

AN ABSTRACT OF THE THESIS OF

JEANE LOUISE DILLE for the degree of DOCTOR OF EDUCATION
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TITLE: THE IDENTIFICATION OF VERBAL, HANDWRITING, AND WRITTEN
COMPOSITION SKILLS AND THE LEVEL OF THOSE SKILLS REQUIRED
BY ENTRY-LEVEL INDUSTRIAL MECHANICS

Abstract approved: Redacted for Privacy
Dr. Larry Kenneke

The purpose of this study was to determine the importance and the frequency of use of certain communication skills to job-entry-level mechanics as assessed by employers, educators at various levels, and entry-level industrial mechanics. The study was conducted in Lane County, Oregon. Communication skills investigated for importance and for frequency of use were: verbal, handwriting, and composition skills.

The following null hypothesis was tested:

There is no significant difference among the means of the seven groups, or, the seven groups agree on the importance and the frequency of use of the investigated communication skills.

After rejection of the original (null) hypothesis, a Least Significant Difference (L.S.D.) test was used to test the following six a priori subhypotheses:

1. Do employers (Group 2) agree with workers (Group 1) on necessary communication skills and level of those skills?

2. Do educators K-6 (Group 3) agree with workers (Group 1) on necessary communication skills and level of those skills?
3. Do educators 7-9 (Group 4) agree with workers (Group 1) on necessary communication skills and level of those skills?
4. Do educators 10-12 (Group 5) agree with workers (Group 1) on necessary communication skills and level of those skills?
5. Do educators 13-14 (Group 6) agree with workers (Group 1) on necessary communication skills and level of those skills?
6. Do educators 14+ (Group 7) agree with workers (Group 1) on necessary communication skills?

Conclusions

1. The seven groups do not agree in their assessment of the importance or the frequency of use by entry-level workers of the communication skills investigated in this study.
2. Workers (Group 1) and employers (Group 2) do not agree in their assessment of the importance or the frequency of use by entry-level workers of the communication skills investigated in this study.
3. Workers (Group 1) and educators K-6 (Group 3) do not agree in their assessment of the importance or the frequency of use by entry-level workers of the communication skills investigated in this study.
4. Workers (Group 1) and educators 7-9 (Group 4) do not agree in their assessment of the importance or the frequency of use by entry-level workers of the communication skills investigated in this study.
5. Workers (Group 1) and educators 10-12 (Group 5) do not agree in their assessment of the importance or the frequency of use by entry-level workers of the communication skills investigated in this study.
6. Workers (Group 1) and educators 13-14 (Group 6) do not agree in their assessment of the importance or the frequency of use by entry-level workers of the communication skills investigated in this study.

7. Workers (Group 1) and educators 14+ (Group 7) do not agree in their assessment of the importance or the frequency of use by entry-level workers of the communication skills investigated in this study.

Procedures

The instrument used for the study was a survey questionnaire consisting of 38 communication-related tasks. The instrument was sent to a selected sample of respondents representing: workers (industrial mechanics) employers, and educators at various levels. The study employed a one-way analysis of variance design (fixed model). The F-statistic was used in the analysis. For a determination of significant differences, the critical F-ratio was established with six degrees of freedom with alpha = .05. In case of rejection of the original (null) hypothesis, a Least Significant Difference (L.S.D.) test was used to test the six a priori subhypotheses.

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The Identification of Verbal, Handwriting, and Written
Composition Skills and the Level of Those
Skills Required by Entry-Level Industrial Mechanics

by

Jeane Louise Dille

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The Identification of Verbal, Handwriting, and Written
Composition Skills and the Level of Those
Skills Required by Entry-Level Industrial Mechanics

I. INTRODUCTION

Change, accelerated by technology, requires frequent investigation of necessary skills. Just as life and industry have been modified by evolving technology, communication skills have been affected also. Regardless of the individual's life role, communication is an integral part of the activities of daily living. Although the activities which members of a community involve themselves in may vary, the needs of individuals to communicate remain constant. Because human need to communicate remains constant, but the environment is ever-changing, both the type of communication skill and the level of skill required may be subject to change.

