/talented program used their subjective judgment in selecting the twenty students which would comprise the experimental group. They also selected twenty-two students who would make up the control group, ten from Lenihan Junior High School and twelve from Anson Junior High School.

Parental approval was obtained as the final step before initiation of the program. Each parent was informed of the overall purpose of the program and was told that it was an experimental approach to meet the needs of their children. They had the prerogative of withdrawing their son or daughter during any phase of the program. Of the twenty-four students initially selected for the experimental group, three members moved out of the school district and one did not wish to participate.

#### Collection of the Data

In the fall of 1974, all students identified as highly gifted/talented were administered the following tests: S.T.E.P.-S.C.A.T., Pennsylvania Assessment of Creative Tendency, Torrance's Test of Creative Thinking, and the Coopersmith Self-Esteem Inventory. The results would serve as the pretest data.

During the fall preschool workshop, the teachers involved in the gifted/talented program met and planned, organized and selected

instructional materials to be used. It was determined at this time, what enrichment activities would be utilized during the school year and how they would be implemented.

The enrichment activities were designed to involve all the members of the experimental group for the same experiences as well as special topics that would involve smaller interest groups. Each participant was expected to pursue several small group activities in the course of the year.

Members of the experimental group were divided into three groups for counseling sessions. This activity provided a means for developing self-concept and values clarification. It also provided an excellent communication link between members of the teaching team and the participants. The school counselor, a member of the teaching team, directed the weekly sessions. On different occasions, the counseling group met at individual members' houses. This allowed for a more personal interaction between members of the counseling group.

Field trips were also employed to provide enrichment experiences for the participants. These field trips did not follow the usual walk-through format but allowed for time to question leading personnel and digest the informative materials provided. Included were trips to the Meredith Publishing Company, Des Moines, Iowa, the Iowa Educational Broadcasting Network, Ames, Iowa, the textile mills of the Amana colonies, Amana, Iowa, and the Honeywell Plant, Des Moines, Iowa. During the visit to the Honeywell Plant, students had an opportunity to talk with engineers from several states who were assembled to discuss the

practicality of solar energy. This interaction provided valuable information for a subgroup of students who were working on a solar energy project as their small group activity.

Several small group activities were designed to satisfy the interests of the selected, gifted students. They included the following:

1. **Computer Programming.** The Fisher Controls Company of Marshalltown donated an 8K digital computer to the school district. Students were provided time to explore and learn computer language. They developed programs they could use in their classrooms. Knowledgeable members of the community assisted students with the general computer instruction and the development of specific programs.
2. **Solar Energy.** Interested students were exposed to field trips and guest speakers with expertise in solar energy. A group went to Des Moines and visited an architectural firm engaged in solar energy research and building. Various resources, such as printed material and video tapes, dealing with solar energy were reviewed. From this, projects such as a solar water heater and a solar cooker were constructed. The Industrial Arts and Science departments provided help in this construction.
3. **Leadership.** The leadership activity involved 12 members of the experimental group. The goal of the group was to plan and direct school activities which fostered enthusiasm in the student body. Among activities planned were bus trips, special assemblies, the designing, making, and selling Christmas

stockings, a school dance and a special pride week for the entire school.

The 12 students throughout the year experienced a variety of different skills to plan and implement their plans. They discussed and researched areas of human relations and how to communicate with people. They experienced conducting a survey, scheduling and conducting meetings, budgeting money and time, assessing needs, brainstorming possibilities, setting goals, planning steps to reach goals, evaluating results, and devising various approaches in communicating with 700 other students and teachers in a leadership role.

4. Exposure. Several of the selected gifted and talented students expressed a fascination with such varied subjects as E.S.P., dream analysis, Kirlian photography, Yoga and handwriting analysis. Follow-up activities included researching literature on these subjects, building a Kirlian camera, experimenting with E.S.P. cards, and sharing ideas, results, and possibilities.

The exposure left many questions unanswered and many avenues of exploration open for the future.

5. Pottery and Sculpture. This project involved the creation of an art object that would be given to and displayed in the school. Members of the selected group who possessed artistic talent were in charge of the project. The art instructor, a member of the teaching team, acted as a resource person.

It was decided that the art object would be sculptured

and placed in the entryway of the school. Skills in sectioning, sizing and three-dimensional art were studied. Planning and construction of the different sections of the sculptured piece followed. The success of the project was determined by the manner in which the sections fitted together yet still represented the original idea of the group.

6. Radio Broadcasting. The objectives of this activity included seeking information, reporting accurately, interviewing, operating AV equipment, editing, broadcasting and advertising. Students interested in this activity sought the help of the members of the local radio station. Their expertise was utilized for the production of tapes that could possibly be used on the air. The material that was taped covered current happenings in school.

After several tries, a tape was produced and aired on the local radio station. The members of the broadcasting staff at the radio station were impressed with the work of the students and, as a consequence, similar productions became a regular Saturday morning feature.

7. Photography. A small group of gifted and talented students asked for formal instructions and special projects in photography. This group initially met twice each week and studied darkroom techniques and methods of taking better pictures. Schedules were rearranged by the administration and some teachers allowed students to miss some classes in order to attend these small

group sessions.

Instruction took the form of discussions, studying professional photographs, developing a basis for constructive criticism of photographs, informational programs from Kodak and a field trip to the Des Moines Register and Tribune photography department.

After the initial instruction, several sessions were spent discussing projects for the group. Two projects were selected. A photography contest was held with specific rules. Each student was required to take, print, and mount the prints entered. The contest was judged by a local professional photographer and an artist.

The second project lasted several months. The students attended as many school events as possible. The pictures they took were posted on a special bulletin board reserved for them. Students and teachers could then place orders for any picture they wanted to buy. The money earned was used to offset the costs of the project.

8. Textiles. The initial plan for this project was to make a movie of the fabric-making process. A trip to the Amana woolen mills was planned for the group of students, four of which were equipped with movie cameras and cameras for making slides. The group met twice before the trip to acquire background information in the field of textiles and general fabric production and to investigate Amana colonies traditions.

When the film was processed and returned, the group viewed the film and decided what should be included in the movie. The film was spliced and put together in the order of process. A dialogue was created and synchronized with the completed film. The movie was shown as an introduction to the home economics style show which was based on the textiles.

In addition to the film, a double slide series was shown while the girls in the home economics class modeled their projects. The purpose of the slides were to show the process of making fabric in one series and the process of making a garment in the other series. They were synchronized with the different fiber contents of the modeled garments.

These and other less time-consuming activities were incorporated into the enrichment program during the first year.

When school opened in September, 1974, the students selected to participate in the program received instruction concerning the variety of activities they would be involved with and were encouraged to begin work in an interest area as soon as possible. Each student was assigned to a staff member and the staff member monitored their respective student's progress periodically throughout the school year. Daily contact was strived for by each staff member. Activities were scheduled before and after school as well as Saturdays. The students selected for the control group received no enrichment or special instruction during this time period.

At the end of one year, fall 1975, all students again received the

Pennsylvania Assessment of Creative Tendency, the Coopersmith Self-Esteem Inventory and Torrance's Test of Creative Thinking. These results were to serve as the posttest data. The S.T.E.P.-S.C.A.T., due to the testing schedule of the school district, was given in the spring of 1976.

The program, as planned, was expanded to include Anson Junior High School in the fall of 1975. Six members of the original control group were selected to participate in the gifted/talented program at Anson Junior High School, consequently, they were administered the S.T.E.P.-S.C.A.T. in the fall of 1975 in order to avoid contamination of the results. From this pretest, posttest data, gain scores were obtained for all members of the experimental and control groups.

#### Hypotheses

The hypotheses to be tested were:

1. There will be no significant change in standardized achievement gains between the experimental and control groups as measured by the S.T.E.P.-S.C.A.T.
2. There will be no significant change in creativity gains between the experimental and control groups as measured by the Pennsylvania Assessment of Creative Tendency.
3. There will be no significant change in productive thinking gains between the experimental and control groups as measured by Torrance's Test of Creative Thinking.
4. There will be no significant change in self-concept between the



experimental and control groups over the period of one year as measured by the Coopersmith Self-Esteem Inventory.

Differences in gain scores by sex were examined.

#### Treatment of the Data

Since there may have been some initial differences between groups on pretests, an analysis of covariance was utilized. This was thought to be the most appropriate statistical tool since members of the experimental and control groups were selected as opposed to being drawn via random sampling.

