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THESIS

REACTIONS OF AUTO MECHANICS TERMINEES AND SUPERVISORS TO THE IMPORTANCE AND QUALITY OF AUTO MECHANICS TRAINING

Submitted by

Howard N. Acott

In partial fulfillment of the requirements

for the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

August, 1973

COLORADO STATE UNIVERSITY

August 1973

WE HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER OUR SUPERVISION BY Howard N. Acott ENTITLED REACTIONS OF AUTO MECHANICS TERMINEES AND SUPERVISORS TO THE IMPORTANCE AND QUALITY OF AUTO MECHANICS TRAINING BE ACCEPTED AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY .

Committee on Graduate Work

Howard W Bruner   A C Masterson

Irving E. Gross

Glenn C. Gilding

B Harold Anderson
Adviser

B Harold Anderson
Head of Department

ABSTRACT OF THESIS

REACTIONS OF AUTO MECHANICS TERMINEES AND SUPERVISORS TO THE IMPORTANCE AND QUALITY OF AUTO MECHANICS TRAINING

The objectives of this study were (1) to analyze the differences in responses of employed terminees and unemployed terminees of auto mechanics training programs and the responses of supervisors of employed terminees as to the importance of training received in auto mechanics in Colorado, (2) to analyze the differences in responses of employed terminees, unemployed terminees of auto mechanics training programs and the responses of supervisors of employed terminees as to the quality of training received in auto mechanics in Colorado, (3) to analyze the differences in the responses of secondary and post-secondary program terminees as to the quality of training received, and (4) to develop an instrument for data collection which would be useful in conducting institutional follow-up studies.

The terminees were selected program graduates of twelve secondary and post-secondary institutions offering auto mechanics training in Colorado. Supervisors were selected through being identified as such by the employed terminees.

Five part response scales were developed based on the units of the Colorado Curriculum Guide in Auto Mechanics.

Statistical tests included the chi square, analysis of variance, and the T test.

The following conclusions were made: (1) both terminees and supervisors rated quality of training significantly lower than they rated importance of training, (2) in some instances, terminees rated importance of training higher than did the supervisors, (3) terminees rated quality of training higher than did the supervisors, and (4) mailed questionnaires were an inefficient method of data collection.

Howard Neil Acott
Vocational Education Department
Colorado State University
Fort Collins, Colorado 80521
August, 1973

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CHAPTER I

Introduction

The Problem

The proliferation of vocational education programs in Colorado during the past few years has caused both excitment and concern to vocational educators. Vocational educators across the State have traditionally felt that not enough money has been available to offer quality programs.

Recent events have changed this pessimistic attitude. The legislation which created the Colorado State Board for Community Colleges and Occupational Education, a State system of Community Junior Colleges, and the Colorado Vocational Act of 1970 are just three examples of the sudden changes in the availability of funds to conduct meaningful vocational programs.

Since 1967, vocational programs in Colorado have increased both at the secondary and post-secondary levels. There are many more students in vocational education programs at the present time than were enrolled prior to the time that large continuing State Legislative appropriations were available. The Colorado Vocational Education Act alone allowed a 33 percent increase in high school

vocational program enrollments between school years 1970 and 1971. (3:3)* The State Board for Community Colleges and Occupational Education also designated five new area vocational schools during the 1971 fiscal year.

Many vocational educators now feel that the time has come to determine to some degree how much quality is being provided in vocational programs. Vocational administrators need to know what return can be expected versus the investment in various types of programs.

Accountability has become the watchword of education. There are many indications that accountability measures in vocational education will be largely based on job placement and retention.

Official follow-up studies are limited to finding the employment status of graduates of programs, and ask only open end general questions (12:4) about the usefulness of training received. The local administrator needs to know much more than this. To justify operating vocational programs often costing twice as much per student as general or academic programs, the local administrator needs to know how well training is received by supervisors in industry. The local administrator needs to know how intensive training should be at the various

---

*In the parenthetical citations, the number before a colon refers to that number in the references cited and when numbers appear following a colon, the numbers refer to the pages cited in that item.

levels or grades, and he needs to know how to better participate in the articulation process between levels of instruction.

Auto mechanics training programs are a logical choice to begin learning more about the criteria delineated above. Auto mechanics programs are found in all sections of the State of Colorado. There are terminees working as auto mechanics who have had training ranging from 360 hours to over 2000 hours.

Furthermore, there are many terminees from these same programs who are not working as auto mechanics. The components of this study were, therefore, readily available: terminees employed as auto mechanics, their immediate supervisors, and unemployed terminees.

The differences in the reactions to training between the employed and the unemployed terminees is valuable information in future program planning. It is also useful to know if there are any differences in the reactions to training between employed terminees and their supervisors.

Significance of the Problem

During the 1972-1973 school year, there were over 90 auto mechanics training programs in Colorado. These programs cost over $1,000,000.00 (7:1). This large cost is alone a matter of concern. Furthermore, with over two thousand students in programs, local administrators

and the public in general are interested in learning more about the success of program graduates.

The problem of useful skill development and at which level of education to offer useful skill development is important. It would be useful to know if entry level skills in auto mechanics can be attained while the student is completing a high school program.

Local administrators need to know how service managers feel about the effectiveness of auto mechanics training programs. Teachers need to know how students rate their training programs after terminating and obtaining an entry level job.

State officials charged with the responsibility of funding and supervising programs need to know where the greatest cost-benefits of programs can be found.

Local administrators need to know more about how much duplication exists between secondary and post-secondary programs of instruction. Knowledge of what is happening to program graduates should lead to better articulation between levels of instruction.

The significance of this problem is then based on both cost effectiveness of training and quality of training.

Cost effectiveness of education and quality of education are extremely important in view of the limitations of funding provided for vocational education.

Objectives

The objectives of the study include the following:

1. To analyze the differences in responses of employed program terminees, unemployed terminees, and supervisors of employed terminees as to the importance of training received in auto mechanics.
2. To analyze the differences in responses of employed terminees, unemployed terminees, and supervisors of terminees as to the quality of training received.
3. To analyze the differences in responses of secondary program terminees as to the quality of training received.
4. To develop an instrument for data collection which will be useful in conducting evaluative follow-up studies in vocational programs.

Delimitations

To facilitate this study, the following limitations apply:

1. The study will be limited to programs in the State of Colorado.
2. The study will be limited to programs in continuous operation for a period of at least three (3) years as of May, 1971.

3. The study will be limited to students terminating from the programs between July 1, 1969, and June 30, 1970.
4. Lee Palmer, Colorado State Supervisor of Trade and Industrial Education, will select the programs to be used in identifying students to be involved in the study.
5. Only terminees responding as full or part-time employees in auto mechanics will be counted as employed terminees.
6. The questionnaire will be based solely on the Curriculum Guide in Automotive Mechanics (5) in use in the State of Colorado in school year 1970-1971.

Assumptions

The underlying assumptions of this study are that:

1. Auto mechanics who have graduated from programs between July 1, 1969, and June 30, 1970, will be performing similar tasks and will be able to objectively evaluate the curriculums they completed against the tasks they are performing.
2. The auto mechanics curriculums used in this study include comparable units of instruction designed to train the student for the position of auto mechanics.

3. The supervisors of program terminees will be readily able to evaluate the importance and quality of training their employees received, based on the terminology of the questionnaire being drawn directly from the Curriculum Guide.

Definition of Terms

For the purposes of this study, the following definitions are offered:

Auto Mechanic - A person who derives much or all of his income in the trade of automotive mechanics.

Auto Mechanics - The trade or educational program leading to the trade of automotive mechanical service.

Terminee - A person who enrolled in a secondary or post-secondary program of auto mechanics and stayed enrolled in that program for such a length of time that he was included in the Colorado State Board of Community Colleges and Occupational Education annual student evaluation report.

Post-Secondary Program - A course of study offered in a public or private institution of education other than an organized kindergarten through grade 12 school district.

Secondary Program - A course of study offered in a public school district.

CHAPTER II

Review of Related Literature

Introduction

The purpose of this chapter is to present the reader with a summary of the research and professional literature directly related to the study. The Education Indexes, The Readers Guide to Periodical Literature, and The Dissertation Abstracts were examined to obtain a source of articles, theses, dissertations, and textbooks relating to the research problem.

A computer search was conducted using the services of The Northern Colorado Educational Board of Cooperative Services, Boulder, Colorado. This procedure provided abstracts of studies closely related to the topic of this study. These abstracts were examined for content validity, procedures and findings.

While many documents may be obtained relating to perceptions of training, few articles or documents were found relating directly to perceptions of Auto Mechanics Training. Most literature available was in the area of follow up studies.

Most follow up studies were restricted to determining what work the program terminees were doing after leaving

programs of training, and some delved into their ratings of their programs.

The investigator found no studies measuring perceptions of program terminees versus perceptions of the supervisors of the terminees.

In order to review the relevant literature, this chapter is organized under the following headings:

1. Evaluation and Follow Up Studies
2. Use of Scales in Response Measurement
3. Statistical Measures
4. "Curriculum Guide - Automotive Mechanics"

Evaluation and Follow Up Studies

The need to follow up trainees has been a more widely utilized concept since relatively large amounts of money have been available for training programs. Official reports of the Colorado State Board for Community Colleges and Occupational Education reveal that placement on the job following training is becoming a critical necessity (3:5).

The Colorado State Board has been attempting to follow up each student officially enrolling in a State vocational program for the last few years (12). The documents used paint a narrow picture of job placement. No consideration is given to employer ratings of training received.

The follow up study as a means of evaluation is well documented. Hawkridge (11) conducted a broad based study in determining what procedures were being used in several states. While this study quoted previous studies, it also

pointed out that a broad based follow up study can be difficult to construct and administer. The need for instrument validation is also documented, particularly if terminology could be misunderstood.

The most definitive report of the type used in this study was conducted by Eninger (8). Eninger encountered problems engendered by individual differences between the responding groups and the non-responding groups. Personal follow ups illustrated that there were no statistical differences in the characteristics of responding groups and non-responding groups.

Eninger studied the experiences of vocational curriculum graduates in terms of occupational, educational, and related experiences. Questions were mailed to 10,788 Trade and Industrial program graduates, and to 3,494 academic program graduates. The use of open ended questions caused a monumental clerical task of data compilation.

In those parts of the Eninger Study which scaled responses were used, much quantified information was recorded. Eninger found that graduates had a fairly high opinion of their training programs. Only 3.7 percent of respondents indicated that they were poorly prepared for their trade tasks.

The investigator did not find vocational follow up studies in which terminees and supervisors were asked to respond to the same questions from differing points of view, although this has been done in other types of studies.

The literature cited plainly indicates that a survey instrument is a valid way of obtaining information from graduates of programs. Most writers used a mailing procedure to obtain their results. Those that did not ask questions with scaled responses experienced difficulty quantifying responses (9) (13).

A United States Office of Education study of proprietary and non-proprietary schools reveals a growing interest in output evaluation. The following statement is offered in summary.

> "To rely on input measures for evaluation of schools implies that we know fairly well which inputs produce better outcomes. This is not the case. Too little is known about techniques of effective learning to justify requiring certain inputs... The output is the payoff and that should be the main criterion for public support (4-212)".

The Use of Scales in Response Measurement

Because the use of scaled responses was apparently the only way of gathering data which could be treated statistically and from which conclusions could be drawn, the investigator reviewed literature in which this type of approach was used.

The Hawkridge Study (11:70) found that most evaluative studies usually rely on response scales.

Some other types of studies also used response scales to validate questions and to gather quantifiable data. Bradin (1) examined college persistence, occupational choice, and opinion on the occupational education program received in high school. Instruments were completed by 3,491 graduates.

While this was a general follow up study attempting to discover the value of counseling in relation to the objectives stated above, the use of scaled response to both general and specific questions was used.

A Maryland study (15:260) also used the scaled response questionnaire. This particular study revealed that additional full time training was a felt need of the high school graduates. A larger percentage of vocationally oriented youth were critical of their training in problem solving than were the college bound youth. The response items in this study were titled "Superior", "Better than Average", "Fair", and "Poor".

The investigator found a follow up study devised by Valentine (16) which used both the scaled response and open ended technique. Dr. Valentine was thus able to quantify data for purposes of comparison, while still giving the respondent a chance for self-expression. Valentine used the terms "Extensive", "Moderate", "Little", and "None" in that part of the survey which measured the quality of training.

The Eninger Study (8) previously mentioned also used a four point scale with the responses labeled "No importance", "Slight Importance", "Considerable Importance", and "Critical Importance". In the section on skills learned in high school, the respondents had to answer the questions with the responses labeled "Almost All", "Large Amount", "Some but not All", "Almost None".

Neither of these two studies allowed a neutral response to the questions posed.

One question which was raised in review of literature was that of the validity of using students to evaluate outcomes. Gustad (10:43) found that "as for students, they are reasonably good sources of information when they are asked the right questions. They make direct observations".

An example of the five part response scale with numbers assigned to the descriptive responses was listed by Eble (6). He pointed out that the University of Washington had used student evaluation since 1925. The five point scale items were labeled "Outstanding", "Superior", "Competent", "Only Fair", and "Of Less Value".

The use of scales in response measurement is a widely accepted practice. Brogden and Taylor (2:159-186) state that scales are used almost universally in survey instruments. They warned the reader of possible problems which may arise- The first possible problem is that of "criterion deficiency". This refers to exclusion of considerations

appropriate to the study. The second problem is that of "Criterion Contamination", or the inclusion of extraneous elements. The third problem is the "Halo effect", or the reluctance of the rater to give an objective opinion. The fourth problem is that of "Scale Unit Bias", or the unequal statement of units. The fifth problem is "Criterion distortion", or the improper weighting of units.

