STUDENT PROJECT PRODUCTIVITY AND ITS RELATIONSHIP TO EXISTING STUDENT RECORDS

by

William Arthur Dotter

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William Arthur Dotter

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Aug 3/83
Date

Chairperson, Graduate Committee

Approved for the Major Department

Aug. 3/83
Date

Head, Major Department

Approved for the College of Graduate Studies

8-4-83
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ABSTRACT

The purpose of this study was to determine if student records can be used to predict performance on project work in the eighth grade industrial arts metal work class at Helena Junior High School in Helena, Montana. Specific objectives for the study were:

1. To determine if students with a high GPA achieve and produce at a higher level on individual project work than students with a low GPA.

2. To determine if students with a high SRA stanine score achieve and produce at a higher level on individual project work than students with low stanine scores.

3. To determine if student interests toward the industrial arts program have an effect on achievement and productivity during individualized project work.

In order to place the proposed investigation in perspective, a review of the literature was conducted so as to locate relevant thoughts and data pertaining to the use of achievement tests, GPAs, and interests to predict performance.

Data concerning GPA and achievement test (SRA) scores were obtained from guidance department files. An interest measurement instrument was developed for use with this study and validated by a jury of experts. The interest instrument was administered to each subject on the first day of class. The population included all 65 students enrolled in the 1981-82 school year eighth grade nine weeks metals industrial arts class.

Conclusions indicated by this study showed a strong relationship between GPA and achievement score averages for groups of high or low students as related to levels of project productivity. As a predictor for individual performance a high incidence of error was noted. Interest was not found to have a relationship with the prediction of project productivity in this study.

CHAPTER 1

INTRODUCTION

Helena, the capital city of Montana, is an urban community of approximately 35,000 people. The mainstay of the area is state and federal government and related services. Agriculture, forest products, manufacturing, and mining industries also serve an important role in the economy.

The Helena school system is composed of one vocational-technical center, two senior high schools, two junior high schools, twelve grade schools and an alternate school.

Helena Junior High serves 850 students in the seventh, eighth, and ninth grades. The ninth grade class is scheduled to move to the high school with the passing of the 1982 bond issue. This move has many implications for the Helena Junior High industrial arts program and may offer new opportunities for program growth.

This study concerned itself with the eighth grade industrial arts program at Helena Junior High School. This nine week metals course is offered to all students on an optional basis requiring them to select either industrial arts or home economics. Approximately 95 percent of the boys and 10 percent of the girls were enrolled in industrial arts at the eighth grade level. It should be noted that this industrial arts program is not intended to provide vocational training, but is a part of general education. The project method of instruction

is used as an exploration tool, and does not focus on skill training as a primary goal. The course does encourage students to use a wide range of materials and utilize a number of methods of fabrication techniques. Little emphasis is placed on skill development or attaining master craftsman level project work. The project represents the student's exposure to the area of study in the same manner as a theme in an English class. The student grades represent the number of experiences they had rather than the skill level attained. An "A" grade may be attained by fulfilling all the exploratory requirements and skill proficiency is not a requirement for an "A" grade in the class.

The exploratory requirements include the following:

-Demonstrating knowledge of pattern and layout drafting and the tools used by producing a series of three sheet metal patterns.

-Demonstrating knowledge of metal fastening techniques and the tools and machines used for fabricating metal fastened by welding, soldering, lock seams, and rivets.

-Demonstrating an understanding of metal finishing methods by individual project fabrication.

-Demonstrating fabrication procedures by designing and building projects utilizing different construction techniques.

The problem in this study was to investigate the fact that some eighth grade students fail to complete a satisfactory number of exploratory experiences at an acceptable level of productivity during the individual project exploration unit of the industrial arts program. For this reason, the investigator felt that these students needs were

not being met. The study compared existing student records of achievement in the industrial arts program to determine the value of existing records as predictors of achievement.

Purpose Of The Study

The purpose of this study was to compare existing student records of past performance on SRA achievement tests, individual grade point averages, and personal interests against achievement of those students in the eighth grade industrial arts metals class at Helena Junior High School.

Need For The Study

The findings of this study are desired to aid the industrial arts instructor in program planning. If student productivity and achievement can be predicted, the information could be used to determine course content and tailor instructional methods to better fit the needs of the student. Student needs may be described as being exploratory in nature, offering the student new experiences which will help them to cope with the future. Examples of such are: precision measuring, machine and hand tool use, job safety, industrial processes, consumer awareness, and information for informed future educational choices.

Students needs may also be described in terms of educational opportunity, ability tracking, presentation style, reading level of text and handouts and level of audio visual materials used. This author has questioned whether some students may excell while others fall behind regardless of teaching style, course content, GPA, SRA

stanine level and interest.