One such change, which established tradition, occurred when Harvard University instituted entrance examinations in English in 1869-70 after which all of the other prestigious colleges followed suit (Hull). Then, because public high schools grew from the concept of the private academy and preparatory school, and because preparation was for college, English teachers in high schools responded to these college entrance examinations. Each college required something a little different, so the high school English departments requested direction. Confusion mounted until, in 1892, the National Education Association attempted to alleviate the confusion by appointing the Committee of Ten (Hull). The

result of the work of the Committee of Ten was a comprehensive outline of the school curriculum, complete with subjects, hours, sequences, and graduation requirements (Baker), which survives to this day.

After the establishment of the curriculum developed by the Committee of Ten, little change from the tradition has taken place until recently. Traditional academic pursuits were the preparation of students for college and universities. Such university pursuits followed the "John Hopkins plan" [classical studies and linguistics] (Parker) and did not include interest in, or research aimed at, the needs of industry.

This study examines the verbal, handwriting, and written composition skills necessary for job-entry level mechanics working in industry as "industrial mechanics."

Statement of the Problem

The main purpose of this study was to determine the importance and the frequency of use of certain communication skills by job-entry level industrial mechanics, as assessed by employers, educators at various levels, and mechanics on the job. The instrument used for the study was a survey-questionnaire consisting of thirty-eight (38) communication related tasks. The survey-questionnaire was sent to a selected sample of respondents representing: workers (industrial mechanics), employers, and educators. The study examined what verbal, handwriting, and composition skills

are important to and frequently used by entry-level industrial mechanics

Hypothesis

This study tested the following null hypothesis: There is no significant difference among the mean scores of the seven groups. Some other questions which were examined are:

1. Do employers (Group 2) agree with workers (Group 1) on necessary communication skills and level of those skills?
2. Do educators K-6 (Group 3) agree with workers (Group 1) on necessary communication skills and level of those skills?
3. Do educators 7-9 (Group 4) agree with workers (Group 1) on necessary communication skills and level of those skills?
4. Do educators 10-12 (Group 5) agree with workers (Group 1) on necessary communication skills and the level of those skills?
5. Do educators 13-14 (Group 6) agree with workers (Group 1) on necessary communication skills and the level of those skills?
6. Do educators 14+ (Group 7) agree with workers (Group 1) on necessary communication skills and the level of those skills?

Definition of Terms

The following definitions have been offered in order to clarify the meaning of certain terms and their use in this study:

Employer: a business or organization which employed cooperative work experience workers or "industrial mechanics" from the cooperative work experience program at Lane Community College during the spring quarter, 1975.

Worker: a student who participated in the spring quarter, 1975, cooperative work experience program at Lane Community College whose work assignment was that of "industrial mechanic."

Cooperative Work Experience Program: a program wherein the student spent one-half of his learning time on a job related to his college (or career) program. He was paid for his work and supervised by the employer. At the same time, he was supervised by the school or College's cooperative work experience coordinator.

Industrial Mechanic: identified by the Department of Health, Education, and Welfare, Dictionary of Occupational Titles, and the Oregon State Education Department as workers in such job categories as small engine repairmen, diesel mechanics, business machine repairmen, construction and maintenance trades, heavy equipment repairmen, and refrigeration or air conditioning mechanics.

Rationale

In order to design a curriculum or a program of study of communication skills which will meet and will satisfy the needs of a society, one must first:

1. ascertain what communication skills are required in order to function in that segment of society.
2. ascertain what level of skill is required for individuals to function in that segment of society.

It is important that such an assessment of needs be current.

One way to investigate the communication needs required by the nonacademic or general student might be through workers who have become instructors. But, by the time an industrial employee has progressed to the point where he is qualified to teach his trade, he is some distance from job-entry level in terms of time

and in terms of skill proficiency. Furthermore, as an instructor, his specialty is teaching the skill, trade, or craft. If he deals with the communication-related teaching aspects at all, he will deal superficially.