A t test was utilized to compare differences in mean gains of the experimental and control groups.

Statistical comparisons utilizing analysis of covariance and t tests was secured as the result of classifying gain scores by subtests and by sex. Interaction of factors was also examined. A .05 significance level was used.

## FINDINGS

The purpose of this study was to develop a group of creative and enriching experiences built into a program for the gifted/talented. Second, the study was to determine what effect an enrichment program had on a group of selected gifted/talented students.

Effectiveness of this program was determined by gain scores in three areas, namely, academic achievement as measured by the S.T.E.P.-S.C.A.T. test, creativity as measured by the Pennsylvania Assessment of Creative Tendency and the Torrance Test of Creative Thinking, and self-concept as measured by the Coopersmith Self-Esteem Inventory. The subtests of these standardized tests, excluding the Pennsylvania, were statistically treated utilizing a t test and an analysis of covariance to determine the significance of gain scores. Gain scores were obtained from a pretest, posttest experimental design.

## Hypotheses Tested

The capabilities of four standardized tests were used in the formulation of the hypotheses stated to test empirical evidence gathered.

Stated in the null form, they are as follows:

1. There will be no significant change in standardized achievement gains between the experimental and control groups as measured by the S.T.E.P.-S.C.A.T.

Subtests were used in the actual statistical analysis. They include the following:

## S.C.A.T.

Verbal  
Quantitative  
Total

## S.T.E.P.

Math-Basic Concepts  
Reading  
Science  
Spelling  
Punctuation and Capitalization  
Total Mechanics of Writing  
Social Studies  
English Expression  
Math-Computation.

2. There will be no significant change in creativity gains between the experimental and control groups as measured by the Pennsylvania Assessment of Creative Tendency. No subtests exist for the Pennsylvania and the results were reported with total score.
3. There will be no significant change in productive thinking gains between the experimental and control groups as measured by Torrance's Test of Creative Thinking. Subtests were also used in the statistical analysis of the Torrance Test. They include the following:
  - Fluency
  - Flexibility
  - Originality.
4. There will be no significant change in self-concept between the experimental and control groups as measured by the Coopersmith Self-Esteem Inventory. Subtests were also used in the statistical analysis of the Coopersmith and they include the following:

General Self  
Social Self-Peers  
Home-Parents  
Lie Scale  
School-Academic  
Total Score.

Additional analysis of subgroups, determined by sex, was also conducted.

### Achievement

Achievement gain scores of the experimental group were compared to those scored by the control group using the 12 subtests of the S.T.E.P.-S.C.A.T.

Pooled variance t tests were computed to test for mean gain score differences for students selected to participate in the gifted/talented, enrichment program and those students who represented the control group. Additional computation of t-values were conducted by a subgroup of boys and a subgroup of girls.

Examination of the results revealed no significant difference for the majority of the S.T.E.P.-S.C.A.T. subtests. Students who participated in the enrichment program did not score significantly higher gains on the S.T.E.P.-S.C.A.T. subtests, English Expression being the exception, when compared to the control group. When a more powerful statistical strategy was used, an analysis of covariance, significant differences favoring the treatment group resulted on two additional subtests, namely, Punctuation and Capitalization and Total Mechanics of Writing.

Examination of the subtest scores show the treatment group achieving higher mean scores in nine of twelve tests. When percentile rank,

Iowa norms, was considered, the treatment group had a range of 74-93 percentile on the subtests of the S.T.E.P.-S.C.A.T. whereas the control group had a range of 57-90 percentile. Mean scores are represented in Table 1.

Table 1. Mean scores for the treatment and control groups on the S.T.E.P.-S.C.A.T. test

Factor	Experimental group		Control group	
	Pretest (N=20)	Posttest	Pretest (N=22)	Posttest
<b>SCAT</b>				
Verbal	463.00	473.00	459.10	468.22
Quantitative	466.30	482.95	467.63	481.68
Total	463.50	476.10	462.40	473.22
<b>STEP</b>				
Math-Basic Concepts	441.25	452.05	440.90	453.10
Reading	461.50	471.50	457.18	465.81
Science	446.80	451.25	441.22	451.31
Spelling	442.95	450.55	442.31	448.40
Punctuation	444.00	452.60	441.63	442.63
Total Mechanics of				
Writing	455.80	466.55	454.22	458.77
Social Studies	446.75	456.10	446.40	453.86
English Expression	444.10	455.70	441.09	446.18
Computation	443.35	466.90	447.77	468.40

The significant mean gain, standard deviation and t-value for the subtest English Expression, is presented in Table 2. (Note: All non-significant results in this study have been tabled in the Appendix.)

Close examination of the mean gain differences show that the students who participated in the gifted/talented, enrichment program averaged four additional correct answers as opposed to students not

Table 2. Mean gain score, standard deviation and t-value for all students on the subtest English Expression of the S.T.E.P. test

Factor	Participating Students (N=20)		Nonparticipating Students (N=22)		t-value
	Mean gain	S.D.	Mean gain	S.D.	
English Expression	11.60	9.17	5.09	10.43	2.14*

\* ( $p < .05$ ).

participating in the program.

Achievement gains were also tested using analysis of covariance techniques to control for initial differences, if any. Examination of all mean gain scores on subtests revealed a higher mean gain on ten of twelve subtests by the students participating in the enrichment program. They scored an average of 3.3 additional correct answers when compared to nonparticipants. The students who did not participate in the program produced higher mean gains on the Math-Basic Concepts and Science subtests.

Significant mean gains for all students and subgroups by sex are represented in Tables 3 through 5.

The total group of students were separated into subgroups by sex and four comparisons were made. They include the following: treatment boys versus control boys, treatment girls versus control girls, treatment boys versus treatment girls and control boys versus control girls.

Significant differences were found in favor of the treatment group

Table 3. Analysis of covariance for all students on the Punctuation and Capitalization subtest of the S.T.E.P. test

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	992.97	1	992.97	7.23*
Residual	5353.91	39	137.27	
Total	6346.48	40		

\* (p < .05).

Table 4. Analysis of covariance for all students on the Total Mechanics of Writing subtest of the S.T.E.P. test

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	494.76	1	494.76	4.64*
Residual	4153.97	39	106.51	
Total	4648.73	40		

\* (p < .05).

Table 5. Analysis of covariance for all students on the English Expression subtests of the S.T.E.P. test

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	696.09	1	696.09	9.97**
Residual	2723.53	39	69.83	
Total	3419.62	40		

\*\* (p < .01).

of boys on the English Expression subtest. The treatment girls scored significant gains on the Punctuation, Total Mechanics of Writing and English Expression subtests. Girls in the treatment group scored significantly higher gains on the Spelling, Punctuation, Total Mechanics of Writing and Math Computation subtests when compared to the boys in the treatment group. Significant differences are represented in Tables 6 through 13.

Table 6. Analysis of covariance for boys on the English Expression subtest of the S.T.E.P. test

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	464.72	1	464.72	5.28*
Residual	1494.81	17	87.93	
Total	1959.53	18		

\* (p < .05).

Table 7. Analysis of covariance for girls on the Punctuation and Capitalization subtest of the S.T.E.P. test

Sources of Variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	1224.24	1	1224.24	11.39**
Residual	2041.58	19	107.45	
Total	3265.82	20		

\*\* (p < .01).



Table 8. Analysis of covariance for girls on the Total Mechanics of Writing subtest of the S.T.E.P. test

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	519.50	1	519.50	5.64*
Residual	1748.86	19	92.04	
Total	2268.36	20		

\*(p < .05).

Table 9. Analysis of covariance for girls on the English Expression subtest of the S.T.E.P. test

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	264.52	1	264.52	4.43*
Residual	1134.34	19	59.70	
Total	1398.86			

\*(p < .05).

Table 10. Analysis of covariance for treatment boys versus treatment girls on the subtest Spelling of the S.T.E.P. test

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	230.52	1	230.52	4.92*
Residual	795.68	17	46.80	
Total	1026.20			

\*(p < .05).

Table 11. Analysis of covariance for treatment boys versus treatment girls on the subtest Punctuation of the S.T.E.P. test

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	219.31	1	219.31	8.37 <sup>**</sup>
Residual	445.25	17	26.91	
Total	664.56			

<sup>\*\*</sup>(p < .01).

