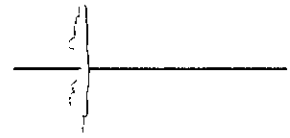
CORRELATES OF EFFICIENT PERFORMANCE IN MECHANICAL DRAWING



A Thesis

Presented to

The Faculty of the Graduate School

Samar State Polytechnic College

Catbalogan, Samar

In Partial Fulfillment of the

Requirements for the Degree Master

of Arts in Education

GENARO J. OSIAS

March, 1991

APPROVAL SHEET

This thesis entitled "**CORRELATES OF EFFICIENT PERFORMANCE IN MECHANICAL DRAWING**, " has been prepared and submitted by GENARO JAVIER OSIAS, who having passed the comprehensive examination, is hereby recommended for oral examination.

March 1, 1991
Date

ALEJANDRO E. CANANUA, M.A. Ed.
Adviser

Approved by the Committee on Oral Examination March 1, 1991 with a rating of **PASSED.**

BERNARDO S. OLIVA, Ph. D.
Chairman

DOMINADOR Q. CABANGANAN, Ed. D.
Member

SENECIO D. AYONG, DPA/Ed. D.
Member

Accepted and approved in partial fulfillment of the requirement for the degree **MASTER OF ARTS IN EDUCATION** major in **ADMINISTRATION AND SUPERVISION.**

RIZALINA M. URBIZTONDO, Ed. D.
Dean , Graduate Studies

Date of Oral Examination
March 1, 1991

ACKNOWLEDGMENT

The researcher wishes to acknowledge gratefully his never-ending indebtedness and obligation to all those who in one way or another have shared their generous services, guidance, encouragement, inspiration, and contribution to the fulfillment of this study.

Professor Alejandro E. Cananua, Planning Officer and Board Secretary of Samar State Polytechnic College for his painstaking services in imparting knowledge, skills and values as research professor and adviser, as well as for his valuable assistance as academic and technical consultant and editor throughout the conduct of the study, not to mention the financial aid extended to the researcher during his pre-oral defense.

A special debt of gratitude is owed to the following executive of Samar State Polytechnic College: Dr. Bernardo S. Oliva, Vice-President for Academic Affairs and Chairman of the Panel of Examiners, Dr. Dominador Q. Cabanganan, Vice-President for Administration, and Dr. Senecio D. Ayong, Dean of Instruction and Related Services/School of Graduate Studies, all members of the Panel of Examiners for their valuable suggestions, criticism, and for giving the right direction towards the completion of this study;

Sincere gratitude is also extended to Professor Basilio S. Frincillo, SSPC President, for granting the reseacher the privilege to study in this college. Assistant Professor Simon P. Babalcon, Jr, and Mr. Amador Velasco for their support and consent to the researcher's request for exchanging classes to avail of the respondents used in this study.

Thanks is due to Mrs. Marilyn Cardoso, SSPC Statistician for her invaluable service in reviewing the statistical computation; and Mrs. Josefina A. Amistoso, SSPC College Librain and her library aides, for their accommodating gesture in lending books, periodicals, unpublished materials and other references;

Profound acknowledgement is extended to his parents Tatay Cesar and Nanay Pura, and to all his relatives for their parental inspiration and moral support;

Finally, his special admiration to his everdearest wife, Dit-dit, for her love, inspiration, patience, and understanding for helping the researcher in the statistical computation of the data and in typing a part of this master's thesis; to his children: Vincent Ceasar, Vina Clarisse and Vanissa Carla for their patience and endurance and sacrifices which contributed immensely to the fulfillment of this long- cherished dream; and

Above all, to Lord Almighty God for His Divine guidance, blessings, mercy, and showering Graces which gave extra energy, courage and vigor to the researcher during the critical moment of his study.

G E N

D E D I C A T I O N

To my everloving wife,

DEODATA APITA OSIAS

and to our children

VINCENT CEASAR

VINA CLARISSE

and

VANISSA CARLA

for their prayers, love,

and inspiration

I dedicate this humble

achievement

GEN

ABSTRACT

This study attempted to analyse the correlates of efficient performance in mechanical drawing among junior high school students of Samar State Polytechnic College; Catbalogan, Samar by sex. This study employed the analytical-descriptive method of research using the Prescribe Rating System for Mechanical Drawing as an instrument in gathering data. The sources of data were the six drawing plates, (plates #4 to 9). The only pair of variables among the females with significant relationship is speed and attitude with computed r value of .81 which is greater than the table value of .36 at .05 level of significance and 28 df. Hence, the rejection of the second null hypothesis relative to this pair of variables. This high relationship between speed and attitude means that the students achieved a high rating in speed as in attitude. The significant relationship among most of the four factors of efficient performance leads to a conclusion of generalization that the ability of male students in the four criteria is homogeneous except in speed and neatness as well as accuracy and attitude. Therefore, those who are good in one factor are also good in most of the other factors. All drawing teachers and shop teachers should closely supervise their students while working on their plates or projects and if possible, should not allow students to take their drawing or unfinished project home. Drawing classes should be provided with adequate instruments and facilities by the school to ensure efficient performance.

TABLE OF CONTENTS

Chapter 1

THE PROBLEM

Introduction

Mechanical drawing is called the language of industry. It is used by people everywhere to dream, draw and build what they draw. The entire industrial history of the world has been written in the language of mechanical drawing. It is as old as the cave dweller who scratched the first picture in the ground, and as modern as the latest rocket design for space flight. Everyone who lives in our industrial society needs to understand mechanical drawing[1]

As long as people build new things, or rebuild old things, they will find jobs with the language of industry. Even if they do not want to work as draftperson, a knowledge of mechanical drawing will help them understand many kinds of plans, blueprints, and graph workers, technicians, architects, and engineers are only a few of the people who use drawing and symbols to tell their ideas to others. No matter what the future plans, will be, there will be many uses for the knowledge of mechanical drawing.[2]

---

[1]Los Angeles Unified School District, Drafting, (Encino, California; Glencoe Publishing Co., Inc., 1978), p. 1.

[2]Ibid.

In both secondary and tertiary level of Technical Vocational Education, Mechanical drawing is intensely emphasized to the students to enable then to gain more skills required in technological advancement which behooves for participation for national development. Article XIV, section 3(3) of thr 1987 constitution provides that:

> All schools shall strenghten ethical and spiritual values, develop moral character and personal discipline, encourage critical and creative thinking broaden scientific and technological knowledge, and promote vocational efficiency.[3]

Thus, the needed knowledge and skills are best developed through training in the school, followed by as conscientious practice in a given trade or occupation. These aspect enables the individuals to obtain work competences necessary to adopt themselves to a variety of jobs in their choosen field of employment. The development of work competencies in the work of vocational schools as mandated by the constitution and further amplified by Batas Pambansa 232 otherwise known as "Education Act of 1982" which streeses among other things, the promotion of scientific and vocational efficiency. [4]

---

[3]"1987 Philippines Constitution", (Quezon City, Philippines, 1987), p. 53.

[4]"Education Act of 1982", MECS Journal, Vo. I and II, (Manila: Philippines, 1987), p. 52.

It is said that efficient performance of every citizen in every occupation contributes to the acceleration of our country's progress. However, it is also adversely said that, our country is burdened with educated parasites, many of whom are graduated from vocatioanl schools. It is noted that the consequence is not merly on job opportunities constraints but is more on performance defficiency. The demand upon every worker today in every occupation is efficiency in a specific occupation.

This demand for specific efficiency in performance of all works is very significant. Technical drafting is one among the needed occupations, thus efficient performance in mechanical drawing is required and is attainable only when one is aware of certain criteria used for rating drawing performance. A good mechanical drawing must be made with speed, that is, it should be made within the given definite time to accomplish. It must be accurate, must conform to the given shape, size, and color. It must be clean and neat. It must be made with one's interest and one's good habits and attitude.

The researcher as a drawing teacher, obviously observed that among the junior high school students of Samar State Polytechnic College, Catbalogan Samar, many do not meet the criteria for efficient performance in mechanical drawing.

Many of them submit their drawing plates before the deadline but are accomplished only for the sake of submission without regards to their quality. When they are required to redraw some manifest signs of resentment and negative reaction. In as much as drawing plates, like other projects in the shops demand such important requirements as speed, the accuracy neatness, and proper attitude towards work, the drawing class should not be made as a venue for relaxation. Rather it should be accepted as a major part of one's personality development and refinement.

It is in this context that the researcher was motivated to conduct this study on "Correlates of Efficient Performance in Mechanical Drawing" to determine how efficient performance is influenced by the factors associated with it and be exercise more objectively in the evaluation of students' projects or plates. The result of this study are expected to benefit the students in terms of motivation towards a more dedicated task. To the instructors, this will provide a more critical and objective measure in evaluating students' project. To the administrators, this will give insights into the needs and problems of instructions and the course they teach.

Theoretical and Conceptual Framework

This study is anchored on Richards theory on job

efficiency which underscores the need to combine technical knowledge, manipulative skills and job intelligence as described by Prosser and Quigly, as shown in Figure 1. The theory states that:

> "Efficiency on the job varies or depends upon the possession of the necessary manipulative skills, the functioning technical knowledge and intelligence which enable the individual to apply the technical knowledge and the manipulative skills to the problem of life."[5]

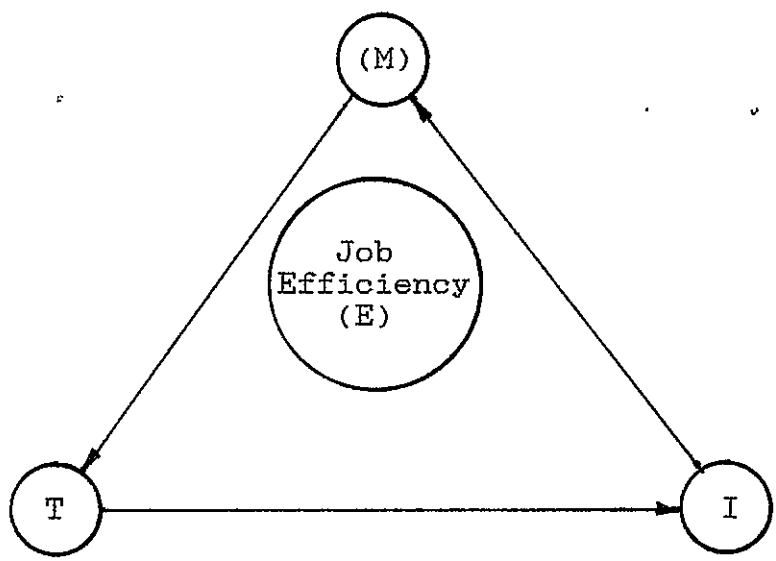


Figure 1. Schematic Diagram of Richard's Theory showing job efficiency as the sum total of technical knowledge (T), manipulative skilled (M), and job intelligence (I).

This equation relates that job efficiency (E) is the aggregate of manipulative skills (M), technical knowledge

---

[5]Charles A. Prosser and Thos H. Quigly, Vocational Education in a Democracy, (Chicago: American Society, 1963), pp. 92-517.

(T) and job intellegence (I). The absence of any one of the three will result in the job inefficiency.

Richard's Theory on the job efficiency stated and conceptualized above as adopted because it has a significant relation to the theory of this study that the efficient performance in mechanical drawing can be attained only through the correlation of speed, accuracy, neatness, and attitude. This is conceptualized in the schema shown in Figure 2.

This schematic diagram illustrates the entire picture of this study. The base consists of the long rectangle containing the Samar State Polytechnic College as the research environment. Above it the third year high school students in mechanical drawing who are the subjects of the study whose drawing plates served as the sources of data. The four smaller rectangle at the center of the schema contain the speed, accuracy, neatness, and attitude as the correlates of these standards performance in mechanical drawing. The arrowheads between the frames show the correlation between the variable by pairs. They served as inputs to hypothesis testing in order to come up with the results of the study in terms of relationship among the variables. These results will lead to some sort of instructional

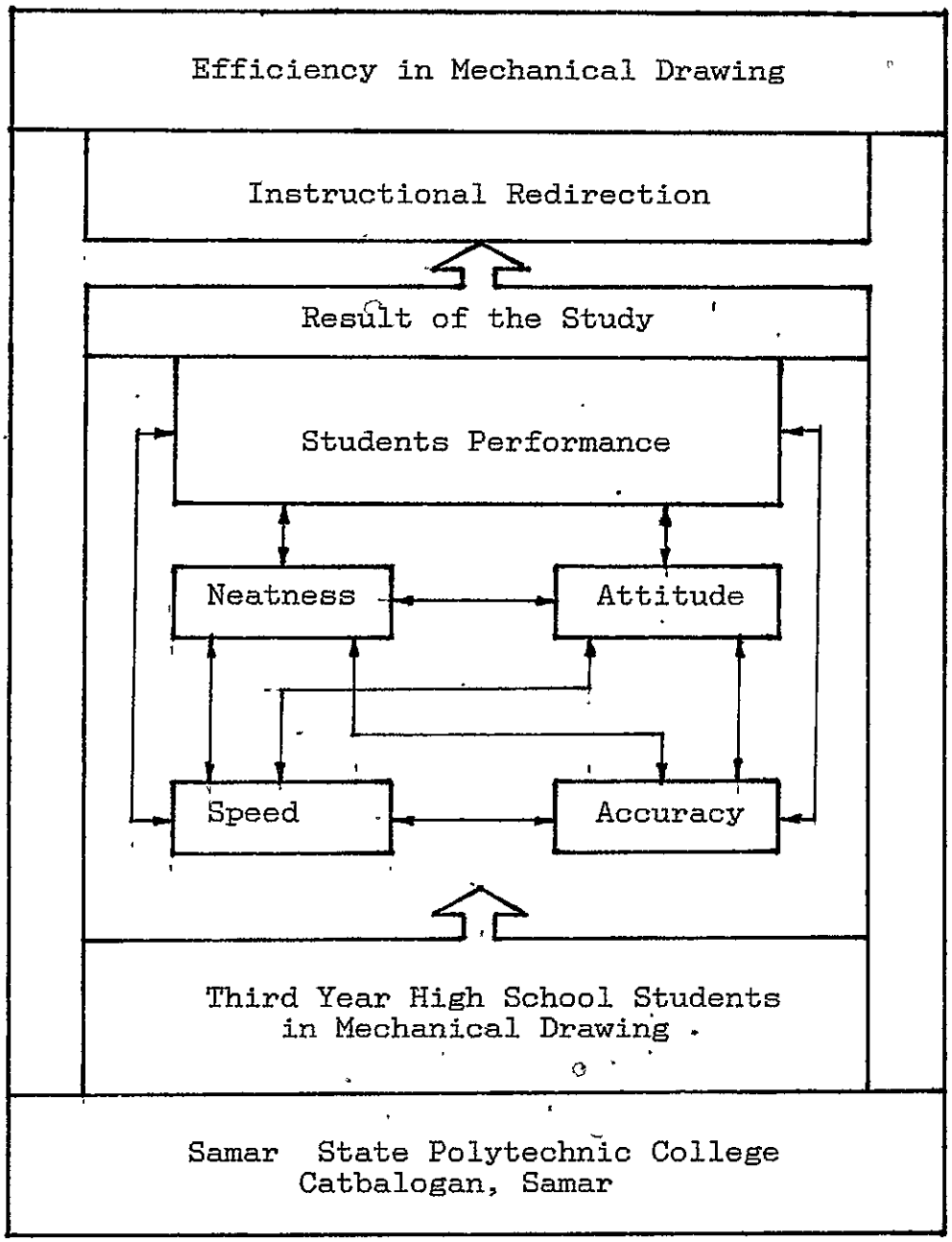


Figure 2. The Conceptual model of the study showing the research environment, the research subject, the variables involved and the possible redirections towards the expected outcomes of the study.

redirection towards the ultimate goal of the study which is efficiency in mechanical drawing.

Statement of the Problem

This study attempted to analyze the correlates of efficient performance in mechanical drawing among junior high school students of Samar State Polytechnic College, Catbalogan, Samar. Specifically it sought answer to the following questions.

1. What are the correlates of efficient performance in mechanical drawing?

2. What is the mean performance rating in mechanical drawing of the junior high school students of Samar State Polytechnic College by sex with respect to the following criteria:

2.1 Speed?

2.2 Accuracy?

2.3 Neatness?

2.4 Attitude?

3. Is there a significant difference between the male and female junior high school students of SSPC with respect to their mean performance in mechanical drawing?

4. Is there a significant relationship among the four criteria by sex as indicated by the following pair of variables:

4.1 Speed and Accuracy?

4.2 Accuracy and Neatness?

4.3 Neatness and Attitude?

4.4 Speed and Attitude?

4.5 Speed and Neatness?

4.6 Accuracy and Attitude?

5. Is there a significant relationship between the mean performance by sex and each of the four criteria as follows:

5.1 Mean performance and speed?

5.2 Mean performance and accuracy?

5.3 Mean performance and Neatness?

5.4 Mean performance and attitude?

Hypothesis

1. There is no significant difference between the male and the female junior high school students of SSPC with respect to their mean performance in mechanical drawing.

2. There is no significant relationship among the four criteria by sex as indicated by the following pairs of variables:

2.1 Speed and Accuracy?

2.2 Accuracy and Neatness?

2.3 Neatness and Attitude?

2.4 Speed and Attitude?

2.5 Speed and Neatness?

2.6 Accuracy and Attitude?

3. There is no significant relationship between the mean performance by sex and each of the four criteria as follows:

3.1 Mean performance and speed.

3.2 Mean performance and accuracy

3.3 Mean performance and neatness

3.4 Mean performance and attitude

Significance of the Study

This study was conducted because up to the present no statistical record yet has been established to show the relationship among the four factors mentioned under the statement of the problem and their influence on the performance of students in mechanical drawing. These factors are speed, accuracy, neatness, and attitude.

Hopefully, the findings of this study will motivate the students to be more responsible in accomplishing their projects and help drawing and vocational teachers in evaluating objectively student's projects in drawing and in different shops based on the standards criteria used in mechanical, manipulative skills, and job intelligence, which are all contributory to job efficiency.

Finally, it will give the administrators an insight into the needs and problems of the drawing and shop teachers, especially on the facilities necessary for the attainment of the job efficiency among students in the vocational department, particularly in mechanical drawing and drafting technology.

Scope and Delimitation

This study is primarily focused on the relationship between speed, accuracy, neatness and attitude as correlates of efficient performance in mechanical drawing. This is an evaluation of performance in mechanical drawing of the third year high school students of Samar State Polytechnic College, Catbalogan, Samar. This study covered the second and third grading periods during the school year 1990-1991 because it is at this period where the students have already acquired the basic knowledge and almost completed the basic skills in mechanical drawing. Out of the 12 plates required of the third year students the researcher will sample only six plates.

There were two sections involved in this study composed of 94 students from which 70 were choosen as samples broken down into 40 males and 30 females.

Definition of Terms

In order to provide the readers a common frame of reference, the following terms are defined as used in this study.

Accuracy. This term refers to the quality of being in comformity with a described standards as to shape, size, color and other specified requirements. No drawing is of maximum usefulness if it is not accurate. The students should remember that the drawing is a means of communication to others, and that it must be clear and ligible in order to serve its purpose well, the students must learn from the beginning that the success in the college career or later in personal employment cannot be if the habit of accuracy is not acquired,[6]

Attitude. This is the predisposition or tendency to react, especially towards work, situation or values; usually accomplished by feelings and emotions,[7] The students should remember that attending to finish dirty works is rejectable and should present no resentment to the teacher when required to redraw.

---

[6]Giesecke, et. al., Technical Drawing, (New York: MacMillan Publishing Co., 1985), p. 15.

[7]Carter V. Good, Dictionary of Education, (MacGraw-Hill, Inc., 1973), p. 49.

Correlates. This term refers to either of two things so related that one directly implies or is complementary to the other.[8]

Correlation. This is shortened term commonly used for coefficient of correlation; the act or process of ascertaining the degree of relationship between two or more variables.[9]

Drawing. This term refers to the process of representing object or ideas depicting on a surface, such as paper with pencil, crayon, pen, brush, or other graphic means, may be freehand or instrumental, or representational or purely informational, or diagramatic.[10]

Efficient Performance. The ability to achieved desire result with economy of time, money and efforts in relation to the amount of work accomplished.[11]

Mechanical Drawing. This is a study of communicating ideas through lines, symbols and drawing; learning activities involving the use of technical drawing instruments to

---

[8]Philip B. Gove, Webster's Third New International Dictionary, (Massachusette, USA: G & C Meriam Co., 1976), p. 511.

[9]Good, op. cit. p. 141.

[10]Ibid. p. 195

[11]Ibid. p. 207

convey ideas graphically through, for example, orthographic projection, pictorial views, and assembly drawing.[12]

Neatness. This term implies to the quality or state of being neat. If the drawing is to be accurate and ligible, it must be also clean; therefore, the students should constantly strive to acquire the habit of neatness. Untidy drawing is the result of sloopy and careless methods. [13]

Vocational and Technical Education. The training intended for students to earn a living in an occupation which is dependent largely upon technical information and understanding of the laws science and technology as applied to modern design, production, distribution, and service.[14]

Speed. This is the quality of satisfactorily meeting the requierements of time. "Time is money" in industry, and there is no demand for the craftsman or engineer who is slow. However, speed is not attained by hurrying; it is unsought by product of intelligent and continous work. It comes with the study of practice, and the fast worker is usually more mentally alert.[15]

---

[12]Ibid. p. 196.

[13]Gieseche, lop. cit. p

[14]Good, op. cit p. 644.

[15]Giesecke, loc. cit.

Chapter 2

REVIEW OF RELATED LITERATURE AND STUDIES

The researcher patiently reviewed books, unpublished works and other research paper, periodicals and other publications relevant to this study to give more meaning and substance to this study.