Such superficial treatment of communication-related aspects of business is evident from the description of "industrial mechanics." When the Ad Hoc Committee for Trade and Industrial Mechanics inventoried the skills of "industrial mechanics," the Committee included only

. . . the basic manipulative skills, related mathematical skills, and shop- or laboratory-related experiences associated with experiences found in industry (U.S. Office of Education).

This is the description for "Trade and Industrial Relations 17.00 00 00" that identifies the job category which includes: small engine repairmen, diesel mechanics, business machine maintenance repairmen, construction and maintenance trades, heavy equipment maintenance repairmen, and refrigeration or air conditioning mechanics. The Committee's description of the tasks performed by industrial mechanics contained no reference to any communication-related skill.

Even if a study of communication skills of industrial mechanics had been undertaken three years ago, it is possible that technology might have changed so much that the worker in the field had to retrain. During an interview on July 11, 1974, as a part of the UNESCO World Conference on Comparative Education,

the personnel manager of the Stahlwerke Bochum (Krupp Steel Works) in Bochum, Germany, indicated that electronics workers in Germany had to retrain every twenty-two months. As Darwin McCarroll, head of the Electronics Department at Lane Community College said in January, 1975, "Technology changes faster than we are able to learn it." So it is possible that teachers throughout education have been insufficiently aware of changing technology and how deeply this changing technology impinges on communication skills.

Some examples of how technology determines the style or format used in business include the optical scanner, now in use in post office terminals, for the swift, mechanical sorting of letters (as opposed to hand-sorting) which has determined the style of address used on envelopes. This change in the style of address includes the placement of the address; the use of two-letter, block, capitalized state abbreviations; and the regulation of the number of spaces between state abbreviation and zip code. In addition, double spacing on envelope addresses has been completely discarded.

Another instance of change is the proliferous use of contractions in verbal communication. Only a generation or two ago, aint became an official word in the dictionary. Also, the subjunctive mode of the American verb has almost disappeared except for an occasional poetic usage. Teachers who are not aware, or who have not kept pace with developments, do not teach their students

how to work in accordance with the incessant demands for change triggered by technology. Further, teachers may even penalize students who depart from the older, more traditional types or methods.

Office-related and clerical curricula designers have been aware of the need to check with industry to discover what communication skills and what level of skills are needed by employees. Employers have strong opinions as to what they want and what they do not want their employees to possess in the way of communication skills. The outstanding communication characteristic of one study of clerical-related communication skills showed that the most highly prized communication-related skill in all situations was that of courtesy: courtesy toward the customer, courtesy toward the employer, and courtesy toward other employees (Dille).

Lane Community College surveyed the community of employers in 1971 (Nord) to design a communication skill course especially for vocational employees. Individual learning packages, prescribed to meet the student's need and career choice, are used. The course has been well received; it is available through ERIC.

Lane's special course includes learning packages on writing a resume, writing the letter of application, how to write a paragraph, writing a report, and filling out forms. However, by the time a student has reached the college level, the student should already possess a background and level of skill in this kind of writing which facilitate his job-seeking efforts. But, neither

"wishing" nor "legislating" will make this a fact unless courses in communication skills, from kindergarten through high school, teach the student what he needs to know in order to perform these communication tasks. Without reliable input from the industrial community, emphasizing what the communication needs of the job-entry level person are, courses cannot be designed efficiently.

If, as the Oregon Board of Education has mandated, a graduating high school senior shall have a job-entry-level skill in addition to his or her academic requirements, then at about the time the student is ready for a cooperative-education work experience--as a high school junior or senior--he should be at a level where he would need only a brush-up on these entry-level communication skills. According to Relating General Educational Development to Career Planning, beginning such communication skill training at any level higher than K-9 should be considered remedial, because it is at the K-9 level that these skills are most efficiently and effectively taught.