The procedure outlined in Chapter Three was designed to overcome these problems.

Statistical Measures

As can be seen from the foregoing information, the use of scaled responses is a common practice. How to best measure the responses also creates problems.

In selecting the appropriate statistical tests, the investigator had to consider both the standard statistical assumptions and the assumptions unique to this study. Because the investigator was interested in more than descriptive statistics, a search of appropriate inferential statistics was instituted.

The response scales listed in Appendixes B and C appear to lend themselves to easy measurement. The investigator could readily make inferences from the data if all assumptions were met.

Runyon and Haber (14:112) state that the concept of randomness is the most important assumption. They suggest that adequate sampling in a universal population will

allow the assumption of randomness. Because of the delimitations of the study, this assumption was difficult to meet.

Homogeneity of variance is another assumption which often concerns the researcher. Wert, Neidt, and Ahmann (17:185) state that homogeniety of variance is not that serious a consideration. A further statement on this subject is made in the introduction to Chapter IV.

A further consideration is in estimating population parameters. The parameters were unknown. Further, it had been determined that according to the attempt to equate programs, a pre-selected group of terminees would be used. Thus, population parameters would remain unknown. More on this subject is presented in Chapter III.

When population parameters are unknown, the logical selection is a nonparametric test. According to Runyon and Haber (14:188)

> a nonparametric test of significance is defined as one which makes no assumptions concerning the shape of the parent distribution or population, and accordingly is commonly referred to as a distribution free test of significance.

According to Runyon and Haber, the chi square test is the appropriate test when dealing with nominal categories and frequency counts when there is no obvious way of determining expected frequencies of occurance.

In an attempt to treat the data rigorously, the level of confidence was set at .01, thus further treatment of

the data would only take place if a high degree of departure from expected frequencies occurred.

The investigator observed that when early returns of the survey were available there appeared to be differences in the responses of supervisors and terminees.

Wert, Neidt, and Ahmann (17:172) state that

> The analysis of variance has been designed to provide an efficient test of the significances of the differences between two or more groups simultaneously.

"Curriculum Guide - Automotive Mechanics"

The Colorado Curriculum Guide for Automotive Mechanics provided a relevant source for review. This guide was assembled by a committee of teachers and leaders of the State Automotive Advisory Committee. The guide was completed by a large group of Auto Mechanics instructors at a Colorado Vocational Association Workshop at Colorado State University in 1968.

The Colorado Curriculum Guide lists the following major units of instruction:

		2,000 Hr. Program
I	Orientation	180
II	Lubrication and Body Service	60
III	Braking System	135
IV	Chassis Suspension and Steering Systems	260
V	Colorado State Safety Inspection	30
VI	Introduction to Engines	90
VII	Basic Automotive Electricity	60

VIII	Automotive Electrical System	210
IX	Fuel Systems	145
X	Intake and Exhaust Systems	45
XI	Trouble Shooting and Tune Up	180
XII	Power Train	305
XIII	Internal Combustion Engine Repair and Overhaul	180
XIV	Automotive Air Conditioning	60
XV	Parts Management	60

The guide lists by hours how much time should be spent in each unit for a 360 hour course, a 540 hour course, a 1,080 hour course and a 2,000 hour course. The same instructional units are mentioned for all four courses, only the amounts of time vary. An example is found on page 13 of the Guide:

Contents	Information and skills to be taught	2000	1080	540	360
Carburetors	Simple Plain Tube Single Barrel Dual Barrel Four Barrel	89	45	30	15

Summary

The investigator found no literature available on the specific subject of vocational terminee perceptions of training received compared to their supervisors perceptions of training received. There is ample research available in terminee perceptions or reactions to training received.

Some studies were reviewed in which performance of terminees was approached. None of these studies attempted a direct rating approach by their supervisors.

There is an abundance of literature on follow-up studies, most of which recommends the open-end or scaled response survey format. Several writers recommended the use of scaled responses when treatment of data is necessary.

The use of the chi square test is the choice of many statistical research workers when dealing with nominal data with numerical assignment.

CHAPTER III

PROCEDURES

Introduction

The procedures used in obtaining the data necessary for the completion of this study were divided into five sections.

The sections discussed are:

1. Development of the survey instruments for the auto mechanics terminees and supervisors.
2. Selection of terminees to participate in the study.
3. Collection of the data.
4. Classifying terminees as employed or unemployed according to the delimitations of the study.
5. Analysis of the data.

Development of the Survey Instruments

There were several problems encountered in designing the survey. The nature of the problem arose from several considerations. The first consideration was that of definition of terms. If terminees and supervisors demonstrated differences in understanding of terminology, the data could be biased.

The investigator, therefore, selected the Curriculum Guide-Automotive Mechanics as a standard source of terminology. This was done because this book is the standard recommended curriculum for the State of Colorado. The book was designed by a group of Auto Mechanics instructors in 1968, and was approved for use by the State Automotive Advisory Committee. Since the Guide was developed by a group of automotive teachers and approved by a group of people representative of the trade, the investigator determined that the terminology would be understood by all study participants.

The second consideration was that of gathering data on the reactions of the terminees to the training in general. A series of questions was developed to ascertain these reactions. These questions were drawn largely from a questionnaire developed by Dr. Ivan Valentine (16).

The third consideration was the development of an instrument which would record the specific reactions of terminees and supervisors as to the importance and quality of the training received. The following is an example of the response scale developed. Question number 15 was the first question with the two part scaled response.

15. Lubrication and Body Service - Including: Use of lubrication equipment, engine lubrication, differential, transmission and body lubrication. Maintaining doors, windows mechanisms, trunk lids and trim, removal and installation of glass.

Importance of this training:	1	2	3	4	5
My training in this area was:	1	2	3	4	5

The complete survey questionnaires are presented in Appendixes B and C.

The following definitions of the scale numbers were presented to the participants.

Importance of Training

1. Highly important training.
2. Important training.
3. Some importance, but not essential.
4. Little importance.
5. Not a necessary training area.

Quality of Training

1. Excellent
2. Good
3. Adequate
4. Fair
5. Inadequate

The definitions corresponding to the numbers were offered to the respondents immediately prior to question 15. Responses 1 and 2 in both importance and quality were positive statements. For example, a response of 1 to the questions on importance of lubrication and body service training indicated that the respondent rated this as "highly important training".

A rating of one (1) below the line meant that the respondent rated the quality of training received as "Excellent".

A rating of three (3) above and below the scale indicated that the rating was neither positive or negative.

A rating of four (4) or five (5) above or below the line was designed to be a negative rating. For example, a rating of four of an importance statement meant that the item was of "little importance". A rating of four in response to a question on quality meant that the quality of training received was only fair.

The fourth consideration in instrument design was that of avoiding criterion bias.

As mentioned in Chapter II, the scaled response is almost universally used in survey instruments. The investigator attempted to avoid criterion bias in five areas.

1. Criterion deficiency. The inclusion of each element in the Curriculum Guide - Automotive Mechanics enables the study to avoid leaving out possible valid considerations.
2. Criterion Contamination. No extraneous elements are included in Section Two of the study. Only the terms specifically listed in the Guide were presented to the respondents.

3. Halo Effect. This source of bias is difficult to overcome. The use of the dichotomous scale in which the respondent must make immediate choices was an attempt at avoiding the Halo Effect.
4. Scale Unit Bias. This was avoided by using a scale of one through five.
5. Criterion Distortion. Improper weighting of components is a potential bias. The researcher determined that a scale of one through five rather than zero through four would yield more conservative data. This lessened the chance for an error of magnification in statistical treatment.

The final consideration was that of developing different forms of the instrument for the two groups of respondents. In this case, the terminee instrument served as a precise model for the supervisor instrument. Questions of a general nature were deleted, as supervisors could only rate the specific items.

The only changes in terminology in Section Two of the instrument were changes in grammar. Thus, the statement "my training in this was...." appeared in the supervisor instrument as "Employee's training was...."

The instruments were developed in April, 1971. The original instruments did not contain dichotomous response scales. During June and July of 1971, the investigator reviewed various procedures for data collection with

Lee Palmer, State Supervisor of Trades and Industry, with Dr. Richard Edsall, State Supervisor of Evaluation, and with several auto mechanics instructors.

The survey instrument validation procedure was completed in August, 1971. The procedure consisted of discussing the questionnaires with three auto mechanics teachers. This was done to insure that the terminology and format of the questionnaires would not be confusing to the participants.

Selection of Terminees to Participate in the Study

Selection of terminees was made in accordance with the delimitations of the study. Lee Palmer, State Supervisor of Trades & Industry, selected the institutions to participate in the study in compliance with the delimitations of the study. The programs were selected on the basis of "Acceptable" training facilities which had been in operation for three years prior to May, 1971.

A list of program terminees leaving the institutions during the period July 1, 1969, through June 30, 1970, was obtained from Dr. Richard Edsall, State Supervisor of Evaluation.

In July, 1971, the investigator accepted a position as a local vocational director. The press of activities caused the suspension of this study from August, 1971, until April, 1972.

A list of 246 terminees was prepared during April of 1972. All terminees of the following institutions during the time period selected received the questionnaire.

1. Poudre (Ft. Collins) High School
2. Montezuma-Cortez High School
3. Grand Junction High School (Central)
4. Salida High School
5. Brighton High School
6. Boulder Valley Area Vocational School
7. Durango High School
8. Colorado Springs (Mitchell) High School
9. Trinidad State Junior College
10. Northeastern Junior College
11. Mesa Junior College
12. Community College of Denver, North Campus

The first mailing was sent on April 17, 1972. The mailing list included 246 terminees of the above programs.

Collection of the Data

The returns from the first mailing were quite scant. Only 28 responses were received as of May 21, 1972. It was also noticed that 14 of the 28 responses claimed employment as auto mechanics. Contact with the State Evaluation Supervisor revealed that the expected employment rate was such that a very small number of terminees would be responding as employed.

A repeat mailing on May 24, 1972, requested all terminees to rate their program whether they had achieved employment or not.

The mail and repeat mail procedure eventually yielded 72 responses, of which 70 were selected for the data analysis process. This was 29 percent of the 246 terminees.

Classifying Terminees

Of the 72 total terminees, two were rejected because of incomplete responses.

Twenty-two terminees claimed employment as auto mechanics. The supervisors survey instrument was mailed on August 9, 1972. This questionnaire was sent to the address of the person directly identified as a terminees' supervisor. A repeat mailing was sent on October 13, 1972. It was determined that 18 terminees were working either full or part-time as auto mechanics. Of this group, seven were secondary program graduates and 11 were post-secondary program graudates. There were 52 usable questionnaires returned by students classified as unemployed auto mechanics.

Analysis of the Data

No treatment of data was performed on the responses to the general questions contained in Section One of the questionnaires. The compiled reactions are presented.

A chi square analysis was performed on the combined groups ratings of importance and quality of training received.

The analysis of variance was used to test the significance of differences among the groups.

Where the analysis of variance revealed a statistically significant difference among the groups mean ratings, the Student T-Test was applied to determine which groups reactions caused the variances to occur. The Student T-Test was applied to the following response groupings:

1. Importance of training received in Braking Systems.
2. Quality of training received in Automotive Electrical Systems.
3. Quality of training received in Trouble Shooting and Tune-Up.
4. Importance of training received in Power Trains.
5. Quality of training received in Power Trains.
6. Importance of training received in Repair and Overhaul of Engines.
7. Quality of training received in Repair and Overhaul of Engines.
8. Importance of training received in Automotive Air Conditioning.
9. Importance of training received in Parts Management.
10. Quality of training received in Parts Management.
11. Quality of training received in Orientation.

No analysis was performed relative to the mean ratings of quality of training received by secondary and post-secondary terminees and their supervisors.

CHAPTER IV

FINDINGS

Introduction

This chapter contains the presentation of data, description of data, statistical analysis, and interpretation of data collected from the three groups of respondents involved in the study.

The data analysis and description are reported in several major parts as follows:

1. Questions one through five on the student questionnaire were used to identify and classify the terminee. For the purposes of the study, no responses were recorded.
2. Questions one through three on the supervisors questionnaire were used to classify the terminee. For the purposes of this study, no responses were recorded.
3. Questions six through eleven on the employed terminee questionnaires were presently only as responses. No attempt was made to analyze this data because of the small number of terminees and supervisors found.

4. Questions six through eleven from the unemployed terminee questionnaire were reported only as responses. No attempt was made to analyze this data because the questionnaire did not ask the terminee to describe a job held if it was not related to auto mechanics.
5. Questions 12 through 14 of the employed and unemployed terminees were presented in a combined table.
6. Question four on the supervisors questionnaire was compared to question 6 on the employed terminee questionnaire.
7. Question six on the supervisors questions was compared to question 14 on the employed terminees questionnaire.
8. Question five on the supervisor questionnaire is presented in narrative form.
9. All questions in Section II of both the terminee questionnaire and the supervisors questionnaire are identical.

The computation of chi square was used to determine if there were significant differences in the responses of the three groups. Analysis of variance was then used to determine whether the groups differ in their reactions to the importance or quality of training. The T test was used only where a significant difference in the mean responses

occurred. The T test was used to determine which groups' reactions had caused the significant variance to occur.

The chi square technique is the choice often made in statistical testing when only nominal or assigned categories are used. Runyon & Haber (14:200) make the following statement concerning the use of chi square in this situation:

> ....parametric techniques are generally perferable because of their greater power. This generalization is not true, however, then the underlying assumptions are seriously violated. Indeed, under certain circumstances (e.f., badly skewed distributions, particularly with small n's), a non parametric test may well be as powerful as its parametric counterpart.