Table 12. Analysis of covariance for treatment boys versus treatment girls on the subtest Total Mechanics of Writing of the S.T.E.P. test

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	242.76	1	242.76	5.11 <sup>*</sup>
Residual	806.38	17	47.43	
Total	1049.14			

<sup>\*</sup>(p < .05).

Table 13. Analysis of covariance for boys versus girls on the subtest Math Computation of the S.T.E.P. test

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	368.22	1	368.22	8.10 <sup>*</sup>
Residual	772.28	17	45.42	
Total	1140.50			

<sup>\*</sup>(p < .05).

Mean scores of boys, girls, and boys versus girls are represented in Tables 14 through 17.

Table 14. Mean scores for boys on the S.T.E.P.-S.C.A.T. test

Factors	Experimental group		Control group	
	Pretest (N=20)	Posttest	Pretest (N=22)	Posttest
<b>SCAT</b>				
Verbal	458.75	470.87	457.08	465.66
Quantitative	468.62	480.37	466.41	481.41
Total	462.37	473.75	460.91	471.66
<b>STEP</b>				
Math-Basic Concepts	440.25	450.12	442.50	453.33
Reading	457.87	468.00	454.75	462.91
Science	446.12	453.12	441.75	453.08
Spelling	442.50	446.12	440.83	445.33
Punctuation	437.12	444.87	437.25	441.66
Total Mechanics of				
Writing	450.62	458.62	450.41	456.08
Social Studies	443.12	453.25	446.16	452.58
English Expression	439.87	454.50	436.83	448.50
Computation	442.75	461.37	443.91	466.16

Table 15. Mean scores for girls on the S.T.E.P.-S.C.A.T. test

Factors	Experimental group		Control group	
	Pretest (N=20)	Posttest	Pretest (N=22)	Posttest
SCAT				
Verbal	465.83	474.41	461.50	471.30
Quantitative	464.75	484.66	469.10	482.01
Total	464.25	477.66	464.20	475.10
STEP				
Math-Basic Concepts	441.91	453.33	439.00	452.80
Reading	463.91	473.83	460.10	469.30
Science	447.25	450.00	440.60	449.20
Spelling	443.25	453.50	444.10	452.10
Punctuation	448.58	458.75	446.90	443.80
Total Mechanics of Writing	459.25	471.83	458.80	462.00
Social Studies	449.16	458.00	446.70	455.40
English Expression	446.91	456.50	446.20	453.80
Computation	443.75	470.58	452.40	469.70

Table 16. Mean scores for treatment boys versus treatment girls on the S.T.E.P.-S.C.A.T. test

Factors	Experimental boys		Experimental girls	
	Pretest	Posttest	Pretest	Posttest
SCAT				
Verbal	458.75	470.87	465.83	474.41
Quantitative	468.62	480.37	464.75	484.66
Total	462.37	473.75	464.25	477.66
STEP				
Math-Basic Concepts	440.25	450.23	441.91	453.33
Reading	457.87	468.00	463.91	473.83
Science	446.12	453.12	447.25	450.00
Spelling	442.50	446.23	443.25	453.50
Punctuation	437.12	444.87	448.58	457.75
Total Mechanics of Writing	450.62	458.62	459.25	471.83
Social Studies	443.12	453.25	449.16	458.00
English Expression	439.87	454.50	446.91	456.50
Computation	442.75	461.37	443.75	470.58

Table 17. Mean scores for control boys versus control girls on the S.T.E.P.-S.C.A.T. test

Factors	Control boys		Control girls	
	Pretest	Posttest	Pretest	Posttest
<b>SCAT</b>				
Verbal	457.08	465.66	461.50	471.30
Quantitative	466.41	481.51	469.10	482.00
Total	460.91	471.66	464.20	475.10
<b>STEP</b>				
Math-Basic Concepts	442.50	453.33	439.00	452.80
Reading	454.75	462.91	460.10	469.30
Science	441.75	453.08	440.60	449.20
Spelling	440.83	445.33	441.10	452.10
Punctuation	437.25	441.66	446.90	443.80
Total Mechanics of Writing	450.41	456.08	458.80	462.00
Social Studies	446.16	452.58	446.70	455.40
English Expression	436.83	448.50	446.20	453.80
Computation	443.91	466.16	452.40	469.70

### Creative tendency

Creative tendency gain scores of participants in the enrichment program, measured by the Pennsylvania test, were compared to the gain scores of nonparticipants. Pooled variance t-tests and analysis of covariance were computed from mean gain score differences. Examination of the results revealed no significant differences. Consequently, the null hypothesis could not be rejected using the t-test and analysis of covariance results.

When mean scores were compared, the treatment group had a reduction in their mean score whereas the control group produced a gain in their mean score. Mean scores are reported in Tables 18 through 22.

Table 18. Mean scores for the treatment and control groups on the Pennsylvania Assessment of Creative Tendency

Factor	Experimental group		Control group	
	Pretest	Posttest	Pretest	Posttest
Total score	158.3	146.85	150.66	151.14

The mean scores of boys, girls and boys versus girls are represented in Tables 19 through 22.

Table 19. Mean scores for boys on the Pennsylvania Assessment of Creative Tendency

Factor	Experimental boys		Control boys	
	Pretest	Posttest	Pretest	Posttest
Total score	152.87	139.62	146.72	149.18

Table 20. Mean scores for girls on the Pennsylvania Assessment of Creative Tendency

Factor	Experimental girls		Control girls	
	Pretest	Posttest	Pretest	Posttest
Total score	161.91	151.66	155.00	153.30

Table 21. Mean scores for treatment boys versus treatment girls on the Pennsylvania Assessment of Creative Tendency

Factor	Treatment boys		Treatment girls	
	Pretest	Posttest	Pretest	Posttest
Total score	152.87	139.62	161.91	151.66

Table 22. Mean scores for control boys versus control girls on the Pennsylvania Assessment of Creative Tendency

Factor	Control boys		Control girls	
	Pretest	Posttest	Pretest	Posttest
Total score	146.72	149.18	155.00	153.30

### Creative thinking

Examination of the mean scores on the Torrance test revealed that the treatment group produced higher post mean scores than the control group. Mean scores for the Torrance Test are represented in Table 23.

Table 23. Mean scores for the treatment and control groups on the Torrance Test of Creative Thinking

Factors	Experimental group		Control group	
	Pretest	Posttest	Pretest	Posttest
Fluency	44.75	58.65	51.42	55.04
Flexibility	52.10	58.95	59.52	56.76
Originality	55.95	74.65	61.33	59.19

Creative thinking gain scores of students participating in the gifted/talented program were also compared. Three subtests of the Torrance Test, Fluency, Flexibility and Originality, were utilized in the analysis.

The pooled variance t-test was used to test the significance of mean gain differences and are reported in Table 24. Values for t of 2.124 and 2.713 were needed for five and one percent significance levels respectively for all students. Significant mean gains, standard deviations and t-values are represented in Table 24.

Table 24. Mean gains, standard deviations and t-values for all students on the Torrance Test of Creative Thinking

Factors	Participating students		Nonparticipating students		t-values
	Mean gain	S.D.	Mean gain	S.D.	
Fluency	13.90	6.53	3.62	9.42	4.04**
Flexibility	6.85	8.69	2.76	9.78	3.32**
Originality	18.70	8.66	7.86	13.37	3.07**

\*\* (p < .01).

All results were reported in standard scores. Analysis of mean gain scores showed that students participating in the enrichment program averaged 8.4 standard scores over and above that of students not participating. The students who participated in the enrichment program were found to have significantly higher mean gain scores on the Torrance Test.



Consequently, the null hypothesis was rejected in this study.

Further analysis of the gain scores of all students using an analysis of covariance techniques also produced significant results. Significant differences of gain scores for the Fluency and Originality subtests are represented in Tables 25 and 26.

Table 25. Analysis of covariance for all students on the Fluency subtest of the Torrance Test of Creative Thinking

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	341.87	1	341.87	7.17*
Residual	1810.99	38	47.66	
Total	2152.86	39		

\*( $p < .05$ ).

Table 26. Analysis of covariance for all students on the Originality subtest of the Torrance Test of Creative Thinking

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	534.47	1	534.47	5.30*
Residual	3832.42	38	100.85	
Total	4366.89	39		

\*( $p < .05$ ).