If learned communication patterns are not the ones needed for job-entry level, then the student has to be retrained. Regardless of the calibre of the teacher or of the program, it is both more expensive and more difficult to offer this training at the college level. At this stage, it is difficult for individuals to break established poor habits and to relearn new habits. Such remedial efforts interfere with the time and effort the student would otherwise have to spend on the main pursuit of his career.

choice. Designing courses with the needs of the students in mind would reduce duplication, increase efficiency, and add to the student's satisfaction. Also, these specially designed courses should reduce student frustration. The Children's Defense Fund report suggests that

. . . schools would have a lot fewer trouble-makers on their hands if they did a better job in the first place of providing youngsters with solid grounding in the basic skills so they will not become bored and antagonistic in the upper grades when they cannot handle the work (Gazette-Times).

Therefore, it is important to find out what communication skills employers believe should be taught to students who are preparing themselves for that business. Not only is it important to find out what employers want, but it is also important to discover what educators think the business community considers important because teachers teach what they consider to be important and appropriate. However, it is even more important that educators be aware of what is commercial in the way of communication skills in the market place. It is also of consequence to find out from the worker on the job what he perceives his communication needs to be. Information gained from these three sources can be extremely helpful in designing curricula and updating courses so that they are in line with the current needs of the society.

II. REVIEW OF RELATED LITERATURE

There are gaps in our understanding of the relationship between education and adequate performance of certain jobs. Young points out the difficulty of separating "required education from actual education" because of insufficient data on just what education is required in order to perform a particular job. Further, he adds that modern technology may have altered both the skill content as well as the amount of training required. The historical approach to job preparation, or "how it has always been done," is no longer expedient or efficient (Young).

Traditional Educational Goals

In the early 1600's, the Puritans created the primitive form of elementary school, the Dame or Infant School, for the purpose of teaching their children enough "letters" so they could read the Bible for themselves (Cubberley). As Brubacher and Rudy points out, from the time of the Greeks, a gentleman's education was "liberal." His education reflected his situation or status in life. That is, a gentleman's education was intellectual as compared to the practical and vocational education of the common folk.

But the Industrial Revolution in the first half of the nineteenth century, which preceded the Civil War, was accompanied by the rise of the middle class. The middle class acquired more

money and more political power. One use of its money was to make sure that its children had as many of the upper class or "aristocratic" advantages as money could buy; among these advantages was education in the gentleman's "liberal" tradition.

The "liberal" education, which the middle class sought for its younger generation in the first half of the nineteenth century, was not practically but scholarly oriented. So, the ten-year decline in Standard Achievement Test (SAT) scores noted in 1974, according to Hechinger, is only one indication of the "imbalance between schools, students, and society" and that the reading level, as indicated by the scores, is deteriorating. The pendulum appears to be swinging from the scholarly orientation back to the vocational.

Emerging Goals

Hoyt, in 1972, described the two major goals of traditional American education to be "the preparation of students for living and the preparation of students for making a living." However, rather than posing the liberal against the vocational or the aristocratic against the practical, he maintained that both of these goals must be implemented within the operation and structure of educational programs. In "Career Education and the Teaching/Learning Process," Hoyt took an even stronger stand:

The American system of formal education must accept increasing responsibility both for providing individuals with general career skills required for adaptability in our rapidly changing society and with specific career skills that can be utilized in making the transition from school to the world of employment.

Career education seeks to make education, as preparation for work, a major goal for all who teach and all who learn (Hoyt, 1975).

Hoyt continued by pointing out that, according to his definition, "career education . . . also includes the work of the student and the work of the teacher." Further, that there are positive relationships in our society "between productivity (output per person hour) and reduction in worker alienation" (Hoyt, 1975).

This worker or student alienation is reflected in the 1960 census report that less than 75 per cent of the population entering American schools completes secondary school (Cervantes). Although the "dropout" may return to complete a high school equivalency program at a later date, in all probability, he has left the school system with inadequate communication skills. The dropout's inability to communicate freely was found to be a factor of greater importance than either finances or IQ (Cervantes), even though Evans and Galloway associated verbal ability with socio-economic and status of the dropout. Probably those who suffer most as a result of inadequate communication skills are the disadvantaged. Although some educators advocate that the severely disadvantaged students begin their education process under non-verbal symbols, the same educators insist that the handicapped must not be permitted to remain educationally retarded and . . . most of this instruction must be geared to standard levels of reading and speech (Leighbody).