The chi square technique used in this study is known as the Multiple-Cell Contingency Table (17:155). Because of the appearance of a small n in certain cells, the normal two by five table is combined into a two by three table. Thus the two 'positive' responses are grouped into one group, and the two 'negative' responses are grouped into one group. This is in accordance with the practice recommended by Wert, Neidt, and Ahmann (17:157).

The chi square was used to determine if there was a significant difference in the ratings of "importance" and "quality". It was determined that it would also be useful to know if there were differences within the categories of "importance" and "quality" as rated by the three groups. For this purpose, the analysis of variance technique was selected. This was done to test the significance of the

mean responses. A lack of a significant difference was taken to mean that most variation in the chi square was due to the differences of the ratings of "importance" and "quality". A significant difference in the mean responses within these categories was taken to mean that there were differences.

The use of analysis of variance in this study is substantiated by Wert, Neidt, and Ahmann (17:184) in the following statement:

> There is increasing evidence, however, that the necessity for the homogeniety of variance is not as serious a consideration as it was formerly thought to be.
>
> From theoretical considerations the foregoing assumptions must be satisfied before the application of the analysis of variance is appropriate. However, it is becoming more apparent that the analysis of variance technique is satisfactory even when there is considerable departure from the strict fulfillment of the assumption.

The T test when a significant difference in the mean responses was obtained was utilized to determine which mean responses contributed to the significant F test in the analysis of variance.

A difference in the "quality" of training received between employed terminees and supervisors would be a useful indicator of the effectiveness of educational programs and could be a starting point for future studies.

The use of the T test is substantiated by Wert, Neidt, and Ahmann (17:183) when significant F values have been found.

General Responses of Terminees

In this section the data is presented in table form comparing the responses of the employed and unemployed terminees to the general questions six through eleven in Section One of the questionnaire in Appendix B.

TABLE 1

RATINGS OF NECESSITY OF SCHOOL TRAINING FOR THE JOB HELD

RESPONSES	EMPLOYED TERMINEES n=18	UNEMPLOYED TERMINEES n=46
Required	1	2
Very Necessary	6	10
Helpful	10	22
No Help At All	1	12

No implications were drawn from Table 1, as more than six of the 52 unemployed terminees claimed to be without jobs of any kind.

TABLE 2

TERMINEE EMPLOYMENT STATUS
IN PRESENT POSITION

RESPONSE	EMPLOYED TERMINEES n=18	UNEMPLOYED TERMINEES n=51
Owner	0	0
Part Owner-Employee	0	2
Partner	0	3
Employee	17	33
Part-time Employee	1	3
Other	0	10

In Table 2, it was noted that 50 of the 70 respondents were full time employees with no ownership in the company for which they were working. The five unemployed terminees had been working for companies or private firms owned by their families.

TABLE 3

RATINGS OF THE MOST HELPFUL COURSES
TAKEN DURING TRAINING

RESPONSE	EMPLOYED TERMINEES n=58	UNEMPLOYED TERMINEES n=69
Mathematics	11	18
Science	1	4
English	10	10
Shop Practice	18	26
Social Science	11	4
Other	7	7

Respondents were allowed to react to all courses mentioned in Table 3. All 18 employed terminees rated shop practices most helpful, while only 26 out of 52 responding unemployed terminees rated shop practice as most helpful.

TABLE 4

RATINGS OF COURSES TAKEN DURING TRAINING WITH LITTLE OR NO VALUE

RESPONSE	EMPLOYED TERMINEES n=18	UNEMPLOYED TERMINEES n=52
Mathematics	2	8
Science	9	26
English	7	20
Shop Practices	0	8
Social Science	8	29
Other	0	0

No employed terminee listed a negative response to the question summarized in Table 4 on shop practices, while 8 unemployed terminees reacted negatively to their training in shop practices.

TABLE 5

RATINGS OF THE FIRST JOB AFTER SCHOOL OR PROGRAM COMPLETION

RESPONSE	EMPLOYED TERMINEES n=18	UNEMPLOYED TERMINEES n=41
Better than Expected	6	8
About what was Expected	8	20
Not as good as Expected	4	13

It is interesting to note that of the 41 unemployed terminees responding to this question, 54 percent rated their first job as meeting or exceeding their expectations. These responses indicate that little dissatisfaction existed in the group responding due to their not being placed in auto mechanics. Eleven unemployed terminees did not respond to the question. Four persons employed as auto mechanics indicated that the jobs they were placed in were below expectations.

TABLE 6

RATINGS OF LENGTH OF REQUIRED COURSES DURING TRAINING

	EMPLOYED TERMINEES	UNEMPLOYED TERMINEES
Mathematics (all levels)		
More than adequate	3	3
Adequate	13	35
Inadequate	2	6
English (Communications)		
More than adequate	4	15
Adequate	8	29
Inadequate	5	4
Social Science		
More than adequate	3	16
Adequate	10	23
Inadequate	5	7
Theory in Auto Mechanics		
More than adequate	8	8
Adequate	9	30
Inadequate	1	13
Science		
More than adequate	3	10
Adequate	11	32
Inadequate	4	10
Shop Practice		
More than adequate	6	10
Adequate	11	30
Inadequate	1	12
Safety		
More than adequate	6	17
Adequate	12	30
Inadequate	1	5
Leadership		
More than adequate	3	9
Adequate	12	29
Inadequate	3	11

Table 6 summarizes the reactions of terminees to a serial question about the length of training involved. The actual question referred to the number of courses taken in particular areas. There was little variation in the responses between classifications. It should be noted that 25 percent of the unemployed terminees expressed dissatisfaction with "Theory in Auto Mechanics".

TABLE 7

RATINGS OF TEXTBOOKS AND OTHER INSTRUCTIONAL MATERIALS OF TRAINING PROGRAMS

RATING	EMPLOYED TERMINEE n=18	UNEMPLOYED TERMINEE n=50
Excellent	11	11
Fair	6	21
Poor	0	3
Insufficient	0	3
Out-dated	1	2

As recorded in Table 7, over 61 percent of employed terminees rated their texts and instructional materials as excellent. Only 21 percent of the unemployed group rated their texts and materials in the excellent category. Very few negative reactions were recorded.

TABLE 8

RATINGS OF SHOP EQUIPMENT
IN THE TRAINING PROGRAMS

RATING	EMPLOYED TERMINEES n=18	UNEMPLOYED TERMINEES n=47
Excellent	11	18
Fair	5	21
Poor	1	3
Insufficient	0	3
Out-dated	1	2

In Table 8 the responses are recorded on a question dealing with the quality of equipment used in the training program. Most terminees rated the equipment used in their program as fair or better.

TABLE 9

RATINGS OF JOB READINESS UPON
PROGRAM COMPLETION

RATING	EMPLOYED TERMINEES n=18	UNEMPLOYED TERMINEES n=47
Well prepared	2	4
Weak in a few areas	12	28
Needed more time in most instructural areas	0	4
Adequate	3	8
Inadequate	1	3

Terminees responses to the question on job readiness upon training completion was recorded in Table 9. Most terminees rated their readiness in a positive fashion.

Over 60 percent of the unemployed group evidently felt ready to perform the duties required for an auto mechanic.

TABLE 10

RATINGS OF THE NECESSITY OF TRAINING FOR THE JOB HELD BY EMPLOYED TERMINEES

RESPONSE	EMPLOYEES n=18	SUPERVISORS n=18
Required	1	3
Very necessary	6	7
Helpful	10	8
No help at all	1	0

The question summarized in Table 10 dealt with the necessity of school training to obtain the job held when the terminee first obtained the job held. Almost all persons responding indicated that training was at least helpful.

TABLE 11

RATINGS OF BASIC READINESS TO PERFORM THE ENTRY LEVEL JOB OF AUTO MECHANIC AT THE TIME OF EMPLOYMENT

DESCRIPTION	EMPLOYEES n=18	SUPERVISORS n=18
Well Prepared	3	2
Weak in a few areas	6	12
Adequate	5	0
Needed more time in most areas	2	3
Inadequate	2	1

TABLE 12

IMPORTANCE OF TRAINING AND RATING OF QUALITY OF TRAINING RECEIVED

Lubrication and Body Service

Rating[1]	Employed n=18				Unemployed n=52				Supervisors n=18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	7	38.89	4	22.22	8	15.39	14	26.93	5	27.78	2	11.11	20	22.73	20	22.73
2	8	44.44	4	22.22	32	61.54	7	13.47	9	50.00	6	33.34	49	55.68	17	19.32
3	0	0	3	16.67	9	17.31	14	26.93	4	22.22	8	44.45	13	14.77	25	28.41
4	3	16.67	3	16.67	1	1.93	7	13.47	0	0	2	11.11	4	4.55	12	13.64
5	0	0	4	22.22	2	3.85	10	19.23	0	0	0	0	2	2.27	14	15.91

1. Refer to explanation on page 43.

The question summarized in Table 11 dealt with the basic readiness of the individual to perform on an entry level auto mechanic. In the category of readiness to perform at the entry level, 14 ex-students rated themselves better than adequate, while the supervisors gave only nine ex-students ratings of better than adequate. The supervisors rated only four ex-students as less than adequate.

Rating of Importance and Quality of Training

As previously stated, two of the major objectives of study were to determine if there were significant differences in the ratings of importance and quality of training received between the employed terminees, unemployed terminees, and supervisors.

Table 12 presents the data collected on Lubrication and Body Service. Table 13 presents the chi square test of significance of the data in Table 3. The same format is replicated through Tables 40 and 41 respectively.

The nominal rating scales used are explained as follows:

Importance of Training

1. Highly important training.
2. Important training.
3. Some importance, but not essential.
4. Little importance.
5. Not a necessary training area.

Quality of Training

1. Excellent
2. Good
3. Adequate
4. Fair
5. Inadequate

These terms were defined differently to the terminees and supervisors, since the supervisors were rating performance and the terminees were rating their training programs. See the appendixes A and B for definitions.

For the purpose of this study, the ratings of one through five were used to categorize the responses for statistical treatment. Table 12 illustrates the procedure used. In the column entitled 'Rating', category one and two were assumed to be positive ratings, category three was assumed to be a neutral rating, and categories four and five were assumed to be negative ratings.

These categories were also used in constructing Table 13. Table 13 is a chi square summary table. The top row of numbers was obtained by adding the importance and quality ratings in categories one and two. The second row in the chi square summary table corresponds to category three in Table 12. The third row in the chi square summary table was obtained by adding the importance and quality ratings in categories four and five.

The above method of constructing reporting and chi square summary tables was replicated through Tables 40 and 41, respectively.

TABLE 13

CHI SQUARE SUMMARY TABLE

LUBRICATION AND BODY SERVICE

Importance		Quality	
O	E[1]	O	E
69	53	37	53
13	19	25	19
6	16	26	16

Obtained Chi Square equals 25.94

Table 12 summarizes the responses of the three groups ratings of the importance and quality of training received in Lubrication and Body Service. Table 13 is a summary table reporting the results of the chi square test of the data in Table 12.

Table 12 illustrates that there is a high degree of difference between the importance and quality of training in lubrication and body service. Eighty-three percent of employed terminees rated importance of training as essential. Sixty-nine percent of all responses were above the neutral area as to importance, but only thirty-seven percent were this high in the quality rating. Thus a thirty-two percent drop in response was noted from positive to neutral or lower.

[1]O = Observed, E = Expected

TABLE 14

IMPORTANCE OF TRAINING AND RATING OF
QUALITY OF TRAINING RECEIVED

Braking Systems

Rating[1]	Employed n-18				Unemployed n-52				Supervisors n-18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	13	72.22	8	44.44	30	57.69	18	34.62	5	27.78	0	0	48	54.55	26	29.55
2	5	27.78	3	16.67	15	28.85	14	26.93	7	38.89	7	38.89	27	30.68	24	27.27
3	0	0	6	33.33	3	3.41	8	9.09	6	33.33	6	33.33	9	10.23	20	22.73
4	0	0	1	5.56	3	3.41	5	9.62	0	0	3	16.67	3	3.41	9	10.23
5	0	0	0	0	1	1.14	7	7.95	0	0	2	11.11	1	1.14	9	10.23

1. Refer to explanation on page 43.

The chi square obtained in Table 13 is equal to 25.94 and is significant at the .01 level of confidence based on two degrees of freedom.

TABLE 15

CHI SQUARE SUMMARY TABLE

BRAKING SYSTEMS

Importance		Quality	
O	E	O	E
75	62	50	62
9	15	20	15
4	11	18	11

Obtained Chi Square equals 18.89

Table 14 summarizes the responses of the three groups ratings of the importance and quality of training received in Braking Systems. Table 15 is a summary table reporting the results of the chi square test of the data in Table 14.

The groups reported a high degree of differences between importance and quality of training. The obtained chi square of 18.89 is significant at the .01 level of confidence.

Seventy-two percent of employed terminees rated importance of training as highly important. Fifty-eight percent of unemployed terminees rated this training as highly important.

TABLE 16

IMPORTANCE OF TRAINING AND RATING OF
QUALITY OF TRAINING RECEIVED

Chassis Suspension and Steering Systems

Rating[1]	Employed n-18				Unemployed n-52				Supervisors n-18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	11	61.11	5	27.78	22	44.00	3	6.00	6	33.33	1	5.56	39	45.35	9	10.47
2	5	27.78	4	22.22	16	32.00	18	36.00	6	33.33	5	27.78	27	31.40	27	31.40
3	2	11.11	3	16.67	8	16.00	7	14.00	6	33.33	6	33.33	16	18.60	16	18.60
4	0	0	5	27.78	1	2.00	10	20.00	0	0	4	22.22	1	1.16	19	21.59
5	0	0	1	5.56	3	6.00	12	24.00	0	0	2	11.11	3	3.49	15	17.44

1. Refer to explanation on page 43.

TABLE 17

CHI SQUARE SUMMARY TABLE

CHASSIS SUSPENSION AND STEERING SYSTEMS

Importance		Quality	
O	E	O	E
66	51	36	51
16	16	16	16
4	19	34	19

Obtained Chi Square equals 32.5

Table 16 summarizes the responses of the three groups ratings of the importance and quality of training received in Chassis Suspension and Steering Systems. Table 17 is a summary table reporting the results of the chi square test of the data in Table 16.