When mean gain scores of the subgroups determined by sex were studied it was found that boys who participated in the enrichment program attained significantly higher gains on the Fluency and Flexibility subtests in comparison to the control group of boys. Girls scored significantly higher gains on the Fluency and Originality subtests. Significant results are represented in Tables 27 through 29.

Table 27. Mean gain scores, standard deviations and t-values for boys on the Torrance Test of Creative Thinking

Factors	Participating students		Nonparticipating students		t-values
	Mean gain	S.D.	Mean gain	S.D.	
Fluency	13.75	4.59	2.45	10.13	2.92 <sup>**</sup>
Flexibility	8.50	5.58	-5.00	11.47	3.06 <sup>**</sup>
Originality	18.50	7.17	6.36	16.48	1.94

<sup>\*\*</sup>(p < .01).

Table 28. Mean gain scores, standard deviations and t-values for girls on the Torrance Test of Creative Thinking

Factors	Participating students		Nonparticipating students		t-values
	Mean gain	S.D.	Mean gain	S.D.	
Fluency	14.00	7.76	4.90	8.93	2.56 <sup>*</sup>
Flexibility	5.75	10.36	-.30	7.32	1.55
Originality	18.83	9.83	9.50	9.40	2.26 <sup>*</sup>

<sup>\*</sup>(p < .05).

Table 29. Analysis of covariance for girls on the Originality subtest of the Torrance Test of Creative Thinking

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	339.95	1	339.95	4.36*
Residual	1480.58	19	77.93	
Total	1820.53	20		

\* (p > .05)

Examination of mean gains of standard scores revealed boys participating in the program averaged 12.3 standard scores above that of the boys in the control group. Girl participants averaged 8.2 standard scores above their counterparts.

The mean scores for boys, girls and boys versus girls are reported in Tables 30 through 33.

Table 30. Mean scores for boys on the Torrance Test of Creative Thinking

Factors	Experimental boys		Control boys	
	Pretest	Posttest	Pretest	Posttest
Fluency	41.12	54.87	50.09	52.54
Flexibility	46.87	55.37	58.54	53.54
Originality	50.37	68.87	60.45	66.81

Table 31. Mean scores for girls on the Torrance Test of Creative Thinking

Factors	Experimental girls		Control girls	
	Pretest	Posttest	Pretest	Posttest
Fluency	47.16	61.16	52.90	57.80
Flexibility	55.58	61.33	60.60	60.30
Originality	59.66	78.50	62.30	71.80

Table 32. Mean scores for treatment boys versus treatment girls on the Torrance Test of Creative Thinking

Factors	Treatment boys		Treatment girls	
	Pretest	Posttest	Pretest	Posttest
Fluency	41.12	54.87	47.16	61.16
Flexibility	46.87	55.37	55.58	61.33
Originality	50.37	68.86	59.66	78.50

Table 33. Mean scores for control boys versus control girls on the Torrance Test of Creative Thinking

Factors	Control boys		Control girls	
	Pretest	Posttest	Pretest	Posttest
Fluency	50.09	52.54	52.90	57.80
Flexibility	58.54	53.54	60.60	60.30
Originality	60.45	66.81	62.3	71.8

Self esteem

When mean scores for the treatment and control groups were compared using the Coopersmith Test, it was found that the treatment group had higher mean scores on five out of six posttest results. Mean scores are represented in Table 34.

Table 34. Mean scores for the treatment and control groups on the Coopersmith Self Esteem Inventory

Factors	Experimental group		Control group	
	Pretest	Posttest	Pretest	Posttest
General Self	21.80	20.50	19.57	20.47
Social Self	6.30	6.40	6.00	6.28
Home-Peer Self	6.60	6.65	5.76	6.19
Lie Scale	6.10	7.20	6.47	6.85
School-Academic Self	6.60	5.95	6.09	5.95
Total score	41.30	39.50	37.43	38.90

Self esteem gain scores of participants were also compared, using the subtests of the Coopersmith Self Esteem Inventory. Pooled variance t-tests and analysis of covariance were used to study mean gain differences. The results showed no significant gain scores, consequently, the null hypothesis failed to be rejected in this instance. Despite efforts to increase their self-concepts, students who participated in the enrichment program did not score significantly higher gains than students who were members of the control group.

When subgroup comparisons were made, girls in the treatment group scored significantly higher gains on the General Self, School and

Academic Self and Total Score subtests compared to boys in the treatment group. Significant results are shown in Tables 35 through 38.

Mean scores for boys, girls and boys versus girls are represented in Tables 39 through 42.

Table 35. Mean gain score, standard deviation and t-values for boys versus girls on the subtest General Self of the Coopersmith Self Esteem Inventory

Factors	Participating boys (N=8)		Participating girls		t-value
	Mean gain	S.D.	Mean gain	S.D.	
General Self	-3.50	3.33	.166	3.01	.02*
Total Score	-5.25	1.90	.50	5.68	.036*

\* (p < .05).

Table 36. Analysis of covariance for boys versus girls on the subtest General Self of the Coopersmith Self Esteem Inventory

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	32.60	1	32.60	4.52*
Residual	122.56	17	7.21	
Total	155.16			

\* (p < .05).

Table 37. Analysis of covariance for boys versus girls on the subtest School and Academic Self of the Coopersmith Self Esteem Inventory

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	18.68	1	18.68	12.09**
Residual	26.25	17	1.54	
Total	44.93			

\*\* (p < .01).

Table 38. Analysis of covariance for boys versus girls on the subtest Total Score of the Coopersmith Self Esteem Inventory

Sources of variance	Sum of squares	d.F.	Mean squares	F-ratio
Treatment	118.99	1	118.99	4.64*
Residual	435.35	17	25.60	
Total	554.34			

Table 39. Mean scores for boys on the Coopersmith Self Esteem Inventory

Factors	Experimental boys		Control boys	
	Pretest	Posttest	Pretest	Posttest
General Self	23.00	19.50	19.27	20.36
Social Self	6.25	6.00	6.00	6.18
Home-Peer Self	7.12	6.50	5.54	6.18
Lie Scale	5.75	7.12	6.45	6.63
School-Academic Scale	5.87	5.00	6.18	5.54
Total Score	42.25	37.00	37.00	38.27

Table 40. Mean scores for girls on the Coopersmith Self Esteem Inventory

Factors	Experimental girls		Control girls	
	Pretest	Posttest	Pretest	Posttest
General Self	21.00	21.16	19.90	20.60
Social Self	6.33	6.66	6.00	6.40
Home-Peer Self	6.25	6.75	6.00	6.20
Lie Scale	6.33	7.25	6.50	7.10
School-Academic Self	7.08	6.58	6.00	6.40
Total Score	40.66	41.16	37.90	39.60

Table 41. Mean scores for treatment boys versus treatment girls on the Coopersmith Self Esteem Inventory

Factors	Treatment boys		Treatment girls	
	Pretest	Posttest	Pretest	Posttest
General Self	23.00	19.50	21.00	21.16
Social Self	6.25	6.00	6.33	6.66
Home-Peer Self	7.12	6.50	6.25	6.75
Lie Scale	5.75	7.12	6.33	7.25
School-Academic Self	5.87	5.00	7.08	6.58
Total Score	42.25	37.00	40.66	41.16

Table 42. Mean scores for control boys versus control girls on the Coopersmith Self Esteem Inventory

Factors	Control boys		Control girls	
	Pretest	Posttest	Pretest	Posttest
General Self	19.27	20.36	19.90	20.60
Social Self	6.00	6.18	6.00	6.40
Home-Peer Self	5.54	6.18	6.00	6.20
Lie Scale	6.45	6.63	6.50	7.10
School-Academic Self	6.18	5.54	6.00	6.40
Total Score	37.00	38.27	37.90	39.60



### Cost of the Program

The gifted/talented program described in this study was organized and implemented through the use of Title III funds. The total amount of money provided was \$60,000 coming in sums of \$30,000, \$20,000 and \$10,000 for the first, second and third years respectively. This study includes the first year and one-half. Therefore, the cost of the program described in this study was approximately \$40,000.

The majority of this money covered additional salaries for the ten participating staff members, the director, consultant fees and the initial materials needed to start the program. Costs for field trips, evaluation for selection, and testing also were paid from this fund.