On the elementary level, concern is expressed at the number of elementary teachers who have substandard speech and pronunciation. King raises the question "Is your speech [as a teacher] worth imitating?" Bradac's research in speech competencies or verbal communication suggests not only "greater [student] participation and involvement, [but also] the beginning of communication training at an earlier (elementary) level." Rexford dismisses as "frivolous" the assumption that teachers are garrulous when discussing "Teachers' Pupil Control and Classroom Verbal Behavior." He does suggest that pupil control by teacher verbosity is a manifestation of

. . . social system influences at work . . .
In both the larger community and the school organization, the predominant expectation is that teachers should command and instruct pupils.

At the secondary level as well as at the college level, there is increasing awareness that students have a need for training which will expedite their entry into the job market. In order to accomplish this objective, students should be taught the use of language practical for vocational needs. Especially in those states which have enacted legislation which includes job-entry-level skills as a requisite for graduation from secondary school, adequate communication skills for the job market enjoy high priority.

In a survey to determine the English competencies required of secretaries in legal and administrative areas,

The respondents and interviewees overwhelmingly ascribed primary importance to knowledge of fundamentals of English and further indicated that competencies were the responsibility of the educator and not the employer (Radloff).

In addition, despite the movements during the sixties to relieve students of pressure and to make language learning "more fun", respondents preferred long-term happiness and satisfaction derived from processing acceptable language competency to the learning-should-be-fun approach (Radloff).

English and communication-related skills are a series of skills which need to be taught (Cox). Many students, who were not successful in their secondary or college-preparatory English, still find it difficult and must go into college "bonehead" or remedial sessions (Scully).

In the teaching of English and communication-related skills, one suggestion in "Remarks on Teaching Grammar" is to base the teaching of grammar on its usage in varied situations (Hopper). This suggestion supports Mey's contention that computational linguistics--and linguistics in general-- is the study of human behavior. Similarly, Mayher, is discussing "Linguistics and Some Implications for the Schools," states that each speaker-hearer commands a language system which he employs unconsciously in speaking and writing.

Communication Skills in Innovative Industrial Programs

Four of the seven innovative industrial programs reviewed by Cochran dealt specifically with students' communication skills in their program objectives. Each of the four programs had a slightly different emphasis. For instance, during the first three semesters of the Correlated Curriculum Project,

. . . students take correlated English, science, and mathematics . . . every effort is made to provide natural correlations and avoid artificial or straight jacket type of subject relationships (Cochran).

Similarly, the Richmond Plan offerings

. . . reflect the interrelated knowledge of science, mathematics, and English . . . Regardless of direction the student's direction--industry or academic emphasis is placed on the development of skills in communications (writing sentences, paragraphs and papers) and mastering other communicative skills in mathematics, science, and drafting (Cochran).

The program structure of the American Industry Project was based on

The recognition that typical content for industrial education lacked a coherent structure which provided the motivation to identify basic concepts common to all industries. An analysis of industry revealed thirteen common concept areas that were prevalent throughout industry. These included communications . . . (Cochran).

The fourth industrial education innovative project described by Cochran, the Maryland Plan, presented three major postulates, one of which was that

. . . there is increasing void in education with respect to the understanding of industry and technology as dominant factors.

This postulate was derived from documentation ". . . from the fields of sociology, psychology, anthropology, history and economics'" (Cochran).

Speaking to dominant factors and trends, in his paper "Modern Trends in Persuasion in Business and Industry, Howell traced clues to project trends. He foresaw

. . . increased study of nonverbal communication, intercultural approaches to communication problems, and increased requests for assistance to business from the academic world.

Turner, in recommending that industrial organizations concern themselves with both the "ritual and language as ways of communicating meaning" was suggesting an examination of the ideas of "occupational role" and "organizational identity." Turner made it clear that such a study of "industrial meaning systems is central to the further development of industrial sociology." Such a study, Turner maintained, could best be accomplished by the "phenomenological approach," or an investigation of the experiences of the world of the industrial worker as a subculture. Within the concerns of this investigation, Turner was recommending a study of the language used by industrial workers within the framework of their occupational local and time frame.