The groups reported a very high degree of difference in the importance and quality of training received. The obtained chi square is significant at the .01 level of confidence.

Almost eighty-nine percent of employed terminees rated importance of this training above the neutral area, but only fifty percent felt that their quality of training was this high. The same general differences appear in the ratings of the unemployed terminees and the supervisors. Less than five percent of the combined ratings of importance were in the negative area, but over thirty-nine percent of combined quality ratings were in the negative area.

TABLE 18

IMPORTANCE OF TRAINING AND RATING OF QUALITY OF TRAINING RECEIVED

Colorado State Safety Inspection

Rating[1]	Employed n-18				Unemployed n-52				Supervisor n-18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	10	55.55	8	44.44	21	40.38	11	21.15	6	33.33	2	11.11	37	42.05	21	23.86
2	4	22.22	1	5.56	11	12.50	10	19.23	4	22.22	4	22.22	19	21.59	15	17.44
3	2	11.11	2	11.11	9	17.31	11	21.15	2	11.11	7	38.89	13	14.77	20	22.73
4	1	5.56	2	11.11	5	9.62	4	7.69	2	11.11	3	16.67	8	9.09	9	10.23
5	1	5.56	5	27.78	6	11.54	16	30.77	3	16.67	1	5.56	10	11.36	22	25.29

1. Refer to explanation on page 43.

TABLE 19

CHI SQUARE SUMMARY TABLE

COLORADO STATE SAFETY INSPECTION

Importance		Quality	
O	E	O	E
56	46	36	46
13	16	20	16
18	24	31	24

Obtained Chi Square equals 9.44

Table 18 summarizes the responses of the three groups ratings of the importance and quality of training received in Colorado State Safety Inspection. Table 19 is a summary table reporting the results of the chi square test of the data in Table 18.

In rating the quality of training received in the Colorado State Safety Inspection, several unemployed terminees pointed out that no training had been offered.

Sixteen out of seventeen responding supervisors rated the employed terminees performance as fair or better, while thirteen out of eighteen responding employed terminees rated quality as fair or better.

Seven supervisors rated this training as the neutral to negative area of importance.

TABLE 20

IMPORTANCE OF TRAINING AND RATING OF
QUALITY OF TRAINING RECEIVED

Introduction to Engines

Rating[1]	Employed n-18				Unemployed n-52				Supervisors n-18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	11	61.11	7	38.89	30	57.69	26	50.00	6	33.33	4	22.22	47	53.41	37	42.05
2	5	27.78	8	44.44	12	23.08	10	19.23	7	38.89	4	22.22	24	27.27	22	25.00
3	2	11.11	2	11.11	5	9.62	9	10.31	3	16.67	6	33.33	10	11.36	17	19.32
4	0	0	1	5.56	3	3.41	2	2.27	2	11.11	4	22.22	5	5.68	7	7.95
5	0	0	0	0	2	2.27	5	9.62	0	0	0	0	2	2.27	5	5.68

1. Refer to explanation on page 43.

TABLE 21

CHI SQUARE SUMMARY TABLE

INTRODUCTION TO ENGINES

Importance		Quality	
O	E	O	E
71	65	59	65
10	13	17	13
7	9	12	9

Obtained Chi Square equals 4.24

Table 20 summarizes the responses of the three groups ratings of the importance and quality of training received in Introduction to Engines. Table 21 is a summary table reporting the results of the chi square test of the data in Table 20.

There were very small differences in the importance and quality ratings of the three groups. The obtained chi square of 4.24 is not significant at the .01 level of confidence.

TABLE 22

IMPORTANCE OF TRAINING AND RATING OF QUALITY OF TRAINING RECEIVED

Basic Automotive Electricity

Rating[1]	Employed n-18				Unemployed n-52				Supervisors n-18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	14	77.77	2	11.11	28	53.85	13	25.00	8	44.44	1	5.56	50	56.82	16	18.60
2	3	16.67	7	38.89	14	26.93	11	21.15	7	38.89	5	27.78	24	27.27	23	26.14
3	1	5.56	6	33.33	5	9.62	12	23.08	3	16.67	5	27.78	9	10.23	23	26.14
4	0	0	2	11.11	3	3.41	12	23.08	0	0	5	27.78	3	3.41	19	21.59
5	0	0	1	5.56	2	2.27	4	7.69	0	0	2	11.11	2	2.27	7	7.95

1. Refer to explanation on page 43.

TABLE 23

CHI SQUARE SUMMARY TABLE

BASIC AUTOMOTIVE ELECTRICITY

Importance		Quality	
O	E	O	E
74	56	39	56
9	16	23	16
5	16	26	16

Obtained Chi Square equals 30.73

Table 22 summarizes the responses of the three groups ratings of the importance and quality of training received in Basic Automotive Electricity. Table 23 is a summary table reporting the results of the chi square test of the data in Table 22.

There was a very high degree of difference between the ratings of importance and quality of training received among the combined groups ratings. The obtained chi square is significant at the .01 level of confidence.

None of the employed terminees or supervisors rated the importance of this training in a negative manner, but of these two groups, 10 persons rated quality of training received in a negative manner.

There was a difference of 35 responses in positive categories between importance and quality ratings of the groups.

TABLE 24

IMPORTANCE OF TRAINING AND RATING OF
QUALITY OF TRAINING RECEIVED

Automotive Electrical Systems

Rating[1]	Employed n-18				Unemployed n-52				Supervisors n-18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	16	88.88	6	33.33	33	63.46	24	46.15	10	55.56	1	5.56	59	67.05	31	35.23
2	2	11.11	9	50.00	14	26.93	10	38.46	8	44.40	4	22.22	24	30.68	23	26.14
3	0	0	2	11.11	3	3.41	7	13.46	0	0	5	27.78	3	3.41	14	15.91
4	0	0	1	5.56	1	1.14	5	9.62	0	0	5	27.78	1	1.14	11	12.50
5	0	0	0	0	1	1.14	6	11.54	0	0	3	16.67	1	1.14	9	10.23

1. Refer to explanation on page 43.

TABLE 25

CHI SQUARE SUMMARY TABLE

AUTOMOTIVE ELECTRICAL SYSTEMS

Importance		Quality	
O	E	O	E
83	68	54	68
3	9	14	9
2	11	20	11

Obtained Chi Square equals 28.14

Table 24 summarizes the responses of the three groups ratings of the importance and quality of training received in Automotive Electrical Systems. Table 25 is a summary table reporting the results of the chi square test of the data in Table 24.

There was a very high degree of difference between the importance and quality ratings of the three groups. The obtained chi square is significant at the .01 level of confidence.

As in the previous set of tables, both employed terminees and supervisors rated importance above the neutral response category, but only five of eighteen supervisors rated the employee terminees in a positive manner. The employed terminees rated program quality much higher than did their supervisors.

TABLE 26

IMPORTANCE OF TRAINING AND RATING OF
QUALITY OF TRAINING RECEIVED

Fuel Systems

Rating[1]	Employed n-18				Unemployed n-52				Supervisors n-18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	14	77.77	6	33.33	29	55.77	19	36.54	7	38.89	4	22.22	50	56.82	29	32.95
2	4	22.22	6	33.33	12	23.08	12	23.08	9	50.00	5	27.78	25	28.41	23	26.14
3	0	0	3	16.67	7	13.46	11	21.15	2	11.11	3	16.67	9	10.23	17	19.32
4	0	0	3	16.67	2	2.27	3	3.41	0	0	5	27.78	2	2.27	11	12.50
5	0	0	0	0	2	2.27	7	13.46	0	0	1	5.56	2	2.27	8	9.09

1. Refer to explanation on page 43.

TABLE 27

CHI SQUARE SUMMARY TABLE

FUEL SYSTEMS

Importance		Quality	
O	E	O	E
75	63	52	63
9	13	17	13
4	12	19	12

Obtained Chi Square equals 16.08

Table 26 summarizes the responses of the three groups ratings of the importance and quality of training received in Fuel Systems. Table 27 is a summary table reporting the results of the chi square test of the data in Table 26.

There is a high degree of difference between the rating of importance and quality of training received among the three groups. The obtained chi square is significant at the .01 level of confidence.

A high percentage of all three groups rated importance of training in a positive manner. Only fifty percent of supervisors rated quality of training in a positive manner. Only nineteen responses in a negative manner were recorded in the quality ratings.

TABLE 28

IMPORTANCE OF TRAINING AND RATING OF
QUALITY OF TRAINING RECEIVED

Intake and Exhaust Systems

Rating[1]	Employed n-18				Unemployed n-52				Supervisors n-18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	6	33.33	4	22.22	20	38.46	24	46.15	7	41.18	2	11.76	33	37.93	30	34.48
2	6	33.33	10	55.56	21	40.38	8	15.38	7	41.18	5	29.41	34	39.08	23	26.44
3	4	22.22	3	16.67	9	17.31	14	26.93	3	17.65	7	41.18	16	18.39	33	37.93
4	2	11.11	1	5.56	2	2.27	4	7.69	0	0	3	17.65	4	4.60	9	10.34
5	0	0	0	0	0	0	2	2.27	0	0	0	0	0	0	2	2.30

1. Refer to explanation on page 43.

TABLE 29

CHI SQUARE SUMMARY TABLE

INTAKE AND EXHAUST SYSTEMS

Importance		Quality	
O	E	O	E
67	60	53	60
16	64	33	24
4	7	11	7

Obtained Chi Square equals 11.21

Table 28 summarizes the responses of the three groups ratings of the importance and quality of training received in Intake and Exhaust Systems. Table 29 is a summary table reporting the results of the chi square test of the data in Table 28.

There was agreement that there is a difference between the importance and quality of training received. The obtained chi square is significant at the .01 level of confidence.

The difference in ratings of quality and importance, while statistically significant, are rather small. The largest shift from importance to quality is found in the supervisors' ratings. Eighty-two percent of supervisors rated this category in a positive fashion, but only forty-one percent rated quality of training this high. The employed terminees rated their programs much higher. The

TABLE 30

IMPORTANCE OF TRAINING AND RATING OF
QUALITY OF TRAINING RECEIVED

Trouble Shooting and Tune-Up

Rating[1]	Employed n-18				Unemployed n-52				Supervisors n-18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	15	83.33	7	38.89	35	67.31	25	48.08	9	52.94	2	11.76	59	67.82	34	39.08
2	2	11.11	6	33.33	9	17.31	14	26.93	4	23.53	2	11.76	15	17.24	22	25.00
3	1	5.56	4	22.22	2	2.27	4	7.69	4	23.53	6	35.29	7	8.05	14	16.09
4	0	0	1	5.56	2	2.27	3	3.41	0	0	2	11.76	2	2.30	6	6.90
5	0	0	0	0	4	7.69	6	11.54	0	0	5	29.41	4	4.60	11	12.50

1. Refer to explanation on page 43.

two groups seem to be in disagreement about the training programs in this area.

TABLE 31

CHI SQUARE SUMMARY TABLE

TROUBLE SHOOTING AND TUNE-UP

Importance		Quality	
O	E	O	E
74	66	56	66
7	11	14	11
6	12	17	12

Obtained Chi Square equals 9.84

Table 30 summarizes the responses of the three groups ratings of the importance and quality of training received in Trouble Shooting and Tune-Up. Table 31 is a summary table reporting the results of the chi square test of the data in Table 30.

There was a difference between importance and quality of training of the three groups. The obtained chi square of 9.84 is significant at the .01 level.

The largest difference in these tables is between the quality ratings of employed terminees and supervisors. Seventeen employed terminees rated training as neutral or better, while thirteen supervisors rated training as neutral or lower.

TABLE 32

IMPORTANCE OF TRAINING AND RATING OF
QUALITY OF TRAINING RECEIVED

Power Trains

Rating[1]	Employed n-18				Unemployed n-52				Supervisors n-18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	6	35.29	5	29.41	21	41.18	8	15.69	4	23.53	0	0	31	36.47	13	15.29
2	8	47.06	6	47.06	19	37.25	11	21.57	3	17.65	5	29.41	30	35.29	22	25.88
3	2	11.76	2	11.76	8	15.69	14	27.45	4	23.53	5	29.41	14	16.47	21	24.82
4	1	5.56	4	23.53	2	3.92	6	11.76	3	17.65	6	47.06	6	6.82	16	18.82
5	0	0	0	0	1	1.96	12	23.53	3	17.65	1	5.88	4	4.55	13	15.29

1. Refer to explanation on page 43.

TABLE 33

CHI SQUARE SUMMARY TABLE

POWER TRAINS

Importance		Quality	
O	E	O	E
61	48	35	48
14	18	21	18
10	19	29	19

Obtained Chi Square equals 17.95

There was a difference between the combined groups ratings of importance and quality of training received. The obtained chi square is significant at the .01 level of confidence.

A majority of terminees and supervisors rated importance at or above the neutral response level. A majority of unemployed terminees and supervisors rated quality at or below the neutral response level.

Over fifty percent of supervisors responding rated quality of training below the neutral area, while only twenty-four percent of employed terminees responded in this negative fashion, indicating a difference in opinion of the quality of the training program.