Several advantages were achieved through the implementation of the program. Although some of these advantages were intangible and not measured in this study, comments by staff members point to their existence.

Faculty members reported that students participating in the program provided leadership within the student body. Student successes in the program fostered an acceptance by teachers of the concept of giftedness. The program also provided a means of exposing students to activities they would not be able to experience in the normal school day. Therefore, their education was perhaps broadened by these activities. It was also reported by teachers that this program seemed to generate a good feeling around the school and consequently staff and student morale was high.

Teachers in the school also profited from the gifted program. It raised the awareness level of all staff members concerning such concepts as giftedness, creativity and individualization. It provided a means of

keeping current to trends in education concerning the teaching of the gifted and talented. The program also created some prestige for the students, staff members and the school district. Other schools, both in and out of state visited the school to observe the program in action. Program staff members were also requested to visit school districts and participate in workshops. They were also called upon to organize workshops at the state level.

If an analysis of cost of the gifted program included a comparison of dollars spent to gain scores achieved, it would reveal a high cost factor for each gain score. However, because this was a pilot program, high costs in relation to results were anticipated. Essentially, by the nature of a title III grant, the Marshalltown School District was providing this gifted-student enriching experiment for the entire state.

## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## Summary

This study sought to determine how effective a group of enrichment experiences was in meeting the needs of a selected group of gifted/ talented seventh grade students. Forty-two gifted, seventh grade students were selected from three junior high schools in Marshalltown, Iowa. This was accomplished with the aid of standardized tests, teacher's ratings and cumulative folder information. Twenty of the gifted students were selected from Miller Junior High School and were to represent the treatment group. The remaining twenty-two students became the control group.

Creativity, achievement and self-concept gains were measured by using four standardized tests, viz., the S.T.E.P.-S.C.A.T., the Pennsylvania Assessment of Creative Tendency, the Torrance Test of Creative Thinking and the Coopersmith Self Esteem Inventory. In the fall of 1974, all students in the experimental and control groups were pretested using the four tests.

The experimental group, under the direction of the Miller Junior High School staff members, participated in a selected group of enrichment activities. Included in this group of activities were topics such as Kirlian photography, solar energy, textiles and clothing, photography, radio broadcasting, art and sculpture. atomic energy and group counseling. Field trips were taken to provide additional information about specific enrichment activities.

At the end of one year, all students were given a posttest consisting of the same four standardized tests, excepting the S.T.E.P.-S.C.A.T. The S.T.E.P.-S.C.A.T. tests, due to the school district's testing schedule, were given to all students one and one-half years from the initiation of the program.

Pooled t-tests and analysis of covariance techniques were utilized to examine the mean gain scores for the experimental and control groups. A significant t-value was found in favor of the experimental group for the subtest English Expression of the S.T.E.P. achievement test. An analysis of covariance showed significant difference on the Punctuation and Capitalization, the Total Mechanics of Writing and English Expression subtests of the S.T.E.P. test. Pooled t-tests and analysis of covariance also produced significant results on the Torrance Test of Creative Thinking.

Subgroups, determined by sex, were established and compared. The results showed significant differences in favor of boys participating in the program on the English Expression subtest of the S.T.E.P. test and the Fluency and Flexibility subtests of the Torrance test. The subgroup of girls who participated in the program scored significant gain differences on the Punctuation and Capitalization, Total Mechanics of Writing and English Expression subtests of the S.T.E.P. test and the Fluency and Originality subtests of the Torrance test.

Girls in the treatment group scored significantly higher gains than boys in the treatment group on the Spelling, Punctuation and Total Mechanics of Writing subtests of the S.T.E.P. test. The same was true for

the General Self, School and Academic Self and Total Score subtests of the Coopersmith Self Esteem Inventory.

Nonsignificant differences in gains were found on the Pennsylvania and the Coopersmith tests.

### Conclusions

Within the limitations presented and based upon the findings of this study, the following conclusions seem justified:

- 1) The enrichment activities group made significantly better gains in English Expression. Further analysis indicated that the treatment group also excelled on the Punctuation and Capitalization and the Total Mechanics of Writing subtests.
- 2) The treatments students scored significantly higher in gains in Creative Thinking.
- 3) Subgroups of boys and girls who experienced enrichment activities produced similar significant gains as in achievement and creativity.
- 4) Girls participating in the enrichment program made significantly higher gains on the Math, Punctuation, Spelling and Writing subtests of the S.T.E.P. test when compared with boys in the program. Girls in the treatment group also attained higher gains on the General Self, School and Academic Self and Total Score subtests of the Coopersmith test (i.e., self-concept was higher).
- 5) The enrichment program did not produce significant differences

favoring the experimental group for self-concept and creative tendencies.

- 6) Considering all facets of the study, the enrichment program, under the present organizational structure, requires further study before continuation can be recommended.

### Discussion

#### Significant subtests results of the S.T.E.P. test

The subtests in which experimental subjects excelled dealt with written expression and basic mechanics of English. Perhaps such gains can be attributed to the method of reporting to staff members by the gifted students (literally a teacher-advisor system). When a student works closely with a staff member on a one-to-one basis, there is a greater chance of clarity of expression through explanation of ideas. Second, students participating in activities were required to research the topic, develop a project from their research and write what they experienced. In each phase, language arts skills were learned through necessity to do research and report findings. Consequently, those enhanced skills may have been reflected in the related subtests of the S.T.E.P. test.

#### Significant results on the Creativity Test

A close examination of the activities included in the enrichment program reveal them to be self-directed, stimulating uniqueness and originality of thought and of the open-ended nature. It is important to note that greater successes were reached when the student initiated

the idea for the research project and carried it to completion as opposed to those activities designed by staff members. Creativity is, by definition, divergent thinking; a part of behavior that is imaginative and inventive.

#### Subgroup results

The subgroups of boys and girls reflect the same results obtained from the analysis of the total group. The major drawback to the subgroup analysis was the small sampling. A larger sample would possibly yield more dependable results.

When the boys and girls in the treatment group were compared, it was found that girls had a tendency to do better in language arts skills. This seems to reflect the common stereotyping of the role of the girl in school. However, the girls also significantly out-performed the boys on the Math Computation test which is out of stereotypic character. Boys did uphold their sex role reputation in science by outscoring the girls.

The girls also seemed to show evidence of having a higher level of maturity as reflected by the Coopersmith test results. These results tend to support the theory that girls mature faster than boys.

#### Contaminating factors

Being singled out for the enrichment program, speculatively speaking, no doubt had an ego inflating effect for a certain period of time. Teachers reported that the participating students had difficulty in accepting this responsibility. The students behavior gave the impression

that they felt slightly better than students not on the program and did not have to put forth their total effort in order to succeed. As a consequence, this lack of effort may have exacted a toll on posttest performance and therefore gain scores on the Coopersmith and the Pennsylvania did not exceed those scores of the control group.

When enrichment activities were conducted, they had a natural attraction and, as a result, students not involved in the study also wanted to participate in the activity. Friendships also had a tendency to draw nonparticipating students into the activities. This created a certain restriction upon the gifted students in terms of realizing total potential growth.

Finally, students who were selected for the program went through numerous evaluations. Consequently, some negative attitudes developed towards testing because of the time taken from the school day. The enrichment program had a tendency to tax each individual's school time and therefore made school time seem much more valuable to both teachers and students.

#### Cost of the program

The cost of the program, \$40,000, seems high considering the results produced. It cost approximately \$2500 per month to operate the program (sixteen months or one and one-half years). Consideration must also be given to the intangible results such as school prestige, good student and teacher morale, high parent satisfaction, and improving teachers' attitudes towards the gifted. These factors are extremely important when considering the smooth operation of the school and helping the gifted.



The effect of the program on all students of the school was not evaluated in the study. It is very difficult to put a price tag on such a factor and yet it must be given consideration in the total cost analysis.

#### Limitations

The following limitations must be recognized when considering the results of this experiment.