RELATED LITERATURE

Positive and Proper Work Attitude

Every person must realize that it is within his means to develop himself physically, mentally, emotionally, culturally, socially and spiritually through his legitimate and honest work. If he does so, he becomes a self-propelled worker. To excel in one's work or to attain effectiveness and efficiency for high productivity you need not only possess the necesssary skills or knowledge but also the proper attitude. Positive or proper attitude speeds the difference between a meaningful and fulfilling work to routinary and humdrum one. And , since life is all work, we must know how to inculcate positive work attitude to others.[16]

---

[16]Trainee's Activity Guide in work Ethics 201, (DECS 1984), p. 8.

The Value of Effectiveness and Efficiency

Assuming that one of the goals of any society is productivity, effectiveness in the work is defined simply as how well and efficiently the worker of an enterprise in a given environment accomplish enterprises objectives. If we can assume that the objectives is productivity, the efficiency is given by the equation, $E = O/i$, where E is efficiency, O is output and i is input. When management principles can be developed, proved, and used efficiency will inevitably improve. Then the conscientious technician can be more effective by using established guidelines to help solve his problem without engaging in original laborious research or the risky practice an error.

Herewith are some guidelines for typical company rules and regulations related to values of effectiveness and efficiency:

1. Promtness - Tardiness
2. Leave of Absence - Absence without leave
3 Horseplaying, loitering, loafing, playing, parlor games.
4. Sleeping during working hours, neglegence or abandonment of duty of post.
5. Performing outside work during working hours using company time/tools.

6. Leaving work other than prescribe periods and leaving machines unattended without proper relief.
7. Inefficiency of performance of assigned work or performing work not assign to one.
8. Attending to personal matter- debts, selling merchandise, operating loans, and other money matters during working hours.
9. Limiting productivity output or inducing other employees to do the same, causing company damage or failure to fulfill outstanding commitments.
10. Destruction, damage or misuse of any company property or property of another through carelessness or negligence.

Productivity and Efficiency[17]

Productivity is occasionally confused with the manager's concept of efficiency. Efficiency in its simplest definition as "completing a process with good result at the shortest possible time" can be a part of the wider concept of productivity.

In other sense, productivity does not simply assume efficiency, a part of it, but indeed extends the concept of efficiency to cover not only one but also all resources and

---

[17]Ibid. p. 44

inputs which are employed in any economically productive activity. Thus productivity in itself may be defined as efficiency in the use of resources capital labor materials in the production of various goods and services in the country.[18]

The factor which determine the degree of efficiency achieved at the firm level, or the limits of labor performance in any economic activity may be classified as those which are job-related; those which are resources-related; those which are environmental.

Value for the Proper Utilization of Time[19]

Time is a succession of moment with a starting point and an ending point. Thus when we say that the working time is eight hours, that means that the work starts at 8:30 A.M. and ends ate 5:30 P.M. This is the western concept of time. It is horizontal. The time is irreplaceable; it is irreverseable. In industry, time is money, thus should not be wasted.

Filipino time, on the other hand, is also a succession of moments, however, without a fixed starting point or ending points. We start when we want and end when we want.

---

[18]Ibid. p. 9

[29]Ibid. p. 51

Thus, the "Filipino" concept of time is cyclical; it is never ending. There is always a tomorrow. For Filipinos, therefore, a deadline is an alive line. It can be "resuscitated" to move further. No wonder we need to set alive deadline before finishing a job or a task.

To manage "Filipino Time" properly one must work-effectively, that is do what one wants to do and do it well. An important aspect of working effectively is planning and organizing one's time so that one will be able to do the things he wants to do.

Organizing one's time is one way of becoming more efficient. Efficiency means completing task with very little waste of time and energy. To have time for the things you want to do, you must schedule your daily activities. Plan what you will do, then stick to your planned schedule.

Other Factors Associated with Performance

Eells, et. al. showed that cultural factors enter into performance in intelligence test. It is maintained that existing group test revealed a striking difference in the academic performance of children who came from poor homes and whose cultural pattern, parental attitudes, and group standards are different from that of the middle class one

which are said to dominate and testing situations. [20]

The quality of Education Opportunity Survey (QEOS), better known as the Coleman Report of 1966, reported that expenditures, books in the library and the facilities, and the curriculum do not significantly related to academic achievement when socio-economic status, attitude of students and their schoolmates are held constant. The study revealed that performance of students in school is greatly affected by socio-economic background of their classmate or no effect on students achievement.[21]

Tuckman made a study on 1001 public high school seniors on their inputs contributory to academic performance. It revealed that the home and school contribute to school effectiveness. A conclusion was drawn that "a one unit increase in the percentage of students with white collar and college graduate has a large effect on high performance than that a one-unit increase in teacher input". It further contained that the socio-economic background factor has a stronger influence on academic achievement than the school-

---

[20]Kenneth W. Eells, et. al., Intelligence and Cultural Differences, (Chicago: University of Chicago Press), cited by Victor Noll, An Introduction to Educational Management, (US: Honghton Mifflin, 1965), p. 294.

[21]Eligio Bersaga, "Do School Make Difference in Student Achievement", Philippine Journal of Education, January 1984, p.381.

related or "in-school" factors.[22]

Research on Work Attitudes[23]

As cited by Walberg, the work of Mayo (1933) and Roethlisthberger and Dickson (1941) seemed to indicate that productivity was not only a function of the employee's aptitude, training, and skills. Indeed, in over 20,000 interview, workers revealed that they did, in fact bring their thoughs and feelings to the job, reacted diffirently to various aspects of it, and felt that their sentiments were related to how hard and how well they were willing to work. Both administrators and personnel researchers leaped from these findings to the conclusion "if we can now only improve employee attitudes, we can thereby improve their job performance."

Most of the studies focused on determining whether any relationship existed between a single organizational variable, such as the salary, and single or global measure of satisfaction. While this research was in progress, administartors were installing training programs to

---

[22]H.P. Tuckman, "High School Inputs and Their Contribution to School Performance", Journal of Human Resources 6, (Fall 1977), p. 509.

[23]Herbert J. Walberg, Evaluating Educational Performance, (California: McCutchan Publishing Corp., 1974), pp.

encourage supervisors to develop better human relations with employees in order to improve work attitudes.

In 1965 Vroom reviewed some twenty studies and found that in most instances higher satisfaction was related top better job performance consistency in the direction of findings indicates that these probably is a moderate positive relationship between satisfaction, performance, and other related variables such as absenteeism and turover. Even more significantly it could seem that work attitudes are not in and off themselves inconsequential but that their relationship to performance are more complex than had been previously recognized.

In 1968, Porter and Lawler point that most of the early researches on job satisfaction tended to be either conceptually naive or greatly oversimplified in design. The more recent studies and formulation of both Porter and Lawler and Vroom possess a similar but more complex relationship between satisfaction and productivity. They hypothesize that satisfaction comes about when certain employees need are fulfill; job satisfaction is generated when the individual receives rewards from his work situation. Some of these rewards are intrinsic to the person and his feeling of accomplishment. In such cases, the individual himself is the source of reward. However, the amount of reward may be

unrelated to how well the person has performed. The issues then becomes: Does the organization actively and visibly provide rewards in proportion to the quality of the job performance? If it does, and if the individual realizes this, then light satisfaction should be more closely related to high performance. In "work attitudes"; Conghlan and Cooke, using teeacher morale scales, identify three factors that significantly distinguish effective, school performance: Techniques of students evaluation, developmental program emphasis, and perceptions of educational effectiveness.

Think Upward

"No lukewarm energy or indifferent ambition ever accomplished anything. There must be vigor in our expectation, in our faith, in our determination, in our endeavor. We must resolve with the energy that does things.

"Not only must the desire for the thing we long for be kept uppermost, but there must be strongly concentrated intensely of effort to attain our objective".[24]

Many people make a very poor showing in life, because there is no vim, no vigor in their backbone in their en-

---

[24]Sedney N. Bremer, Successful Achievement, Vol. I (Kentuckey, USA: Success Unlimited Enterprise, 1988), p. 73.

deavor - no grit in the ambition.[25]

"One reason why the careers of most of us are so finched and narrow, is because we do not have a large faith in our selves and in our power to accomplish. We are held back too much caution.[26] We are not bold enough.

"Self-confidence is not egotism. It is knowledge, and it comes from the consciousness of possessing the ability requisite for what one undertakes. Civilization today rests upon self-confedence."

"A firm self-faith helps a man to project himself with a force that is almost irresistible. A balancer, a doubter, has no projectible power. If he starts at all, he moves with uncertainty. There is no vigor in his initiative, no positiveness in his energy.

"There is a great difference between a man who thinks that 'pershaps' he can do, or who 'will try' to do a thing, and man who 'knows' he can do it, who is bound to do it; who feels within himself a pulsating power, an irresistible force, equal to any emergency[27]

---

[25]Ibid.

[26]Ibid. p. 74.

[27]Ibid.

A Life-Work that Gives Play to one Individuality[28]

"If you would have your work count for something, put yourself into it; put character, originality, individuality into everything you do. Don't be satisfied to be an automation. Determine that whatever you do in life shall be a part of your self, and that it shall be stamped with superiority. Remember that everything you do of real value must have the impress of your self upon it, and let that be the evidence of excellence and superiority.

"You will find that devotion to your work will pay. Superiority of method, progressiveness, and up-to-dateness, leavened with your own individuality, are permanent.

The Quality of your Work is your Trademark[29]

"The quality of your work will have a great deal to do with the quality of your life", said Orizon Swett Marden. "If your work quality is down, your character will be down, your standards down, your ideals down. The habit of insisting upon the best of which you are capable and of always demanding of yourself the highest, never accepting the

---

[28]Ibid. p. 123.

[29]Ibid. p. 246.

lowest, will make all the difference between mediocrity or failure, and a successful career.

"No matter how humble your work may seem, do it in the spirit of an artist, of a master, Emil Swenson, who was a general superintendent of Andrew Carnegie's Keynote Bridge Works, attributes his promotions to his endeavor to always surpass, if possible, his latest achievement.

"Whatever I have to do in my life", said Charles Dickens, "I have tried with all my heart to do well. What I have devoted myself to completely. Never to put one hand to anything on which I could throw my whole self, and never to accept depreciation of my work, what ever it was, I find now to have been golden rules".

Labor of Love[30]

"Love thy work", is a proverb of Talmud. "A man is most efficient and will more quickly and easily succeed when engaged in work that he loves, or work that he performs in behalf of some person whom he loves", said a philosopher. "Whenever the element of love enters into any task that one performs, the quality of work becomes immediately improved

---

[30]Sedney N. Bremer, Successful Achievement Vol. I (Kentuckey, USA: Success Unlimited Enterprises, 1988), p. 246.

and the quality increased, without a corresponding increase in the fatigue caused by the work".

Samuel Gompers, founder of the American Foundation of Labor, when asked to what he attributed his success in his life-work, replied: "I learned both to think and to act, and to feel strongly enough on these great questions of labor to be willing to sacrifice my personal convenience for my aims. I have felt great devotion to the common cause of the manual works, and I can say nothing better to young men then, `Be devoted to your work; "You are unfortunate", said W.E. Coery, "If you cannot throw your heart into your work.

The foregoing literatures were been reviewed and made part of this study because all those are related to the aim and ideas of the study. The foregoing related literature revealed the effect of different factors towards efficient performance and work achievements. However, the areas of curiosity of the study are different from this study but strongly considered as significantly to substantiate the concept of this study. Because, the variables of this study such as speed, accuracy, neatness, and attitudes, the relationship between each and to mean performance are also one of the factors that influence the qualitative individual prestige, excellent work performance, and life's famous achievements.

RELATED STUDIES

Andres[31] conducted a study on the correlation between the pupils performance in elementary mathematics achievements test and their final scholastic grades. The correlation method was used in this study. The respondents consisted of 829 grade five pupils enrolled in the district of Anganadan, San Guillermo, during the school year 1978-1980. The computed value of r was, 73 which shows that there was a high correlation between the final grades by the teachers and the performance of the pupils in the achievement test exemplifies the objectivity of the teachers in giving grade.

The study also found out the factors that affect the relationship between the pupil's test results in the achievement test in elementary mathematics and their final grades, a questioniare and checklist were presented to 16 teachers handling grade five mathematics in the district. Based on the questionaire and checklist, the reason drawn to explain the low performance of some pupils in the achieve-

---

[31]Lelina Andres, "Correlation Between Pupils Performance in Elementary Mathematics V Achievement Test and their Final Schoolastic Grades", (Unpublished master's thesis, Baguio City, Vocational Normal School, 1980),

ment test was the inavailability of curriculum materials on the new content.

Cero[32] made a study on the relationship of the teacher-given rating to the district achievement test scores of grade six pupils in three subject areas, namely: Arithmetic, English and Social Studies. The respondents of the study consisted on 107 grade six pupils coming from the four sections. She used the result of the district achievement test in the three subject areas, and correlated them with the final rating of pupils gathered from their permanent records. She used the Pearson's Product Moment Method in finding the coeffecient of Correlation. Her findings showed that in arithmetic alone, the coefficient of correlation was .77 which means that there was a high degree of correlation between the two variable paired. This implied that the marks given by the teachers were reliable.

Another study was written by Nuez[33] on the relationship

---

[32]Patero Cero, "A Study on the Relationship of the Teacher's Rating to the District Achievement Test Score of Grade Six Pupils of Jagna Central Elementary School Division of Bohol 1969-1970", (Unpublished master's thesis, Rafael Palma College, Tagbilaran City, 1970), p. 61.

[33]Victoria Nuez, "The Relationship Between Reading Achievement and Modern Mathematics Achievement Among the Grade Five and Six Pupils of Guadalope Elementary School in 1968-1969 and in 1969-1970". (Unpublished master's thesis, Colegio de San Jose Recoletos, Cebu City, 1971), p. 58.

between reading achievement and modern Mathematics achievement among the grade five and six pupils. She found out that there was a very high correlation between reading and modern mathematics. This study revealed that mathematics is dependent upon reading, especially on the problem solving and interpreting mathematical sentences.

Perez[34] also made a correlation study on mathematics of grade six pupils of the three central schools in Catbalogan Samar. The respondents totalled to one hundred twenty pupils, 60 of whom were males and 60 were females.

The Pearson Product-moment Method of Correlation was used in treating the achievement test results and the t-test of significance at .05 level with two degrees of freedom was employed to find out whether the obtained correlation falls within the region of acceptance or rejection. Since the computed t-value were greater than the critical t-value, the four null hypotheses were rejected signifying thate the mean achievement scores and the mean schoolastic ratings in both mathematics and english are significantly the same. This

---

[34]Tomasa R. Perez, "Mathematical and Language Abilities of Grade Six Pupils of the Three Central School in Catbalogan, Samar 1987" (Unpublished master's thesis, Samar State Polytechnic College, Catbalogan, Samar. 1987), pp. 50-57.

also means that the sample pupils were as good in mathematics as in english.

Another study conducted by Manahan[35] on the correlation of reading comprehension skill to mathematics skills in problem solving of 250 grade six pupils of Calbanga Pilot School. The data used in the study were the report cards (Form 138) of previous years in grade five and grade six in reading comprehension and in problem solving in mathematics. The statistical tool used was the Pearson Product-Moment Coefficient of Correlation.

Her findings showed that the skills in reading comprehension and their correlation to problem solving skills in mathematics as found in the investigation provide very meaningful information on the nature and extent of the relationship betwen reading comprehension and problem solving and the strength and weaknesses of pupils in these skills.

She found out further the following resluts:

1. The marked, substantial and positive correlation of .64 between the diagnostic test scores in reading comprehension and diagnostic test scores in problem solving and

---

[35]Divina T. Manahan, "The Correlation of Reading Comprehension Skills to Mathematics Skills", in Problem Solving of Grade Six Pupils of Calabanga", (Unpublished master's thesis, University of Nueva Caceras, 1977),

the correlation of .54 between summative test scores in these skills got high scores in problem solving and in the reading comprehension test.

2. There is a positive substantial and marked correlation between variable of reading comprehension and problem solving.

3. The weakness of children in solving problem are mostly two of three-steps problems, inability to think critically and determine what operation are needed, and weaknesses in the computations of the four fundamental operation.

4. Grade VI pupils weaknesses in reading comprehension are mostly in sequencing events, answering critical questions, drawing conclusions, comparison, generalization, interpreting and making inferences, cause and effect relationship.

Marco[36] conducted a study on "Correlation Between Students Perceived and Actual Learning Difficulties in Mathematics IV". The main objectives of the study was to find out if there is a signficant relationship between the student's percieved and actual learning difficulties in

---

[36]Florida B. Marco, "Correlation Between Students's Perceived and Actual Learning Difficulties in Mathematics IV", (A seminar paper, Marikina, Metro Manila, 1983).

Mathematics IV.

She used 100 fourth year high school students 56 of whom were males and 44 were females, of Samar State Polytechnic College, Catbalogan, Samar during the school year 1981-1982.

A questionaire checklist and a teacher-made achievement test were used to gather the data needed. To find out if there exist similarities/differences between the perception of the learning difficulties by the males and females the t-test for correlated mean was used. The statistical test was used to ascertain the similarities/diffirences of the actual learning difficulties. The Spearman Rank Difference Correlation was used to determine if correlation existed between the student perception of the learning difficulties in Mathematics IV. The findings showed that the students perception of the learning difficulties differs with respect to sex. As revealed by the mathematics IV achievement test results, males and females do not differ in actual learning difficulties in Mathematics IV and actual learning difficulties in the same subject.

Another study conducted by Lipio[37] on the "Perfor-

---

[37]Carmilita Lipio. "The Performance of the Second Year College Students in Solving Trigonometric Problems in MNAS for School Year 1979-1980, Cebu City March 1980).

mance of Second Year College Students in solving Trigonometric Problems in MNAS for school year 1979-1980." The respondents were 45 college sophomores. The descriptive survey was used using teacher-made tests as main instrument in gathering the data. The chi-square was employed in determining the relationship between students performance in College Trigonometry and the grade in College Algebra. The findings lead to the conclusion that there is a significant relationship between student performance solving trigonometric problems and the grade in College Algebra. She further recommended that English Communication skills should be will develop to enhance the comprehension of problem situation of the students such as mathematics sentences, vocabulary development and qualitative relationship.

Relationship with the Present Study

The foregoing studies bear similarities to this study in the sense that all studies conducted were on correlation and performance. However, the related studies above were on mathematics, english, reading, language, and schoolastic achievement, while the present study is on the relationship between each of the four ctiteria such as speed, accuracy, neatness, and attitude, and mean performance and each of the

four criteria. The foregoing related studies were made part of this study to give more meaning and insight of this study.

Chapter 3

METHODOLOGY

This chapter presents the methods and procedure, the research design, the description of the respondents, the instrument used to gather the data, and the statistical measures used in the treatment of the data.

The Method and Research Design

This study was conducted to evaluate the performance of male and female junior high school students in mechnical drawing of Samar State Polytechnic College, Catbalogan, Samar and to determine the relationship between each of the four criteria used in rating mechanical drawing. the analytical-descriptive method of research was used in this study to analyze and ascertain facts that prevail among and between the variable which were made as the bases for drawing conclusions and presenting recommendations in order to ultimately achieve efficient performance in mechanical drawing.

The Subject and Sources of Data

The respondents of this study were the junior high school students of Samar State Polytechnic College, Catbalogan, Samar, during the school year 1990-1991. There

were only two sections, one section consisting of 46 students with 41 males and only 5 females. The other section was composed of 48 students with 34 females and 14 males, thus making a total population of 94 students. the source of data for this study were the drawing plates of the third year high school students

Intrumentation

The researcher utilized instructions, six students drawing plates, self-devised rating system and the standard criteria in rating mechanical drawing as instruments in gathering of data.

Every drawing plates made by the students, from plates one to six were rated through the use of the established criteria in rating mechanical drawing to determine the performance of students in mechanical drawing. Each criterion as speed, accuracy, neatness and attitude contained 25 points which made the criteria a total of 100 points.[38] The self-devised rating system was used to determine the number of points earned in each criterion.

---

[38]Giesecke, et., al, Technical Drawing. (New York: Macmillan Publishing Co. 1985), p. 15.

Gathering of Data

Before the data were gathered, the researcher sought an approval from the Head of the Technical-Vocational Department for an arrangement about the exchanging of classes between the researcher and the drawing teacher particularly handling high school students. The researcher personally made this arrangement with the proper authorities for the purpose of this study and consequently, the request was granted. This request was made in order to give the researcher a direct control and supervision of the respondents through out the period covered by the study. Out of the 12 plates required for the whole school year, the researcher selected only six plates as samples, particularly plates number 4, 5, 6, 7, 8, and 9. Plates number one to three were not included as sources of data because at this stage, the students were still undergoing orientation on the rating system designed by the researcher and duly approved by the thesis committee for the purpose of this study to insure reliability of results.

The gathering of data was done inside the drawing room during the second and third grading period, school year 1990 -1991. During the gathering of data there were rules and regulations imposed. Drawing plates were drawn under the prescribed time limit. Every students was required to pro-

vide their own drawing instruments for their own work. They were allowed to work only by themselves during their drawing period without taking the unfinished plates to their home.

Aside from posting a clear model or illustration of a particular plate on the board, the researcher still gave comprehensive instructions and complete directions before the students begin to work. The drawing plates submitted by the respondents were personally checked and rated at once through the established standard rating system for mechanical drawing found in Appendix F. The obtained data were immediately recorded on a data sheets by section. The data sheet contained six columns corresponding to the number of plates used as sources of data. Each of the six columns was divided into five subcolumns for recording the data for speed, accuracy, neatness, and attitudes, and total rating of one plate. Each respondents was coded with a number.