TABLE 34

IMPORTANCE OF TRAINING AND RATING OF
QUALITY OF TRAINING RECEIVED

Repair and Overhaul of Engines

Rating[1]	Employed n-18				Unemployed n-52				Supervisors n-18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	15	83.33	9	50.00	31	59.62	22	42.31	9	50.00	2	11.11	55	62.50	33	37.50
2	3	16.67	7	38.89	13	25.00	10	19.23	7	38.89	3	16.67	23	26.14	20	22.73
3	0	0	2	11.11	5	9.62	9	17.31	1	5.56	5	27.78	6	6.82	16	18.60
4	0	0	0	0	3	3.41	4	7.69	1	5.56	5	27.78	4	4.55	9	10.23
5	0	0	0	0	0	0	7	13.46	0	0	3	16.67	0	0	10	11.36

1. Refer to explanation on page 43.

TABLE 35

CHI SQUARE SUMMARY TABLE

REPAIR AND OVERHAUL OF ENGINES

Importance		Quality	
O	E	O	E
78	65	53	65
6	11	16	11
4	12	19	12

Obtained Chi Square equals 18.77

There was a difference in the combined groups ratings of importance and quality of training received. The obtained chi square is significant at the .01 level of confidence.

While there is clear agreement in the responses that all groups find this area of training to be important, over seventy percent of supervisors rated quality of training as adequate or less. Almost forty percent of unemployed terminees rated quality of training as neutral or negative.

TABLE 36

IMPORTANCE OF TRAINING AND RATING OF QUALITY OF TRAINING RECEIVED

Automotive Air Conditioning

Rating[1]	Employed n-18				Unemployed n-52				Supervisors n-18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	4	22.22	1	5.56	7	13.46	8	15.38	9	56.25	1	6.25	20	23.26	10	11.63
2	5	27.78	1	5.56	16	30.77	4	7.69	4	25.00	0	0	25	29.07	5	5.81
3	6	33.33	3	16.67	15	28.85	7	13.46	3	18.75	1	6.25	24	27.91	11	12.79
4	2	11.11	4	22.22	8	15.38	4	7.69	0	0	6	37.50	10	11.63	14	16.28
5	1	5.56	9	50.00	6	11.54	29	55.77	0	0	8	50.00	7	8.14	46	53.49

1. Refer to explanation on page 43.

TABLE 37

CHI SQUARE SUMMARY TABLE

AUTOMOTIVE AIR CONDITIONING

Importance		Quality	
O	E	O	E
45	30	15	30
24	18	11	18
17	39	60	39

Obtained Chi Square equals 43.44

There is a very high difference in the combined groups rating of the importance and quality of training received. The obtained chi square is significant at the .01 level of confidence.

This table illustrates the lowest rating of the quality of training received of all the categories in the study. A majority of responses recorded, fell in the lowest negative category. Seventy-two percent of employed terminees and eighty-seven percent of supervisors rated quality of training in a negative fashion. Eighty-one percent of supervisors rated importance in a positive fashion.

Several terminees and supervisors commented on a lack of training in automotive air conditioning.

TABLE 38

IMPORTANCE OF TRAINING AND RATING OF
QUALITY OF TRAINING RECEIVED

Parts Management

Rating[1]	Employed n-18				Unemployed n-52				Supervisors n-18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	7	38.89	4	22.22	12	23.08	6	11.54	8	44.44	3	16.67	27	30.68	13	14.77
2	6	33.33	6	33.33	9	17.31	9	17.31	5	27.78	1	5.56	20	22.73	16	18.60
3	3	16.67	1	5.56	12	23.08	10	19.23	3	16.67	4	22.22	18	20.45	15	17.44
4	1	5.56	2	11.11	4	7.69	7	13.46	2	11.11	6	33.33	7	7.95	15	17.44
5	1	5.56	5	27.78	15	28.85	20	38.46	0	0	4	22.22	16	18.60	29	32.95

1. Refer to explanation on page 43.

TABLE 39

CHI SQUARE SUMMARY TABLE

PARTS MANAGEMENT

Importance		Quality	
O	E	O	E
47	38	29	38
18	17	15	17
23	33	44	33

Obtained Chi Square equals 11.25

There was a difference in the combined groups ratings of importance and quality of training received. The obtained chi square is significant at the .01 level of confidence.

The combined groups rated fifty-three percent in a positive fashion for importance of training, but over fifty percent rated quality of training in a negative fashion.

TABLE 40

IMPORTANCE OF TRAINING AND RATING OF
QUALITY OF TRAINING RECEIVED

Orientation

Rating[1]	Employed n-18				Unemployed n-52				Supervisors n-18				Overall			
	Importance		Quality		Importance		Quality		Importance		Quality		Importance		Quality	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1	13	72.22	9	50.00	25	28.41	24	27.27	8	44.44	2	11.11	46	52.27	35	39.77
2	4	22.22	4	22.22	17	19.32	7	7.95	5	27.78	3	16.67	26	29.55	14	15.91
3	1	5.56	2	11.11	7	7.95	11	12.50	5	27.78	8	44.44	13	14.77	21	23.86
4	0	0	2	11.11	1	1.92	2	2.27	0	0	2	11.11	1	1.14	6	6.82
5	0	0	1	5.56	2	2.27	8	9.09	0	0	3	16.67	2	2.27	12	12.64

1. Refer to explanation on page 43.

TABLE 41

CHI SQUARE SUMMARY TABLE

ORIENTATION

Importance		Quality	
O	E	O	E
72	62	49	62
13	17	21	17
3	8	18	8

Obtained Chi Square equals 9.21

There is a small difference in the ratings of the combined groups between importance and quality of training received. The obtained chi square is not significant at the .01 level of confidence, but would be significant at the .05 level of confidence.

Variance of Responses within Groups

In this section of findings the analysis of variance technique was used to determine if there were significant differences in the mean ratings of the three groups. This was done to determine if there were any differences between the group ratings of importance and quality of training.

TABLE 42

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN LUBRICATION AND BODY SERVICE

SOURCE	SS	DF	MS	F
Between Groups	2	2	1	.9901
Within Groups	83	85	1.09	
Total	85	87		

As seen in Table 42 the obtained F value of .9901 is not significant at the .05 level of confidence. There is little difference between the group mean ratings of importance of lubrication and body service.

TABLE 43

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED FOR LUBRICATION AND BODY SERVICE

SOURCE	SS	DF	MS	F
Between Groups	1	2	.5	.2646
Within Groups	161	85	1.89	
Total	162	87		

As seen in Table 43 the obtained F value of .2646 is not significant at the .05 level of confidence, indicating little difference between the group mean ratings of the quality of training received in lubrication and body service.

TABLE 44

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN BRAKING SYSTEMS

SOURCE	SS	DF	MS	F
Between Groups	5	2	2.5	3.57
Within Groups	63	85	.70	
Total	68	87		

As seen in Table 44 the obtained F value of 3.57 is significant at the .05 level of confidence. There is a difference in the group mean ratings of the importance of

braking systems training. Inspection of Table 14 illustrates that supervisors rated importance of this training somewhat lower than employed terminees.

TABLE 45

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED FOR BRAKING SYSTEMS

SOURCE	SS	DF	MS	F
Between Groups	7	2	3.5	2.30
Within Groups	129	85	1.52	
Total	136	87		

As seen in Table 45 the obtained F value of 2.30 is not significant at the .05 level of confidence. There is little difference between the group mean ratings of the quality of training received in braking systems.

TABLE 46

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN CHASSIS SUSPENSION AND STEERING SYSTEMS

SOURCE	SS	DF	MS	F
Between Groups	2	2	1	1.02
Within Groups	82	83	.98	
Total	84	85		

As seen in Table 46 the obtained F value of 1.02 is not significant at the .05 level of confidence. There is little difference between the group ratings of the importance of training received in chassis suspension and steering systems.

TABLE 47

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED FOR CHASSIS SUSPENSION AND STEERING SYSTEMS

SOURCE	SS	DF	MS	F
Between Groups	5	2	2.5	1.5
Within Groups	133	83	1.6	
Total	138	85		

As seen in Table 47 the obtained F value of 1.5 is not significant at the .05 level of confidence. The group ratings of the quality of training received in chassis suspension and steering systems are not significantly different than expected chance observations.

TABLE 48

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN COLORADO STATE SAFETY INSPECTION

SOURCE	SS	DF	MS	F
Between Groups	5	2	2.5	1.30
Within Groups	162	84	1.92	
Total	167	86		

As seen in Table 48 the obtained F value of 1.30 is not significant at the .05 level of confidence. There is little difference between the group ratings of the importance of training received in the Colorado State Safety Inspection.

TABLE 49

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED IN COLORADO STATE SAFETY INSPECTION

SOURCE	SS	DF	MS	F
Between Groups	2	2	1	.40
Within Groups	207	84	2.46	
Total	209	86		

As seen in Table 49 the obtained F value of .40 is not significant at the .05 level of confidence. All three groups rate the quality of training about the same.

TABLE 50

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN INTRODUCTION TO ENGINES

SOURCE	SS	DF	MS	F
Between Groups	3	2	1.5	1.47
Within Groups	87	85	1.02	
Total	90	87		

As seen in Table 50 the obtained F value of 1.47 is not significant at the .05 level of confidence. There is little difference between the groups mean ratings of the importance of training received in Introduction to Engines.

TABLE 51

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED FOR INTRODUCTION TO ENGINES

SOURCE	SS	DF	MS	F
Between Groups	7	2	3.5	2.30
Within Groups	139	85	1.52	
Total	146	87		

As seen in Table 51 the obtained F value of 2.30 is not significant at the .05 level of confidence. There is little difference between the groups mean ratings of the quality of training received in Introduction to Engines.

TABLE 52

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN BASIC AUTOMOTIVE ELECTRICITY

SOURCE	SS	DF	MS	F
Between Groups	3	2	1.5	1.68
Within Groups	76	85	.89	
Total	79	87		

As seen in Table 52 the obtained F value of 1.68 is not significant at the .05 level of confidence. The group ratings of importance of training in this area do not vary significantly.

TABLE 53

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED FOR BASIC AUTOMOTIVE ELECTRICITY

SOURCE	SS	DF	MS	F
Between Groups	10	2	5	2.27
Within Groups	187	85	2.2	
Total	197	87		

As seen in Table 53 the obtained F value of 2.27 is not significant at the .05 level of confidence. There is little difference between the groups mean ratings of quality of training received for Basic Automotive Electricity.

TABLE 54

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN AUTOMOTIVE ELECTRICAL SYSTEMS

SOURCE	SS	DF	MS	F
Between Groups	2	2	1	1.97
Within Groups	43	85	.5059	
Total	45	87		

As seen in Table 54 the obtained F value of 1.97 is not significant at the .05 level of confidence. There is little difference between the groups mean ratings of importance of training received for Automotive Electrical Systems.

TABLE 55

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED FOR AUTOMOTIVE ELECTRICAL SYSTEMS

SOURCE	SS	DF	MS	F
Between Groups	22	2	11	5.95
Within Groups	158	85	1.85	
Total	180	87		

As seen in Table 55 the obtained F value of 5.95 is significant at the .05 level of confidence. There is a difference among the groups mean ratings of the quality of training received in Automotive Electricial Systems. Both groups of terminees rate the qualify of training programs higher than do the supervisors.

TABLE 56

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN FUEL SYSTEMS

SOURCE	SS	DF	MS	F
Between Groups	4	2	2	2.428
Within Groups	70	85	.8236	
Total	74	87		

As seen in Table 56 the obtained F value of 2.428 is not significant at the .05 level of confidence. There is little difference between the groups mean ratings of importance of training received for Fuel Systems.

TABLE 57

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED FOR FUEL SYSTEMS

SOURCE	SS	DF	MS	F
Between Groups	3	2	1.5	.87
Within Groups	146	85	1.72	
Total	149	87		

As seen in Tabel 57 the obtained F values of .87 is not significant at the .05 level of confidence. All three groups rate the quality of training received in Fuel Systems about the same.

TABLE 58

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN INTAKE AND EXHAUST SYSTEMS

SOURCE	SS	DF	MS	F
Between Groups	1	2	.5	.6667
Within Groups	63	84	.75	
Total	64	86		

As seen in Table 58 the obtained F value of .6667 is not significant at the .05 level of confidence. There is little difference between the groups mean ratings of the importance of training received in Intake and Exhaust Systems.

TABLE 59

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED FOR INTAKE AND EXHAUST SYSTEMS

SOURCE	SS	DF	MS	F
Between Groups	2	2	1	1.33
Within Groups	63	84	.75	
Total	65	86		

As seen in Table 59 the obtained F value of 1.33 is not significant at the .05 level of confidence. There is little difference between the groups mean ratings of the quality of training received in Intake and Exhaust Systems.

TABLE 60

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN TROUBLE SHOOTING AND TUNE-UP

SOURCE	SS	DF	MS	F
Between Groups	4	2	2	1.85
Within Groups	91	84	1.08	
Total	95	86		

As seen in Table 60 the obtained F value of 1.85 is not significant at the .05 level of confidence. There is little difference between the groups mean ratings of importance of training received for Trouble Shooting and Tune-Up.

TABLE 61

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED FOR TROUBLE SHOOTING AND TUNE-UP

SOURCE	SS	DF	MS	F
Between Groups	24	2	12	6.25
Within Groups	165	84	1.92	
Total	189	86		

As seen in Table 61 the obtained F value of 6.25 is significant at the .05 level of confidence. There is a difference among the groups mean ratings of the quality of training received in Trouble Shooting and Tune-Up. See Table 74 for an analysis of the cause of the variance.