Objectives

The specific objectives for this study were as follows:

1. To determine if students with a high GPA achieve and produce at a higher level on individual project work than students with a low GPA.

2. To determine if students with a high SRA stanine score achieve and produce at a higher level on individual project work than students with low SRA stanine scores.

3. To determine if student interests toward the industrial arts program have an effect on achievement and productivity during individualized project work.

Definitions

For the purpose of this study the following terms are defined:

ACADEMIC ACHIEVEMENT: Knowledge attained or skills developed in the school subjects, usually designed by test scores or by marks assigned by teachers, or by both. (Good, C.V. 1959)

ACHIEVEMENT: Accomplishment or proficiency of performance in a given skill or body of knowledge. (Good, C.V. 1959)

APTITUDE: (1) a group of characteristics deemed to be symptomatic of an individual's ability to acquire proficiency in a given area; (2) ability measured by the amount of time required by the learner to acquire mastery of a task; thus given enough time, all students can conceivably attain such mastery. (Good, C.V. 1959)

ATTITUDE: The predisposition or tendency to react specifically towards an object, situation, or value; usually accompanied by feelings and emotions. Attitudes cannot be directly observed but must be inferred from over behavior, both verbal and nonverbal. (Good, C.V. 1959)

EDUCATIONAL APTITUDE: A combination of characteristics and abilities which considered together can be used as a basis for prediction of a certain level of achievement that can be attained through further development. (Good, C.V. 1959)

GPA: Grade point average is the mean of grades obtained on a number of school courses. (Good, C.V. 1959)

IEP: Individual educational program.

PERFORMANCE: Actual accomplishment as distinguished from potential ability. (Good, C.V. 1959)

PRODUCTIVITY: Relation between input of a resource and the output of a product. (Page, G.T. & Thomas, J.B. 1977)

SRA: Science Research Associates achievement test series.

STANINE: A national stanine indicates a student's standing in comparison with students in the national sample at the same grade level and in the same semester. The stanine range 7-9 represents the upper 23 percent; 4-6, the middle 54 percent; and 1-3, the lower 23 percent. (SRA Achievement Series, user's guide 1979)

Limitations

This study is undertaken with this limitation:

-The measure of project productivity is based on instructor

judgement.

Delimitations

The following delimitation has been identified for this study.

-This study will be limited to the Helena Junior High eighth grade industrial arts metals program.

Assumptions

The assumptions for this study were as follows:

1. The subjects in this study reflect no difference in response from those in any given year.

2. Value judgements made by the teacher concerning criteria for experiences required for study group placement are correct based on thirteen years of teaching experience and educational training.

3. That the interest survey is valid based on pretest of the instrument and its review by a panel of experts.

CHAPTER 2

REVIEW OF RELATED LITERATURE

In order to place the proposed investigation in perspective, a review of the literature was conducted to: (a) establish a theoretical frame work for the study including an examination of the junior high/middle school student, (b) locate relevant data pertaining to the use of achievement tests, GPA, and attitude to predict performance in the industrial arts laboratory, (c) report on research studies in industrial arts dealing with the problem being investigated in this study.

This researcher was unable to locate similar studies in industrial arts, necessitating the inclusion of research at age levels other than junior high/middle school and disciplines outside the field of industrial arts.

The basis for this study is founded on the "common observation that groups of students show considerable variation in their achievement over almost any learning task in the schools. Some students will need more time and help to attain this criterion than will others" (Good, C.V. 1959, p. 31). This observation has been noted at Helena Junior High in the eighth grade industrial arts program with some students producing few or no projects while others produce several projects with the same instruction and time.

It has been suggested in some studies that if students are

normally distributed with respect to aptitude in a subject area and are given the same learning time and equal quality instruction, then achievement when measured at completion of the course will have a normal distribution. Conversely, if quality of instruction and learning time are adapted to each individual learner then a majority will achieve mastery of the subject. (Carroll, J.B. 1976, p. 155-159)

Variations in learning tasks might be explained in part by the students motivation and the quality of instruction. Research by Bloom indicates that, "if all the learners do possess the necessary prerequisites of a learning task then it should be possible for all of them to adequately learn the task, if they are motivated to do so and if the quality of instruction is appropriate to their need." (Bloom, B.S. 1956, p. 33) In other words, if the students have the necessary preparatory skills, then there should be no variation in level of achievement or time required to reach that achievement level.