Treatment of Data

After recording all the necessary data, the researcher found out that there were respondents who were not able to yield complete data. Out of 94 respondents only 70 yielded complete data, 40 of whom were males and 30 were females, hence, only the 70 who yielded complete data were used as samples in this study. The researcher computed the mean of

each of the four criteria by sex. Among the computed means, the researcher tabulated, analyzed and interpreted the data quantitatively and qualitatively using the most appropraite statistical measures to arrived at the answer to the questions raised in Chapter 1.

Statistical Measures After the mean of the four criteria had been computed, the researcher proceeded to the testing of the hypotheses. There were three null hypotheses formulated in this study. To test the first hypotheses the researcher used z-test of significance of the difference between the male and female mean performance in mechanical drawing. The following formula was used:[39]

$$z = \frac{X_1 - X_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

where: X_1 = the grand mean performance of male

X_2 = the grand mean performance of female

S_1 = the variance of male

---

[39]Ronald E. Walpole, Introduction to Statistics 3rd Edition, (New York: Macmillan Publishing Co., Inc., 1982), p. 311.

S_2 = the variance of female

N_1 = number of cases for male

N_2 = number of cases for female

Z = the computed significance of the difference

The second and third null hypotheses were tested using the Pearson-Product Moment Correlation Coefficient (r) to determine the relationship between each of the paired variables with the following formula:[40]

$$z = \frac{N\ E\ XY - (EX) - (Ey)}{\sqrt{[\ N\ EX_2 - (EX)_2]\ [\ N\ EY_2 - (EY)_2]}}$$

Where:

EX = Summation of X scores

EY = Summation of Y scores

EXY = Summation of X and Y scores

N = number of cases

r = computed coefficient of correlation

---

[40]Cris Spatz and James O. Johnston, Basic Statistics 3rd Editions. (Montery, California: Brooks/Cole Publishing Co., 1984), p. 94.

For the accurate interpretation of the results of the hypotheses testing, references was made to the Table of critical value of r is interpreted using the legend below:

r value	: Interpretation
± 0 to ± .19	negligible correlation
± .20 to ± .39	relationship is present but slight
± .40 to ± .69	relationship is moderate/ substantial
± .70 to ± .89	high mark relationship
± .90 to ± .99	very high relationship
± 1.00	perfect relationship

Chapter 4

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

This chapter presents the data gathered as a result of the study, duly analyzed and interpreted in response to the question raised in chapter 1, particularly under the statement of the problem, including the discussion on the results of the hypotheses testing. The data used in this study are the ratings in mechanical drawing of the male and female junior high school students of the Samar State Polytechnic College, speoially those obtained from plates number 4, 5, 6, 7, 8, and 9. Plates number one to three were not included as sources of data because at this stage, the students were still undergoing orientation on the rating system designed by the researcher for the purpose of this study to insure reliability of results. The data are expressed in terms of means or average rating of the six plates using the four criteria as follows: (1) speed, (2) accuracy, (3) neatness, and (4) attitude. These criteria are assigned 25 points each so that the total points is 100 percent. In this case, whatever is the summation of the rating under the four criteria becomes the final rating of the students in mechanical drawing for a particular plate.

Mean Performance Rating of the Male Students with Respect to the Four Criteria

Table 1 shows the mean performance rating in mechanical drawing of the male junior high school students of SSPC with respect to the four criteria. A cursory glance at the table reveals that the grand mean performance rating of the male students is 87.91, broken down as follows: 92.70 for speed. 79.90 for accuracy, 86.10 for neatness, and 92.95 for attitude. It can be noted that while the highest for spped is 100, the lowest is only 64.64 thus yielding a range of 35.36, which indicates a very wide gap between the highest and the lowest. As to the accuracy, the highest is 92.00 and the lowest is 50.00. Hence, a gap of 42.00. Under neatness, the highest is 92.00 and the lowest is 77.00, thus making a range of 15.00. Attitude yields a highest of 100 and the lowest is 72.00, hence a range of 28.00. On the whole, the highest grand mean is 94.66, while the lowest is 77.99, thereby yielding a range of 16.67. One striking aspect among the male students is that of student number 40 whose rating for speed is 64.64 but the rating for attitude is 94.00. This particular student is really slow in performing the plates but he always wants that his plates will be neat. Whenever he is not satisfied with the result of his work he changes it. But since he is deficient

Table 1

Mean Performance Rating of the Female Student With Respect to the Four Criteria

Student Code	Speed	Accuracy	Neatness	Attitude	Grand Mean
1	90.64	90.64	92.00	97.32	92.65
2	92.00	86.00	91.32	87.32	89.16
3	97.32	80.00	85.32	94.64	89.32
4	89.32	77.32	84.00	96.00	86.66
5	96.00	92.00	91.32	99.32	94.66
6	97.32	80.64	88.00	91.32	89.32
7	84.72	70.64	85.32	92.00	83.17
8	92.00	83.32	88.64	99.32	90.82
9	93.32	87.32	91.32	91.32	90.85
10	96.00	50.64	77.32	92.64	79.15
11	93.32	81.32	91.32	98.64	91.15
12	93.32	67.32	80.64	93.32	83.65
13	99.32	85.32	86.00	99.32	92.49
14	80.64	75.32	84.65	74.64	78.81
15	97.32	80.64	86.64	94.64	89.81
16	96.00	85.32	85.32	94.64	90.32
17	98.00	84.00	90.00	99.32	92.83
18	93.32	82.00	84.60	99.32	89.81
19	97.32	81.32	86.00	91.32	88.99
20	90.00	81.32	80.64	90.64	85.65
21	99.32	78.64	84.64	98.00	90.15
22	99.32	74.00	83.32	93.32	85.49
23	98.64	90.00	90.64	98.64	94.48
24	95.32	80.00	88.64	89.32	88.32
25	98.64	86.64	88.00	94.00	91.82
26	94.64	75.32	80.00	94.00	85.99
27	96.64	79.32	86.64	91.32	88.48
28	94.64	79.32	85.32	94.00	88.32
29	98.00	82.00	89.32	90.00	89.38
30	100.00	86.64	92.00	90.00	92.16
31	99.32	84.00	85.32	94.00	90.66
32	99.32	88.00	90.64	93.32	92.81
33	90.00	81.32	90.00	87.32	87.16
34	94.64	78.64	83.32	88.64	86.31
35	77.32	78.00	84.00	92.64	82.99
36	98.64	80.64	87.32	100.00	91.65
37	80.00	80.64	80.64	72.00	87.32
38	75.32	73.32	80.00	94.00	80.66
39	86.64	66.00	82.00	92.64	81.82
40	64.64	71.32	82.00	94.00	77.99
Total	3708.20	3196.16	3444.12	3718.16	3516.66
Mean	92.70	79.90	86.10	92.95	87.91

in the use of drawing instruments, his work is often inaccurate. However, he is always present and he always keeps busy working and whenever he is corrected, he does not resent. This makes him earned a good rating in attitude. While it is true that most of the students are equally good in the four aspects of mechanical drawing, it cannot be denied that some are only good in one or two aspects but deficient in the others.

Mean Performance Rating of the Female Students with Respect to the Four Criteria

Table 2 reveals the mean performance rating in mechanical drawing of the female junior high school students of SSPC with respect to the four criteria. The table shows that the grand mean performance rating of the female students is 86.65, broken down as follows: 93.45 for attitude. It can be observed that while the highest for speed is 100, the lowest is 86.64 thus bearing a range of 13.36. As to accuracy, the highest is 88.00 while the lowest is only 54, hence yeilding a distant gap of 34. Under neatness, the highest is 92 with a lowest rating of 75.32 which indicates a gap of 16.68, while on attitude the highest is 100 and the lowest is 80, yeilding a difference of 20. On the whole, the highest grand mean performance for

Table 2

Mean Performance Rating of the Female Student With Respect to the Four Criteria

Student Code	Speed	Accuracy	Neatness	Attitude	Grand Mean
1	92.00	68.64	79.32	100.00	84.99
2	100.00	78.64	84.00	94.64	89.32
3	100.00	76.00	84.00	100.00	90.00
4	91.32	54.00	80.00	95.32	80.16
5	94.00	68.64	82.00	90.00	83.32
6	88.64	72.00	82.00	96.64	84.82
7	96.64	72.00	75.32	100.00	85.99
8	76.00	70.64	86.64	96.64	82.48
9	96.64	72.00	83.32	100.00	87.99
10	95.32	76.64	82.64	95.32	87.48
11	89.32	60.00	79.32	96.64	81.32
12	94.00	82.00	86.64	100.00	90.66
13	90.00	75.32	86.00	80.00	82.83
14	87.32	68.00	85.32	98.00	84.66
15	97.32	82.00	84.64	100.00	90.99
16	95.32	76.00	83.32	100.00	88.66
17	91.32	76.00	86.64	100.00	88.49
18	99.32	88.00	92.00	99.32	94.66
19	98.00	70.00	82.64	100.00	87.66
20	97.32	58.00	78.00	100.00	83.33
21	100.00	73.32	82.00	100.00	88.83
22	96.00	79.32	89.32	100.00	91.16
23	100.00	75.32	84.64	99.32	89.82
24	96.00	74.64	86.00	96.64	88.32
25	76.00	74.64	84.64	90.00	81.32
26	88.64	74.64	85.32	96.64	86.31
27	100.00	84.64	89.32	99.32	93.32
28	96.00	54.00	79.32	90.64	79.99
29	94.64	75.32	84.00	84.00	84.49
30	86.64	77.32	84.64	94.64	85.81
Total	2803.72	2187.68	2512.96	2894.36	2599.68
Mean	93.45	72.92	83.76	96.47	86.65

female is 94.66, while the lowest is 79.99, hence a range of 14.67. One aspect that attracts attention of the researcher is the performance of the students number 4 whose rating for speed is only 54 but the rating for attitude is 95.32 just like that of student number 28 whose rating in speed is also 54 and earned 90.64 for attitude. These two particular students have similar attitude towards mechanical drawing. However, they are slow in performing their plates being deficient in figure analysis and significant skills in manipulating drawing instruments. However, they always aim to satisfy the expected good result.

Comparative of the Male and the Female Students with Respect to their Mean Performance Rating in Mechanical Drawing

As gleaned from the data in tables 1 and 2, the grand mean performance rating of the male and the female junior high school students of SSPC are 87.91 and 86.65, respectively. The result of the hypothesis testing reveals a computed z value of .30 which is less than the table value of 1.96 at .05 level of significance. Therefore, the hypothesis that "there is no significant difference between the male and female junior high school students with respect to their mean performance in mechanical drawing" is accepted.

This mean that the male and female students can perform well equally in mechanical drawing if they are required to

draw under certain equal measures which compelling them to work; like, during laboratory hours, both must be (1) required to bring complete drawing instruments and materials necessary for the construction of a particular drawing plate, (2) refrained from doing any indolent habit such as horseplaying and the like, (3) prohibited from hiring or working for the favor of others, (4) prohibited from making absences, (5) given complete amount of instruction demons-

Table 3

Comparison of the Male and the Female Students with Respect to the Mean Reformance Rating in Mechanical Drawing

Sex	N	x_1 and x_2	Computed z	Critical value at .05 level	Interpretation
Male	40	87.91	.30	1.96	insignificant difference
Female	30	86.65			

Legend: N = Number of cases

$\overline{X}_1$ = mean performance rating of male

X_2 = mean performance rating of female

trations (6) equal motivation, and (7) given equal individual supervision.

Relationship Between Speed and Accuracy for SSPC Male Junior High School Students in Mechanical Drawing

Table 4 shows the summary of the computation of rwx which asserts that the computed r value of .34 being greater than the table value of .31 at .05 level of significance and 38 df, leads to the rejection of the null hypothesis that "there is no significant relationship between speed and accuracy of male students in mechanical drawing.

Table 4

Relationship Between Speed and Accuracy for SSPC Male Junior High School Students in Mechanical Drawing

Variable	N	rwx	Critical Value at .05	Interpretation
w and x	40	.34	.31	slight relationship

Legend: w = speed
x = Accuracy
rwx = commputed correlation coefficient
N = number of cases

Since the computed r value of .34 lies within the bracket from ±.20 to ±39 in the table of determining the

degree of relationship the relation between speed and accuracy marked a slight relationship. This means that those who obtained high rating in speed likewise, obtained high rating in accuracy.

Relationship Between Accuracy and Neatness SSPC Male Junior High School Students in Mechanical Drawing

Table 5 reveals that the computed r value of .45 is greater than the critical value of .31 at .05 level of significance and 38 df, the hypothesis is rejected. Therefore, there is a significant relationship between accuracy and neatness.

Computed rxy value of .45 exhibited a substantial relationship between accuracy and neatness since r value of .45 found within the bracket form ± 40 to ± 70 in the table of determining the degree of relationship.

Table 5

Relationship Between Accuracy and Neatness for SSPC Male Junior High School Students in Mechanical Drawing

Variable	N	rxy	Critical Value at .05	Interpretation
x and y	40	.45	.31	substantial relationship

Legend: x = speed

y = neatness

rxy = commputed correlation coefficient

N = number of cases

Relationship Between Neatness and Attitude for SSPC Male Junior High School Students in Mechanical Drawing

Table 6 shows that the obtained ryz value of .22 is less than the critical value of .31 at .05 level of significance and 38 df. This result leads to the acceptance of hypothesis states that "there is no significant relationship

Table 6

Relationship Between Neatness and Attitude for SSPC Male Junior High School Students in Mechanical Drawing

Variable	N	ryz	Critical Value at .05	Interpretation
y and z	40	.22	.31	insignificant relationship

Legend: y = neatness

z = attitude

ryz = commputed correlation coefficient

N = number of cases

between neatness and attitude of male students in mechanical drawing. Hence, those who obtained high rating in neatness do not necessarily achieve high rating in attitude.

Relationship Between Speed and Neatness for SSPC Male Junior High School Students in Mechanical Drawing

Table 7 disclose the rejection of the null hypothesis that "there is no significant relationship between speed and neatness of male students in mechanical drawing, because the computed rwy value of .40 is greater than the critical value of .31 at .05 level of significance and 38 df.

There is a slight relationship existing between speed and neatness, since the computed r of .40 belong to the

Table 7

Relationship Between Neatness and Attitude for SSPC Male Junior High School Students in Mechanical Drawing

Variable	N	ryz	Critical Value at .05	Interpretation
y and z	40	.40	.31	slight relationship

Legend: w = speed
y = neatness
rwy = commputed correlation coefficient
N = number of cases

Relationship Between Speed and Attitude for SSPC Male Junior High School Students in Mechanical Drawing.

Table 8 reveals a high relationship between speed and attitude as indicated by the computed rwz value of .81 which is found within the bracket from ± .70 to ± .89 which marked

Table 8

Relationship Between Speed and Attitude for SSPC Male Junior High School Students in Mechanical Drawing

Variable	N	rwz	Critical value at .05	Interpretation
w and z	40	.81	.31	high relationship

Legend:

w = speed

z = attitude

rwz = computed correlation coefficient

N = number of cases

a high correlation in the table of determining the degree of relationship. This result also leads to the rejection of the hypothesis that "there is no significant relationship between speed and attitude of male students in mechanical drawing", especially that the obtained r value of .81 is

greater than the critical value .31 at .05 level of significance and 38 df. This implies that those who achieved high rating in speed likewise achieved high rating in attitude.

Relationship Between Accuracy and attitude for SSPC Male Junior High School Students in Mechanical Drawing

Table 9 shows the result of the statistical test made with the particular pair of variable (x and z). The

Table 9

Relationship Between Accuracy and Attitude for SSPC Male Junior High School Students in Mechanical Drawing

Variables:	N	rxz	Critical value at .05	Interpretation
x and z	40	.17	.31	high relationship

Legend: x = accuracy
z = attitude
rxz = computed correlation coefficient
N = number of cases

computed r value of .17 is less than the table value of .31 at .05 level of significance and 38 df. This findings leads to the acceptance of the hypothesis that "there is no

significant relationship between accuracy and attitude of male in mechanical drawing". This shows further that those who obtained high rating in accuracy did not necessarily obtain high rating in attitude. It means that attitude of students did not affect their accurate performance.

Relationship Between Speed and Accuracy for SSPC Female Junior High School Students in Mechanical Drawing

Table 10 shows the acceptance of the hypothesis that "there is no significant relationship between speed and

Table 10

Relationship Between Speed and Accuracy for SSPC Female Junior High School Students in Mechanical Drawing

Variable	N	rwx	Critical value at .05	Interpretation
w and x	30	.19	.36	insignificant relationship

Legend: w = speed

x = accuracy

rwx = computed correlation coefficient

N = number of cases

accuracy of female students in mechanical drawing. The interpretation is based on the obtained rwx value of .19, being less than the table value of .36 at .05 level of significant and 28 df. This findings reveals that speed and accuracy are independent from each other. This mean that speed does not affect accuracy in the effecient performance in mechanical drawing.

Relationship Between Accuracy and Neatness for SSPC Female Junior High School Students in Mechanical Drawing

Table 11 point out that the obtained r value of .74 is greater than the critical value of .36 at .05 level of significance and 28 df. Therefore, the hypothesis that "there is no significant relationship between accuracy and neatness of female students in mechanical drawing" is rejected.

Table 11

Relationship Between Accuracy and Neatness for SSPC Female Junior High School Students in Mechanical Drawing

Variable	N	rxy	Critical value at .05	Interpretation
w and z	30	.74	.36	high relationship

Legend: x = accuracy

y = neatness

rxy = computed correlation coefficient

N = number of cases

Hence, a high degree of relationship exist between accuracy and neatness exhibited by the computed rxy value of .74 which lies within the bracket from ±.20 to ±.89 which marked high relationship found in the table in determining the degree of relationship.

Relationship Between Neatness and Attitude for SSPC Female Junior High School Students in Mechanical Drawing

Table 12 shows that the computed r value of .10 is very much less than the table value of .36 at .05 level of significance and 28 df. This signifies the acceptance of the hypothesis that "there is no significant relationship between neatness and attitude of female students in mechanical drawing". This means that neatness does not influence the attitude of the students.

Table 12

Relationship Between Neatness and Attitude for SSPC Male Junior High School Students. in Mechanical Drawing

Variable	N	Ryz	Critical value at .05	Interpretation
y and z	30	.01	.36	insignificant relationship

Legend:

y = neatness

z = attitude

ryz = computed correlation coefficient

N = number of cases

Relationship Between Speed and Neatness for SSPC Female Junior High Shool Students in Mechanical Drawing

Table 13 reveals an obtained r value of .04 which is less than the table value of .36 at .05 level of significance and 28 df. This result leads to the acceptance of the hypothessis which states that "there is no significant relationship between speed and neatness of female students in mechanical drawing". This means that speed is not associated with neatness or vice versa, especially that the computed r is negative which indicates reverse correlation.

This reveals further that a student who obtained high rating in speed does not necessarily obtain high rating in neatness.

Table 13

Relationship Between Speed and Neatness for SSPC Female Junior High School Students in Mechanical Drawing

Variable	N	rwy	Critical value at .05	Interpretation
w and y	30	-.04	.36	insignificant relationship

Legend:

w = speed

y = neatness

rwy = computed correlation coefficient

N = number of cases

Relationship Between Speed and Attitude for SSPC Female Junior High School Students in Mechanical Drawing

Table 14 shows that there is no significant relationship between speed and attitude. The obtained rwz value of .33 which is less than the critical value of .36 at .05 level of significance and 28 df, indicates the acceptance of

hypothesis that "there is no significant relationship between speed and attitude of female students in mechanical drawing". This implies that those who got high rating in

Table 14

Relationship Between Speed and Attitude for SSPC Female Junior High School Students in Mechanical Drawing

Variable	N	rwz	Critical value at .05	Interpretation
w and z	30	.33	.36	insignificant relationship

Legend:

w = speed

z = attitude

rwz = computed correlation coefficient

N = number of cases

speed does not necessarily get high rating in attitude. This means further that speed does not influence attitude or vice versa.

Relationship Between Accuracy and Attitude for SSPC Female Junior High School Students in Mechanical Drawing

Table 15 reveals the acceptance of the hypothesis that

"there is no significant relationship between accuracy and

Table 15

Relationship Between Accuracy and Attitude for SSPC Female Junior High School Students in Mechanical Drawing

Variable	N	rxz	Critical value at .05	Interpretation
x and z	30	.21	.36	insignificant relationship

Legend: x = accuracy
z = attitude
rxz = computed correlation coefficient
N = number of cases

attitude of female students in mechanical drawing", as evidenced by the computed rxz value of .21 which is less than the table value of .36 at .05 level of significance and 28 df. This means that accuracy and attitude does not influence each other.

Relationship Between the Mean Performance and Speed of SSPC Male Junior High School Students in Mechanical Drawing

Table 16 shows the obtained rvw of .47 is greater than

the critical value of .31 at .05 level of significance and 38 df. Hence, the hypothesis that "there is no significant relationship between the mean performace and speed of male students in mechanical drawing is rejected". The findings reveals a substantial relationship existing between the two variables since the r value of .47 lies within the bracket from ± 40 to ± 69 which marked a substantial relationship in the table of determining the degree of relationship.

This means that those who obtained high rating in the mean performance likewise obtained high rating in speed.