1. The students used in this study were not randomly selected but were selected from teacher's ratings, standardized tests and cumulative folder information.
2. Student selection was limited to the seventh graders of the Marshalltown (Iowa) school district. Consequently, the conclusions reached are applicable to this school district and to this grade level.
3. This investigation was a pilot project that used a small sample. A larger sample would have a greater chance of producing more dependable results.
4. The quality of the activities was not maintained for all students. The enrichment activities were not required for each student but were selected from a group of enrichment experiences. Consequently, all students did not receive the same degree of enrichment.
5. The effectiveness of the enrichment program was measured by mean gain differences obtained from the experimental and control groups using four standardized tests. Other measures might have produced different results.
6. Each standardized test used in the study had a ceiling factor

(i.e., were both speed and power tests) in terms of a total possible score or total time that could be spent taking the test. The ceiling factor restricted possible gain scores of some individuals.

## Recommendations

### Recommendations for practice

The director and staff members of this enrichment program need to revise their methods of selection of students. A review of the literature supports a multifaceted approach as opposed to the restrictive method used in the study. Parent and peer groups need to be involved in this identification process.

Raising the awareness level of all teachers to the uniqueness of gifted students needs to be explored. Giftedness is often suppressed by students due to peer group pressure. Therefore, presence of a gifted student goes unrecognized in the classroom. Teaching to the average student is also a deterrent to the development of the gifted student. Individualization helps bring about this awareness thereby insuring a greater chance of discovery of this gifted student.

There is a need to restrict the program to those identified as gifted. Participation of nongifted students in the program only lowers the learning level thereby placing limitations on total educational growth of the gifted.

Exploration of different measures other than the four standardized tests used in this study should be conducted. Currently, measures within the effective domain and creativity are being developed and should be

researched to determine their value for use in evaluating similar enrichment programs.

The quality of the enrichment activities should be improved upon. Development of activities that would be more thought provoking and would give emphasis to productive thinking are needed. Greater utilization of school time and outside resource persons would also improve the program.

Finally, an evaluation of each activity after it is completed seems in order. If this were accomplished, a sorting process would result and poor activities would be deleted from the program.

#### Recommendations for research

A similar study should be replicated following the refinement of identification procedures, the development of more thought provoking activities and the maintenance of the selected, gifted students as a group.

Presently, special resource teachers and special resource rooms are being utilized to meet the needs of the slow learner. This same model could be used to meet the needs of the gifted students. Just as the slow learner is allowed to progress at a slower rate than his average friends, the gifted should be allowed to accelerate his educational development. Research reviewed indicated that the only objection to acceleration were parent and teacher attitudes. If allowed to use this accelerated approach within the same school setting as his average and slow learning friends, the sociological problems that exist only in the minds of parents and teachers could be alleviated. A pilot project utilizing this model needs to be studied.

Emphasis on programs that challenge the elementary, gifted student is in need of development. This would help prevent the masking of giftedness brought on by peer pressure. Research shows that suppression of this talent occurs as the student approaches junior high school level.

In light of the current emphasis being placed upon the education of the gifted student by federal and state governments, studies should be conducted that would involve larger numbers of gifted students and more school districts. State departments of public instruction should provide the leadership and encourage school districts to develop gifted programs. Where numbers within a school district inhibit a full-scale gifted program, perhaps several school districts could share their gifted students and cooperatively develop one program.

In conclusion, additional research is needed to identify and improve public attitudes towards the gifted. Perhaps this will result in the development of a more realistic opinion and assessment of true talents. It should also create an awareness that Americans as a society cannot risk losing this talent. The gifted student needs the freedom to grow and develop intellectually rather than be ridiculed by peers for his great capacity to learn and his different ways.

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## ACKNOWLEDGMENTS

Praise the Lord for people who reach out to others and give of their time and friendship.

Many people have come into my life and helped me. For that, I am truly grateful. I especially extend my sincere thanks to Dr. Richard Manatt for the guidance he extended throughout my program.

I also appreciate the help and advice received from Dr. Marl Ramsey, Dr. Jerry Trullinger and Dr. Dick Doyle.

A special thanks to my wife, Rochelle and my daughters Jaci and Jan for their understanding and encouragement.

**APPENDIX**

Table A.1. Mean gain scores, standard deviations and t-values for all students on the S.T.E.P.-S.C.A.T. test

Factors	Participating Students (N=20)		Nonparticipating Students (N=22)		t-values
	Mean gain	S.D.	Mean gain	S.D.	
<b>S.C.A.T.</b>					
Verbal	10.00	9.37	9.14	7.31	.33
Quantitative	16.65	9.51	14.05	11.11	.81
Total	12.60	6.56	10.82	6.41	.89
<b>S.T.E.P.</b>					
Math-Basic					
Concepts	10.80	7.59	12.18	9.71	-.51
Reading	10.00	6.88	8.64	6.45	.66
Science	4.45	11.58	10.09	6.60	-1.96
Spelling	7.60	7.99	6.09	8.05	.61
Punctuation & Capitaliza- tion	8.60	6.67	1.00	19.12	1.69
Total Mechanics of Writing	10.75	7.67	4.55	13.65	1.79
Social Studies	9.35	6.58	7.45	6.15	.96
Math- Computation	23.55	10.08	20.64	10.65	.91

Table A.2. Mean gain scores, standard deviations and t-values of boys on the S.T.E.P.-S.C.A.T. test

Factors	Participating Students (N=8)		Nonparticipating Students (N=12)		t-values
	Mean gain	S.D.	Mean gain	S.D.	
<b>S.C.A.T.</b>					
Verbal	12.13	11.81	8.58	6.82	.85
Quantitative	11.75	8.73	15.00	10.59	-.72
Total	11.38	7.95	10.75	5.94	.20
<b>S.T.E.P.</b>					
Math-Basic					
Concepts	8.88	7.75	10.83	6.91	-.29
Reading	10.13	4.12	8.17	6.16	.79
Science	7.00	7.33	11.33	6.42	-1.40
Spelling	3.63	7.19	4.50	9.82	-.22
Punctuation & Capitalization	7.75	8.78	4.42	17.63	.49
Total Mechanics of Writing	8.00	8.28	5.67	12.38	.47
Social Studies	10.13	7.14	6.42	7.31	1.12
English					
Expression	14.63	11.67	6.92	11.26	1.48
Math- Computation	18.63	8.59	21.17	13.56	-.47



Table A.3. Mean gain scores, standard deviations and t-values for girls on the S.T.E.P.-S.C.A.T. test

Factors	Participating Girls (N=12)		Nonparticipating Girls (N=10)		t-values
	Mean gain	S.D.	Mean gain	S.D.	
<b>S.C.A.T.</b>					
Verbal	8.58	7.57	9.80	8.19	-.36
Quantitative	19.92	8.87	12.90	12.17	1.56
Total	13.42	5.68	10.90	7.26	.91
<b>S.T.E.P.</b>					
Math-Basic					
Concepts	11.42	7.76	13.80	12.50	-.55
Reading	9.92	8.42	9.20	7.07	.21
Science	2.75	13.77	8.60	6.84	-1.22
Spelling	10.25	7.63	8.00	5.10	.79
Punctuation and Capital- ization	9.17	5.18	-3.10	20.96	1.97
Total Mechan- ics of Writ- ing	12.58	6.97	3.20	15.61	1.88
Social Studies	8.83	6.45	8.70	4.47	.06
English Expression	9.58	6.88	2.90	9.43	1.92
Math- Computation	26.83	9.95	20.00	6.25	1.88

Table A.4. Mean gains, standard deviations and t-values for treatment boys versus treatment girls on the S.T.E.P.-S.C.A.T. test

Factors	Treatment boys		Treatment girls		t-values
	Mean gain	S.D.	Mean gain	S.D.	
<b>S.C.A.T.</b>					
Verbal	12.12	11.81	8.58	7.57	.82
Quantitative	11.75	8.73	19.91	8.86	-2.03
Total	11.37	7.94	13.41	5.68	-.67
<b>S.T.E.P.</b>					
<b>Math-Basic</b>					
Concepts	9.87	7.75	11.41	7.76	-.44
Reading	10.12	4.12	9.91	8.41	.06
Science	7.00	7.32	2.75	13.76	.80
Spelling	3.62	7.19	10.25	7.62	-1.95
Punctuation	7.75	8.77	9.16	5.18	-.46
<b>Total</b>					
<b>Mechanics of</b>					
Writing	8.00	8.28	12.58	6.98	-1.34
<b>Social</b>					
Studies	10.12	7.14	8.83	6.45	.42
<b>English</b>					
Expression	14.62	11.67	9.58	6.88	1.22
<b>Math-</b>					
Computation	18.62	8.58	26.83	9.95	-1.90