TABLE 62

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN POWER TRAINS

SOURCE	SS	DF	MS	F
Between Groups	13	2	6.5	5.86
Within Groups	91	82	1.11	
Total	104	84		

As seen in Table 62 the obtained F value of 5.86 is significant at the .05 level of confidence. There is a difference among the groups mean ratings of the importance of training received in Power Trains. See Table 75 for an analysis of the cause of the variance.

TABLE 63

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED FOR POWER TRAINS

SOURCE	SS	DF	MS	F
Between Groups	12	2	6	3.489
Within Groups	141	82	1.72	
Total	153	84		

As seen in Table 63 the obtained F value of 3.489 is significant at the .05 level of confidence. There is a difference among the groups mean ratings of the quality of training received in Power Trains. See Table 76 for an analysis of the cause of the variance.

TABLE 64

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN REPAIR AND OVERHAUL OF ENGINES

SOURCE	SS	DF	MS	F
Between Groups	4	2	2	3.15
Within Groups	54	85		
Total	58	87		

As seen in Table 64 the obtained F value of 3.15 is significant at the .05 level of confidence. There is a difference among the groups mean ratings of the importance of training received in Repair and Overhaul of Engines. See Table 77 for an analysis of the cause of the variance.

TABLE 65

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED FOR REPAIR AND OVERHAUL OF ENGINES

SOURCE	SS	DF	MS	F
Between Groups	24	2	12	7.27
Within Groups	140	85	1.65	
Total	164	87		

As seen in Table 65 the obtained F value of 7.27 is significant at the .05 level of confidence. There is a difference among the groups mean ratings of the quality of

training received in Repair and Overhaul of Engines. See Table 78 for an analysis of the cause of variance.

TABLE 66

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN AUTOMOTIVE AIR CONDITIONING

SOURCE	SS	DF	MS	F
Between Groups	18	2	9	6.97
Within Groups	107	83	1.29	
Total	125	85		

As seen in Table 66 the obtained F value of 6.97 is significant at the .05 level of confidence. There is a difference among the groups mean ratings of the importance of training received in Automotive Air Conditioning. See Table 79 for an analysis of the cause of variance.

TABLE 67

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED FOR AUTOMOTIVE AIR CONDITIONING

SOURCE	SS	DF	MS	F
Between Groups	3	2	1.5	.53
Within Groups	236	83	2.84	
Total	239	85		

As seen in Table 67 the obtained value of .53 is not significant at the .05 level of confidence. There is little

difference between the groups mean ratings of quality of training received for Automotive Air Conditioning.

TABLE 68

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN PARTS MANAGEMENT

SOURCE	SS	DF	MS	F
Between Groups	21	2	10.5	11.93
Within Groups	75	85	.88	
Total	96	87		

As seen in Table 68 the obtained F value of 11.93 is significant at the .05 level of confidence. There is a difference between the groups mean ratings of the importance of training received in Parts Management. See Table 85 for an analysis of the cause of variance.

TABLE 69

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED FOR PARTS MANAGEMENT

SOURCE	SS	DF	MS	F
Between Groups	35	2	17.5	6.09
Within Groups	244	85	2.87	
Total	279	87		

As seen in Table 69 the obtained F value of 6.09 is significant at the .05 level of confidence. There is a difference between the groups mean ratings of the quality of training received in Parts Management. See Table 81 for an analysis of the cause of variance.

TABLE 70

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN ORIENTATION

SOURCE	SS	DF	MS	F
Between Groups	4	2	2	1.98
Within Groups	86	85	1.01	
Total	90	87		

As seen in Table 70 the obtained F value of 1.98 is not significant at the .05 level of confidence. There is little difference between the groups mean ratings of the importance of training received in Orientation.

TABLE 71

ANALYSIS OF VARIANCE SUMMARY TABLE FOR SIGNIFICANCE OF DIFFERENCES AMONG THE RESPONSES OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED FOR ORIENTATION

SOURCE	SS	DF	MS	F
Between Groups	11	2	5.5	3.59
Within Groups	130	85	1.53	
Total	141	87		

As seen in Table 71 the obtained F value of 3.59 is significant at the .05 level of confidence. There is a difference between the groups mean ratings of the quality of training received for Orientation. See Table 82 for an analysis of the cause of variance.

Variances of Responses Between Groups

In twelve of the thirty analyses of variance summary tables, a significant difference among the groups ratings occurred. The student T test was used to determine which groups mean ratings caused the significant variance estimate to occur.

Each summary table in this section presents the following mean ratings: Employed terminees versus unemployed terminees, unemployed terminees versus supervisors, and employed terminees versus supervisors. The student T ratio is employed. The level of confidence is set at the .05 level.

TABLE 72

SUMMARY TABLE OF T-TESTS OF THE DIFFERENCES BETWEEN THE MEAN RATINGS OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN BRAKING SYSTEMS

GROUP	MSW	$\bar{X}-\bar{X}$	df	T-Ratio
Employed vs. Unemployed Terminees	.70	.37	67	1.56
Unemployed Terminees vs. Supervisors	.70	.40	67	1.68
Employed Terminees vs. Supervisors	.70	.77	33	2.65*

* Significant at the .05 level of confidence

Inspection of the data presented in Table 72 reveals that employed terminees rated importance of training received higher than the supervisors. It is not possible to tell from the data gathered why this difference has occurred.

TABLE 73

SUMMARY TABLE OF T-TESTS OF THE DIFFERENCES BETWEEN THE MEAN RATINGS OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED IN AUTOMOTIVE ELECTRICAL SYSTEMS

GROUP	MSW	$\bar{x}-\bar{x}$	df	T-Ratio
Employed vs. Unemployed Terminees	1.85	.22	67	.58
Unemployed Terminees vs. Supervisors	1.85	1.17	67	3.04*
Employed Terminees vs. Supervisors	1.85	1.39	33	2.96*

*Significant at the .05 level of confidence

Inspection of Table 73 reveals that supervisors rated quality of training received much lower than all terminees. Terminees rated the quality of this training about the same. This implies that both student groups rate the quality of training programs significantly higher than is accepted as a trade standard by their supervisors.

TABLE 74

SUMMARY TABLE OF T-TESTS OF THE DIFFERENCES BETWEEN THE MEAN RATINGS OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED IN TROUBLE SHOOTING AND TUNE-UP

GROUP	MSW	$\bar{x}-\bar{x}$	df	T-Ratio
Employed vs. Unemployed Terminees	1.92	.11	67	0.28
Unemployed Terminees vs. Supervisors	1.92	1.30	67	3.32*
Employed Terminees vs. Supervisors	1.92	1.41	33	2.94*

*Significant at the .05 level of confidence

Inspection of Table 74 reveals that there is no statistical difference between the ratings of the two groups of terminees. Supervisors rated the quality of training received much lower than did the terminees.

TABLE 75

SUMMARY TABLE OF T-TESTS OF THE DIFFERENCES BETWEEN THE MEAN RATINGS OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN POWER TRAINS

GROUP	MSW	$\bar{x}-\bar{x}$	df	T-Ratio
Employed vs. Unemployed Terminees	1.11	0.00	--	--
Unemployed Terminees vs. Supervisors	1.11	1.00	65	3.36*
Employed Terminees vs. Supervisors	1.11	1.00	31	2.74*

*Significant at the .05 level of confidence

As seen in Table 75 there is no difference in the rating of importance of training received by terminees. Supervisors rated the importance of training received lower than did the terminees. This implies that terminees perceptions of the quality of training are below the standards of the trade.

TABLE 76

SUMMARY TABLE OF T-TESTS OF THE DIFFERENCES BETWEEN THE MEAN RATINGS OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED IN POWER TRAINS

GROUP	MSW	$\bar{x}-\bar{x}$	df	T-Ratio
Employed vs. Unemployed Terminees	1.72	.97	65	2.62*
Unemployed Terminees vs. Supervisors	1.72	.12	65	.3235
Employed Terminees vs. Supervisors	1.72	1.00	31	2.20*

*Significant at the .05 level of confidence

As shown in Table 76 employed terminees rated the quality of training higher than did unemployed terminees. The employed terminees evidently felt more confident in the quality of the program than did the supervisors. Unemployed terminees rated the quality of training received in Power Trains about the same as supervisors.

TABLE 77

SUMMARY TABLE OF T-TESTS OF THE DIFFERENCES BETWEEN THE MEAN RATINGS OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN REPAIR AND OVERHAUL OF ENGINES

GROUP	MSW	x-x	df	T-Ratio
Employed vs. Unemployed Terminees	.635	.45	67	2.00*
Unemployed Terminees vs. Supervisors	.635	.05	67	.22
Employed Terminees vs. Supervisors	.635	.50	33	1.85

*Significant at the .05 level of confidence

As shown in Table 77 the employed terminees rated the importance of training received higher than did the unemployed terminees and supervisors. There was almost no difference in the mean ratings of the importance of Repair and Overhaul of Engines between unemployed terminees and supervisors. Refer to Table 34, all employed terminees rated the importance of Repair and Overhaul above the neutral area, but several unemployed terminees did not rate importance this high.

TABLE 78

SUMMARY TABLE OF T-TESTS OF THE DIFFERENCES BETWEEN THE MEAN RATINGS OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED IN REPAIR AND OVERHAUL OF ENGINES

GROUP	MSW	$\bar{x}-\bar{x}$	df	T-Ratio
Employed vs. Unemployed Terminees	1.65	.71	67	1.93
Unemployed Terminees vs. Supervisors	1.65	.92	67	2.52*
Employed Terminees vs. Supervisors	1.65	1.61	33	3.62*

*Significant at the .05 level of confidence

Table 78 illustrates differences in the mean ratings between the terminees and the supervisors. As can be seen in Table 34, the supervisors rated the quality of training received much lower than did the terminees. The terminees perceptions of the quality of training in Repair and Overhaul of Engines is evidently below the standards of the trade.

TABLE 79

SUMMARY TABLE OF T-TESTS OF THE DIFFERENCES BETWEEN THE MEAN RATINGS OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN AUTOMOTIVE AIR CONDITIONING

GROUP	MSW	$\bar{x}-\bar{x}$	df	T-Ratio
Employed vs. Unemployed Terminees	1.29	.20	67	.62
Unemployed Terminees vs. Supervisors	1.29	1.08	65	3.37*
Employed Terminees vs. Supervisors	1.29	.83	31	2.12*

* Significant at the .05 level of confidence

As shown in Table 79, there was no difference in the ratings of the terminees in the importance of training received. Supervisors rated the importance of training received higher than did the groups of terminees. The Terminees were evidently not aware of the supervisors feelings, as one-half of the terminees rated the importance of the training as neutral or lower.

TABLE 80

SUMMARY TABLE OF T-TESTS OF THE DIFFERENCES BETWEEN THE MEAN RATINGS OF THE THREE STUDY GROUPS FOR THE IMPORTANCE OF TRAINING RECEIVED IN PARTS MANAGEMENT

GROUP	MSW	x-x	df	T-Ratio
Employed vs. Unemployed Terminees	.88	.93	67	3.51*
Unemployed Terminees vs. Supervisors	.88	1.04	67	3.92*
Employed Terminees vs. Supervisors	.88	.11	33	.34

*Significant at the .05 level of confidence

As shown in Table 80 there was no difference between the ratings of importance of training received between the supervisors and employed terminees. Employed terminees rated quality of training higher than did unemployed terminees. Supervisors also rated importance of training received higher than did the unemployed terminees. This may be a case illustrating that the unemployed terminees had no basis upon which to judge the importance of training.

TABLE 81

SUMMARY TABLE OF T-TESTS OF THE DIFFERENCES BETWEEN THE MEAN RATINGS OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED IN PARTS MANAGEMENT

GROUP	MSW	$\bar{x}-\bar{x}$	df	T-Ratio
Employed vs. Unemployed Terminees	2.87	1.53	67	3.19*
Unemployed Terminees vs. Supervisors	2.87	.08	67	0.17
Employed Terminees vs. Supervisors	2.87	1.61	33	2.74*

*Significant at the .05 level of confidence

As demonstrated in Table 81 the employed terminees rated quality of training received higher than did the supervisors. The employed terminees rated quality of training higher than did the unemployed terminees. There was no difference between the ratings of supervisors and unemployed terminees. This data indicates that employed terminees were unaware of the knowledge expected of them by the supervisors. As reported in Table 38, only four supervisors rated the quality of training received in Parts Management above the neutral area.

TABLE 82

SUMMARY TABLE OF T-TESTS OF THE DIFFERENCES BETWEEN THE MEAN RATINGS OF THE THREE STUDY GROUPS FOR THE QUALITY OF TRAINING RECEIVED IN ORIENTATION

GROUP	MSW	$\bar{x}-\bar{x}$	df	T-Ratio
Employed vs. Unemployed Terminees	1.53	.28	67	.80
Unemployed Terminees vs. Supervisors	1.53	.77	67	2.21*
Employed Terminees vs. Supervisors	1.53	1.05	33	2.45*

*Significant at the .05 level of confidence

As shown in Table 82 there was no difference in the ratings of quality of training received between groups of terminees. Both groups of terminees rated quality of training received higher than did the supervisors. The terminees rated the quality of training received in Orientation much higher than the trade standards of the supervisors.