Table 16

Relationship Between the Mean Performance and Speed of SSPC Male Junior High School Students in Mechanical Drawing

Variable	N	rvw	Critical value at .05	Interpretation
v and w	40	.47	.31	substantial relationship

Legend: v = mean performance

w = speed

rvw = computed correlation coefficient

N = number of cases

Relationship Between the Mean Performance and Accuracy of SSPC Male Junior High School Students in Mechanical Drawing

As shown in table 17, the obtained r is .77 which is very much greater than the critical value of .31 at .05 level of significant and 38 df. This leads to the rejection of the hypotheses that "there is no significant relationship between the mean performance and accuracy of male students in mechanical drawing". This finding asserts that there is a high relationship between the mean performace and accuracy

Table 17

Relationship Between the mean Performance and Accuracy of SSPC Male Junior High School Students in Mechanical Drawing

Variable	N	rvx	Critical value at .05	Interpretation
v and x	40	.77	.31	high relationship

Legend:

v = mean performance

x = accuracy

rvx = computed correlation coefficient

N = number of cases

since r value of .77 is found within the bracket from ± 70 to ± 89 which marked a high relationship in the table of determining the degree of relationship. This means that the rating in accuracy has much to do with the mean performance.

Relationship Between the Mean Performance and Neatness of SSPC Male Junior High School Students in Mechanical Drawing

Table 18 reveals that the obtained r between the mean performance and neatness is also .77, which is very much greater than the table value of .31 at .05 level of signifi-

Table 18

Relationship Between the mean Performance and Neatness of SSPC Male Junior High School Students in Mechanical Drawing

Variable	N	Rwz	Critical value at .05	Interpretation
v and y	40	.77	.31	high relationship

Legend:

v = mean performance

y = neatness

rvy = computed correlation coefficient

N = number of cases

cance and 38 df. This indicates that there is a high relationship between mean performance and neatness. Hence, the hypothesis that "there is no significant relationship between the mean performance and neatness of male students in mechanical drawing", is rejected. This findings reveals that those who got high rating in mean performance also got high rating in neatness.

Relationship Between the Mean Performance and Attitude of SSPC Male Junior High School Students in Mechanical Drawing

Table 19 presents the relationship between mean performance and attitude. The obtained rvz of .45 is less than the critical value of .31 at .05 level of significance and 38 df. This indicates the rejection of the hypothesis that "there is no significant relationship between the mean performance and atttitude of male students in mechanical drawing". This result reveals a subtantial relationship between the mean performance and attitude. In the since that the computed r value of .45 lies within the bracket of ± .40 to ± .69 which marked a substantial relationship in the table of determining the degree of relationship. This means that those who obtained high rating in the mean performance likewise obtained high rating in attitude.

Table 19

Relationship Between the Mean Performance and Attitude of SSPC Male Junior High School Students in Mechanical Drawing

Variable	N	rvz	Critical value at .05	Interpretation
v and z	40	.45	.31	substantial relationship

Legend:

v = mean performance

z = attitude

rvz = computed correlation coefficient

N = number of cases

Relationship Between the Mean Performance and Speed of SSPC Female Junior High School Students in Mechanical Drawing

As shown in Table 20, the computed rvw value of .60 is greater than the table value of .36 at .05 level of significance and 28 df. Since the computed r value is greater than the table value, the hypothesis that "there is no significant relationship between the mean performance and speed of female students in mechanical drawing" is rejected. Hence, ascerts a substantial relationship between the mean performance and speed because the computed r lies within the

bracket from ± .40 to ± .69 which marked a substantial relationship in the table of determining the degree of relationship. This implies that the rating in mean performance significantly influenced by the rating in speed.

Table 20

Relationship Between Mean Performance and Speed of SSPC Female Junior High School Students in Mechanical Drawing

Variable	N	rvw	Critical value at .05	Interpretation
v and w	30	.60	.36	substantial relationship

Legend:

v = mean perfromance

w = speed

rvw = computed correlation coefficient

N = number of cases

Relationship Between the mean Performance and Accuracy of SSPC Female Junior High School Students in Mechanical Drawing

Table 21 reveals the computed rvx value of .85 being very much greater than the critical value of .36 at .05 level of significance and 28 df, leads to the rejection of

the hypothesis that "there is no significant relationship between the mean performance and accuracy of female asserts that high relationship exist between the mean performance and accuracy because the r value of .83 is found within the bracket of ±.70 to ± 89 which marked a high relationship in the table of determining the degree of relationship.

This means that those who achieved high rating in the mean performance likewise got high rating in accuracy.

Table 21

Relationship Between the Mean Performance and Accuracy of SSPC Male Junior High School Students in Mechanical Drawing

Variable	N	rvx	Critical value at .05	Interpretation
v and x	30	.36	.83	high relationship

Legend:

v = mean performance

x = accuracy

rvx = computed correlation coefficient

N = number of cases

Relationship Between the mean Performance and Neatness of SSPC Female junior High School Students in Mechanical Drawing

Table 22 indicates an obtained rvy of .60, which is greater than the table value of .36 at .05 level of significance and 28 df. Hence, the hypothesis that "there is no significant relationship between the mean performance and neatness of female students in mechanical drawing" is rejected. This is evidenced by a substantial relationship

Table 22

Relationship Between the Mean Performance and Neatness of SSPC Male Junior High School Students in Mechanical Drawing

Variable	N	rvy	Critical value at .05	Interpretation
v and y	30	.60	.36	substantial relationship

Legend:

v = mean performance

y = neatness

rvy = computed correlation coefficient

N = number of cases

between the mean performance and neatness because the computed r falls within the bracket from ±.40 to ±.69 which marked a substantial relationship in the table of determining the degree of relationship.

Relationship Between the Mean Performance and Attitude of SSPC Female Junior High School Students in Mechanical Drawing

Table 23 show the obtained rvz value of .55 which is greater than the critical value of .36 at .05 level of significance and 28 df. This leads to the rejection of the null hypothesis that "there is no significant relationship between the mean performance and attitude of female students in mechanical drawing".

Table 23

Relationship Between the Mean Performance and Attitude of SSPC Male Junior High School Students in Mechanical Drawing

Variable	N	rvz	Critical value at .05	Interpretation
v and z	30	.53	.36	substantial relationship

Legend:

v = mean performance

z = attitude

rvz = computed correlation coefficient

N = number of cases

This finding asserts that there is a substantial relationship between mean performance and attitude as determined in the table of determining the degree of relationship that if the r value is located within the bracket from ±.40 to ± .69 marked substantial relationship.

This means that those who gained high rating in the mean performance likewise gained high rating in attitude.

Chapter 5

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter presents the summary, conclusions, and recommendation of the study.

Summary

This study was conducted to evaluate the drawing plates of SSPC male and female junior high school students with respect to speed, accuracy, neatness, and attitude as correlates to efficient performance in mechanical drawing. More specifically, it sought answers to the following questions:

1. What are the correlates of efficient performance in mechanical drawing?

2. What is the mean performance rating in mechanical drawing of the junior high school students of Samar State Polytechnic College by sex with respect to the following criteria:

    2.1 Speed

    2.2 Accuracy

    2.3 Neatness

    2.4 Attitude

3. Is there a significant difference between the male and female junior high school students of SSPC with respect

to their mean performance in mechanical drawing.

4. Is there a significant relationship among the four criteria by sex as indicated by the following pair of variables:

4.1 Speed and Accuracy

4.2 Accuracy and Neatness

4.3 Neatness and Attitude

4.4 Speed and Attitude

4.5 Speed and Neatness

4.6 Accuracy and Attitude

5. Is there a significant relationship between the mean performance by sex and each of the four criteria as follows:

5.1 Mean performance and speed

5.3 Mean performance and accuracy

5.4 Mean performance and attitude

The following are the null hypotheses formulated and tested;

1. There is no significant difference between the male and female junior high school students of SSPC with respect to their mean performance in mechanical drawing.

2. There is no significant relationship among the four criteria by sex as indicated by the following pairs of variables.

2.1 Speed and Accuracy (rwx)

2.2 Accuracy and Neatness (rxy)

2.3 Neatness and Attitude (ryz)

2.4 Speed and Attitude (rwz)

2.5 Speed and Neatness (rwy)

2.6 Accuracy and Attitude (rxz)

3. There is no significant relationship between the mean performance by sex and each of the four criteria as follows:

3.1 Mean performance and speed (rvw)

3.2 Mean performance and Accuracy (rvx)

3.3 Mean performance and Neatness (rvy)

3.4 Mean performance and attitude (rvz)

The analytical-descriptive method of research was employed in this study using instructions sets-devised rating system in rating the standard criteria and the mechanical drawing as instrument in gathering data. The sources of data were the six drawing plates, (plate no. 4 to 9). Close observation and supervision was duly exercised to insure the reliability of the results obtained.

This study is of importance to students because becoming aware of the relationship between mean performance and each of the four criteria, such as speed, accuracy, neatness, and attitude, will help them achieve life's

greatest riches which include success, happiness, and peace of mind particularly in the world of work. This will help drawing teachers and other vocational teacher in evaluating objectively student's performance in the different shops based on the Standard Rating System used in mechanical drawing. To the administrators, this will give them insight into the needs and problems of the drawing and shop teachers, especially on the facilities necessary for the attainment of job efficiency.

To enrich the content of the study, the researcher patiently reviewed books, unpublished works and other research paper, periodicals and other publication to gather information relevant to the study.

The subject of the study were the junior high school students of Samar State Pokytechnic College, Catbalogan, Samar during the school year 1990-1991, with 55 males and 30 females, totalling to 94 students, 70 of whom were selected as samples of study.

The data gathered were carefully recorded, tabulated, and statistically treated, uisng the most appropriate statistical measures such as: the Z-test of significance of the difference between the means of independent samples, and the Pearson-Product Moment of Correlation Coefficient (r) to test the relationship between the four criteria by sex, the

relationship between performance and each of the four criteria. The alpha level of significance used was .05 level of significance and certain degrees of freedom depending on the number of cases.

Finding Based on the computations found in the Appendices, the following results were obtained.

1. There is no significant difference between the SSPC male and female junior high school students with respect to their mean performance in mechanical drawing as revealed by the computed z value of .30 which is less than the tabular z value of 1.96. Therefore, the first null hypothesis that "there is no significant difference between the male and female junior high school students with respect to their mean performance in mechanical drawing" is accepted. This result indicate that both the male and female students can perform equally well in mechanical drawing if properly supervised.

2. The result of the computation for the Pearson-Product Moment of Correlation Coefficient (r) revealed the following findings:

2.1 As to the male students, the pairs of variables with significant r value are as follows: speed and accuracy, .34 (slight reltionship); accuracy and neatness, .45 (substantial relationship); speed and

neatness, .40 (substantial relationship); speed and attitude, .81 (high relationship). the foregoing results lead to rejection of the second null hypothesis relative to the foregoing pairs of variables that "there is no significant relationship between each of the four criteria in mechanical drawing." This means that the foregoing pairs of variables influenced each other.

2.2 The pairs of variable with significant r value are as follows: speed and neatness, .22; accuracy and attitude, .17. These results indicate the acceptance of the second null hypothesis relative to these particular pairs of variables. Therefore, these pairs of variables do not affect each other in achieving efficient performance of students

2.3 For the female students, the r value insignificant for the following pairs of variables: speed and accuracy, .19; neatness and attitude, .01; speed and neatness, -.04; speed and attitude, .33; accuracy and attitude, .21. For the above pairs of variables the second null hypothesis is accepted because the computed value of r are less than the critical value of .36 at .05 level of significant and 28 df. This means that one variable does not influenced the other.

2.4 The only pair of variable among the female with significant relationship is speed and attitude with computed r value of .81 which is greater than the table value of .36 at .05 level of significance and 28 df. Hence, the rejection of the second null hypothesis relative to this pair of variable. This high relationship between speed and attitude means that the students achieved high rating in speed as in attitude.

3. As to the relationship between mean performance and each of the four criteria, the hypothesis testing reveals the following results:

3.1 Among the male students the obtained r value for the mean performance and each of the four criteria are as follows mean performance and speed, .47 (substantial relationship); mean performance and accuracy, .77 (high relationship); mean performance and neatness, .77 also (high relationship); mean performance and attitude, .45 (substantial relationship). All the above computed r value, being greater than the ctitical value of .31 at .05 level of significance and 38 df, lead to the rejection of the third null hypothesis that "there is no significant relationship between the mean performance and each of the four criteria in mechanical drawing". This reveals that the four criteria

contribute significantly to the efficient performance of students in mechanical drawing.

3.2 The findings for the female students similar to those of the males, where the obtained r value are always greater than the critical value of .36, are the following; mean performance and speed, .60 (substantial relationship); mean performance and accuracy, .83 (high relationship); mean performance and neatness, .60 (substantial relationship); mean performance and attitude, .53 (substantial relationship). The above results indicate a strong influence of the speed, accuracy, neatness, and attitude of the performance of students in mechanical drawing.

Conclusion

In the light of the foregoing findings, the following conclusions are drawn:

1. Both male and female can perform equally well in mechanical drawing if given equal chances and if they are well supervised while they are working. Therefore, sex has nothing to do with the performance of students in mechanical drawing.

2. The significant relationship among of the four factors of efficient performance leads to a conclusion or generalization that the ability of male students in the four

criteria is homogenous except in speed and neatness as will as accuracy and attitude. Therefore, those who are good in one factor are also good in most of the other factors.

3. As to the females, the significant relationship among the four criteria reveals disparity in their ability in speed, accuracy, neatness, and attitude. This leads to the generalization that those who are good in one factor are not necessarily good in most of the other factors.

4. Both male and female students in mechanical drawing exhibited evidence of substantial and high relationship between the mean performance and each of the four factors or criteria such as speed, accuracy, neatness, and attitude. Therefore, the mean performance rating is highly influence by their rating earned in speed, accuracy, neatness, and attitude.

Recommendations

Based on the conclusion made, the researcher recommends the following:

1. All drawing teacher and shop teacher should closely supervise their students while working on their plates or projects and, if possible, should not allow students to take their unfinished project home.

2. Drawing classes should be provided with adequate instruments and facilities by the school to insure efficient

performance.

3. All drawing teachers should evaluate the drawing plates of students as objectively as possible using the Standard Rating System for Mechanical Drawing.

4. All drawing teachers should devotedly guide and assist the students in performing their plates specially on the factors where they are weak.

5. All teachers and administrator should join hands in inculcating and developing the value of efficiency as key to the world of work and possible growth and advancement thereafter.

Further Researches Recommended. The researcher recommends the following researches as an offshot of this study:

1. THE INFLUENCE OF SCHOOL FACILITIES ON THE PERFORMANCE OF STUDENTS IN DRAWING
2. THE RELATIONSHIP BETWEEN THE THEORETICAL KNOWLEDGE AND PRACTICAL SKILL IN MECHANICAL DRAWING
3. RELATIONSHIP BETWEEN MECHANICAL AND FREEHAND DRAWING

B I B L I O G R A P H Y

BIBLIOGRAPHY

A. BOOKS

Bremer, Sedney N. Successful Achievement Vol. I. Kentucky, USA: Success Unlimited Enterprises, 1988.

Dizon, Amado C. Presidential Decree on Education and Related Laws. Manila, Philippines, 1978.

Eells, Kenneth W. Intelligence and Cultural Differences. cited by Victor Noll, An Introduction to Educational Management. US: Houghton Mifflin, 1965.

Giesecke, Mitchell et al. Technical Drawing. New York: MacMillan Publishing Co., 1985.

Good, Carter V. Dictionary of Education. New York: McGraw-Hill Book Co., Inc., 1945.

Gove. Philip B. Webster's Third New International Dictionary. G & C Merriam Co., 1976.

Los Angeles Unified School District. Drafting. Encino, California: Collencoe Publishing Co., Inc., 1978.

Prosser, Charles A., Quigly, Thos. Vocational Education in a Democracy. Chicago: American Society, 1963.

Spatz, Chris and Johnston, James O. Basic Statistics 3rd Edition, Monterey, California: Brooks/Cole Publishing Co., 1984.

Walberg, Herbert J. Evaluation Education Performance. California: McCutchan Publishing Corp., 1974.

Walpole, Ronald E. Introduction to Statistics 3rd Edition. New York: MacMillan Publishing Co., Inc., 1982.

PERIODICALS

Bersaga, Eligio "Do Schools Make Difference in Student Achievement?" Philippines Journal of Education, January 1984.

Tuckman, H. P. "High School Inputs and Their Contribution to School Performance". Journal of Human Resources. Fall 1977.

UNPUBLISHED WORKS

Andres, Lelina., "Correlation Between Pupils Performance in Elementary Mathematics V Achievement Test and Their Final Scholastic Grades." Unpublished Master's Thesis, Baguio City, Vocational Normal School, 1980.

Cero, Patero. "A Study on the Relationship of the Teacher's Rating to the District Achievement Test Scores Grade Six Pupils of Jagna Central Elementary

School Division of Bohol 1969-1970." Unpublished Master's Thesis, Rafael Palma College, Tagbilaran City, 1970.

Lipio, Carmilita. "The Performance of the Second Year College Students in Solving Trigonometric Problems in MNAS for School Year 1979-1980." Unpublished Master's Thesis, Cebu City, March 1980.

Manahan, Divina T. "The Correlation of Reading Comprehension Skills to Mathematical Skills in Problem Solving of Grade Six Pupils of Calabanga." Unpublished Master's Thesis, University of Nueva Caceras, 1977.

Marco, Florida B. "Correlation Between Student's Perceived and Actual Learning Difficulties in Mathematics IV." Unpublished Master's Thesis, Cebu State College, Cebu City, March 1980.

Nuez, Victoria. "The Relationship Between Reading Achievement and Modern Mathematics Achievement Among the Grade Five and Grade Six Pupils of Guadalupe Elementary School in 1968-1970". Unpublished Master's Thesis, Colegio de San Jose Recoletos, Cebu City, 1971.

Perez, Tomasa R. "Mathematical and Language Abilities of Grade Six Pupils of the Three Central Schools in Catbalogan, Samar," Unpublished Master's Thesis, Samar State Polytechnic College, Catbalogan, Samar, 1987.

DOCUMENTS

MECS Journal Vol. "Education Act of 1982." September-October, 1982.

Trainee's Activity Guide in Work Ethics 101 & 102. DECS, 1984.

1987 Constitution of the Philippines. "Primer" Quezon City, Philippines, 1987.

A P P E N D I C E S

APPENDIX A

SAMAR STATE POLYTECHNIC COLLEGE
Catbalogan, Samar

March 29, 1989

The Dean of Graduate Studies
Samar State Polytechnic College
Catbalogan, Samar
(Thru Channel)

S i r :

In my desire to start writing my thesis proposal, I have the honor to submit for your approval one of the following research problems, preferably problem number 1:

1. CORRELATES OF EFFICIENT PERFROMANCE IN MECHANICAL DRAWING

2. TRADE DRAWING AS A SPECIALIZED COURSE IN THE SECONDARY TRADE CURRICULUM: A FEASIBILITTY STUDY

3. EFFECTIVENESS OF MODULAR INSTRUCTION IN PICTORIAL DRAWING FOR SECONDARY STUDENTS

I hope for your earlly and favorable action on this matter.

Very truly yours,

(SGD.) GENARO J. OSIAS
Researcher

Recommending Approval:

(SGD.) ALEJANDRO E. CANANUA M. Ed.
Head, Research and Development

APPROVED

(SGD.) DOMINADOR Q. CABANGANAN, Ed. D.
Dean, Graduate Studies

APPENDIX B

SAMAR STATE POLYTECHNIC COLLEGE
Catbalogan, Samar

SCHOOL OF GRADUATE STUDIES

APPLICATION FOR ASSIGNMENT OF ADVISER

NAME : Osias Genaro Javier
Surname First Name Middle Name

CANDIDATE FOR DEGREE: Master of Arts in Education

AREA OF SPECIALIZATION: Administration and Supervision

TITLE OF PROPOSED THESIS: CORRELATES OF EFFICIENT PERFOR-MANCE IN MECHANICAL DRAWING

(SGD.) GENARO J. OSIAS
Applicant

(SGD). Asso. Prof. ALEJANDRO CANANUA
Name of Designated Adviser

APPROVED

(SGD). SENECIO D. AYONG DPA/Ed. D.
Dean

CONFORME

(SGD). ALEJANDRO E. CANANUA M. Ed.
Adviser

APPENDIX C

SAMAR STATE POLYTECHNIC COLLEGE
Catbalogan, Samar

March 12, 1990

The Dean
School of Graduate Studies
Samar State Polytechnic College
Catbalogan, Samar

Sir:

I have the honor to apply for Pre-Oral Defense of my thesis proposal entitled CORRELATES OF EFFICIENT PERFORMAMCE IN MECHANICAL DRAWING on March 16, 1990.

In this connection, I am submitting herewith five copies of my thesis proposal for distribution to the Dean and the panel members.

I hope for your favorable action on this matter.

Very truly yours,

(SGD.) GENARO J. OSIAS
Researcher

Recommending Approval:

(SGD.) ALEJANDRO E. CANANUA, M. Ed
Adviser

APPROVED:

(SGD.) SENECIO D. AYONG. DPA Ed. d
Dean , Graduate School

APPENDIX D

SAMAR STATE POLYTECHNIC COLLEGE
Catbalogan, Samar

February 22, 1991

The Dean
School of Graduate Studies
Samar State Polytechnic College
Catbalogan, Samar

Sir:

I have the honor to apply for final Defense of my thesis proposal entitled CORRELATES OF EFFICIENT PERFORMAMCE IN MECHANICAL DRAWING on March 1, 1991.

In this connection, I am submitting herewith five copies of my thesis proposal for distribution to the Dean and the panel members.

I hope for your favorable action on this matter.

Very truly yours,

(SGD.) GENARO J. OSIAS
Researcher

Recommending Approval:

(SGD.) ALEJANDRO E. CANANUA, M. Ed
Adviser

APPROVED:

(SGD.) SENECIO D. AYONG. DPA Ed. d
Dean , Graduate School

APPENDIX E

SAMAR STATE POLYTECHNIC COLLEGE
Catbalogan, Samar

July 20, 1990

The Chairman and the
Members of the Panel of Examiners
Samar State Polytechnic College
Catbalogan, Samar

Sir:

The undersigned is hereby furnishing you, for your perusal, a copy of the Standard Rating System for Mechanical Drawing as instrument in gathering data for his study entitled "CORRELATES OF EFFICIENT PERFORMANCE IN MECHANICAL DRAWING" in compliance with the suggestion of the Panel of Examiners during the pre-oral examination.