The Junior or Middle Age Student

The following is a fine description of early adolescents:

> "confused by self-doubt, plagued with forgetfulness, addicted to extreme fads, preoccupied with peer status, disturbed about physical development, aroused by physiological impulses, stimulated by mass media communication, comforted by daydreams, chafed by restriction, loaded with purposeless energy, bored by routine, irked by social amenities, veneered with "wise cracks", insulated from responsibility, labeled with delinquency, obsessed with personal autonomy, but destined to years of economic dependency, early adolescents undergo a critical and frequently stormy period of their lives." (author and source unknown)

A cross section of eighth grade students covers a wide range of both physical and mental growth stages, with only a small percentage

at an ideal period in their development to receive maximum gain from the traditional junior high school. Sexual development may vary from that of a child to that of an adult. Reading levels vary from early grade school to senior high school levels. Brain gowth and intellectual ability also cover broad distances. Toepfer (1981) stated that nationally, "no more than one percent of 11-year-olds, and 12 percent of 12-year-olds can even initiate formal operations." None of these age levels can perform mature formal operations thinking. At the eighth grade level 76 percent operate at the concrete level with 76 percent at the transitional level and 9 percent at the formal level. Toepfer points out the fact that IQ designation is not tied to thought level, which leads to failure of many high IQ students to do well on standardized tests. (Toepfer, 1981, p. 1-7)

Many students experience failure at the junior high level for the first time. Epstein (1974) believed that this is caused by the over challenge of learners who have not experienced adequate brain growth to operate at levels expected by junior high teachers. A strong brain growth spurt occurs in approximately 85 percent of adolescents in the 10 to 12 year age group, with each student at a different stage and about 10 percent who have not started the growth period or have all ready passed through it.

A junior high level educator should expect wide differences in student performance even among groups with similar IQs. In a middle school workshop, Dr. Tom Maglaras (1982) made the following statements concerning beliefs about how middle age students learn:

1. Students learn what they see purpose in learning. Teachers must develop an understanding of purpose. This is a highly personalized matter. Learning should be goal-oriented to be purposeful and problem centered to be effective.

2. Learning is an active process. Rather than drill, students must ponder, rearrange, and use information.

3. Change in behavior is the central goal of instruction. If students do not grow, develop, adapt, create, and change in their behavior as a result of self-realization and understanding, then instruction has been ineffectual.

4. Students learn at different rates and on various levels of comprehension in different content areas.

5. Students learn best as a result of an appeal to as many of the five senses as possible.

6. The environments for learning, psychological and physical, are contributing factors to successful outcomes.

7. Learning is affected by the student's concept of himself and his attitude toward others. Students can do little that they think they cannot do. Before a pupil can set realistic educational goals, he must see himself worthy and able to achieve success in routine tasks. A pupil must see himself as one who can do what he aspires to do.

8. The pupil learns in direct proportion to the way teachers perceive his ability to learn.

Attitude and Self Esteem as Predictors of Achievement

Researchers have not arrived at a consensus as to the validity of using attitude to predict achievement. While educators commonly believe that favorable attitudes towards school and school subjects increase learning, research doesn't clearly document such a belief. After a review of the related research and research of his own, Jackson (1980, p. 177) concluded that "nearly all investigations of the matter have found no statistically significant relationship between attitudes toward school and school achievement". In another

study it was noted that attitudes toward school subjects became increasingly less positive as students advance through grade levels. (Anttonen, 1967, p. 224) Anttonen also found significant differences in attitudes at the beginning of a class and the end of the class. Possible reasons suggested that success, failure, student interaction, and teaching method were responsible.

In a study concerning the eighth grader's attitudes toward school and achievement, test scores did not show any positive relationship. Attitudes toward individual classes were not examined. The researcher did find a significant relationship between the attitude measure and teacher grades. (Malpass, 1953, p. 475-482)

In a study measuring attitudes toward specific school subjects Neale (1970) found significant correlations between attitudes and achievement. Neale concluded that attitudes toward subjects are more related to achievement than is general attitude toward school. Neale went on to say while favorable attitudes cause students to achieve at a high level, "students who achieve well received more reward than those who achieve poorly and as a consequence develop more favorable attitudes." In other words a favorable attitude may have a high motivational consequence to the student who may derive personal pleasure in the form of praise at school and home.

Teacher expectations may also effect student attitude and achievement. In 1968 Rosenthal and Jacobsen published Pygmalion in the Classroom and proposed the theory that teachers treat low and high achievers in ways that cause low achievers to remain there and encourage high achievers to higher performance. Rosenthal went on to

say that by misleading a teacher with false test scores so as to have them believe that low achievers were in fact high achievers, teachers behavior resulted in higher student attitudes and achievement.

Good and Brophy (1981) have done follow up research based on the work of Rosenthal and concluded that teacher expectations do indeed affect student attitude and as a result influence achievement. Specific ways that teachers vary their behavior toward low and high achieving students according to Good are as follows:

1. "Seating slow students farther from the teacher or in a group making it harder to monitor low-achieving students or treat them as individuals."

2. "Paying less attention to lows in academic situations (smiling less often and maintaing less eye contact)."