TABLE 83

MEAN RATINGS OF THE QUALITY OF TRAINING BY STUDENTS AND SUPERVISORS OF SECONDARY AND POST-SECONDARY PROGRAMS

	Secondary		Post-Secondary	
	Employed	Supervisor	Employed	Supervisor
Lubrication and Body Service	2.86	2.43	2.64	1.91
Braking Systems	2.29	3.29	1.82	2.82
Chassis Suspension and Steering	2.72	4.00	2.55	2.46
Colorado State Safety Inspection	3.15	2.29	2.46	3.37
Introduction To Engines	1.58	2.72	2.00	2.46
Basic Automotive Electricity	2.43	3.00	2.64	3.19
Automotive Electrical Systems	1.58	3.72	2.09	3.00
Fuel Systems	2.15	2.86	2.19	2.55
Intake and Exhaust Systems	2.00	3.15	2.09	2.09
Trouble Shooting and Tune-Up	1.43	3.15	2.28	3.19
Power Trains	1.72	3.15	2.46	2.91
Engine Overhaul	1.58	3.58	1.64	2.91
Automotive Air Conditioning	3.86	4.15	4.19	4.34
Parts Management	2.29	4.00	3.28	3.46
Orientation	1.58	3.58	2.28	2.73
OVERALL	2.21	3.27	2.33	2.89

Statistical treatment of the data reported in Table 83 was not possible, as the analysis of variance procedures used revealed that several of the quality ratings were not statistically different. The small numbers of terminees was also a factor in determining not to perform any statistical tests on the overall quality ratings.

The T-test technique used in Tables 72 through 82 are more revealing. The pattern of ratings is that the supervisors rated quality of training received significantly lower than did the terminees.

The terminees evidently do not view their acquired knowledge as below acceptable entry level standards. The supervisors do not value the terminees quality of training as high as do the terminees, but still indicate overall satisfaction in most areas.

It is interesting to note that there is a greater mean difference in ratings of quality between the secondary employed terminees and their supervisors than there is between the post-secondary employed terminees and their supervisors.

This indicates that supervisors expect a better trained mechanic to come from post-secondary programs.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Summary

This study was concerned with the importance and quality of auto mechanics training programs in the State of Colorado. The high cost of operating these programs is a major concern of both administrators and State supervisory officials.

The main purpose of this study was to determine the reactions of terminees and supervisors to auto mechanics training programs. The study was an initial effort to learn more about auto mechanics training program products as an evaluation procedure.

The evident low rate of placement from both secondary and post-secondary auto mechanics programs was the chief concern of the investigator when this study was designed.

This study involved the terminees of twelve auto mechanics programs in the State of Colorado. All terminees of the selected programs completing the course of study between July 1, 1969, and June 30, 1970, were invited to participate. The invitation consisted of a letter of request with an enclosed questionnaire.

During the time period mentioned above, 246 terminees completed the selected programs.

The questionnaire was sent to the 246 terminees during April, 1971. Due to a very low response, a repeat mailing was conducted in May, 1971.

From the persons responding to the data gathering procedure, 73 questionnaires were selected on which to perform a statistical analysis. Twenty-one of the selected respondents were identified as being employed either as full or part-time auto mechanics.

A part of this identification procedure consisted of asking the employed auto mechanics training program terminees supervisors to participate in the study. Only those terminees whose supervisors responses identified the terminees as actually being employed were included in the study. Eighteen of the twenty-one respondents claiming employment were included.

The questionnaires gathered from the eighteen supervisors were also included in the study. The questionnaires are presented in appendixes B and C.

The questionnaires asked the respondents to evaluate the importance and quality of the auto mechanics training program in which they were enrolled. The importance and quality questions were based on the recommended auto mechanics curriculum as found in the Colorado State Automotive Curriculum Guide, a publication of the Colorado State Board for Community Colleges and Occupational Education.

The responses to the scaled questions were tabluated into three categories: employed terminee, unemployed terminee, and supervisor of employed terminee.

The statistical analysis of the data involved the use of three techniques: (1) a chi square analysis was conducted to determine if there was a statistical difference in the three groups rating of the importance and quality of training received; (2) the analysis of variance was conducted to determine if there were differences of responses among the three groups; and (3) the student T test was performed where differences were found in (2) to determine which groups reactions caused these differences. The .01 level of confidence was selected for the chi square analysis. The .05 level of confidence was selected for the analysis of variance and the student T test.

The chi square technique revealed that differences in rating between importance and quality of training in the selected auto mechanics programs did exist. The three groups rated quality of training significantly lower than importance of training, with only two exceptions, the exceptions were "Introduction to Engines" and "Orientation".

The three groups rated quality of training lower than importance of training in the following areas:

1. Lubrication and Body Service
2. Braking Systems
3. Chassis Suspension and Steering Systems
4. Colorado State Safety Inspection

5. Basic Automotive Electricity
6. Automotive Electrical Systems
7. Fuel Systems
8. Intake and Exhaust Systems
9. Trouble Shooting and Tune-Up
10. Power Trains
11. Repair and Overhaul of Engines
12. Automotive Air Conditioning
13. Parts Management

The analysis of variance technique revealed that the mean ratings of the three groups differed significantly in eleven areas:

1. Importance of Training in Braking Systems
2. Quality of Training in Automotive Electrical Systems
3. Quality of Training in Trouble Shooting and Tune-Up
4. Importance of Training in Power Trains
5. Quality of Training in Power Trains
6. Importance of Training in Repair and Overhaul of Engines
7. Quality of Training in Repair and Overhaul of Engines
8. Importance of Training in Automotive Air Conditioning
9. Importance of Training in Parts Management
10. Quality of Training in Parts Management
11. Quality of Training in Orientation

The student T technique revealed the following differences in mean ratings between the groups.

1. Importance of Training in Braking Systems.
   a. Employed terminees rated importance higher than did the supervisors.
2. Quality of Training in Automotive Electrical Systems.
   a. Unemployed terminees rated the quality of programs higher than did the supervisors.
   b. Employed terminees rated the program higher than did the supervisors.
3. Quality of Training in Trouble Shooting and Tune-Up.
   a. Unemployed terminees rated the quality of training higher than did the supervisors.
   b. Employed terminees rated the quality of training higher than did the supervisors.
4. Importance of Training in Power Trains.
   a. Unemployed terminees rated the importance of training higher than did the supervisors.
   b. Employed terminees rated the importance of training higher than did the supervisors.
5. Quality of Training in Power Trains.
   a. Unemployed terminees rated the quality of training higher than did the supervisors.
   b. Employed terminees rated the quality of training higher than did the supervisors.

6. Importance of Training in Repair and Overhaul of Engines.
   a. Employed terminees rated the importance of training higher than did the unemployed terminees.
7. Quality of Training in Repair and Overhaul of Engines.
   a. Unemployed terminees rated the quality of training higher than did the supervisors.
   b. Employed terminees rated the quality of training higher than did the supervisors.
8. Importance of Training in Automotive Air Conditioning.
   a. Unemployed terminees rated the importance of training higher than did the supervisors.
   b. Employed terminees rated the importance of training higher than did the supervisors.
9. Importance of Training in Parts Management.
   a. Employed terminees rated the importance of training higher than did the unemployed terminees.
   b. Supervisors rated the importance of training higher than did the unemployed terminees.
10. Quality of Training in Parts Management.
   a. Employed terminees rated the quality of training higher than did the unemployed terminees.
   b. Employed terminees rated the quality of training higher than did the supervisors.

11. Quality of Training in Parts Management
    a. Unemployed terminees rated the quality of training higher than did the supervisors.
    b. Employed terminees rated the quality of training higher than did the supervisors.

Conclusions

The following conclusions were based upon the findings of the investigator.

1. Both terminees and supervisors rated quality of training significantly lower than they rated importance of training.
2. In some instances, terminees rate the importance of training higher than the supervisors.
3. In assessing the quality of training received, the terminees consistently rated the programs higher than the supervisors.
4. It is very difficult to find a sufficient number of employed terminees that will respond to a mailed questionnaire to adequately perform evaluative studies of auto mechanics programs.

Implications

While the investigator found it difficult to draw conclusions based on the small sample size, this study illustrates some apparent implications:

1. Terminees of auto mechanics programs are not very knowledgeable about how they are rated by their

supervisors. Several cases were noted where the supervisor rated the quality of training much lower than did the terminee. These terminees had been employed for up to 20 months, but evidently had never been told anything about their entry-level performance by their supervisors.

2. The chi square analyses implied that there is a real gap between entry level skills in auto mechanics needed and the skills obtained in auto mechanics programs in Colorado.
3. Terminees believe that they perform at an acceptable entry level. Secondary terminees rated the quality of programs much higher than did the post-secondary terminees. Secondary terminees supervisors did not agree. As indicated in Table 83, post-secondary terminees and supervisors more nearly agreed on the quality of programs than did the secondary terminees and supervisors. This implies that secondary terminees are less able to judge the quality of programs than post-secondary terminees.
4. The terminees of secondary programs may be less well prepared to perform at the entry level auto mechanics job than the post-secondary terminee. This may be a result of the amount of time spent in training.

Recommendations

In view of the findings, conclusions, and implications of this research study, the following recommendations are listed:

1. The non-institutional follow-up study questionnaire seems to be an inefficient method of data collection. Face-to-face interviews are recommended.
2. Institutional evaluative studies should include following up former students. Instructors were asked to identify which of their students were holding jobs as auto mechanics. Their estimates were much higher than was found in the study.
3. Efforts should be made to determine why terminees, especially secondary terminees, rate the quality of the programs so much higher than the supervisors.
4. Efforts should be made to determine why so few terminees are performing the job of auto mechanics for which they were trained.
5. A definitive authoritative study should be performed to determine if sufficient time is allowed in secondary programs for the training of entry-level auto mechanics. There were many more secondary terminees invited to participate than there were post-secondary terminees. Only seven secondary terminees were found to be performing

the job of auto mechanics. Because this study found no great discrepancy in facilities and other instructional items between the secondary and post-secondary programs, the answer may lie in time of program or the age of the students involved. Any further studies should include these factors.

APPENDIX A

Letters Requesting Participation in Project

April 17, 1972

Letter to Terminees

I am surveying course of study in Auto Mechanics and need your help. The enclosed questionnaire is being sent to a select group of auto mechanics to help devise a complete course of study for both high school and post high school vocational programs.

The questionnaire asks you several questions about your readiness to work at the job of auto mechanics at the time you got your present job. Upon the return of the completed questionnaire, your shop foreman will receive a questionnaire asking similar questions.

One of several importane questions needing a solution is how much time is needed to train a good mechanic. I hope you will cooperate with us in finding solutions to these problems. Please complete the questionnaire and return it in the enclosed stamped envelope.

Thank you for your cooperation.

Sincerely,

Howard N. Acott

HNA:jn

Enclosures

August 9, 1972

Letter to the Service Managers

We are conducting a survey to determine the effectiveness of the present Auto Mechanics training curriculum in Colorado. At the present time, all high school and post high school students in Colorado are studying the same curriculum. Our primary interest is in deciding when the various levels of training should be offered.

A questionnaire was recently sent to one of your employees, whose name appears at the upper right hand corner of the questionnaire. He has responded to that questionnaire.

Please fill out and return the enclosed questionnaire with reference to the employee listed.

Your answers will be very valuable to us in designing curriculums in Auto Mechanics. Please let us know your answers about this ex-student even if he no longer works with your company.

Your interest and cooperation is appreciated.

Sincerely,

Howard N. Acott

HNA:jn

Enclosure

APPENDIX B

Terminee Questionnaire

FOLLOW-UP STUDY

AUTO MECHANICS GRADUATES

SECTION ONE

General Information

Please fill the blank or encircle the correct number.

1. Name: _____

2. Age;_____

3. Now employed: 1. Full-time 2. Part-time

4. Name and address of present employer:_____

_____

5. Name of school where you completed Auto Mechanics Training: _____

_____

6. How necessary was your school training to getting and keeping this job?

   1. Required
   2. Very necessary
   3. Helpful
   4. No help at all

7. Are you now the owner or an employee of the business you are with?

   1. I am owner
   2. I am a partner and part owner
   3. I am a partner with no ownership
   4. I am an employee
   5. I am a part-time employee
   6. Other (specify) _____

8. What subjects or courses taken at this school were most helpful or useful on your job? (Check as many as apply)

   1. Mathematics
   2. Science
   3. English (Communications)
   4. Shop Practices
   5. Social Science (History, Geography, Economics, Psychology)
   6. Other (specify) _____

9. What subjects or courses taken at this school had little or no value to you either on the job or at home? (Check as many as apply)

   1. Mathematics
   2. Science
   3. English (Communications)
   4. Shop Practices
   5. Social Science (History, Geography, Economics, Psychology)
   6. Other (specify) _____

10. How did your First Job after graduating from school compare with the kind of job you thought you might be able to get?

    1. It was better than the type I expected.
    2. It was just about what I expected.
    3. It wasn't as good as I expected.

11. In your opinion, were you required to take enough courses in the following areas:

    a. Mathematics (all levels)
       1. More than adequate
       2. Adequate
       3. Inadequate

    b. English (Communications)
       1. More than adequate
       2. Adequate
       3. Inadequate

    c. Social Science (History, Human Relations, Industrial Psychology, Economics, etc.)

       1. More than adequate
       2. Adequate
       3. Inadequate

    d. Theory in Auto Mechanics
       1. More than adequate
       2. Adequate
       3. Inadequate

    e. Science (Physics, Chemistry, Biology, etc.)

       1. More than adequate
       2. Adequate
       3. Inadequate

f. Shop Practices (Auto Mechanics)
1. More than adequate
2. Adequate
3. Inadequate

g. Safety and Related Practices
1. More than adequate
2. Adequate
3. Inadequate

h. Leadership (Supervision and Decision-Making

1. More than adequate
2. Adequate
3. Inadequate

i. Other (please specify) _____

1. More than adequate
2. Adequate
3. Inadequate

12. How would you rate the textbooks and other instructional materials utilized in your instructional programs?

1. Excellent 2. Fair 3. Poor 4. Insufficient
5. Out-dated

13. How would you rate the shop equipment which was used in your Auto Mechanics training?

1. Excellent 2. Fair 3. Poor 4. Insufficient
5. Out-dated

14. Were you ready to perform the duties of an auto mechanic when you finished this program?

1. Well prepared
2. weak in a few areas
3. Adequate
4. Needed more instructional time in most areas
5. Inadequate

SECTION II

Specific Information

Please read the item carefully to see what your level of preparation was in each area, and how important the training was to you. Circle one number above the line and one number below the line, The top number indicates how important this training should be to an auto mechanic, and the bottom number indicates how good your own program was.