Table A.5. Mean gains, standard deviations and t-values for control boys versus control girls on the S.T.E.P.-S.C.A.T. test

Factors	Control boys		Control girls		t-values
	Mean gain	S.D.	Mean gain	S.D.	
<b>S.C.A.T.</b>					
Verbal	8.58	6.81	9.80	8.18	-.38
Quantitative	15.00	10.59	12.90	12.17	.43
Total	10.75	5.94	10.90	7.26	-.05
<b>S.T.E.P.</b>					
Math-Basic					
Concepts	10.83	6.91	13.80	12.49	-.71
Reading	8.16	6.16	9.20	7.06	-.37
Science	11.33	6.41	8.60	6.83	.97
Spelling	4.50	9.82	8.00	5.09	-1.02
Punctuation	4.41	17.62	-3.10	20.96	.91
Total					
Mechanics of					
Writing	5.66	12.38	3.20	15.61	.41
Social					
Studies	6.41	7.30	8.70	4.47	-.86
English					
Expression	6.91	11.26	2.90	9.43	.90
Math-					
Computation	21.16	13.55	20.00	6.25	.25

Table A.6. Analysis of covariance for all students on the S.T.E.P.-  
S.C.A.T. test

Subtests	Sources of variance	d.F.	Mean squares	F-ratio
<b>S.C.A.T.</b>				
Verbal	Treatment	1	76.07	1.49
	Residual	39	50.97	
Quantitative	Treatment	1	31.07	.52
	Residual	39	59.31	
Total	Treatment	1	48.40	1.29
	Residual	39	37.46	
<b>S.T.E.P.</b>				
Math-Basic Concepts	Treatment	1	13.07	.46
	Residual	39	28.22	
Reading	Treatment	1	73.56	2.15
	Residual	39	34.13	
Science	Treatment	1	23.06	.79
	Residual	39	29.23	
Spelling	Treatment	1	28.80	.47
	Residual	39	60.62	
Social Studies	Treatment	1	43.41	1.60
	Residual	39	27.09	
Math- Computation	Treatment	1	8.62	.106
	Residual	39	81.03	

Table A.7. Analysis of covariance for boys on the S.T.E.P.-S.C.A.T. test

Subtests	Sources of variance	d.F.	Mean squares	F-ratio
<b>S.C.A.T.</b>				
Verbal	Treatment	1	93.65	1.53
	Residual	17	61.03	
Quantitative	Treatment	1	21.71	.296
	Residual	17	73.38	
Total	Treatment	1	6.21	.145
	Residual	17	42.92	
<b>S.T.E.P.</b>				
Math-Basic Concepts	Treatment	1	27.57	1.39
	Residual	17	19.71	
Reading	Treatment	1	25.57	.864
	Residual	17	29.61	
Science	Treatment	1	15.74	.652
	Residual	17	24.17	
Spelling	Treatment	1	2.03	.025
	Residual	17	81.29	
Punctuation and Capitalization	Treatment	1	49.27	.394
	Residual	17	125.16	
Total Mechanics of Writing	Treatment	1	27.89	.26
	Residual	17	107.24	
Social Studies	Treatment	1	31.78	.76
	Residual	17	41.80	
Math-Computation	Treatment	1	44.02	.392
	Residual	17	112.35	

Table A.8. Analysis of covariance for girls on the S.T.E.P.-S.C.A.T. test

Subtests	Sources of variance	d.F.	Mean squares	F-ratio
<b>S.C.A.T.</b>				
Verbal	Treatment	1	3.86	.083
	Residual	19	45.56	
Quantitative	Treatment	1	74.99	1.68
	Residual	19	44.55	
Total	Treatment	1	35.08	.97
	Residual	19	36.11	
<b>S.T.E.P.</b>				
Bath-Basic Concepts	Treatment	1	.28	.008
	Residual	19	35.67	
Reading	Treatment	1	48.68	1.78
	Residual	19	27.27	
Science	Treatment	1	.93	.032
	Residual	19	28.68	
Social Studies	Treatment	1	10.36	.68
	Residual	19	15.13	
Math- Computation	Treatment	1	10.67	.25
	Residual	19	42.37	

Table A.9. Analysis of covariance for treatment boys versus treatment girls on the S.T.E.P.-S.C.A.T. test

Factors	Sources of variance	d.F.	Mean squares	F-ratio
<b>S.C.A.T.</b>				
Verbal	Treatment	1	9.51	.22
	Residual	17	42.82	
Quantitative	Treatment	1	165.37	3.89
	Residual	17	42.50	
Total	Treatment	1	44.58	1.44
	Residual	17	30.85	
<b>S.T.E.P.</b>				
Math-Basic Concepts	Treatment	1	34.51	.92
	Residual	17	37.52	
Reading	Treatment	1	34.44	1.24
	Residual	17	27.66	
Science	Treatment	1	54.09	1.32
	Residual	17	40.87	
Social Studies	Treatment	1	24.96	1.38
	Residual	17	18.03	
English Expression	Treatment	1	1.74	.026
	Residual	17	66.93	

Table A.10. Analysis of covariance for control boys versus control girls on the S.T.E.P.-S.C.A.T. test

Factor	Sources of variance	d.F.	Mean squares	F-ratio
<b>S.C.A.T.</b>				
Verbal	Treatment	1	26.89	.49
	Residual	19	54.36	
Quantitative	Treatment	1	.32	.00
	Residual	19	74.65	
Total	Treatment	1	2.98	.06
	Residual	19	43.79	
<b>S.T.E.P.</b>				
Math-Basic Concepts	Treatment	1	.05	.00
	Residual	19	21.77	
Reading	Treatment	1	26.65	.69
	Residual	19	38.48	
Science	Treatment	1	64.99	4.18
	Residual	19	15.54	
Spelling	Treatment	1	90.82	1.43
	Residual	19	63.33	
Punctuation	Treatment	1	274.64	1.54
	Residual	19	177.69	
Total Mechanics of Writing	Treatment	1	34.76	.22
	Residual	19	153.72	
Social Studies	Treatment	1	32.31	.98
	Residual	19	32.87	
English Expression	Treatment	1	9.75	.11
	Residual	19	82.56	
Math-Computation	Treatment	1	23.92	.23
	Residual	19	102.78	



Table A.11. Mean gain scores, standard deviations and t-value for all students on the Pennsylvania Assessment of Creative Tendency

Factor	Participating students		Nonparticipating students		t-value
	Mean gain	S.D.	Mean gain	S.D.	
Total Score	-11.45	12.35	.48	16.44	-2.62

Table A.12. Mean gain scores, standard deviations and t-value of boys on the Pennsylvania Assessment of Creative Tendency

Factor	Participating boys		Nonparticipating boys		t-value
	Mean gain	S.D.	Mean gain	S.D.	
Total Score	-13.25	11.31	2.45	16.47	2.32

Table A.13. Mean gain scores, standard deviations and t-value of girls on the Pennsylvania Assessment of Creative Tendency

Factor	Participating girls		Nonparticipating girls		t-value
	Mean gain	S.D.	Mean gain	S.D.	
Total Score	-10.25	13.35	-1.70	17.00	-1.32

Table A.14. Mean gains, standard deviations, and t-value for treatment boys versus treatment girls on the Pennsylvania Assessment of Creative Tendency

Factor	Treatment boys		Treatment girls		t-value
	Mean gain	S.D.	Mean gain	S.D.	
Total Score	-13.25	11.31	-10.25	13.34	-.52

Table A.15. Mean gains, standard deviations and t-value for control boys versus control girls on the Pennsylvania Assessment of Creative Tendency

Factor	Control boys		Control girls		t-value
	Mean gain	S.D.	Mean gain	S.D.	
Total Score	24.54	16.47	-1.70	16.99	.57

Table A.16. Analysis of covariance for all students on the Pennsylvania Assessment of Creative Tendency

Source of variance	d.f.	Mean squares	F-ratio
Treatment	1	459.39	3.15
Residual	38	145.99	

Table A.17. Analysis of covariance for boys on the Pennsylvania Assessment of Creative Tendency

Source of variance	d.F.	Mean squares	F-ratio
Treatment	1	533.86	4.15
Residual	16	128.55	

Table A.18. Analysis of covariance for girls on the Pennsylvania Assessment of Creative Tendency