This rating system is intended to be used beginning the second and third grading period of this school year 1990-1991.

Youe early favorable action and approval is highly expected.

Very truly yours,

(SGD.) GENARO J. OSIAS
Researcher

Recommending Approval:

(SGD.) ALEJANDRO E. CANANUA, M. Ed
Adviser

APPROVED:

(SGD.) SENECIO D. AYONG. DPA Ed. d
Dean , Graduate School

(SGD.) DOMINADOR Q. CABANGANAN, ED. D.
Member, Panel of Examineers

(SGD.) BERNARDO S. OLIVA, Ph. D.
Chairman, Panel of Examineers

APPENDIX F

PRESCRIDED RATING SYSTEM FOR MECHANICAL DRAWING

The Main Criteria are

a.	Speed	25 points
b.	Accuracy	25 points
c.	Neatness	25 points
d.	Attitude	25 points
	Total	100 points

How Speed is Rated (25 points)

25 pts = drawing plate submitted within the prescribe time

24 pts = 10 minutes late

23 pts = 20 minutes late

22 pts = 30 minutes late

21 pts = 40 minutes late

20 pts = 50 minutes late

19 pts = 1 hour late

18 pts = 1 hour and 10 minutes late

17 pts = 1 hour and 20 minutes late

16 pts = 1 hour and 30 minutes late

15 pts = 1 hour and 40 minutes late

14 pts = 1 hour and 50 minutes late

13 pts = 2 hours late

12 pts = 2 hours and 10 minutes late

11 pts = 2 hours and 20 minutes late

10 pts = 2 hours and 30 minutes late

9 pts = 2 hours and 40 minutes late

8 pts = 2 hours and 50 minutes late

7 pts = 3 hours late

6 pts = 3 hours and 10 minutes late

5 pts = 3 hours and 20 minutes late

4 pts = 3 hours and 30 minutes late

3 pts = 3 hours and 40 minutes late

2 pts = 3 hours and 50 minutes late

1 pts = 4 hours late

How Accuracy is Rated (25 point)

A. Construction, visible, and hidden lines (5 points)

1 pt = constructions lines are erased not shown

1 pt = visible lines are thickl and distints, have sharp intersections, and clean points of tangency.

1 pt = Hidden line dashes are medium, equal in length and equally spaced touches visible and radial line.

1 pt = All visible lines have the same thickness

1 pt = Small hidden arc which have a raduis of about 3.16 inches or less are drawn solid.

B. Dimension: Line placement, line weight, and arrowheads.

1 pt = Thin extension lines are 1/16" (2mm) away from visible lines

1 pt = Thin dimension lines are broken for numerals

1 pt = Thin dimension lines are 3/4" from the visible lines and 1/4 inch from each other.

1 pt = Arrowheads are touches thin extension lines

1 pt = Raduis dimension has one arrowhead only require the letter [R]

C. Tangent

1 pt = Tangent are always perpendicular to radii

1 pt = Points of tangency are clearly marked

1 pt = The circles or arc and the straight lines become one at the point of tangency.

1 pt = Circles, arcs and straight lines are clearly tangent.

1 pt = Centers of circles and arcs emphasized with center lines.

D. Layout: Selection and Placement of views and selection of appropriate scale (5 points).

1 pt = Principal views are selected properly.

1 pt = Top view is directly above the front view.

1 pt = Front view is horizontally inline with the side views

1 pt = Proper scale is selected to fit drawing on the drawing paper.

1 pt = Keep space below and between views for dimensions.

E. Notes, letterings and accuracy of dimensions. (5 points)

1 pt = The notes gives information about the object

1 pt = Leader lines are drawn at any convenient angle and point towards the center of circle ars, and holes.

1 pt = Lettering are vertical gothic letters uniform in hiegth, correct spacing and ligible in form.

1 pt = Numerals and fractions are one and two thirds the hieght of the whole number.

1 pt = Dimension should be accurate, either fullesize or to given scale.

How Neatness is Rated (25 points)

5 pts = All pencil marks are erased

5 pts = absence of ink blots, stain, marks of dirty fingers and the like.

5 pts = Drawing paper is plane not crumpled and no folds.

5 pts = Drawing paper is not torn, without scratches and not perforated.

5 pts = Absence of erasing marks such as whiteout, tampering and the like.

How attitude is Rate (25points)

22 - 25 = Work most of the time during working hours.

18 - 21 = Work hard during working hours

14 - 17 = Work less during working hours

10 - 13 = Work nothing but maintain harmoneous relation with othes.

6 - 9 = Absent but excused

2 - 5 = Absent but unexcused

1 = Misbehaved/escaped.

APPENDIX G

TYPICAL EXAMPLE OF PERFORMANCE RATING
SHEET IN MECHANICAL DRAWING
OF MALE STUDENTS

Students codes	Plate No. 4 Points of W	X	Y	Z	TP	Plate No. 5 Points of W	X	Y	Z	TP	Plate No. 6 Points of W	X	Y	Z	TP	Plate No. 7 Points of W	X	Y	Z	TP	Plate No. 8 Points of W	X	Y	Z	TP	Plate No. 9 Points of W	X	Y	Z
1	21	22	23	23	89	19	23	23	21	86	25	23	23	25	96	24	22	23	25	94	25	23	23	25	96	23	23	23	25
2	22	22	23	24	91	19	23	23	15	80	25	23	23	25	96	22	17	23	18	80	25	22	22	24	93	25	22	23	25
3	23	21	22	24	91	25	19	20	25	89	25	21	22	25	93	23	16	20	18	77	25	23	23	25	96	25	20	21	25
4	18	21	23	24	86	21	20	22	20	83	25	21	21	25	92	22	18	21	25	86	23	17	20	25	85	25	19	19	25
5	20	23	24	24	91	25	24	22	25	96	25	24	22	25	96	24	23	23	25	95	25	23	23	25	96	25	23	23	25
6	23	20	22	24	89	23	20	24	20	87	25	22	23	25	95	25	18	20	18	81	25	19	20	25	89	25	22	22	25
7	17	15	22	23	77	19	15	20	15	69	25	21	22	25	93	22	18	20	25	85	23	18	22	25	88	25	19	20	25
8	20	22	24	24	90	25	20	23	25	93	25	22	23	25	95	24	20	20	25	89	19	21	23	25	88	25	20	23	25
9	24	20	23	24	91	20	22	23	20	85	25	23	23	25	96	23	21	22	18	84	23	22	23	25	93	25	23	19	25
10	22	16	22	22	80	25	10	20	25	80	25	15	23	25	85	24	10	15	18	67	25	10	20	25	79	25	15	23	25
11	17	20	23	23	83	25	19	23	25	92	25	22	22	25	95	23	19	23	25	90	25	20	22	25	92	25	22	21	25
12	19	20	20	24	83	25	15	20	25	85	25	21	22	25	91	21	10	18	18	67	25	19	20	25	89	25	16	20	25
13	24	21	23	24	92	25	22	21	25	93	25	23	22	25	95	25	19	21	25	90	25	21	22	25	93	25	22	20	25
14	18	22	23	24	87	23	20	22	1	66	25	20	22	25	92	25	15	20	12	52	25	18	20	25	88	25	18	22	25
15	21	23	24	24	92	25	21	22	25	93	25	21	22	25	93	25	17	20	18	80	25	19	20	25	89	25	20	20	25
16	22	22	22	23	90	25	20	21	25	91	25	22	20	25	92	16	22	22	18	85	25	22	23	25	95	25	19	23	25
17	24	21	23	24	92	24	20	22	25	91	25	22	23	25	95	24	20	22	25	91	25	22	22	25	94	25	21	19	25
18	22	21	22	24	89	24	20	22	25	91	25	21	21	25	92	22	20	23	25	90	22	21	22	25	90	25	20	20	25
19	24	19	20	24	87	22	21	20	25	88	25	21	23	25	94	22	19	20	18	79	25	20	22	25	92	25	22	22	25
20	20	23	20	23	86	25	19	20	25	88	25	20	20	20	85	18	18	20	18	74	25	20	19	20	89	25	20	20	25
21	25	20	20	22	87	25	15	22	25	89	25	21	23	25	94	24	18	20	25	87	25	20	22	25	92	25	20	22	25
22	24	20	22	15	81	25	24	23	25	87	25	21	20	25	90	25	18	20	25	88	25	19	21	25	90	25	19	20	25
23	23	22	23	23	91	25	24	23	25	97	25	23	23	25	96	25	22	23	25	95	25	23	22	25	95	25	21	22	25
24	18	20	23	23	84	25	21	23	25	94	25	20	22	25	92	25	19	23	18	85	25	20	22	25	85	25	20	20	25
25	25	22	23	24	94	25	23	22	25	95	25	21	22	25	93	23	21	23	18	85	25	23	20	18	92	25	20	22	25
26	24	20	20	23	87	22	20	20	25	87	25	20	20	25	90	21	15	20	18	74	25	19	20	24	89	25	19	20	25
27	24	20	23	24	91	21	20	22	20	83	25	20	20	25	90	25	15	20	18	78	25	23	23	25	96	25	21	22	25
28	20	20	23	23	86	25	20	18	25	88	25	22	22	25	94	22	16	22	18	78	25	22	23	25	95	25	19	20	25
29	23	21	22	24	91	25	21	21	25	92	25	21	23	25	94	24	17	23	18	82	25	22	23	18	88	25	21	22	25
30	25	22	24	24	95	25	20	23	25	93	25	23	23	25	96	25	23	22	18	88	25	22	23	18	88	25	20	23	25

Legend:

W = points of speed; X = points of accuracy TP = Total points
Y = points of neatness Z = points of attitude

APPENDIX G-1

CONVERSION OF POINTS TO PERCENTAGE RATING
OF MALE STUDENTS

Student code	Speed Points	Speed %	Accuracy Points	Accuracy %	Neatness Points	Neatness %	Attitude Points	Attitude %	Grand Mean
1	22.66	90.64	22.66	90.64	23.00	92.00	24.33	97.32	92.65
2	23.00	92.00	21.50	86.00	22.83	91.32	21.83	87.32	89.16
3	24.33	97.32	20.00	80.00	21.33	85.32	23.66	94.64	89.32
4	22.33	89.32	19.33	77.32	21.00	84.00	24.00	96.00	89.66
5	24.00	96.00	23.33	92.00	22.83	91.32	24.83	99.32	94.66
6	24.33	97.32	20.16	80.64	22.00	88.00	22.83	91.32	89.32
7	21.18	84.72	17.66	70.64	21.33	85.32	23.00	92.00	87.17
8	23.00	92.00	20.83	83.32	22.16	88.64	24.83	99.32	90.82
9	23.33	93.32	21.83	87.32	22.83	91.32	22.83	91.32	90.82
10	24.00	96.00	12.66	50.64	19.33	77.32	23.16	92.64	79.15
11	23.33	93.32	20.33	81.32	22.83	91.32	24.66	98.64	91.15
12	23.33	93.32	16.83	67.32	20.16	80.64	23.33	93.32	83.65
13	24.83	99.32	21.33	85.32	21.50	86.00	24.83	99.32	92.46
14	20.16	80.64	18.83	75.32	21.16	84.64	18.66	74.64	78.81
15	24.33	97.32	20.16	80.64	21.16	86.64	23.66	94.64	89.81
16	24.00	96.00	21.33	85.32	21.33	85.32	23.66	94.64	90.32
17	24.50	98.00	21.00	84.00	22.50	90.00	24.83	99.32	92.83
18	23.33	93.32	20.50	82.00	21.15	84.60	24.83	99.32	89.81
19	24.33	97.32	20.33	81.32	21.50	86.00	22.83	91.32	88.99
20	22.50	90.00	20.33	81.32	20.16	80.64	22.66	90.64	85.65
21	24.83	99.32	19.66	78.64	21.16	84.64	24.50	98.00	90.15
22	24.83	99.32	18.50	74.00	20.83	83.32	23.33	99.22	87.40
23	24.66	98.32	22.50	90.00	22.66	90.64	24.66	98.64	94.48
24	23.83	95.32	20.00	80.00	22.16	88.64	22.33	89.32	88.32
25	24.66	98.64	21.66	86.64	22.00	88.00	23.50	94.00	91.82
26	23.66	94.64	18.83	75.32	20.00	80.00	23.50	94.00	85.99
27	24.16	96.64	19.83	79.32	21.66	86.64	22.83	91.32	88.48
28	23.66	94.64	19.83	79.32	21.33	85.32	23.50	94.00	88.32
29	24.50	98.00	20.50	82.00	22.33	89.32	22.50	90.00	89.83
30	25.00	100	21.66	86.64	23.00	92.00	22.50	90.00	92.16
31	24.83	99.32	21.00	84.00	21.33	85.32	23.50	94.00	90.66
32	24.83	99.32	22.00	88.00	22.66	90.64	23.33	93.32	92.82
33	22.50	90.00	20.33	81.32	22.50	90.00	21.83	87.32	87.16
34	23.66	94.64	19.66	78.64	20.83	83.32	22.16	88.64	86.32
35	19.77	77.32	19.50	78.00	21.00	84.00	23.16	94.64	83.99
36	24.66	98.64	20.16	80.64	21.83	87.32	25.00	100.00	91.65
37	20.00	80.00	20.16	80.64	20.16	80.64	18.00	72.00	78.32
38	18.83	75.32	18.33	73.32	20.00	80.00	23.50	94.00	80.66
39	21.66	86.64	16.50	66.00	20.50	82.00	23.16	92.64	81.82
40	16.16	64.64	17.83	71.32	20.50	82.00	23.50	94.00	77.99
Total	3708.20		3196.16		3444.12		3718.16		3516
Mean	92.70		79.90		86.10		92.95		87.91

APPENDIX G-2

CONVERSION OF POINTS TO PERCENTAGE RATING
OF FEMALE STUDENTS

Student code	Speed Points	Speed %	Accuracy Points	Accuracy %	Neatness Points	Neatness %	Attitude Points	Attitude %	Grand Mean
1	23.00	90.64	22.66	90.64	23.00	92.00	24.33	97.32	92.65
2	25.00	92.00	21.50	86.00	22.83	91.32	21.83	87.32	89.16
3	25.00	97.32	20.00	80.00	21.33	85.32	23.66	94.64	89.32
4	22.83	89.32	19.33	77.32	21.00	84.00	24.00	96.00	89.66
5	23.50	96.00	23.33	92.00	22.83	91.32	24.83	99.32	94.66
6	22.16	97.32	20.16	80.64	22.00	88.00	22.83	91.32	89.32
7	24.16	84.72	17.66	70.64	21.33	85.32	23.00	92.00	87.17
8	19.00	92.00	20.83	83.32	22.16	88.64	24.83	99.32	90.82
9	24.16	93.32	21.83	87.32	22.83	91.32	22.83	91.32	90.82
10	23.83	96.00	12.66	50.64	19.33	77.32	23.16	92.64	79.15
11	22.33	93.32	20.33	81.32	22.83	91.32	24.66	98.64	91.15
12	23.30	93.32	16.83	67.32	20.16	80.64	23.33	93.32	83.65
13	22.50	99.32	21.33	85.32	21.50	86.00	24.83	99.32	92.46
14	21.83	80.64	18.83	75.32	21.16	84.64	18.66	74.64	78.81
15	24.33	97.32	20.16	80.64	21.16	86.64	23.66	94.64	89.81
16	23.83	96.00	21.33	85.32	21.33	85.32	23.66	94.64	90.32
17	22.83	98.00	21.00	84.00	22.50	90.00	24.83	99.32	92.83
18	24.83	93.32	20.50	82.00	21.15	84.60	24.83	99.32	89.81
19	24.33	97.32	20.33	81.32	21.50	86.00	22.83	91.32	88.99
20	22.50	90.00	20.33	81.32	20.16	80.64	22.66	90.64	85.65
21	24.83	99.32	19.66	78.64	21.16	84.64	24.50	98.00	90.15
22	24.83	99.32	18.50	74.00	20.83	83.32	23.33	99.22	87.40
23	24.66	98.32	22.50	90.00	22.66	90.64	24.66	98.64	94.48
24	23.83	95.32	20.00	80.00	22.16	88.64	22.33	89.32	88.32
25	24.66	98.64	21.66	86.64	22.00	88.00	23.50	94.00	91.82
26	23.66	94.64	18.83	75.32	20.00	80.00	23.50	94.00	85.99
27	24.16	96.64	19.83	79.32	21.66	86.64	22.83	91.32	88.48
28	23.66	94.64	19.83	79.32	21.33	85.32	23.50	94.00	88.32
29	24.50	98.00	20.50	82.00	22.33	89.32	22.50	90.00	89.83
30	25.00	100	21.66	86.64	23.00	92.00	22.50	90.00	92.16
Total	3708.20		3196.16		3444.12		3718.16		3516
Mean	92.70		79.90		86.10		92.95		87.91

APPENDIX H

Computation of the z-test of Significance of the Difference Between the Male (X_1) and Female (X_2) Mean Percentage in Mechanical Drawing

Students Code #	X_1	X_2
1	92.65	84.99
2	89.16	89.32
3	89.32	90.00
4	86.66	80.16
5	94.66	83.82
6	89.32	84.82
7	83.17	85.99
8	90.82	82.48
9	90.82	87.99
10	79.15	87.48
11	91.15	81.32
12	83.65	90.66
13	92.49	82.83
14	78.81	84.66
15	89.81	90.99
16	90.32	88.66
17	92.83	88.49
18	89.81	94.66
19	88.99	87.66
20	85.65	83.33
21	90.15	88.83
22	87.49	91.16
23	94.48	89.82
24	88.32	88.32
25	91.82	81.32
26	85.99	86.32
27	88.48	93.32
28	88.32	79.99
29	89.83	84.49
30	92.16	85.81
31	90.66	
32	92.82	
33	87.16	
34	86.31	
35	82.99	
36	91.65	
37	78.32	
38	80.66	
39	81.82	
40	77.99	
Total	3516.66	2599.68

$$X_1 = \frac{EX_1}{N_1}$$

$$= \frac{3516.66}{40}$$

$$= 87.91$$

$$X_1 = \frac{EX_1}{N_1}$$

$$= \frac{2599.68}{30}$$

$$= 86.65$$

$$S_1^2 = \frac{N_1 \, EX_1^2 - (EX_1)^2}{N_1 \, (N_1-1)}$$

$$= \frac{(40)(3099290.27)-(3516.66)^2}{(40)\,(40-1)}$$

$$= \frac{12399290.80 - 12366897.56}{(40)\,(39)}$$

$$= \frac{32393.24}{1560.00}$$

$$= 20.76$$

$$S_2^2 = \frac{N_2 \, EX_2^2 - (EX_2)^2}{N_2 \, (N_2-1)}$$

$$= \frac{(30)(225698.84)-(2599.68)^2}{(30)\,(30-1)}$$

$$= \frac{6770965.20 - 6758336.10}{(30)\,(29)}$$

$$= \frac{32393.24}{870}$$

$$= 14.51$$

$$z = \frac{\bar{X} - \bar{X}}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_1^2}{N_1}}}$$

$$= \frac{87.91 - 86.65}{\sqrt{\frac{(20.76)^2}{40} + \frac{(14.51)^2}{30}}}$$

$$= \frac{1.26}{\sqrt{\frac{430.97}{40} + \frac{210.54}{30}}}$$

$$= \frac{1.26}{\sqrt{10.77 + 7.02}}$$

$$= \frac{1.26}{\sqrt{17.79}}$$

$$= \frac{1.26}{4.22}$$

$$z = .30$$

Table Value at alpha .05 = 1.96

The computed z value of .30 is less than the tabular z value of 1.96 at .05 level of significance, hence the acceptance of null hypothesis. Therefore, there is no significant difference between the male and female mean performance in mechanical drawing.