3. "Calling on lows less often to answer classroom questions or make public demonstrations."

4. "Waiting less time for lows to answer questions."

5. "Not staying with lows in failure situations (providing clues asking follow up questions).

6. "Criticizing lows more frequently than highs for incorrect public responses."

7. "Praising lows less frequently than highs after successful public responses."

8. "Demanding less work and effort from lows than from highs."

9. "Interrupting the performance of low achievers more frequently than that of high achievers."

Achievement Tests and Future Achievement

One point that appears throughout research concerning the prediction of achievement and performance is that standardized tests of intellectual and academic ability to clearly relate to subsequent

achievement, both educational and economical for high and low groups. It should be noted that the reference here is to groups and as pointed out by Sacher (1978) no mastery standards have been found that all successful students surpass and all failing students do not." The word "all" is the key word in that not all students with high standardized scores are high achievers either in the present or future, while some students with low scores do achieve at high levels.

Lowman (1980) while doing a ten year follow up study of eighth grade standardized test results was able to identify factors that influence achievement which are not touched upon by standardized tests.

For example high test score children of large low income families may be victim of lack of opportunity while low test level children of small well to do families may achieve at a high level. Postlethwaite (1980) refers to achievement as an "individuals level of success at activities commonly valued by the members of our society which all persons must participate--formal schooling and work." It becomes clear that achievement is a complex construct including pure ability as well as other factors not related to ability. Our American educational system would like to believe that all students will achieve at the same high level and receive the same equal education. (Sacher 1978) The fact is that not all people will receive an equal education and achieve at the same level due to the fact that some people are inherently faster, stronger, with the ability to think abstractly and learn faster. Ability differences do not sufficiently explain achievement variations.

Both knowledge and performance tests do the job of assessing the

cognitive and psychomotor domains, but "the affective domain remains untouched". (Ellis 1979) This domain includes interest, motivation, attitudes and values. Ellis concluded that there "may be little relationship between measures of knowledge and actual proficiency in performing a job." Social skills are another area not addressed by standardized tests. Rackham (1971) states that "difficulty encountered in precisely describing any social skill hampers test development."

Researchers have identified many reasons for achievement tests failure to predict accurately for all students, however, there are still unexplained examples to consider. The student that forges ahead and succeeds beyond anyone's expectation and against supposedly unsurmountable odds and the student who lags behind in spite of high test scores are cases in point.

Ability then cannot stand alone as a predictor of future performance. Choice, perserverance, opportunity, and social judgement must also be included in order to truly forecast achievement for all students.

Summary

In summary, the following statements can be made:

-Some students need more time to learn than others.

-If quality of instruction and learning time are adapted to each individual learner, a majority will learn.

-Sexual development, reading level, brain growth, learning style, personality type, attitude, teacher expectation, inherent ability, social skills, economic class, parental job and education level,

CHAPTER 3

PROCEDURE

The following is a discussion of the procedures that were followed while this study was conducted. The study was conducted at Helena Junior High School during the 1981-82 school year. The subjects studied included those students, male and female, enrolled in the eighth grade industrial arts metals work classes. New enrollees were excluded from this study if permanent records for them were not available, also students classified as special education were excluded due to the fact that GPAs and SRA test scores are not available for them.

An interest survey instrument (Appendix A) was developed and tested for face validity by a panel of experts including Dr. Paul Vaughen of New Mexico State University and graduate students enrolled in his evaluation class. Further pretesting of the instrument was conducted using eighth grade students at C. R. Anderson Junior High School in Helena. The instrument was given to one class one week apart and then checked to see if the students' answers were the same in each case. Answers were found to be identical on both forms for all students present both days.

All eighth grade industrial arts classes of nine week in length are included in this study, two during the third nine week period and three during the fourth nine week period. The interest survey was

administered to each eighth grade industrial arts class the first day of each nine week period. The survey was administered the first day of class so that responses do not reflect changes in attitude or interest after the instruction started. Students were not informed that they were participants in a study group.

Each student was exposed to each of six required exploratory exercises in the program. These six exercises were valued at 900 points, 90 percent of which would equal 810 points or a satisfactory score on the exploration unit. It should be noted that this grading is teacher subjective and that to earn 90 out of 100 points the project must show an understanding of the principles involved. The remaining 10 points reward skill attainment. Thus, proficiency at a skill is not a preprequisite for success in this exploratory program. Students were not limited to the minimum six exercises, and, working at their own speed, may complete more exercises thereby earning points in excess of 900.

Students were then divided into groups for comparative purposes. Group A included students who received 810 points or exceeded minimum required exploratory laboratory experiences for individualized project work. Group B excludes those students that did not meet the minimum expectations.

Student records kept on file in the guidance office provided GPAs and SRA stanine standing for those students included in this study. Student confidentiality was not compromised during this study or in this final document.