Summary

Business and technology have deflected education away from "liberal" education with its emphasis on intellectual exclusiveness

and college-preparatory curricula. The communication skill needs of business and industry are not identical with those of the academic marketplace. The traditional content and methodologies, which made up the academic communication skills curriculum, have not been those required for business, industrial, and vocational students. As evidenced by remedial and "bonehead" programs, the general or nonacademic communication skills curricula (Cochran) have not provided satisfactory communication skills for workers entering the industrial job market.

Education has not been aware of the communication skills needs of business, nor has education been sufficiently aware of the dominant force business and industry represent in the determination of marketable skills. Industrial employees and employers, as well, believe that education is responsible for training in required communication skills. There are effective means for teaching these skills and, with certain exceptions, it is possible to train individuals in identified communication skills to the level required by industry. In addition, recipients of this training prefer the pressures concomitant with learning required competencies to the "fun and games" approach.

In order to identify the skills required by industry and the level of skill required, education must enlist the cooperation of industry. Further, it is not sufficient to identify what skills and what level of skills are required, it is also necessary to identify these skills within the context or situation the skills

are to be used. Therefore, this study represents an effort to identify what communication skills are used and what level of verbal, handwriting, and composition skills are necessary for entry-level industrial mechanics on the job.

III. DESIGN OF THE STUDY

The main purpose of this study was to determine the importance and the frequency of use of certain communication skills to job-entry-level industrial mechanics, as assessed by mechanics, employers, and educators at various levels. The study employed a one-way analysis of variance design (fixed model). The F-statistic was used in the analysis.

The Dependent Variable

The dependent variable for the study was the respondent's reaction to each of thirty-eight (38) items on a survey-questionnaire. The respondent's score was the rank assigned to the item on a Likert-type scale.

The Instrument

The instrument used for this study was a survey-questionnaire consisting of communication-related tasks which were abstracted from recent task analyses of "industrial mechanics," published by the Oregon State Board of Education. These task analyses, or lists of tasks, described tasks which were considered essential to the "industrial mechanics" occupation (a job title designed by the U.S. Office of Health, Education and Welfare to identify the various jobs classified under "industrial mechanics"). This same classification system appears in the Dictionary of Occupational Titles.

A four-state, western consortium, which includes Oregon, utilizes the classification system for storage and retrieval of its employment statistics.

The instrument--a 38-item, survey-questionnaire--was divided into three general skill areas: (1) verbal skills, (2) handwriting skills, and (3) written composition skills. For each of the 38 communication tasks, the respondent was asked two questions:

(a) how important is this communication task to a job-entry-level industrial mechanic; and, (b) how frequent is this communication task used by a job-entry-level industrial mechanic. The survey instrument is shown in Appendix I.

On the Likert-type scale used for answering these questions, the answers were ranked with 1 assigned highest importance and 5 lowest importance. In the area of frequency, number 1 was assigned the highest frequency and number 5 was assigned the lowest frequency of use.

After the items had been grouped into the three general categories of verbal, handwriting, and composition skills, the items were then arranged in the suggested questionnaire format using the five-interval, Likert-type scale. The questionnaire was submitted to several trade and industry instructors for suggestions and recommendations. The questionnaire was modified, where appropriate, and then tested by a "panel of judges." The "panel of judges" consisted of a group of 35 student-employees enrolled in the cooperative work experience program at Lane Community College.

Although not all of the members of this group were classified as "industrial mechanics," the majority of 27 was so-identified. The one recommendation from this group dealt with the spatial arrangement of the items on the questionnaire. In all other respects, such as readability and understanding of the items, the panel approved the format and the content of the survey instrument.

See Appendix I for the instrument in its final form.

Sampling

Because stratified samples were used, each group was selected as follows:

Group 1, Workers, was selected by random sample from among the students participating in the spring quarter, 1975, cooperative work experience program at Lane Community College whose work assignment was that of "industrial mechanic."