APPENDIX I

Computation of the Coefficient of Correlation (rwx) Between Speed (w) and Accuracy (x) for Male Students in Mechanical Drawing

Students Code #	w	x	w^2	x^2	wx
1	90.64	90.64	8215.61	8215.61	8215.61
2	92.00	86.00	8464.00	7396.00	7912.00
3	97.32	90.00	9471.18	6400.00	7785.60
4	89.32	77.32	7978.06	5978.38	6906.22
5	96.00	92.00	9216.00	8464.00	8832.00
6	97.32	80.64	9471.18	6502.81	7847.88
7	84.72	70.64	7177.48	4990.01	5984.01
8	92.00	83.32	8464.00	6942.22	7665.44
9	93.32	87.32	8708.62	7624.78	8148.70
10	96.00	87.32	9216.00	2564.41	4861.44
11	93.32	50.64	8708.62	6612.94	7588.78
12	93.32	81.32	8708.62	4531.98	6282.30
13	99.32	85.32	9864.46	7279.50	8473.98
14	80.64	75.32	6502.81	5673.10	6073.80
15	97.32	80.64	9471.18	6502.81	7847.88
16	96.00	85.32	9216.00	7279.50	8190.72
17	98.00	84.00	9604.00	7056.00	8232.00
18	93.32	82.00	8708.62	6724.00	7652.24
19	97.32	81.32	9471.18	6612.94	7914.06
20	90.00	81.32	8100.00	6612.94	7318.80
21	99.32	78.64	9864.46	6184.25	7810.52
22	99.32	74.00	9864.46	5476.00	7349.68
23	98.64	90.00	9729.85	8100.00	8877.60
24	95.32	80.00	9085.90	6400.00	7625.60
25	98.64	86.64	9729.85	7506.49	8546.17
26	94.64	75.32	8956.73	5673.10	7128.28
27	96.64	79.32	9339.29	6291.66	7665.48
28	94.64	79.32	8956.73	6291.66	7506.84
29	98.00	82.00	9604.00	6724.00	8036.00
30	100.00	86.64	10000.00	7506.49	8664.00
31	99.32	84.00	9864.46	7056.00	8342.88
32	99.32	88.00	9854.46	7744.00	8740.16
33	90.00	81.32	8100.00	6612.94	7318.80
34	94.64	78.64	6956.73	6184.25	7442.49
35	77.32	78.00	5978.38	6084.00	6030.96
36	98.64	80.64	9729.85	6502.81	7954.33
37	80.00	80.64	6400.00	6502.81	6451.20
38	75.32	73.32	5673.10	5375.82	5522.46
39	86.64	66.00	7506.49	4356.00	5718.24
40	64.64	71.32	4178.33	5086.54	4610.12
Total	3708.20	3196.16	346120.72	257622.79	297075.93

$$r_{wx} = \frac{N\,E\,wx - (Ew)\,(Ex)}{\sqrt{N\,Ew^2 - (Ew)^2][NEx^2 - (Ex)^2}}$$

$$= \frac{(40)(297075.93) - (3708.20)\,(3196.16)}{\sqrt{[(40)(346120.72) - (3708.20)^2][(40)(257622.78) - (3196.16)^2]}}$$

$$= \frac{11883037.2 - 1185000.51}{\sqrt{13844828.8 - 13750747.24][10304911.2 - 10215438.75]}}$$

$$= \frac{31036.69}{\sqrt{(94081.56)(89472.45)}}$$

$$= \frac{31036.69}{\sqrt{8417707673}}$$

$$= \frac{31036.69}{91748.06}$$

rwx = .34

tv at 0.05 = .31

The computed r-value of .34 is greater than the table value of r of .31, hence, there is a significant relationship between speed and attitude.

APPENDIX I-1

Computation of the Coefficient of Correlation (rxy) Between Accuracy (x) and Neatness (y) for Male Students in Mechanical Drawing

Students Code #	x	y	y^2	x^2	xy
1	90.64	92.00	8215.61	8215.61	8338.88
2	86.00	91.32	7396.00	7396.00	7853.52
3	90.00	85.32	6400.00	6400.00	6825.60
4	77.32	84.00	5078.38	5978.38	6494.00
5	92.00	91.32	8464.00	8464.00	8401.44
6	80.64	88.00	6502.81	6502.81	7096.32
7	70.64	85.32	4990.01	4990.01	6027.00
8	83.32	88.64	6942.22	6942.22	7385.48
9	87.32	91.32	7624.78	7624.78	7974.06
10	87.32	77.32	2565.41	2564.41	3915.48
11	50.64	91.32	6612.94	6612.94	7426.14
12	67.32	80.64	4531.98	4531.98	5428.68
13	85.32	86.00	7279.50	7279.50	7337.52
14	75.32	84.64	5673.10	5673.10	6375.08
15	80.64	86.64	6502.81	6502.81	6986.65
16	85.32	85.32	7279.50	7279.50	7279.50
17	84.00	90.00	7056.00	7056.00	7560.00
18	82.00	84.60	6724.00	6724.00	6937.20
19	81.32	86.00	6612.94	6612.94	6993.52
20	81.32	80.64	6612.94	6612.94	6557.64
21	78.64	84.64	6184.25	6184.25	6656.09
22	74.00	83.32	5476.00	5476.00	6165.68
23	90.00	90.64	8100.00	8100.00	8157.60
24	80.00	88.64	6400.00	6400.00	7091.20
25	86.64	88.00	7506.49	7506.49	7624.32
26	75.32	80.00	5673.10	5673.10	6025.60
27	79.32	86.64	6291.66	6291.66	6872.28
28	79.32	85.32	6291.66	6291.66	6767.58
29	82.00	89.32	6724.00	6724.00	7324.24
30	86.64	92.00	7506.49	7506.49	7970.88
31	84.00	85.32	7056.00	7056.00	7166.88
32	88.00	90.64	7744.00	7744.00	7976.32
33	81.32	90.00	6612.94	6612.94	7318.80
34	78.64	83.32	6184.25	6184.25	6562.28
35	78.00	84.00	6084.00	6084.00	6552.00
36	80.64	87.32	6502.81	6502.81	7041.48
37	80.64	80.64	6502.81	6502.81	6502.81
38	73.32	80.00	5375.82	5375.82	5865.60
39	66.00	82.00	4356.00	4356.00	5412.00
40	71.32	82.00	5086.54	5086.54	5848.24
Total	3196.16	3444.12	257622.78	297140.30	276086.52

$$r_{xy} = \frac{N\,E\,xy - (Ex)\,(Ey)}{\sqrt{N\,Ex^2 - (Ex)^2][NEy^2 - (Ey)^2}}$$

$$= \frac{(40)(276086.52) - (3196.16)\,(3444.12)}{\sqrt{[(40)(257622.78) - (3196.16)^2][(40)(297140.30) - (3444.12)^2]}}$$

$$= \frac{11043460.8 - 11007988.58}{\sqrt{10304911.2 - 10043575.11][11885612 - 11861962.57]}}$$

$$= \frac{35502.22}{\sqrt{(261336.09)(23649.43)}}$$

$$= \frac{35502.22}{\sqrt{6180449567}}$$

$$= \frac{35502.22}{78615.83}$$

rxy = .45

tv at 0.05 = .31

Since the computed r-value of .45 being greater than the critical r-value of .31 the null hypothesis is rejected. Therefore, there is a substantial relationship between accuracy and neatness.

APPENDIX I-2

Computation of the Coefficient of Correlation (ryz) Between Neatness (y) and Attitude (z) for Male Students in Mechanical Drawing

Students Code #	y	z	y^2	z^2	yz
1	92.00	97.32	8464.00	9471.18	8953.44
2	91.32	87.32	8339.34	7624.78	7974.06
3	85.32	94.64	6400.00	9216.00	8074.66
4	84.00	96.00	5978.38	9864.46	8064.00
5	91.32	99.32	8464.00	8339.34	9069.90
6	88.00	91.32	6502.81	8464.00	8036.16
7	85.32	92.00	4990.01	9864.46	7849.44
8	88.64	99.32	6942.22	8339.34	8803.72
9	91.32	91.32	7624.78	8582.17	8339.34
10	77.32	92.64	2565.41	9729.85	7162.92
11	91.32	98.64	6612.94	8708.62	9007.80
12	80.64	93.32	4531.98	9864.46	7525.32
13	86.00	99.32	7279.50	5571.13	8541.52
14	84.64	74.64	5673.10	8956.73	6317.53
15	86.64	94.64	6502.81	8956.73	8199.61
16	85.32	94.64	7279.50	9864.46	8074.68
17	90.00	99.32	7056.00	9864.46	8938.80
18	84.60	99.32	6724.00	8339.34	8402.47
19	86.00	91.32	6612.94	8215.61	7853.52
20	80.64	90.64	6612.94	9604.00	7309.21
21	84.64	98.00	6184.25	8708.62	8294.72
22	83.32	93.32	5476.00	9729.85	7775.42
23	90.64	98.64	8100.00	7978.06	8940.73
24	88.64	89.32	6400.00	8836.00	7917.32
25	88.00	94.00	7506.49	8836.00	8272.00
26	80.00	94.00	5673.10	8339.34	7520.00
27	86.64	91.32	6291.66	8836.00	7911.96
28	85.32	94.00	6291.66	8100.00	8020.08
29	89.32	90.00	6724.00	8100.00	8038.80
30	92.00	90.00	7506.49	8836.00	8280.00
31	85.32	94.00	7056.00	8708.62	8020.08
32	90.64	93.32	7744.00	7624.78	8458.52
33	90.00	87.32	6612.94	7624.78	7858.80
34	83.32	88.64	6184.25	7857.05	7385.48
35	84.00	92.64	6084.00	8582.17	7781.76
36	87.32	100.00	6502.81	10000.00	8732.00
37	80.64	72.00	6502.81	5184.00	5806.08
38	80.00	94.00	5375.82	8836.00	7520.00
39	82.00	92.64	4356.00	8592.17	7596.48
40	82.00	94.00	5086.54	8836.00	7708.00
Total	3444.12	3718.16	297140.30	346908.54	320336.41

$$r_{yz} = \frac{N \, E \, xy - (Ex)(Ey)}{\sqrt{N \, Ex^2 - (Ex)^2][NEy^2 - (Ey)^2}}$$

$$= \frac{(40)(320336.41) - (3444.12)(3718.16)}{\sqrt{[(40)(297140.30) - (3444.12)^2][(40)(346908.54) - (3718.16)^2]}}$$

$$= \frac{12813456.4 - 12805789.22}{\sqrt{11885612 - 11861962.57][138766341.6 - 13824713.79]}}$$

$$= \frac{7667.18}{\sqrt{120968279}}$$

$$= \frac{7667.18}{34942.35}$$

ryz = .22

tv at 0.05 = .31

Since the computed r-value of .22 is less than the critical r-value of .31, the null hypothesis is accepted. Therefore, the relationship between neatness and speed is insignificant.

APPENDIX I-3

Computation of the Coefficient of Correlation (rwy) Between Speed (w) and Neatness (y) for Male Students in Mechanical Drawing

Students Code #	w	y	y^2	w^2	wy
1	90.64	92.00	8464.00	8215.61	8338.88
2	92.00	91.32	8339.34	8464.00	8401.44
3	97.32	85.32	6400.00	9471.18	8303.34
4	89.32	84.00	5978.38	7978.06	7502.88
5	96.00	91.32	8464.00	9216.00	8766.72
6	97.32	88.00	6502.81	9471.18	8564.16
7	84.72	85.32	4990.01	7177.48	7228.31
8	92.00	88.64	6942.22	8464.00	8154.83
9	93.32	91.32	7624.78	8708.62	8521.98
10	96.00	77.32	2565.41	9216.00	7422.72
11	93.32	91.32	6612.94	8708.62	8521.98
12	93.32	80.64	4531.98	8708.62	7525.32
13	99.32	86.00	7279.50	9864.46	8541.52
14	80.64	84.64	5673.10	6502.81	6825.37
15	97.32	86.64	6502.81	9471.18	8431.80
16	96.00	85.32	7279.50	9216.00	8190.72
17	98.00	90.00	7056.00	9604.00	8820.00
18	93.32	84.60	6724.00	8708.62	7894.87
19	97.32	86.00	6612.94	9471.18	8369.52
20	90.00	80.64	6612.94	8100.00	7257.60
21	99.32	84.64	6184.25	9864.46	8406.44
22	99.32	83.32	5476.00	9864.46	8275.34
23	98.64	90.64	8100.00	9729.85	8940.73
24	95.32	88.64	6400.00	9085.90	8449.16
25	98.64	88.00	7506.49	9729.85	8680.32
26	94.64	80.00	5673.10	8956.73	7571.20
27	96.64	86.64	6291.66	9339.29	8372.89
28	94.64	85.32	6291.66	8956.73	8074.68
29	98.00	89.32	6724.00	9604.00	8753.36
30	100.00	92.00	7506.49	10000.00	9200.00
31	99.32	85.32	7056.00	9864.46	8473.98
32	99.32	90.64	7744.00	9854.46	9002.36
33	90.00	90.00	6612.94	8100.00	8100.00
34	94.64	83.32	6184.25	6956.73	7885.40
35	77.32	84.00	6084.00	5978.38	6494.88
36	98.64	87.32	6502.81	9729.85	8613.24
37	80.00	80.64	6502.81	6400.00	6451.20
38	75.32	80.00	5375.82	5673.10	6025.60
39	86.64	82.00	4356.00	7506.49	7104.48
40	64.64	82.00	5086.54	4178.33	5300.48
Total	3708.20	3444.16	297140.30	346120.72	319759.80

$$r_{wy} = \frac{N \, E\, wy - (Ew)\,(Ey)}{\sqrt{N\,Ew^2 - (Ew)^2][N\,Ey^2 - (Ey)^2}}$$

$$= \frac{(40)(319759.80) - (3708.20)(3444.12)}{\sqrt{[(40)(346120.72) - (3708.20)^2][(40)(297140.30) - (3444.12)^2]}}$$

$$= \frac{12790392 - 12771485.78}{\sqrt{13844828.8 - 13750747.24][11885612 - 11861962.57]}}$$

$$= \frac{18906.22}{\sqrt{(94081.56)(23649.43)}}$$

$$= \frac{18906.22}{\sqrt{2224975268}}$$

$$= \frac{18906.22}{47169.64}$$

rwy = .40

tv at 0.05 = .31

Since the computed r-value of .40 being greater than the critical r-value of .31 the null hypothesis is rejected. Therefore, there is a substantial relationship between speed and neatness.

APPENDIX I-4

Computation of the Coefficient of Correlation (rwz) Between Speed (w) and Neatness (z) for Male Students in Mechanical Drawing

Students Code #	w	z	w^2	z^2	wz
1	90.64	97.32	8215.61	9471.18	8821.06
2	92.00	87.32	8464.00	7624.78	8033.44
3	97.32	94.64	9471.18	9216.00	9210.36
4	89.32	96.00	7978.06	9864.46	8574.72
5	96.00	99.32	9216.00	8339.34	9534.72
6	97.32	91.32	9471.18	8464.00	8887.26
7	84.72	92.00	7177.48	9864.46	7794.24
8	92.00	99.32	8464.00	8339.34	9137.44
9	93.32	91.32	8708.62	8582.17	8521.98
10	96.00	92.64	9216.00	9729.85	8893.44
11	93.32	98.64	8708.62	8708.62	9205.08
12	93.32	93.32	8708.62	9864.46	8708.62
13	99.32	99.32	9864.46	5571.13	9864.46
14	80.64	74.64	6502.81	8956.73	6018.97
15	97.32	94.64	9471.18	8956.73	9210.36
16	96.00	94.64	9216.00	9864.46	9085.44
17	98.00	99.32	9604.00	9864.46	9733.36
18	93.32	99.32	8708.62	8339.34	9268.54
19	97.32	91.32	9471.18	8215.61	8887.26
20	90.00	90.64	8100.00	9604.00	8157.60
21	99.32	98.00	9864.46	8708.62	9733.36
22	99.32	93.32	9864.46	9729.85	9268.54
23	98.64	98.64	9729.85	7978.06	9729.85
24	95.32	89.32	9085.90	8836.00	8513.98
25	98.64	94.00	9729.85	8836.00	9272.16
26	94.64	94.00	8956.73	8339.34	8896.16
27	96.64	91.32	9339.29	8836.00	8825.16
28	94.64	94.00	8956.73	8100.00	8896.16
29	98.00	90.00	9604.00	8100.00	8820.00
30	100.00	90.00	10000.00	8836.00	9000.00
31	99.32	94.00	9864.46	8708.62	9336.08
32	99.32	93.32	9854.46	7624.78	9268.54
33	90.00	87.32	8100.00	7624.78	7858.80
34	94.64	88.64	6956.73	7857.05	8388.89
35	77.32	92.64	5978.38	8582.17	7162.92
36	98.64	100.00	9729.85	10000.00	9864.00
37	80.00	72.00	6400.00	5184.00	5760.00
38	75.32	94.00	5673.10	8836.00	7080.08
39	86.64	92.64	7506.49	8592.17	8026.33
40	64.64	94.00	4178.33	5300.48	6076.16
Total	3708.20	3718.16	346120.30	346908.54	345325.59

$$r_{wz} = \frac{N\ E\ wz - (Ew)\ (Ez)}{\sqrt{N\ Ew^2 - (Ew)^2][N\ Ez^2 - (Ez)^2}}$$

$$= \frac{(40)(345325.59) - (3708.20)(3718.16)}{\sqrt{[(40)(346120.72) - (3708.20)^2][(40)(346908.54) - (3718.16)^2]}}$$

$$= \frac{13784428.8 - 13787680.91}{\sqrt{13844828.8 - 13750747.24][13876341.6 - 13824713.78]}}$$

$$= \frac{57147.9}{\sqrt{(94081.56)(51627.82)}}$$

$$= \frac{18906.22}{\sqrt{4857225844}}$$

$$= \frac{57147.9}{69693.80}$$

rwz = .81

tv at 0.05 = .31

Since the computed r-value of .81 is very much greater than the critical r-value of .31 the null hypothesis is rejected. Therefore, there is a high relationship between speed and attitude.

APPENDIX I-5

Computation of the Coefficient of Correlation (rxz) Between Accuracy (x) and Attitude (z) for Male Students in Mechanical Drawing

Students Code #	x	z	x^2	z^2	xz
1	90.64	97.32	8215.61	9471.18	8821.08
2	86.00	87.32	7396.00	7624.78	7509.52
3	90.00	94.64	6400.00	9216.00	7571.20
4	77.32	96.00	5978.38	9864.46	7422.72
5	92.00	99.32	8464.00	8339.34	9137.44
6	80.64	91.32	6502.81	8464.00	7364.04
7	70.64	92.00	4990.01	9864.46	6498.88
8	83.32	99.32	6942.22	8339.34	8275.34
9	87.32	91.32	7624.78	8582.17	7974.06
10	87.32	92.64	2564.41	9729.85	4691.29
11	50.64	98.64	6612.94	8708.62	8021.40
12	81.32	93.32	4531.98	9864.46	6282.30
13	85.32	99.32	7279.50	5571.13	8473.98
14	75.32	74.64	5673.10	8956.73	5621.88
15	80.64	94.64	6502.81	8956.73	7631.77
16	85.32	94.64	7279.50	9864.46	8074.66
17	84.00	99.32	7056.00	9864.46	8342.88
18	82.00	99.32	6724.00	8339.34	8144.24
19	81.32	91.32	6612.94	8215.61	7426.14
20	81.32	90.64	6612.94	9604.00	7370.84
21	78.64	98.00	6184.25	8708.62	7706.72
22	74.00	93.32	5476.00	9729.85	6905.68
23	90.00	98.64	8100.00	7978.06	8877.60
24	80.00	89.32	6400.00	8836.00	7145.60
25	86.64	94.00	7506.49	8836.00	8144.16
26	75.32	94.00	5673.10	8339.34	7080.08
27	79.32	91.32	6291.66	8836.00	7243.50
28	79.32	94.00	6291.66	8100.00	7456.08
29	82.00	90.00	6724.00	8100.00	7380.00
30	86.64	90.00	7506.49	8836.00	7797.60
31	84.00	94.00	7056.00	8708.62	7896.00
32	88.00	93.32	7744.00	7624.78	8212.16
33	81.32	87.32	6612.94	7624.78	6970.65
34	78.64	88.64	6184.25	7857.05	7100.86
35	78.00	92.64	6084.00	8582.17	7225.92
36	80.64	100.00	6502.81	10000.00	8064.00
37	80.64	72.00	6502.81	5184.00	5806.08
38	73.32	94.00	5375.82	8836.00	6892.08
39	66.00	92.64	4356.00	8592.17	6114.24
40	71.32	94.00	5086.54	8836.00	6704.08
Total	3196.16	3718.16	25622.78	346908.54	297378.81

$$r_{xz} = \frac{N \, E\,xz - (Ex)\,(Ez)}{\sqrt{[N\,Ex^2 - (Ex)^2][NEw^2 - (Ew)^2]}}$$

$$= \frac{(40)(297378.81) - (3196.16)\,(3718.16)}{\sqrt{[(40)(257622.78) - (3186.16)^2][(40)(346908.54) - (3718.16)^2]}}$$

$$= \frac{11895152.4 - 11883834.27}{\sqrt{10304911.2 - 10215438.75][13876341.6 - 13824713.70]}}$$

$$= \frac{11318.13}{\sqrt{(89472.45)(51627.81)}}$$

$$= \frac{11318.13}{\sqrt{4619266649}}$$

$$= \frac{11318.13}{67965.18}$$

rxz = .17

tv at 0.05 = .31

The computed r-value of .17 is less than the table value of r of .31, hence, the acceptance of null hypothesis. Therefore, the relationship between accuracy and attitude is insignificant.

APPENDIX J

Computation of the Coefficient of Correlation (rwx) Between Speed (w) and Accuracy (x) for Female Students in Mechanical Drawing

Students Code #	w	x	w^2	x^2	wx
1	92.00	68.64	8464.00	4711.45	6314.88
2	100.00	78.64	10000.00	6184.25	7864.00
3	100.00	76.00	10000.00	5776.00	7600.00
4	91.32	54.00	8339.34	2916.00	4931.28
5	94.00	68.64	8836.00	4711.45	6452.16
6	88.64	72.00	7857.05	5184.00	6382.08
7	96.64	72.00	9339.29	5184.00	6958.08
8	76.00	70.64	5776.00	4990.01	5368.64
9	96.64	72.00	9339.29	5184.00	6958.08
10	95.32	76.64	9085.90	5873.69	7305.32
11	89.32	60.00	7978.06	3600.00	5359.20
12	94.00	82.00	8836.00	6724.00	7708.00
13	90.00	75.32	8100.00	5673.10	6778.80
14	87.32	68.00	7624.78	4624.00	5937.76
15	97.32	82.00	9471.18	6724.00	7980.24
16	95.32	76.00	9085.90	5776.00	7244.32
17	91.32	76.00	8339.34	5776.00	6940.32
18	99.32	88.00	9864.46	7744.00	8740.18
19	98.00	70.00	9604.00	4900.00	6860.00
20	97.32	58.00	9471.18	3364.00	5644.56
21	100.00	73.32	10000.00	5375.82	7332.00
22	96.00	79.32	9216.00	6291.66	7614.72
23	100.00	75.32	10000.00	5673.10	7532.00
24	96.00	74.64	9216.00	5571.13	7165.44
25	76.00	74.64	5776.00	5571.13	5672.64
26	88.64	74.64	7857.05	5571.13	6616.09
27	100.00	84.64	10000.00	7163.93	8464.00
28	96.00	54.00	9216.00	2916.00	5184.00
29	94.64	75.32	8956.73	5673.10	7128.28
30	86.64	77.32	7506.49	5978.38	6699.00
Total	2803.72	2187.68	263156.06	161405.34	204736.06

$$r_{wx} = \frac{N \, E \, wx - (Ew)(Ex)}{\sqrt{N \, Ew^2 - (Ew)^2][N \, Ex^2 - (Ex)^2}}$$

$$= \frac{(30)(204736.06) - (2803.72)(2187.69)}{\sqrt{[(30)(263156.06) - (2803.72)^2][(30)(161405.34) - (2187.68)^2]}}$$

$$= \frac{6142081.8 - 6133642.17}{\sqrt{7894681.8 - 7860845.83][4842160.2 - 4785943.78]}}$$

$$= \frac{843963}{\sqrt{(33835.97)(56216.42)}}$$

$$= \frac{843963}{\sqrt{1902137100}}$$

$$= \frac{843963}{43613.49}$$

rwx = .19

tv at 0.05 = .36

The computed r-value of .19 is less than the critical r-value of .36, the null hypothesis is accepted. Therefore, the relationship of speed and attitude is insignificant.