Subjects were placed in Group A or in Group B and all data

tabulated. Based on a target population of 77 students, data tabulation and group placement resulted in Group A containing 34 students, Group B containing 31 students, and 12 students were rejected due to incomplete data in the student permanent records. Those rejected equal 15 percent of the total population. Of those, six would have been placed in Group A and six in Group B. Their project points closely resemble a cross section of the study group indicating that their exclusion did not effect this study. Two of the twelve were in self-contained classes and therefore did not have complete records, while 7 others were transfers and the remaining 3 were absent during SRA tests. A list of both groups appears in Table 1 on the following page.

Table 1

Project Points Earned, GPA, and Stanine Level for Each Subject in Group A and Group B

Group A N = 34			Group B N = 31		
Project Points Earned	GPA	Stanine	Project Points Earned	GPA	Stanine
1650	2.50	7	760	3.80	9
1275	3.75	9	760	3.20	4
1235	3.80	8	750	2.00	3
1235	1.75	6	750	3.25	8
1215	1.75	6	750	2.25	7
1203	1.75	7	745	2.00	6
1175	3.00	7	745	1.75	5
1140	2.50	8	740	.75	3
1115	2.25	7	735	2.00	5
1070	2.00	4	735	2.25	7
1070	4.00	9	730	2.20	7
1060	2.00	6	730	2.00	6
1055	2.80	8	720	3.20	9
1050	3.40	9	675	3.40	7
1050	3.60	8	660	4.00	9
1045	1.50	4	655	1.50	5
1040	3.00	7	655	2.75	5
1025	3.40	9	650	1.70	6
1020	2.00	6	555	1.60	4
1015	.00	5	555	1.25	3
1015	2.00	6	550	3.00	4
980	2.25	5	540	1.75	5
965	2.80	8	535	2.40	6
940	3.00	5	470	1.63	3
920	1.60	6	385	1.65	7
915	3.20	9	375	2.00	3
885	2.60	5	370	1.00	4
860	2.20	7	370	.75	3
860	2.25	7	315	1.75	4
850	1.74	4	185	.25	5
845	2.00	5	90	.75	3
840	3.50	8			
840	2.75	7			
815	1.50	5			

NOTE: A minimum of 810 project points are required to be placed in Group A. The total possible project points is unlimited.

CHAPTER 4

ANALYSIS AND PRESENTATION OF THE DATA

The findings of this research effort are reported in this chapter as they relate to the three research questions posed by the statement of the problem and objectives in chapter one. Those objectives are as follows:

1. To determine if students with a high GPA achieve and produce at a higher level on individual project work than students with a low GPA.
2. To determine if students with a high SRA stanine score achieve and produce at a higher level on individual project work than students with low stanine scores.
3. To determine if student interests toward the industrial arts program have an effect on achievement and productivity during individualized project work.

GPA, Stanine and Point Totals for Each Group

The average number of points received for project work, GPA and stanine levels for Group A and Group B are found in Table 2. Group A accumulated a mean of 1037 project points while Group B accumulated a mean of 588 project points. The mean GPA for Group A was 2.44 and for Group B the mean score was 1.99. Group A has a GPA mean that is higher than that of Group B indicating that a relationship exists between a high GPA and high project point accumulation. The difference in mean stanine scores, with Group A at 6.6 and Group B at 5.3, also shows a relationship between high stanine scores and high project

point accumulation in this eighth grade industrial arts program.

Table 2

Point, GPA and Stanine Averages
for Group A and Group B

	Points	GPA	Stanine
Group A N = 34	1037	2.44	6.6
Group B N = 31	588	1.99	5.3

Grade Point Average Data Presentation and Analysis

The first research question evolving from the objectives of this study was:

> To determine if students with a high GPA achieve and produce at a higher level on individual project work than students with a low GPA.

An examination of data presented in Table 3 brings to light many exceptions to the predictive value of GPA as a basis for predicting future project productivity. A total of 17 students in this study fell in the 3 to 4.0 GPA range and of those, 65 percent are in Group A and 35 percent in Group B. A total of 26 students in both groups are in the 2 to 2.9 GPA range and of these, 58 percent are in Group A and 42 percent are in Group B. A total of 17 students are in the 1 to 1.9 GPA range, of which 41 percent are in Group A and 59 percent in Group B. A total of 5 students are in the 0 to 0.9 GPA range, of which 20 percent are in Group A and 80 percent in Group B. Both Group A and Group B have GPA distributions of 2.5 to 4.0.