Group 2, Employers, was selected by random sample from those businesses or organizations which employed cooperative work experience "industrial mechanics" from Group 1 above (from the cooperative work experience program at Lane Community College during the spring quarter, 1975).

Group 3, Educators K-6, was selected by random sample from teachers on the K-6 level assigned to teach kindergarten or a specific, elementary grade level in the 4-J District (listed in the 1974-75 Personnel Directory of Lane Community School District).

Group 4, Educators 7-9, was selected by random sample from teachers assigned to teach English, Business English, or Language Arts on the 7-9 level in the 4-J school district (listed in the 1974-75 Personnel Directory of Lane Community School District).

Group 5, Educators 10-12, was selected by random sample from teachers on the 10-12 level assigned to teach English, Business English, Language Arts, Journalism, Business Education, or Distributive Education in the 4-J School District (listed in the 1974-75 Personnel Director of Lane Community School District).

Group 6, Educators 13-14, was selected by random sample from the roster of instructors assigned to teach English composition or writing courses at Lane Community College.

Group 7, Educators 14+, was selected by random sample from the roster of instructors assigned to teach English composition or writing courses at the University of Oregon.

The sample consisted of ten (10) respondents from each of the seven (7) groups; thus, the sample totaled seventy (70) respondents.

Statistical Design

A 2 x 7 factorial analysis of variance (ANOVA) design was used for this study. The design consisted of a fixed model with equal cell size. The analysis of variance arrangement is depicted in Table 1.

Table 1
ANOVA Layout Arrangement
(Fixed Model)

Source of Variation	Degrees of Freedom	SS	MS	F
Between Groups	6	A	A/6	MS/grps/MSerror
Within (error)	63	B	B/63	
TOTAL	69	C		

The basic experimental design incorporated seven (7) separate categories as indicated below in Table 2:

Table 2
Sampling Matrix
(Equal Cell Size)

Group 1 Emp- ploy- ees	Group 2 Emp- ploy- ers	Group 3 Edu- cators K-6	Group 4 Edu- cators 7-9	Group 5 Edu- cators 10-12	Group 6 Edu- cators 13-14	Group 7 Edu- cators 14+
N=10	N=10	N=10	N=10	N=10	N=10	N=10

The F-statistic was selected as the appropriate tool for analyzing the research data. The F-statistic is widely used to compare variance and for testing differences among means. According to Courtney and Sedgwick, the F-statistic is effective where several means are being considered.

For a determination of significant differences, the critical F-ratio was established with six (6) degrees of freedom, as indicated in the ANOVA Layout Arrangement in Table 1, with alpha = .05. The critical F-value at the .05 level of significance with degrees of freedom (df) = 6, 63 is 2.24. The data was analyzed on the Oregon State University computer using predesigned program *ANOV12 One or Two Factor Analysis of Variance.

Hypotheses to Be Tested

The design of the study tested one major hypothesis:

H_0 : There is no significant difference among the mean scores of the seven (7) groups.

The test of Least Significant Difference (L.S.D.) served to identify the existence of differences between the various mean scores following rejection by the F-test.

In case of rejection of the original (null) hypothesis, a Least Significant Difference (L.S.D.) test was used to test the six (6) a priori subhypotheses:

1. $\mu_1 = \mu_2$ or the mean of Group 1, workers, is equal to the mean of Group 2, employers.
2. $\mu_1 = \mu_3$ or the mean of Group 1, workers, is equal to the mean of Group 3, educators K-6.
3. $\mu_1 = \mu_4$ or the mean of Group 1, workers, is equal to the mean of Group 4, educators 7-9.
4. $\mu_1 = \mu_5$ or the mean of Group 1, workers, is equal to the mean of Group 5, educators 10-12.
5. $\mu_1 = \mu_6$ or the mean of Group 1, workers, is equal to the mean of Group 6, educators 13-14.
6. $\mu_1 = \mu_7$ or the mean of Group 1, workers, is equal to the mean of Group 7, educators 14+.