Source of variance	d.F.	Mean squares	F-ratio
Treatment	1	71.21	.44
Residual	16	161.60	

Table A.19. Analysis of covariance for treatment boys versus treatment girls on the Pennsylvania Assessment of Creative Tendency

Factor	Sources of variance	d.F.	Mean squares	F-ratio
Total Score	Treatment	1	372.27	3.80
	Residual	17	97.79	

Table A.20. Analysis of covariance for control boys versus control girls on the Pennsylvania Assessment of Creative Tendency

Factors	Sources of variance	d.F.	Mean squares	F-ratio
Total Score	Treatment	1	15.39	.08
	Residual	18	192.78	

Table A.21. Mean gains, standard deviations and t-values for treatment boys versus treatment girls on the Torrance Test of Creative Thinking

Factor	Treatment boys		Treatment girls		t-values
	Mean gain	S.D.	Mean gain	S.D.	
Fluency	13.75	4.59	14.00	7.75	-.08
Flexibility	8.50	5.58	5.75	10.358	.68
Originality	18.50	7.17	18.83	9.83	-.08

Table A.22. Mean gains, standard deviations and t-values for control boys versus control girls on the Torrance Test of Creative Thinking

Factor	Control boys		Control girls		t-values
	Mean gain	S.D.	Mean gain	S.D.	
Fluency	2.454	10.13	4.90	8.92	-.58
Flexibility	-5.00	11.47	-.300	7.31	-1.11
Originality	6.363	16.48	9.50	9.44	-.53

Table A.23. Analysis of covariance for treatment boys versus treatment girls on the Torrance Test of Creative Thinking

Factors	Sources of variance	d.F.	Mean squares	F-ratio
Fluency	Treatment	1	36.38	.99
	Residual	17	36.63	
Flexibility	Treatment	1	19.84	.37
	Residual	17	53.40	
Originality	Treatment	1	33.85	.44
	Residual	17	76.48	

Table A.24. Analysis of covariance for control boys versus control girls on the Torrance Test of Creative Thinking

Factors	Sources of variance	d.F.	Mean squares	F-ratio
Fluency	Treatment	1	117.96	2.26
	Residual	18	52.17	
Flexibility	Treatment	1	120.05	2.97
	Residual	18	48.39	
Originality	Treatment	1	155.29	1.76
	Residual	18	87.89	

Table A.25. Mean gain scores, standard deviations and t-values of all students on the Coopersmith Self Esteem Inventory

Factors	Selected students		Nonselected students		t-values
	Mean gains	S.D.	Mean gains	S.D.	
General Self	-1.30	3.57	.90	3.78	-1.92
Social Self- Peer	.10	1.07	.29	1.49	-.46
Home-Parent	.05	2.52	.43	2.36	-.50
Lie Scale	1.10	1.33	.38	1.43	1.66
School- Academic	-.65	1.87	-.14	1.87	-.87
Total Score	-1.80	6.14	1.47	6.40	-1.67

Table A.26. Mean gain scores, standard deviations and t-values for boys on the Coopersmith Self Esteem Inventory

Factors	Selected boys		Nonselected boys		t-values
	Mean gains	S.D.	Mean gains	S.D.	
General Self	-3.50	3.34	1.09	4.35	-2.49*
Social Self- Peer	-.25	.71	.18	1.72	-.67
Home-Parent	-.63	1.77	.64	1.91	-1.46
Lie Scale	1.38	1.60	.18	1.54	1.64
School- Academic	-.88	2.64	-.64	1.80	-.23
Total Score	-5.25	5.39	1.27	6.54	-2.30*

\* (p &lt; .05).

Table A.27. Mean gain scores, standard deviations and t-values of girls on the Coopersmith Self Esteem Inventory

Factors	Selected girls		Nonselected girls		t-value
	Mean gains	S.D.	Mean gains	S.D.	
General Self	.17	3.01	.70	3.27	-.40
Social Self- Peer	.33	1.23	.40	1.27	-.12
Home-Parent	.50	2.91	.20	2.86	.24
Lie Scale	.92	1.16	.60	1.35	.59
School- Academic	-.50	1.24	.40	1.90	-1.34
Total Score	.50	5.68	1.70	6.58	-.46

Table A.28. Analysis of covariance for all students on the Coopersmith Self Esteem Inventory

Subtests	Sources of variance	d.F.	Mean squares	F-ratio
General Self	Treatment	1	6.51	.87
	Residual	38	7.51	
Social Self- Peers	Treatment	1	.132	.086
	Residual	38	1.55	
Home-Parents	Treatment	1	.79	.282
	Residual	38	2.81	
Lie Scale	Treatment	1	2.20	2.02
	Residual	38	1.09	
School- Academic	Treatment	1	.016	.008
	Residual	38	1.88	
Total Score	Treatment	1	10.31	.405
	Residual	38	25.49	

Table A.29. Analysis of covariance for boys on the Coopersmith Self Esteem Inventory

Subtests	Sources of variance	d.F.	Mean squares	F-ratio
General Self	Treatment	1	10.06	1.05
	Residual	16	9.55	
Social Self-Peers	Treatment	1	.575	.353
	Residual	16	1.63	
Home-Parents	Treatment	1	.191	.08
	Residual	16	2.37	
Lie Scale	Treatment	1	2.95	1.53
	Residual	16	1.93	
School-Academic	Treatment	1	1.37	.512
	Residual	16	2.67	
Total Score	Treatment	1	55.56	1.82
	Residual	16	30.50	

Table A.30. Analysis of covariance for girls on the Coopersmith Self Esteem Inventory

Subtests	Sources of variance	d.F.	Mean squares	F-ratio
General Self	Treatment	1	.000	.000
	Residual	19	4.88	
Social Self-Peers	Treatment	1	.002	.001
	Residual	19	1.57	
Home-Parents	Treatment	1	1.39	.393
	Residual	19	3.53	
Lie Scale	Treatment	1	.178	.424
	Residual	19	.418	
School-Academic	Treatment	1	.339	.492
	Residual	19	.690	
Total Score	Treatment	1	.850	.045
	Residual	19	19.00	



Table A.31. Mean gains, standard deviations and t-values for treatment boys versus treatment girls on the Coopersmith Self Esteem Inventory

Factor	Treatment boys		Treatment girls		t-values
	Mean gains	S.D.	Mean gains	S.D.	
Social- Peer Self	-.250	.707	.333	1.231	-1.21
Home- Parent Self	-.625	1.768	.500	2.908	-.98
Lie Scale	1.375	1.598	.9167	1.164	.74
School- Academic Self	-.875	2.642	-.500	1.243	-.43

Table A.32. Mean gains, standard deviations and t-values for control boys versus control girls on the Coopersmith Self Esteem Inventory

Factor	Control boys		Control girls		t-values
	Mean gains	S.D.	Mean gains	S.D.	
General Self	1.090	4.346	.700	3.268	.23
Social- Peer Self	.181	1.722	.400	1.265	-.33
Home- Parent Self	.6364	1.912	.200	2.86	.41
Lie Scale	.1818	1.537	.600	1.350	-.66
School- Academic Self	-.6364	1.804	.400	1.897	-1.28
Total Score	1.272	6.54	1.700	6.584	-.15

Table A.33. Analysis of covariance for treatment boys versus treatment girls on the Coopersmith Self Esteem Inventory

Factor	Sources of variance	d.F.	Mean squares	F-ratio
Social- Peer Self	Treatment	1	1.64	1.38
	Residual	17	1.18	
Home- Parent Self	Treatment	1	.48	.18
	Residual	17	2.68	
Lie Scale	Treatment	1	.008	.013
	Residual	17	6.19	

Table A.34. Analysis of covariance for control boys versus control girls on the Coopersmith Self Esteem Inventory

Factor	Sources of variance	d.F.	Mean square	F-ratio
General Self	Treatment	1	.001	.00
	Residual	18	7.19	
Social- Peer Self	Treatment	1	.24	.14
	Residual	18	1.77	
Home- Parent Self	Treatment	1	.08	.02
	Residual	18	3.21	
Lie Scale	Treatment	1	1.02	.66
	Residual	18	1.55	
School- Academic Self	Treatment	1	4.01	3.24
	Residual	18	1.23	
Total Score	Treatment	1	4.98	.22
	Residual	18	22.55	