Table 3

Number of Students and Percentages of Group A and Group B at Each GPA Level

GPA	Group A N = 34		Group B N = 31		Combined Groups N = 65		
	No. of Students	% of Group	No. of Students	% of Group	No. of Students	% of Group A	% of Group B
3-4.0	11	.32	6	.19	17	.65	.35
2-2.9	15	.44	11	.36	26	.58	.42
1-1.9	7	.21	10	.32	17	.41	.59
0-0.9	1	.03	4	.13	5	.20	.80

Table 3 data clearly show a relationship between a high GPA and group achievement, with 65 percent of the 3 to 4.0 GPA students being placed in Group A. The use of this data for predicting an individuals future performance with project experiences does not show that same relationship. At the 3 to 4.0 GPA level 35 percent of the students performed at Group B level, while in the 0 to 0.9 GPA level, 20 percent performed at Group A level.

Table 4 further points out the wide range of GPAs distributed through both groups. A high GPA does clearly show a higher average point total in each group. In the 3 to 4.0 GPA range 11 students in Group A earned an average of 1055 points and 6 students in Group B earned an average of 685 points. In the 2 to 2.9 GPA range 15 students in Group A earned an average of 1024 points and 11 students in Group B earned an average of 681 points. Students with high GPAs

in both groups have the highest point totals, but the wide distribution between both groups suggest that GPA by itself is not a reliable predictor of individual future project productivity.

Table 4

Average Points Earned and Number of Students of Group A and Group B at Each GPA Level

	Group A N = 34		Group B N = 31	
GPA	Number of Students	Average Points	Number of Students	Average Points
3-4.0	11	1055	6	685
2-2.9	15	1024	11	681
1-1.9	7	1040	10	524
0-0.9	1	1015	4	346

While it is clear that a high GPA improves chances of a high project productivity, it is equally clear that a low GPA does not guarantee a low project productivity. In the 1 to 1.9 GPA range 7 students are in Group A and 10 in Group B. In the 0 to 0.9 GPA range 1 student is in Group A and 4 in Group B.

Stanine Data Presentation and Analysis

The second research question evolved from the objectives of this study was:

> To determine if students with a high SRA stanine score achieve and produce at a higher level on individual project work than students with low stanine scores.

Stanine comparisons also show a positive relationship between points earned and stanine level in Group A and Group B as indicated in Table 5 below. Points earned drop as stanine level drops.

Table 5

Number of Students for Each Stanine Level and Average Number of Points Earned at Each Level

	Group A N = 34		Group B N = 31	
Stanine	Number of Students	Average Points	Number of Students	Average Points
9	5	1067	3	713
8	6	1047	1	750
7	8	1093	5	655
6	6	1077	4	665
5	6	913	6	585
4	3	988	5	510
3	0	0	7	478
2	0	0	0	0
1	0	0	0	0

Table 6 contains data showing a wide distribution of students in both groups at each stanine level. In the 7 to 9 stanine level there was 19 students in Group A and 9 students in Group B. Of those 28 students or 68 percent performed at the high group level and 32 percent at the low group level. Thus a high stanine indicates a

higher average group performance, yet on an individual performance prediction 32 percent would have been improperly placed in the high performance group.

Table 6

Number and Percentage of Group A and Group B and Combined Groups at Each Stanine Range

Stanine Range	Group A N = 34 No. of Students	Group A % of Students	Group B N = 31 No. of Students	Group B % of Students	Combined Groups N = 65 No. of Students	Combined Groups % of Group A	Combined Groups % of Group B
7-9	19	56	9	29	28	68	32
4-6	15	44	15	48	30	50	50
1-3	0	00	7	23	7	0	100

A combined group total of 30 students fall in the 4 to 6 stanine level, 50 percent of which are in Group A and 50 percent of which are in Group B indicating no relationship at this level between stanine of predicting future project productivity.

In the 1 to 3 stanine range no students are in Group A while 7 appear in Group B indicating a positive relationship between low stanine and low project productivity at that level.

Interest As an Achievement Predictor

The third research question evolved from the objectives of this study was:

To determine if student interests toward this program in

industrial arts have an effect on achievement and productivity during individualized project work.

The following is a presentation of the findings of the attitude survey, a copy of which appears in Appendix A. The first question asked on the survey was:

Did you want to take this industrial arts class?

The second question asked was:

I did not want to take this industrial arts class, but had to because it was required.

Both of the above questions required yes or no answers. The responses of each group are tabulated in Table 7 in order to understand and analyze the results.

Table 7

A Summary of Those Students Who Desired to Take The Industrial Arts Course and Those Who Did Not Desire To Take The Course

	Group A N = 34				Group B N = 31			
	Yes		No		Yes		No	
	#	%	#	%	#	%	#	%
Question #1	33	97	1	03	28	100	0	00
Question #2	1	03	33	97	0	00	29	100

*3 students in Group B failed to answer question number one and two.