APPENDIX J-1

Computation of the Coefficient of Correlation (rxy) Between Accuracy (x) and Neatness (y) for Female Students in Mechanical Drawing

Students Code #	x	y	x^2	y^2	xy
1	68.64	79.32	4711.45	6291.66	5444.52
2	78.64	84.00	6184.25	7056.00	6605.76
3	76.00	84.00	5776.00	7056.00	6384.00
4	54.00	80.00	2916.00	6400.00	4320.00
5	68.64	82.00	4711.45	6724.00	5628.48
6	72.00	82.00	5184.00	6724.00	5904.00
7	72.00	75.32	5184.00	5673.10	5423.10
8	70.64	86.64	4990.01	7506.49	6120.25
9	72.00	83.32	5184.00	6942.22	5999.04
10	76.64	82.64	5873.69	6829.37	6333.35
11	60.00	79.32	3600.00	6291.66	4759.20
12	82.00	86.64	6724.00	7506.49	7104.48
13	75.32	86.00	5673.10	7396.00	6477.52
14	68.00	85.32	4624.00	7279.50	5801.76
15	82.00	84.64	6724.00	7163.93	6940.08
16	76.00	83.32	5776.00	6942.22	6332.32
17	76.00	86.64	5776.00	7506.49	6584.64
18	88.00	92.00	7744.00	8464.00	8096.00
19	70.00	82.64	4900.00	6829.37	5784.80
20	58.00	78.00	3364.00	6084.00	4524.00
21	73.32	82.00	5375.82	6724.00	6012.24
22	79.32	89.32	6291.66	7978.06	7084.86
23	75.32	84.64	5673.10	7163.93	6375.08
24	74.64	86.00	5571.13	7396.00	6419.04
25	74.64	84.64	5571.13	7163.93	6317.53
26	74.64	85.32	5571.13	7279.50	6368.28
27	84.64	89.32	7163.93	7978.06	7560.04
28	54.00	79.32	2916.00	6291.66	4283.28
29	75.32	84.00	5673.10	7056.00	6326.88
30	77.32	84.64	5978.38	7163.93	6544.36
Total	2187.68	2512.96	161405.34	210861.59	183859.44

$$r_{xy} = \frac{N \, E\, xy - (Ex)\,(Ey)}{\sqrt{N\,Ex^2 - (Ex)^2][NEy^2 - (Ey)^2}}$$

$$= \frac{(30)(183859.44) - (2187.68)(2512.96)}{\sqrt{[(30)(161405.34) - (2187.68)^2][(30)(210861.59) - (2512.96)^2]}}$$

$$= \frac{5515783.2 - 5497552.33}{\sqrt{4842160.2 - 4785943.78][632585557.7 - 6314967.96]}}$$

$$= \frac{18230.87}{\sqrt{(56216.42)(10879.74)}}$$

$$= \frac{18230.87}{\sqrt{611620033.3}}$$

$$= \frac{18230.87}{24730.95}$$

rxy = .74

tv at 0.05 =.36

Since the computed r-value of .74 being greater than the critical r-value of .36 the null hypothesis is rejected. Therefore, there is a high significant relationship between accuracy and neatness.

APPENDIX J-2

Computation of the Coefficient of Correlation (ryz) Between Neatness (y) and Attitude (z) for Female Students in Mechanical Drawing

Students Code #	y	z	y^2	z^2	yz
1	79.32	100.00	6291.66	10000.00	7932.00
2	84.00	94.64	7056.00	8956.73	7949.76
3	84.00	100.00	7056.00	10000.00	8400.00
4	80.00	95.32	6400.00	9085.90	7625.60
5	82.00	90.64	6724.00	8215.61	7432.48
6	82.00	96.64	6724.00	9339.29	7924.48
7	75.32	100.00	5673.10	10000.00	7532.00
8	86.64	96.64	7506.49	9339.29	8372.89
9	83.32	100.00	6942.22	10000.00	8332.00
10	82.64	95.32	6829.37	9085.90	7877.24
11	79.32	96.64	6291.66	9339.29	7665.48
12	86.64	100.00	7506.49	10000.00	8664.00
13	86.00	80.00	7396.00	6400.00	6880.00
14	85.32	98.00	7279.50	9604.00	8361.36
15	84.64	100.00	7163.93	10000.00	8464.00
16	83.32	100.00	6942.22	10000.00	8332.00
17	86.64	100.00	7506.49	10000.00	8664.00
18	92.00	99.32	8464.00	9864.46	9137.44
19	82.64	100.00	6829.37	10000.00	8264.00
20	78.00	100.00	6084.00	10000.00	7800.00
21	82.00	100.00	6724.00	10000.00	8200.00
22	89.32	100.00	7978.06	10000.00	8932.00
23	84.64	99.32	7163.93	9864.46	8406.44
24	86.00	96.64	7396.00	9339.29	8311.04
25	84.64	90.00	7163.93	8100.00	7617.60
26	85.32	96.64	7279.50	9339.29	8245.32
27	89.32	99.32	7978.06	9864.46	8871.26
28	79.32	90.64	6291.66	8215.61	7189.56
29	84.00	84.00	7056.00	7056.00	7056.00
30	84.64	94.64	7163.93	8956.73	8010.35
Total	2512.96	2894.36	210861.59	279966.32	242450.31

$$r_{yz} = \frac{N\ E\ yz - (Ey)\ (Ez)}{\sqrt{N\ Ey^2 - (Ey)^2][N\ Ez^2 - (Ez)^2}}$$

$$= \frac{(30)(242450.51) - (2512.96)(2894.36)}{\sqrt{[(30)(210861.59) - (2512.96)^2][(30)(279966.32) - (2894.36)^2]}}$$

$$= \frac{7273509.3 - 7273410.90}{\sqrt{[6328847.7 - 6314967.96][8398989.6 - 8377319.81]}}$$

$$= \frac{98.4}{\sqrt{(10879.74)(21669.79)}}$$

$$= \frac{98.4}{\sqrt{235761881.1}}$$

$$= \frac{98.4}{15354.55}$$

ryz = .01

tv at 0.05 =.36

Since the computed r-value of .01 is less than the critical r-value of .36, the null hypothesis is accepted. Hence, the relationship of neatness and attitude is insignificant.

APPENDIX J-3

Computation of the Coefficient of Correlation (rwy) Between Speed (w) and Neatness (y) for Female Students in Mechanical Drawing

Students Code #	w	y	w^2	y^2	wy
1	92.00	79.32	8464.00	6291.66	7297.44
2	100.00	84.00	10000.00	7056.00	8400.00
3	100.00	84.00	10000.00	7056.00	8400.00
4	91.32	80.00	8339.34	6400.00	7305.60
5	94.00	82.00	8736.00	6724.00	7708.00
6	88.64	82.00	7857.05	6724.00	7278.48
7	96.64	75.32	9339.29	5673.10	7278.92
8	76.00	86.64	5776.00	7506.49	6584.64
9	96.64	83.32	9339.29	6942.22	8052.04
10	95.32	82.64	9085.90	6829.37	7877.24
11	89.32	79.32	7978.06	6291.66	7084.86
12	94.00	86.64	8836.00	7506.49	8144.16
13	90.00	86.00	8100.00	7396.00	7740.00
14	87.32	85.32	7624.78	7279.50	7450.14
15	97.32	84.64	9471.18	7163.93	8237.16
16	95.32	83.32	9085.90	6942.22	7942.06
17	91.32	86.64	8339.34	7506.49	7911.96
18	99.32	92.00	9864.46	8464.00	9137.44
19	98.00	82.64	9604.00	6829.37	8098.72
20	97.32	78.00	9471.18	6084.00	7590.96
21	100.00	82.00	10000.00	6724.00	8200.00
22	96.00	89.32	9216.00	7978.06	8574.72
23	100.00	84.64	10000.00	7163.93	8464.00
24	96.00	86.00	9216.00	7396.00	8256.00
25	76.00	84.64	5776.00	7163.93	6432.64
26	88.64	85.32	7857.05	7279.50	7562.76
27	100.00	89.32	10000.00	7978.06	8932.00
28	96.00	79.32	9216.00	6291.66	7614.72
29	94.64	84.00	8956.73	7056.00	7949.76
30	86.64	84.64	7506.49	7163.93	7333.21
Total	2803.72	2512.96	263156.06	210861.59	234829.67

$$r_{wy} = \frac{N\,E\,wy - (Ew)(Ey)}{\sqrt{N\,Ew^2 - (Ew)^2][NEy^2 - (Ey)^2}}$$

$$= \frac{(30)(234829.27) - (2803.72)(2512.96)}{\sqrt{[(30)(263156.06) - (2803.72)^2][(30)(210861.59) - (2512.96)^2]}}$$

$$= \frac{7044890.1 - 7045636.21}{\sqrt{[7894681.8 - 7860845.83][6325847.7 - 6314967.96]}}$$

$$= \frac{-746.11}{\sqrt{(33835.97)(10879.74)}}$$

$$= \frac{-746.11}{\sqrt{368126556.2}}$$

$$= \frac{-746.11}{19186.62}$$

rwy = -0.04

tv at 0.05 =.36

Since the computed r-value of -0.04 is less than the critical r-value of .36 the null hypothesis is accepted. Hence, the relationship of neatness and speed is insignificant.

APPENDIX J-4

Computation of the Coefficient of Correlation (r_{wz}) Between Speed (w) and Attitude (z) for Female Students in Mechanical Drawing

Students Code #	w	z	w^2	z^2	wz
1	92.00	100.00	8464.00	10000.00	6314.88
2	100.00	94.64	10000.00	8956.73	7864.00
3	100.00	100.00	10000.00	10000.00	7600.00
4	91.32	95.32	8339.34	9085.90	4931.28
5	94.00	90.64	8836.00	8215.61	6452.16
6	88.64	96.64	7857.05	9339.29	6382.08
7	96.64	100.00	9339.29	10000.00	6958.08
8	76.00	96.64	5776.00	9339.29	5368.64
9	96.64	100.00	9339.29	10000.00	6958.08
10	95.32	95.32	9085.90	9085.90	7305.32
11	89.32	96.64	7978.06	9339.29	5359.20
12	94.00	100.00	8836.00	10000.00	7708.00
13	90.00	80.00	8100.00	6400.00	6778.80
14	87.32	98.00	7624.78	9604.00	5937.76
15	97.32	100.00	9471.18	10000.00	7980.24
16	95.32	100.00	9085.90	10000.00	7244.32
17	91.32	100.00	8339.34	10000.00	6940.32
18	99.32	99.32	9864.46	9864.46	8740.18
19	98.00	100.00	9604.00	10000.00	6860.00
20	97.32	100.00	9471.18	10000.00	5644.56
21	100.00	100.00	10000.00	10000.00	7332.00
22	96.00	100.00	9216.00	10000.00	7614.72
23	100.00	99.32	10000.00	9864.46	7532.00
24	96.00	96.64	9216.00	9339.29	7165.44
25	76.00	90.00	5776.00	8100.00	5672.64
26	88.64	96.64	7857.05	9339.29	6616.09
27	100.00	99.32	10000.00	9864.46	8464.00
28	96.00	90.64	9216.00	8215.61	5184.00
29	94.64	84.00	8956.73	7056.00	7128.28
30	86.64	94.64	7506.49	8956.73	6699.00
Total	2803.72	2894.36	263156.06	279966.32	27093.62

$$r_{wz} = \frac{N \, E \, xy - (Ex)(Ey)}{\sqrt{N \, Ex^2 - (Ex)^2][NEy^2 - (Ey)^2}}$$

$$= \frac{(30)(270793.62) - (2803.72)(2894.36)}{\sqrt{[(30)(263156.06) - (2803.72)^2][(30)(279966.32) - (2894.36)^2]}}$$

$$= \frac{8839.59}{\sqrt{(338335.97)(21669.79)}}$$

$$= \frac{8839.59}{\sqrt{733218364.3}}$$

$$= \frac{8839.59}{27078.00}$$

rwz = .33

tv at 0.05 = .36

Since the computed r-value of .33 is less than the critical r-value of .36 the null hypothesis is accepted. Therefore, the relationship of speed and attitude is insignificant.

APPENDIX J-5

Computation of the Coefficient of Correlation (rxz) Between Accuracy (x) and Attitude (z) for Female Students in Mechanical Drawing

Students Code #	x	z	z^2	x^2	xz
1	68.64	100.00	10000.00	4711.45	6864.00
2	78.64	94.64	8956.73	6184.25	7442.49
3	76.00	100.00	10000.00	5776.00	7600.00
4	54.00	95.32	9085.90	2916.00	5147.28
5	68.64	90.64	8215.61	4711.45	6221.53
6	72.00	96.64	9339.29	5184.00	6958.08
7	72.00	100.00	10000.00	5184.00	7200.00
8	70.64	96.64	9339.29	4990.01	6825.65
9	72.00	100.00	10000.00	5184.00	7200.00
10	76.64	95.32	9085.90	5873.69	7305.32
11	60.00	96.64	9339.29	3600.00	5798.40
12	82.00	100.00	10000.00	6724.00	8200.00
13	75.32	80.00	6400.00	5673.10	6025.60
14	68.00	98.00	9604.00	4624.00	6664.00
15	82.00	100.00	10000.00	6724.00	8200.00
16	76.00	100.00	10000.00	5776.00	7600.00
17	76.00	100.00	10000.00	5776.00	7600.00
18	88.00	99.32	9864.46	7744.00	8740.16
19	70.00	100.00	10000.00	4900.00	7000.00
20	58.00	100.00	10000.00	3364.00	7332.00
21	73.32	100.00	10000.00	5375.82	7932.00
22	79.32	100.00	10000.00	6291.66	7480.78
23	75.32	99.32	9864.46	5673.10	7213.21
24	74.64	96.64	9339.29	5571.13	6717.60
25	74.64	90.00	8100.00	5571.13	7213.21
26	74.64	96.64	9339.29	5571.13	8406.44
27	84.64	99.32	9864.46	7163.93	4894.56
28	54.00	90.64	8215.61	2916.00	6326.88
29	75.32	84.00	7056.00	5673.10	6326.88
30	77.32	94.64	8956.73	5978.38	7317.56
Total	2187.68	2894.36	161405.34	279966.32	211227.76

$$r_{xz} = \frac{N\ E\ xz - (Ex)\ (Ez)}{\sqrt{N\ Ex^2 - (Ex)^2][N\ Ez^2 - (Ez)^2}}$$

$$= \frac{(30)(211227.76) - (2187.68)\ (2894.36)}{\sqrt{[(30)(161405.34) - (2187.68)^2][(30)(279966.32) - (2894.36)^2]}}$$

$$= \frac{6336832.8 - 6331933.48}{\sqrt{4842160.2 - 4785943.78][8398989.6 - 8377319.81]}}$$

$$= \frac{4899.32}{\sqrt{268104316}}$$

$$= \frac{4899.32}{23834.93}$$

rxz = .21

tv at 0.05 = .36

Since the computed r-value of .21 is less than the critical r-value of .36 the null hypothesis is accepted. Therefore, the relationship of accuracy and attitude is insignificant.

APPENDIX K

Computation of the Coefficient of Correlation (rvw) Between Mean Performance (v) and Speed (w) for Male Students in Mechanical Drawing

Students Code #	v	w	v^2	w^2	vw
1	92.65	90.64	8584.02	8215.61	8397.79
2	89.16	92.00	7949.50	7396.00	8202.72
3	89.32	97.32	7978.06	6400.00	8692.62
4	86.66	89.32	7509.95	5978.38	7740.47
5	94.66	96.00	8960.51	8464.00	9087.36
6	89.32	97.32	7978.06	6502.81	8692.62
7	83.17	84.72	6917.24	4990.01	7046.16
8	90.82	92.00	8248.27	6942.22	8355.44
9	90.82	93.32	8248.27	7624.78	8475.32
10	79.15	96.00	6264.72	2564.41	7598.40
11	91.15	93.32	8308.32	6612.94	7806.21
12	83.65	93.32	6997.32	4531.98	9186.10
13	92.49	99.32	8554.40	7279.50	6355.23
14	78.81	80.64	6211.01	5673.10	8740.32
15	89.81	97.32	8065.85	6502.81	8670.72
16	90.32	96.00	8157.70	7279.50	9097.34
17	92.83	98.00	8617.40	7056.00	8381.06
18	89.81	93.32	8065.83	6724.00	8660.50
19	88.99	97.32	7919.22	6612.94	7708.50
20	85.65	90.00	7335.92	6612.94	8953.69
21	90.15	99.32	8127.02	6184.25	8953.69
22	87.49	99.32	7654.50	5476.00	8689.50
23	94.48	98.64	8926.47	8100.00	9319.50
24	88.32	95.32	7800.42	6400.00	8418.66
25	91.82	98.64	8430.91	7506.49	9057.12
26	85.99	94.64	7394.28	5673.10	8138.09
27	88.48	96.64	7828.71	6291.66	8550.70
28	88.32	94.64	7800.00	6291.66	8358.60
29	89.83	98.00	8069.42	6724.00	8803.34
30	92.16	100.00	8493.46	7506.49	9216.00
31	90.66	99.32	8219.23	7056.00	9216.00
32	92.82	99.32	8615.55	7744.00	9004.35
33	87.16	90.00	7596.86	6612.94	7844.40
34	86.31	94.64	7449.41	6184.25	8168.37
35	82.99	77.32	6887.32	6084.00	6416.78
36	91.65	98.64	8399.72	6502.81	9040.35
37	78.32	80.00	6134.02	6502.81	6265.60
38	80.66	75.32	6506.03	5375.82	6075.31
39	81.82	86.64	6694.51	4356.00	7088.88
40	77.99	64.64	6082.44	5086.54	5041.27
Total	3516.66	3708.20	309982.27	346120.72	326670.46

$$r_{vw} = \frac{N\,E\,vw - (Ev)\,(Ew)}{\sqrt{N\,Ev^2 - (Ev)^2][N\,Ew^2 - (Ew)^2}}$$

$$= \frac{(40)(326670.56) - (3616.66)\,(3708.20)}{\sqrt{[(40)(309982.27) - (3515.66)^2][(40)(346120.72) - (3708.20)^2]}}$$

$$= \frac{26339.79}{\sqrt{3047606552.65}}$$

$$= \frac{26339.79}{55205.13}$$

rvw = .47

tv at 0.05 = .31

The computed r-value of .47 is greater than the critical value of r of .31 at .05 level of significance and 38df, the null hypothesis is rejected. Therefore, there is a subtantial relationship between mean performance and speed.