Top Line Numbers - 1. Highly important training
2. Important training
3. Some importance, but not essential
4. Little importance
5. Not a necessary training area

Bottom Line Numbers - 1. Excellent - I had no problems applying my training to the job.
2. Good - I had a few problems applying my training to the job.
3. Adequate - I had some problems, but I knew enough to get by.
4. Fair - I had some problems, and had to get help from other people on the job.
5. Inadequate - I really didn't get the training needed to do the job.

EXAMPLE:

1	(2)	3	4	5
1	2	3	(4)	5

The circled "2" on the top line means that this training was "Important". The "4" on the bottom line means that your training was "Fair".

15. Lubrication and Body Service - Including: Use of lubrication equipment, engine lubrication, differential, transmission and body lubrication. Maintaining doors, window mechanisms, trunk lids and trim. Removal and installation of glass.

Importance of this training:	1	2	3	4	5
My training in this area was:	1	2	3	4	5

16. Braking System - Including: Principles and components of braking systems adjustment and/or R & R of: Pedal and linkage, master cylinder, brake shoes, lining and backing plate. Understand and operate drum grinder and other power units in care of brakes.

Importance of this training:	1	2	3	4	5
My training in this area was:	1	2	3	4	5

17. Chassis Suspension and Steering Systems - Including: Front and rear end suspension, alingment and maintenance components of front end and steering gears. R & R and inspection of wheel bearings, tires, rims, and wheels.

Importance of this training:	1	2	3	4	5
My training in this area was:	1	2	3	4	5

18. Colorado State Safety Inspection - Including: All safety checks, familiar with Motor Vehicle Division inspection manual.

	1	2	3	4	5
Importance of this training:					
My training in this area was:	1	2	3	4	5

19. Introduction to Engines - Including: Fundamentals of 2 and 4 cycle, ratings and ratios. Parts of the engine, types and parts of cooling systems; types and parts of oiling systems.

	1	2	3	4	5
Importance of this training:					
My training in this area was:	1	2	3	4	5

20. Basic Automotive Electricity - Including: Terminology - volts, amps, ohms, resistance, ground. Circuit requirements, magnetism, a.c. and d.c. current. Use of basic electrical equipment.

	1	2	3	4	5
Importance of this training:					
My training in this area was:	1	2	3	4	5

21. Automotive Electrical Systems - Including: Primary, battery, coil, distributor, Secondary; coil, distributor, spark plugs, starting circuit; battery, switches, starter, cables. Charging circuit; battery, generator, alternator, controls; lighting and accessory circuits.

	1	2	3	4	5
Importance of this training:					
My training in this area was:	1	2	3	4	5

22. Fuel Systems - Including: Fuels and combustion; Carburetors, fuel feeds and pumps, air cleaners, Smog control devices.

	1	2	3	4	5
Importance of this training:					
My training in this area was:	1	2	3	4	5

23. Intake and Exhaust Systems - Including: Types and purposes of intake and exhause manifolds and valves.

	1	2	3	4	5
Importance of this training:					
My training in this area was:	1	2	3	4	5

24. Trouble Shooting and Tune-Up - Including: Engine fundamentals, review of fuel and electrical principles. Use of tune-up equipment; distributor testers, volt amp units, vacuum gauge, timing light, strobe, oscilloscope,

exhaust analyzer, compression tester, starter tester, diode and transister tester, electronic compression tester, generator - alternator tester.

Importance of this training:	1	2	3	4	5
My training in this area was:	1	2	3	4	5

25. Power Trains- Including: Inspection, R & R of clutches, 3 and 4 speed standard transmissions, drive shafts, rear ends, and axles. Automatic transmissions; type and operation of torque converters, controls, planetaries, servos, clutches, pumps, cooling and lubrication.

Importance of this training:	1	2	3	4	5
My training in this area was:	1	2	3	4	5

26. Repair and Overhaul of Engines - Including: Engine rebuilding, valve service, crankshafts and bearings, piston rod and cylinder service.

Importance of this training:	1	2	3	4	5
My training in this area was:	1	2	3	4	5

27. Automotive Air Conditioning - Including: Refrigeration fundamentals, heat measurement, human comfort, types of refrigerant. Systems; compressor, condenser, valves, evaporator, and controls. Heating systems. Safety requirements and trouble shooting.

Importance of this training:	1	2	3	4	5
My training in this area was:	1	2	3	4	5

28. Parts Management - Including: Human Relations, parts control, purchasing and sales.

Importance of this training:	1	2	3	4	5
My training in this area was:	1	2	3	4	5

29. Orientation - Including: Shop safety, Leadership development, Shop equipment, Shop organization. Orientation to use of tools; cooperative cleanup.

Importance of this training:	1	2	3	4	5
My training in this area was:	1	2	3	4	5

30. I spent this amount of time studying Auto Mechanics in school: (Check appropriate one)

	Single Period	Double Period	Triple Period
1. Sophomore year high school	___	___	___
2. Junior year high school	___	___	___
3. Senior year high school	___	___	___
4. One year post high school	___	___	___
5. Two years post high school	___	___	___

APPENDIX C

Supervisor Questionnaire

FOLLOW-UP STUDY
AUTO MECHANICS GRADUATES

Section One

GENERAL INFORMATION

_____
(Student's Name)

Please circle the correct response.

1. Name of person completing questionnaire: _____

2. Position: _____

3. Company Name: _____

4. Necessity of school training this person completed for the job now held:

   A. Required B. Very Necessary C. Helpful
   D. No help at all

5. Knowledge of related material:

   A. Mathematics
      1. More than adequate
      2. Adequate
      3. Inadequate

   B. English
      1. More than adequate
      2. Adequate
      3. Inadequate

   C. Theory in Auto Mechanics
      1. More than adequate
      2. Adequate
      3. Inadequate

   D. Shop Safety
      1. More than adequate
      2. Adequate
      3. Inadequate

5. Basic readiness of the named person to perform the entry level job of Auto Mechanic at the time of employment:

   A. Well prepared B. Weak in a few areas
   C. Adequate D. Needed more instruction time in most areas
   E. Inadequate

Section II

SPECIFIC INFORMATION

Please read the item carefully to see what the employee's level of preparation was in each area, and how important the training was to the employee. Circle one number above the line and one number below the line. The top number indicates how important this training should be to an auto mechanic, and the bottom number indicates how good the employee's training program was.

Top Line Numbers

1. Highly important training
2. Important training
3. Some importance, but not essential
4. Little importance
5. Not a necessary training area

Bottom Line Numbers

1. Excellent--Employee had no problems applying training to the job.
2. Good--Employee had a few problems applying training to the job.
3. Adequate--Employee had some problems, but knew enough to get by.
4. Fair--Employee had some problems, and had to get help from other people on the job.
5. Inadequate--Employee really didn't get the training needed to do the job.

EXAMPLE:

1	(2)	3	4	5
1	2	3	(4)	5

The circled "2" on the top line means that this training was "Important". The "4" on the bottom line means that his training was "Fair".

1. Lubrication and Body Service - Including: Use of lubrication equipment, engine lubrication, differential, transmission and body lubrication. Maintaining doors, window mechanisms, trunk lids and trim. Removal and installation of glass.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

2. Braking System - Including: Principles and components of braking systems adjustment and/or R & R of; Pedal and linkage, master cylinder, brake shoes, lining and backing plate. Understand and operate drum grinder and other power units in care of brakes.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

3. Chassis Suspension and Steering Systems - Including: Front and rear end suspension, alignment and maintenance components of front end and steering gears. R & R and inspection of wheel bearings, tires, rims, and wheels.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

4. Colorado State Safety Inspection - Including" All safety checks, familiar with Motor Vehicle Division Inspection manual.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

5. Introduction to Engines - Including: Fundamentals of 2 and 4 cycle, ratings and ratios. Parts of the engine, types and parts of cooling systems; types and parts of oiling systems.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

6. Basic Automotive Electricity - Including: Terminology--volts, amps, ohms resistance, ground. Circuit requirement, magnetism, a.c. and d.c. current. Use of basic electrical equipment.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

7. Automotive Electrical System - Including: Primary, battery, coil, distributor. Secondary; coil, distributor, spark plugs, starting circuit; battery, switches, starter, cables. Charging circuit; battery, generator, alternator, controls; lighting and accessory circuits.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

8. Fuel systems - Including: Fuels and combustion; Carburetors, fuel feeds and pumps, air cleaners; Smog control devices.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

9. Intake and Exhaust Systems - Including: Types and purposes of intake and exhaust manifolds and valves.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

10. Trouble Shooting and Tune-Up - Including: Engine fundamentals, review of fuel and electrical principles. Use of tune-up equipment; distributor testers, volt amp units, vacuum gauge, timing light, strobe, oscilloscope, exhaust analyzer, compression tester, starter tester, diode and transister tester, electronic compression tester, generator - alternator tester.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

11. Power Trains - Including: Inspection, R & R of clutches, 3 and 4 speed standard transmission, drive shafts, rear ends, and axles. Automatice transmission; type and operation of torque converters, controls, planetaries, servos, clutches, pumps, cooling and lubrication.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

12. Repair and Overhaul of Engines - Including: Engine rebuilding, valve service, crankshafts and bearings, piston rod and cylinder service.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

13. Automotive Air Conditioning - Including: Refrigeration fundamentals, heat measurement, human comfort, types of refrigerant. Systems; compressor, condenser, valves, evaporator, and controls. Heating systems. Safety requirements and trouble shooting.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

14. Parts Management - Including: Human relations, parts control, purchasing and sales.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

15. Orientation - Including: Shop safety, leadership development, shop equipment, shop organization. Orientation to use of tools, cooperative cleanup.

Importance of this training:	1	2	3	4	5
Employee's training was:	1	2	3	4	5

APPENDIX D

Follow-Up Letters Requesting Participation

May 24, 1972

Letters to Terminees:

I am again asking for your help. Your return of the enclosed questionnaire would be quite helpful in planning courses of study in Auto Mechanics.

It may be that you are not now employed as an auto mechanic. Please send us your answers anyway.

Your help is appreciated.

Sincerely,

Howard N. Acott

HNA:jn

Enclosure

October 13, 1972

Letter to Service Manager

Last August I sent you a questionnaire on one of your employees.

Your answers can help us develop a better Auto Mechanics curriculum not only at our own school, but perhaps all over the State of Colorado.

Please take a few moments to fill out and return the enclosed form as it pertains to the named student when he was first employed in your firm.

Sincerely,

Howard N. Acott

HNA:jn

Enclosure

REFERENCES CITED

1. Bradin, Billy. "A Pilot Follow-Up Study of High School Graduates for the Years 1961 and 1965 in the 23 Counties of Western Kentucky Having Counselors During 1964 and 1965". Kentucky State Department of Education, Frankfort, 1968.

2. Brogden, H. E. and Taylor, E. K. "The Theory of and Classification of Criterion Bias". Educational and Psychological Measurement, 1950.

3. _____. "Colorado Vocational Education Act of 1970: Second Annual Report - 1971 - 1972", The Colorado State Board for Community Colleges and Occupational Education, Denver, 1972.

4. _____. A Comparative Study of Proprietary and Non-Proprietary Vocational Training Programs. United States Office of Education, 1972.

5. _____. Curriculum Guide Automotive Mechanics. Colorado State Board for Community Colleges and Occupational Education, Denver, Undated.

6. Eble, Kenneth E. The Recognition and Evaluation of Teaching. Project to Imporve College Teaching, Salt Lake City, 1971.

7. Edsall, Richard H. "State Follow-Up Report", Unpublished. State Board for Community Colleges and Occupational Education, Denver, 1972.

8. Eninger, M. V. The Process and Product of Trade and Industrial High School Level Education in the United States: The Product, The American Institute for Research, Pittsburgh, 1965.

9. Gran, J. R. "A Follow-Up Study of the One Hundred and Eleven Graduates - Class of 1968 of the Jackson County Adult Evening Program". Unpublished, Board of Education, Jackson County, Iowa, 1969.

10. Gustad, John W. Handbook on Selected Readings in Evaluation of Teaching Performance. American Council on Education, Washington, D. C., 1967.

11. Hawkdrige, D. et. al., "A Study of Selected Programs for Vocational Education in Secondary Schools. Final Report", American Institute for Research in Vocational Education, Palo Alto, 1970.

12. _____. "Initial Follow-Up Survey of Former Students, DF-6". The Colorado State Board for Community Colleges and Occupational Education, Denver, 1971.

13. Mallinson, George C. "Characteristics of Non-College Bound Vocationally Oriented School Leavers and Graduates", Western Michigan University, 1968.

14. Runyon, Richard P., and Haber, Audry. Fundamentals of Behavioral Statistics. Reading, Massachusetts: Addison-Wesly Publishing Co., 1967.

15. Towson, T. R. "A Follow-up Study of Baltimore County High School Graduates. Baltimore County Public Schools, Baltimore, 1969.

16. Valentine, Ivan E. "Vocational Education Follow-up Study" Unpublished. Colorado State University, Fort Collins, 1971.

17. Wert, James E.; Neidt, Charles O.; and Ahmann, Stanley J. Statistical Methods in Research in Educational and Psychological Research. New York: Appleton-Century-Crofts, Inc., 1954.