Question one and two sought to determine if students who wanted to enroll in the class would perform better on project work than those who were required to enroll. Neither confirmation or denial of that statement was indicated by this data. In Group A 33 students

indicated they wanted to take the course while one student took the course because it was required. That one student's placement in Group A does not support the proposed relationship. In Group B 28 students replied yes with 3 students failing to answer the question. The only reasonable conclusion that can be drawn from this data is that students who enrolled had a favorable attitude toward the industrial arts class.

The third question asked in the survey was:

> If you did not want to take this Industrial Arts class, then what class or subject would you have rather taken.

The purpose of questions one, two and three was to determine if a lack of interest in industrial arts was a factor contributing to poor performance. Ninety-seven percent of Group A and 100 percent of Group B answering yes to question number one. Only one student answered question number three, stating that she would have take home economics if given a choice. An interview with the guidance counselor and the principal determined that this female student was not required to enroll in the class as she stated and therefore her answers to the first three questions may be invalid. It may be concluded then, that lack of interest in industrial arts is not a contributing factor to low perofrmance levels and that students have a high interest in enrolling in the eighth grade industrial arts course at Helena Junior High School.

The fourth question asked in the survey was:

> What type of job do you presently wish to have when you finish your education.

The above question addressed itself to the idea that students with a career goal related to industrial arts subject matter would achieve at

a higher level than those students seeking an unrelated career. Table 8 is presented below in order to organize the results for examination.

Table 8

The Relationship Of Career Choice
To Industrial Arts Enrollment

Group A		N = 34		Group B		N = 31	
Related		Not related		Related		Not related	
#	%	#	%	#	%	#	%
8	28	20	72	5	19	21	81

*six students failed to answer in Group A.
*five students failed to answer in Group B.

The data in Table 8 does not support that conclusion even though Group A had 28 percent of the students in related fields and Group B only 19 percent. Both groups show a strong trend toward nonrelated careers. Group A has 72 percent and Group B has 81 percent in the unrelated category. Career goals are not a predictor that can be used to forecast future performance in this industrial arts program.

The fifth question asked in the attitude survey was:

Do you like your shop teacher?

It should be noted that the students had known the teacher during their seventh grade year of school and therefore had an opportunity to determine their feelings toward the industrial arts instructor. Question five sought a relationship between their feelings for their teacher and their productivity on personal project work.

The results at Helena Junior High School are presented in Table 9 below for examination of results.

Table 9

Student Attitude Toward Teacher

Group A		N = 34		Group B		N = 31	
Yes		No		Yes		No	
#	%	#	%	#	%	#	%
33	97	1	03	30	97	0	0

*one student failed to answer in Group B.

This question failed to support the thought that students who liked their teacher would achieve at a higher level than other students. The only no response was from a member of Group A indicating that if a negative relationship existed between the student and teacher, it did not affect this student's ability to perform at Group A level.

The sixth question asked on the interest survey was:

Are you looking forward to this class and expect to learn a lot? Table 10 is presented to enable the researcher to evaluate the data collected for question number six.

Table 10

Expectation of Students Toward the Industrial Arts Class

Group A		N = 34		Group B		N = 31	
Yes		No		Yes		No	
#	%	#	%	#	%	#	%
34	100	0	0	31	100	0	0

The desire to determine if those students that were looking forward to the class and expecting to learn a lot would complete the projects with a greater degree of accuracy than the others was not substantiated by the data. One hundred percent of both groups answered yes to the question. The Helena Junior High School results indicated that the students do have a positive feeling toward this industrial arts class.

The seventh question asked on the attitude survey was:

Are you good at working with your hands and with tools?

This final question on the interest survey dealt with the proposed prediction factor that students who perceived themselves as being good at working with their hands would achieve at a higher level on individual project work. Table 11 is presented to organize the collected data for examination.

Table 11

Student Perceptions of Their Ability to Work With Their Hands

Group A		N = 34		Group B		N = 31	
Yes		No		Yes		No	
#	%	#	%	#	%	#	%
32	94	2	6	22	73	8	27

*one student failed to answer in Group B.

Ninety-four percent of Group A answered yes and 22 percent of Group B answered yes indicating some positive relationship for the predictor factor. The data suggest that those students who had negative feelings about hands-on skills are more likely to achieve at a lower level than those who feel positively. Twenty-seven percent of Group B answered no while six percent of Group A answered no.

CHAPTER 5

SUMMARY, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to determine if student GPA, achievement test scores and the interests of the students enrolled in industrial arts at Helena Junior High School could be used as predictor factors of student productivity on individual project work in their industrial arts class. The specific objectives for the study were:

1. To measure if students with a high GPA achieve and produce at a higher level on individual project work than students with low GPA.
2. To determine if students with a high SRA stanine score achieve and produce at a higher level on individual project work than students with low stanine scores.
3. To determine if student interest toward this industrial arts program have an effect on achievement and productivity during individualized project work.