APPENDIX K-1

Computation of the Coefficient of Correlation (rvx)
Between Mean Performance (v) and Accuracy (x)
for Male Students in Mechanical Drawing

Students Code #	v	x	v^2	x^2	vx
1	92.65	90.64	8584.02	8215.61	8396.88
2	89.16	86.00	7949.50	7396.00	7667.76
3	89.32	90.00	7978.06	6400.00	7145.60
4	86.66	77.32	7509.95	5978.38	6700.00
5	94.66	92.00	8960.51	8464.00	8708.72
6	89.32	80.64	7978.06	6502.81	7202.76
7	83.17	70.64	6917.24	4990.01	5875.12
8	90.82	83.32	8248.27	6942.22	7567.12
9	90.82	87.32	8248.27	7624.78	7930.40
10	79.15	87.32	6264.72	2564.41	4008.15
11	91.15	50.64	8308.32	6612.94	7412.31
12	83.65	67.32	6997.32	4531.98	5631.31
13	92.49	85.32	8554.40	7279.50	7891.24
14	78.81	75.32	6211.01	5673.10	5935.96
15	89.81	80.64	8065.85	6502.81	7242.27
16	90.32	85.32	8157.70	7279.50	7706.10
17	92.83	84.00	8617.40	7056.00	7797.12
18	89.81	82.00	8065.83	6724.00	7364.42
19	88.99	81.32	7919.22	6612.94	7236.66
20	85.65	81.32	7335.92	6612.94	6965.05
21	90.15	78.64	8127.02	6184.25	7089.39
22	87.49	74.00	7654.50	5476.00	6474.26
23	94.48	90.00	8926.47	8100.00	8503.20
24	88.32	80.00	7800.42	6400.00	7065.60
25	91.82	86.64	8430.91	7506.49	7955.28
26	85.99	75.32	7394.28	5673.10	6476.76
27	88.48	79.32	7828.71	6291.66	7018.23
28	88.32	79.32	7800.00	6291.66	7005.54
29	89.83	82.00	8069.42	6724.00	7366.06
30	92.16	86.64	8493.46	7506.49	7984.74
31	90.66	84.00	8219.23	7056.00	7615.44
32	92.82	88.00	8615.55	7744.00	8168.16
33	87.16	81.32	7596.86	6612.94	7087.85
34	86.31	78.64	7449.41	6184.25	6787.41
35	82.99	78.00	6887.32	6084.00	6473.22
36	91.65	80.64	8399.72	6502.81	7390.65
37	78.32	80.64	6134.02	6502.81	6315.72
38	80.66	73.32	6506.03	5375.82	5913.99
39	81.82	66.00	6694.51	4356.00	5400.12
40	77.99	71.32	6082.44	5086.54	5562.24
Total	3516.66	3196.16	309982.27	257622.78	282039.96

$$r_{wx} = \frac{N \; E \; wx - (Ew)\,(Ex)}{\sqrt{N \; Ew^2 - (Ew)^2][N \; E \; x^2 - (Ex)^2}}$$

$$= \frac{(40)(282039.96) - (3516.66)\,(3196.16)}{\sqrt{[(40)(309982.27) - (3516.66)^2][(40)(257622.78) - (3196.16)^2]}}$$

$$= \frac{11281598.40 - 11239808.03}{\sqrt{12399290.80 - 12366897.56][10304911.2 - 10215438.75]}}$$

$$= \frac{41790.37}{\sqrt{(32383.24)(89472.45)}}$$

$$= \frac{41790.37}{\sqrt{2898302546.23}}$$

$$= \frac{41790.37}{53835.88}$$

rvx = .77

tv at 0.05 = .31

Since the computed r-value of .77 is very much greater than the critical r-value of .31 the null hypothesis is rejected. Therefore, there is a high relationship between mean performance and accuracy.

APPENDIX K-2

Computation of the Coefficient of Correlation (rvy) Between Mean Performance (v) and Accuracy (y) for Male Students in Mechanical Drawing

Students Code #	v	y	v^2	y^2	vx
1	92.65	92.00	8584.02	8464.00	8523.80
2	89.16	91.32	7949.50	8339.34	8142.09
3	89.32	85.32	7978.06	7279.50	7620.78
4	86.66	84.00	7509.95	7056.00	7279.44
5	94.66	91.32	8960.51	8339.34	8644.35
6	89.32	88.00	7978.06	7744.00	7860.16
7	83.17	85.32	6917.24	7279.50	7096.06
8	90.82	88.64	8248.27	7857.05	8050.28
9	90.82	91.32	8248.27	8339.34	8293.68
10	79.15	77.32	6264.72	5978.38	6119.37
11	91.15	91.32	8308.32	8339.34	8323.81
12	83.65	80.64	6997.32	6502.81	6745.53
13	92.49	86.00	8554.40	7396.00	7954.14
14	78.81	84.64	6211.01	7163.93	6670.47
15	89.81	86.64	8065.85	7056.49	7781.13
16	90.32	85.32	8157.70	7279.50	7706.10
17	92.83	90.00	8617.40	7056.00	8354.70
18	89.81	84.60	8065.83	6724.00	7597.92
19	88.99	86.00	7919.22	6612.94	7653.14
20	85.65	80.64	7335.92	6612.94	6906.51
21	90.15	84.64	8127.02	6184.25	7630.29
22	87.49	83.32	7654.50	5476.00	7289.66
23	94.48	90.64	8926.47	8100.00	8563.66
24	88.32	88.64	7800.42	6400.00	7828.68
25	91.82	88.00	8430.91	7506.49	8080.16
26	85.99	80.00	7394.28	6400.00	6878.20
27	88.48	86.64	7828.71	7506.49	7665.90
28	88.32	85.32	7800.00	7279.50	7535.46
29	89.83	89.32	8069.42	7978.00	8023.61
30	92.16	92.00	8493.46	8464.00	8478.72
31	90.66	85.32	8219.23	7279.50	7735.11
32	92.82	90.64	8615.55	8215.61	8413.20
33	87.16	90.00	7596.86	8100.00	7844.34
34	86.31	83.32	7449.41	6942.22	7191.16
35	82.99	84.00	6887.32	7056.00	6971.16
36	91.65	87.32	8399.72	7624.78	8002.87
37	78.32	80.64	6134.02	6502.81	6315.72
38	80.66	80.00	6506.03	6400.00	6452.80
39	81.82	82.00	6694.51	6724.00	6709.24
40	77.99	82.00	6082.44	6724.00	6395.18
Total	3516.66	3444.12	309982.27	297140.30	303330.62

$$r_{yv} = \frac{N\ E\ yv - (Ey)\ (Ev)}{\sqrt{N\ Ey^2 - (Ey)^2][N\ Ev^2 - (Ev)^2}}$$

$$= \frac{(40)(303330.62) - (3444.12)(3516.66)}{\sqrt{[(40)(309982.27)-(3516.56)^2][(40)(297140.30)-(3444.12)^2]}}$$

$$= \frac{21425.76}{\sqrt{766091661.85}}$$

$$= \frac{21425.76}{27678.18}$$

rvy = .77

tv at 0.05 = .31

Since the computed r-value of .77 is greater than the critical r-value of .31 at .05 level of significance and 38 df, the null hypothesis is rejected. Therefore, there is a high significant relationship between mean performance and neatness.

APPENDIX K-3

Computation of the Coefficient of Correlation (rvz)
Between Mean Performance (v) and Attitude (z)
for Male Students in Mechanical Drawing

Students Code #	v	z	v^2	z^2	vz
1	92.65	97.32	8584.02	9471.18	9016.69
2	89.16	87.32	7949.50	7624.78	7785.45
3	89.32	94.64	7978.06	9216.00	8453.24
4	86.66	96.00	7509.95	9864.46	8319.36
5	94.66	99.32	8960.51	8339.34	9401.63
6	89.32	91.32	7978.06	8464.00	8156.70
7	83.17	92.00	6917.24	9864.46	7651.64
8	90.82	99.32	8248.27	8339.34	9020.24
9	90.82	91.32	8248.27	8582.17	8293.68
10	79.15	92.64	6264.72	9729.85	7332.45
11	91.15	98.64	8308.32	8708.62	8991.03
12	83.65	93.32	6997.32	9864.46	7806.21
13	92.49	99.32	8554.40	5571.13	9186.10
14	78.81	74.64	6211.01	8956.73	8499.61
15	89.81	94.64	8065.85	8956.73	8499.61
16	90.32	94.64	8157.70	9864.46	8547.88
17	92.83	99.32	8617.40	9864.46	9219.87
18	89.81	99.32	8065.83	8339.34	8919.92
19	88.99	91.32	7919.22	8215.61	8126.56
20	85.65	90.64	7335.92	9604.00	7763.31
21	90.15	98.00	8127.02	8708.62	8834.70
22	87.49	93.32	7654.50	9729.85	8164.56
23	94.48	98.64	8926.47	7978.06	9319.50
24	88.32	89.32	7800.42	8836.00	7888.74
25	91.82	94.00	8430.91	8836.00	8584.08
26	85.99	94.00	7394.28	8339.34	8083.06
27	88.48	91.32	7828.71	8836.00	8079.99
28	88.32	94.00	7800.00	8100.00	8302.08
29	89.83	90.00	8069.42	8100.00	8084.70
30	92.16	90.00	8493.46	8836.00	8294.40
31	90.66	94.00	8219.23	8708.62	8522.04
32	92.82	93.32	8615.55	7624.78	8661.96
33	87.16	87.32	7596.86	7624.78	7610.81
34	86.31	88.64	7449.41	7857.05	7650.51
35	82.99	92.64	6887.32	8582.17	7688.19
36	91.65	100.00	8399.72	10000.00	9165.00
37	78.32	72.00	6134.02	5184.00	5639.04
38	80.66	94.00	6506.03	8836.00	7562.04
39	81.82	92.64	6694.51	8592.17	7579.80
40	77.99	94.00	6082.44	8836.00	7331.06
Total	3516.66	3718.16	309982.27	346902.54	327440.20

$$r_{vz} = \frac{N\,E\,vz - (Ev)\,(Ez)}{\sqrt{N\,Ev^2 - (Ev)^2][N\,Ez^2 - (Ez)^2}}$$

$$= \frac{(40)(327440.20) - (3516.66)(3718.16)}{\sqrt{[(40)(346120.72) - (3708.20)^2][(40)(297140.30) - (3444.12)^2]}}$$

$$= \frac{13097608.00 - 130755004.55}{\sqrt{13844828.8 - 13750747.24][11885612 - 11861962.57]}}$$

$$= \frac{22103.45}{\sqrt{1664617662.4}}$$

$$= \frac{22103.45}{47169.64}$$

rvz = .54

tv at 0.05 = .31

The computed r-value of .54 being greater than the critical r-value of .31 at .05 level of significance, hence, the rejection of the null hypothesis. Therefore, there is a substantial relationship existing between mean performance and attitude.

APPENDIX L

Computation of the Coefficient of Correlation (rvw) Between Mean Perfromance (v) and Speed (w) for Female Students in Mechanical Drawing

Students Code #	v	w	w^2	v^2	vw
1	84.99	92.00	8464.00	7223.30	7819.08
2	89.32	100.00	10000.00	7978.06	8932.00
3	90.00	100.00	10000.00	8100.00	9000.00
4	80.16	91.32	8339.34	6425.62	7320.21
5	83.62	94.00	8836.00	7025.79	7679.08
6	84.82	88.64	7857.05	7194.43	7518.44
7	85.99	96.64	9339.29	7394.28	8310.07
8	82.48	76.00	5776.00	6802.95	6268.48
9	87.99	96.64	9339.29	7742.24	8503.35
10	87.48	95.32	9085.90	7652.75	8338.59
11	81.32	89.32	7978.06	6612.94	7263.50
12	90.66	94.00	8836.00	8219.23	8522.04
13	82.83	90.00	8100.00	6660.80	7454.70
14	84.66	87.32	7624.78	7167.31	7392.51
15	90.99	97.32	9471.18	8279.18	8855.14
16	88.66	95.32	9085.90	7860.59	8451.07
17	88.49	91.32	8339.34	7830.48	8080.90
18	94.66	99.32	9864.46	8960.51	9401.63
19	87.66	98.00	9604.00	7684.27	8590.68
20	83.33	97.32	9471.18	6943.88	8109.67
21	88.83	100.00	10000.00	7890.76	8883.00
22	91.16	96.00	9216.00	8310.14	8751.36
23	89.82	100.00	10000.00	8067.63	8982.00
24	88.32	96.00	9216.00	7800.00	8478.72
25	81.32	76.00	5776.00	6612.94	6180.32
26	86.31	88.64	7857.05	7449.41	7650.51
27	93.32	100.00	10000.00	8708.62	9332.00
28	84.00	96.00	9216.00	7138.56	7996.13
29	84.49	94.64	8956.73	7363.35	7996.13
30	85.81	86.64	7506.49	7363.35	7434.57
Total	2599.68	2803.72	225698.84	263156.06	243378.76

$$r_{vw} = \frac{N\ E\ vw - (Ev)\ (Ew)}{\sqrt{N\ Ev^2 - (Ev)^2][N\ Ew^2 - (Ew^2}}$$

$$= \frac{(30)(243378.76) - (2599.68)\ (2805.72)}{\sqrt{[(30)(225698.84) - (2599.68)^2][(30)(263156.06) - (2803.72)^2]}}$$

$$= \frac{12587.99}{\sqrt{(12629.10)(33835.97)}}$$

$$= \frac{12587.99}{\sqrt{427317848.70}}$$

$$= \frac{12587.99}{20671.66}$$

rvw = .60

tv at 0.05 = .36

The computed r-value of .60 is greater than the tabular r-value of .36, hence the rejection of null hypothesis. Therefore, there is a significant relationship between mean performance and speed of students in mechanical drawing.

APPENDIX L-1

Computation of the Coefficient of Correlation (rvx)
Between Mean Perfromance (v) and Accuracy (x)
for Female Students in Mechanical Drawing

Students Code #	v	x	x^2	v^2	vx
1	84.99	68.64	4711.45	7223.30	5833.71
2	89.32	78.64	6184.25	7978.06	7024.12
3	90.00	76.00	5776.00	8100.00	6840.00
4	80.16	54.00	2916.00	6425.62	4328.64
5	83.62	68.64	4711.45	7025.79	5753.40
6	84.82	72.00	5184.00	7194.43	6107.04
7	85.99	72.00	5184.00	7394.28	6191.28
8	82.48	70.64	4990.01	6802.95	5826.38
9	87.99	72.00	5184.00	7742.24	6335.28
10	87.48	76.64	5873.69	7652.75	6704.46
11	81.32	60.00	3600.00	6612.94	4879.20
12	90.66	82.00	6724.00	8219.23	7434.12
13	82.83	75.32	5673.10	6660.80	6238.75
14	84.66	68.00	4624.00	7167.31	5756.88
15	90.99	82.00	6724.00	8279.18	7461.18
16	88.66	76.00	5776.00	7860.59	6738.16
17	88.49	76.00	5776.00	7830.48	6738.16
18	94.66	88.00	7744.00	8960.51	8330.08
19	87.66	70.00	4900.00	7684.27	6136.20
20	83.33	58.00	3364.00	6943.88	4833.14
21	88.83	73.32	5375.82	7890.76	6513.01
22	91.16	79.32	6291.66	8310.14	7230.81
23	89.82	75.32	5673.10	8067.63	6765.24
24	88.32	74.64	5571.13	7800.00	6592.20
25	81.32	74.64	5571.13	6612.94	6069.72
26	86.31	74.64	5571.13	7449.41	6442.17
27	93.32	84.64	7163.93	8708.62	7898.60
28	84.00	54.00	2916.00	7138.56	4319.46
29	84.49	75.32	5673.10	7363.35	6363.78
30	85.81	77.32	5978.38	7363.35	6634.82
Total	2599.68	2187.68	225698.84	161405.34	190319.99

$$r_{vx} = \frac{N\,E\,vx - (Ev)\,(Ex)}{\sqrt{[N\,Ev^2 - (Ev)^2][NEx^2 - (Ex)^2}}$$

$$= \frac{(30)(190319.99) - (2599.68)(2187.68)}{\sqrt{[(30)(225698.84) - (2599.68)^2][(30)(161405.34) - (2187.68)^2]}}$$

$$= \frac{22331.76}{\sqrt{(12629.10)(56216.42)}}$$

$$= \frac{22331.76}{\sqrt{709962789.8}}$$

$$= \frac{22331.76}{26645.12}$$

rvx = .83

tv at 0.05 =.36

The computed r-value of .83 is very much greater than the tabular r-value of .36, hence the rejection of null hypothesis. Therefore, there is a high significant relationship between mean performance and accuracy of students in mechanical drawing.

APPENDIX L-2

Computation of the Coefficient of Correlation (rvy)
Between Mean Performance (v) and Neatness (y)
for Female Students in Mechanical Drawing

Students Code #	v	y	y^2	v^2	vy
1	84.99	79.32	6291.66	7223.30	6741.40
2	89.32	84.00	7056.00	7978.06	7502.88
3	90.00	84.00	7056.00	8100.00	7560.00
4	80.16	80.00	6400.00	6425.62	6412.80
5	83.62	82.00	6724.00	7025.79	6873.24
6	84.82	82.00	6724.00	7194.43	6955.24
7	85.99	75.32	5673.10	7394.28	6476.76
8	82.48	86.64	7506.49	6802.95	7146.06
9	87.99	83.32	6942.22	7742.24	7331.32
10	87.48	82.64	6829.37	7652.75	7229.34
11	81.32	79.32	6291.66	6612.94	6449.50
12	90.66	86.64	7506.49	8219.23	7854.78
13	82.83	86.00	7396.00	6660.80	7123.38
14	84.66	85.32	7279.50	7167.31	7223.19
15	90.99	84.64	7163.93	8279.18	7701.39
16	88.66	83.32	6942.22	7860.59	7387.15
17	88.49	86.64	7506.49	7830.48	7666.77
18	94.66	92.00	8464.00	8960.51	8706.72
19	87.66	82.64	6829.37	7684.27	7244.22
20	83.33	78.00	6084.00	6943.88	8499.74
21	88.83	82.00	6724.00	7890.76	7284.06
22	91.16	89.32	7978.06	8310.14	8142.41
23	89.82	84.64	7163.93	8067.63	7602.36
24	88.32	86.00	7396.00	7800.00	7595.52
25	81.32	84.64	7163.93	6612.94	6882.92
26	86.31	85.32	7279.50	7449.41	7363.96
27	93.32	89.32	7978.06	8708.62	8335.34
28	84.00	79.32	6291.66	7138.56	6344.80
29	84.49	84.00	7056.00	7363.35	7097.16
30	85.81	84.64	7163.93	7363.35	7262.95
Total	2599.68	2512.96	225698.84	210861.59	217999.36

$$r_{vy} = \frac{N\ E\ vy - (Ev)\ (Ey)}{\sqrt{N\ Ev^2 - (Ev)^2][NEy^2 - (Ey)^2}}$$

$$= \frac{(30)(217999.36) - (2599.68)(2512.96)}{\sqrt{[(30)(225698.84)-(2599.60)^2][(30)(210861.59)-(2512.96)^2]}}$$

$$= \frac{6539980.60 - 6532891.85}{\sqrt{[6770965.20 - 6758336.10][6325847.70 - 6314967.96]}}$$

$$= \frac{7088.95}{\sqrt{137401324.4}}$$

$$= \frac{7088.95}{11721.83}$$

rvy = .60

tv at 0.05 =.36

The computed r-value of .60 is greater than the tabular r-value of .36, hence the rejection of null hypothesis. Therefore, there is a significant relationship between mean performance and neatness of students in mechanical drawing.

APPENDIX L-3

Computation of the Coefficient of Correlation (rvz)
Between Mean Performance (v) and Attitude (z)
Female Students in Mechanical Drawing

Students Code #	v	z	v^2	z^2	vz
1	92.00	100.00	7223.30	10000.00	8499.00
2	100.00	94.64	10000.00	8956.73	8453024
3	100.00	100.00	10000.00	10000.00	9000.00
4	91.32	95.32	6425.62	9085.90	7640.85
5	94.00	90.64	7025.79	8215.61	7597.44
6	88.64	96.64	7194.43	9339.29	8197.00
7	96.64	100.00	7394.28	10000.00	8599.00
8	76.00	96.64	6802.95	9339.29	7970.86
9	96.64	100.00	7742.24	10000.00	8799.00
10	95.32	95.32	7652.75	9085.90	8338059
11	89.32	96.64	6612.94	9339.29	7858.76
12	94.00	100.00	8219.23	10000.00	9066.00
13	90.00	80.00	6660.80	6400.00	6626.40
14	87.32	98.00	7167.31	9604.00	8296.68
15	97.32	100.00	8279.18	10000.00	9099.00
16	95.32	100.00	7860.59	10000.00	8866.00
17	91.32	100.00	7830.48	10000.00	8849.00
18	99.32	99.32	8960.51	9864.46	9401.63
19	98.00	100.00	7684.27	10000.00	8766.00
20	97.32	100.00	6943.88	10000.00	8335.00
21	100.00	100.00	10000.00	10000.00	8883.00
22	96.00	100.00	8310.14	10000.00	9116.00
23	100.00	99.32	10000.00	9864.46	8920.92
24	96.00	96.64	7800.00	9339.29	8535.24
25	76.00	90.00	6612.94	8100.00	7318.80
26	88.64	96.64	7449.41	9339.29	8340.99
27	100.00	99.32	8708.62	9864.46	9268.54
28	96.00	90.64	7138.56	8215.61	7250.29
29	94.64	84.00	7363.35	7056.00	7097.16
30	86.64	94.64	7363.35	8956.73	8121.05
Total	2599.68	2894.36	225698.84	279966.32	251109.44

$$r_{vz} = \frac{N\ E\ vz - (Ev)\ (Ez)}{\sqrt{N\ Ev^2 - (Ev)^2][NEz^2 - (Ez)^2}}$$

$$= \frac{(30)(251109.44) - (2599.68)\ (2894.36)}{\sqrt{[(30)(225698.84) - (2599.68)^2][(30)(279966.32) - (2894.36)^2]}}$$

$$= \frac{8873.40}{\sqrt{(12629.10)(21669.79)}}$$

$$= \frac{8873.40}{\sqrt{273669944.9}}$$

$$= \frac{8873.40}{16542.97}$$

rvz = .53

tv at 0.05 = .36

The computed r-value of .60 is greater than the tabular r-value of .36, hence the rejection of null hypothesis. Therefore, there is a significant relationship between mean performance and attitude of students in mechanical drawing.

CURRICULLUM VITAE

NAME	:	GENARO J. OSIAS
ADDDRESS	:	Gamay N. Samar
DATE OF BIRTH	:	September 19, 1961
PLACE OF BIRTH	:	Gamay N. Samar
PRESENT POSITION	:	Instructor III
STATION	:	Samar State Polytechnic College Catbalogan, Samar
STATUS	:	Married

EDUCATIONAL BACKGROUND

Elementary	:	Gamay Central Elementary School Gamay N. Samar
Secondary	:	Gala Vocational School Gamay N. Samar
College	:	Bachelor of Science in Industrial Education Leyte Institute of Technoclogy Tacloban, City
Graduate Studies	:	Master of Arts in Education Major: Administration and Supervision Samar State Polytechnic College Catbalogan, Samar

CIVIL SERVICE ELIGIBILITY

Professional Board Examination for Teachers, Tacloban City, October 26, 1986.

LIST OF FIGURES AND TABLES

LIST OF FIGURES AND TABLE