This investigation included several distinct phases. First the design for the study was approved, and then a review of related literature was conducted, followed by the development of the interest measurement instrument which was developed under the guidance of Dr. Paul Vaughn of New Mexico State University and Dr. James Laport of Montana State University. The instrument was then submitted to them and graduate students in their research classes for review. The second step took place during the school year 1981-1982. Student records from the guidance department were reviewed in search of data

concerning SRA stanine scores and GPAs for each student. Phase three involved administering the interest instrument to each student in the study on the first day of class. The population for this study included each boy and girl enrolled in eighth grade industrial arts of nine weeks in length. The study population included 65 students. In phase four, records of the total points earned by each student were recorded. When completed, each student was assigned to Group A or Group B according to the number of points they had earned. The fifth phase involved the tabulation and charting of the results for study and analysis. The final phase was the writing of this study.

Conclusion

Based on the data collected, analyzed, and presented in this report, the following conclusions are made. In the review of related literature, it was noted that GPA is widely used as a factor for predicting academic performance. Students with GPAs in the 3 to 4.0 range did make up the top level of each group, however, 11 of those 17 students were in Group A while 7 were in Group B. It may be concluded that GPA is a good predictor of average group performance; it is not an adequate factor for prediction of individual performance of project productivity in industrial arts at this school.

The second objective of this study was to determine if SRA stanine scores can be used to predict high or low productivity levels in individual project work. After studying the data collected, some conclusions can be drawn. The review of literature tells us that SRA stanine scores have been extensively used for the successful

prediction of academic success. The data show the same relationship to be true based on combined group averages in this study. The prediction for individual performance does not show that same relationship. Twenty-eight students have stanine scores in the 7 to 9 range, of those 68 percent are in Group A and 32 percent are in Group B. If stanine were used to place students in high or low ability groups, 9 of the 28 students would have been improperly placed. It may be concluded that SRA stanine scores are a good predictor of group performance; it is not an adequate factor for prediction of individual performance of project productivity in industrial arts programs at this school.

The third objective of this study was to determine if student interest was a factor in predicting high performance at individual project work. Researchers have found interests to be of limited value in predicting future performance, a problem noted in the review of literature. Interest is difficult to measure and at best of questionable validity. Understanding these limitations may be possible to infer some conclusions based on the interest instrument used on this study.

The first area dealt with on the interest survey sought to see if those students who were required to enroll would perform at a lower level than average. With one exception it can be concluded that all students felt that they had taken the class because they wanted to rather than because they had to. The second area was desired future careers either related or unrelated to the industrial arts field. Twenty-eight percent of Group A desired related careers while 19

percent of Group B did. It might then be concluded that a related career choice has some predictive value for future performance at project work.

In studying the data pertaining to like or dislike of the teacher, it is concluded that with only one respondent disliking the instructor and with that student's placement in Group A, no relationship was noted in this study. The next question sought a positive relationship between those students who felt they would do well as compared to those same students that actually did. With all students reporting a belief that they were looking forward to the class and were expecting to learn a lot, the most likely conclusion is that the question was not valid.

The final question queried the students as to their self perceived ability to work with their hands and with tools. Six percent of Group A and 27 percent of Group B answered negatively, supporting a conclusion that students are more likely to achieve at a lower level than those who feel positively.

Recommendations

Based on the results of this study, the following recommendations are made:

1. If further attempts to find a relationship between attitude and future project productivity should be attempted, an effort should be made to improve the instrument used to reflect the attitudes toward subject and teacher to a higher degree. Other influencing factors such as sex, peer influence, and race might be included.

2. In view of the number of students with high GPAs and stanine scores that performed at a moderate to low level and those with low GPAs and stanines that performed in the high productivity group, it is recommended that students not be labeled or placed in special groups with instruction geared to their supposed level. Each student should have the opportunity to achieve at the highest possible level.

3. This study was based on existing and presently used school records and tests. If further study is done to find predictors of project performance, it is recommended that attitude and aptitude tests and measurements be considered for addition to the school testing program.

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APPENDIX

INDUSTRIAL ARTS INTEREST SURVEY

Please read each question and circle the answer that best fits your present feelings. Fill in answer blanks where appropriate.

1. Did you want to take this Industrial Arts class? YES - NO

2. I did not want to take this Industrial Arts class, but had to because it was required. YES - NO

3. If you did not want to take this Industrial Arts class, then what class or subject would you have rather taken?

_____

4. What type of job do you presently wish to have when you finish your education?

_____

5. Do you like your shop teacher? YES - NO

6. Are you looking forward to this class and expect to learn a lot? YES - NO

7. Are you good at working with your hands and with tools? YES - NO