The function of the testing was to determine whether or not the seven (7) group mean scores differed significantly on the importance of certain communication skills, and the frequency of use of those skills, by entry-level industrial mechanics.

Data Collection

The survey-questionnaire instrument included a letter of transmittal explaining the purpose of the survey. The letter, originating from the office of the Dean of Research and Planning of Lane Community College, was printed on College letterhead with expenses being underwritten by Lane Community College.

The instrument was mailed to each of the population groups. Three weeks after the first mailing, a follow-up was forwarded to each group participant. If there was no response to the follow-up mailing after a three-week period, alternatives were utilized. In this manner, ten (10) respondents were accumulated for each of the seven (7) groups.

IV. ANALYSIS OF DATA

The data presented in this chapter were obtained from the scores assigned to certain communication skills by seventy respondents. The detailed procedure, as well as the statistical technique for testing the hypotheses and analyzing the data, is cited in Chapter III.

Seventy respondents, representing entry-level industrial mechanics, employers, and educators, provided the data for this study. The respondents answered and returned a mailed survey-questionnaire, which listed tasks representative of: verbal skills, handwriting skills, and composition skills. The purpose of the study was to determine the importance of these skills to job-entry-level industrial mechanics and, also, to determine how frequently industrial mechanics, or workers, used these skills on the job. Scores were obtained from respondents' rankings of the importance and the frequency of use of these skills from the returned survey-questionnaire. The survey-questionnaire, or test instrument, is shown in Appendix I.

Results of Analysis of Variance

The design of the study was a 2×7 analysis of variance which permitted the researcher to compare means among the seven groups. Table 3 shows the results of the one-way analysis of variance used to test for significant differences. The .05 level

Table 3
Main Hypothesis

Importance			Frequency of Use		
Item No.	Rejected	Retained	Item No.	Rejected	Retained
A-1	x		B-1	x	
A-2	x		B-2	x	
A-3		x	B-3	x	
A-4	x		B-4	x	
A-5	x		B-5	x	
A-6	x		B-6	x	
A-7		x	B-7	x	
A-8		x	B-8		x
A-9	x		B-9	x	
A-10	x		B-10		x
A-11	x		B-11	x	
A-12	x		B-12	x	
A-13	x		B-13	x	
A-14		x	B-14	x	
A-15		x	B-15		x
A-16		x	B-16		x
A-17		x	B-17		x
A-18	x		B-18	x	
A-19	x		B-19		x
A-20	x		B-20		x
A-21		x	B-21		x
A-22		x	B-22		x
A-23		x	B-23	x	
A-24	x		B-24	x	
A-25	x		B-25	x	
A-26		x	B-26		x
A-27	x		B-27		x
A-28	x		B-28	x	
A-29	x		B-29	x	
A-30		x	B-30		x
A-31	x		B-31		x
A-32	x		B-32		x
A-33	x		B-33	x	
A-34	x		B-34		x
A-35	x		B-35	x	
A-36	x		B-36	x	
A-37	x		B-37	x	
A-38	x		B-38	x	

of significance was chosen as the critical region for all tests of significance included in this study.

Based on the results of the analysis, the main hypothesis was rejected at the specified level of significance as shown in Table 3 above. For all of the rejected items, the null hypothesis, that there were no significant differences among the means, was rejected at the specified level of significance.

Results of Test of the Main Hypothesis

The main hypothesis stated that there was no significant difference among the mean scores of the seven groups. The critical F-value at the .05 level of significance with degrees of freedom (df) = 6, 63 is 2.24. The computed values for the test items listed above were within the critical region; hence, the null hypothesis was rejected for these items. The L.S.D. (Least Significance Difference) test was used to analyze the various group means and to test the a priori subhypotheses stated in Chapter III.

The organization of the discussion for each subhypothesis and group will separate the items into three groups: verbal items, handwriting items, and composition items.

Workers, Group 1

Group 1, workers, is discussed first because all other groups are analyzed in relationship to Group 1. Therefore, the means of

workers are used to rank the items in descending order, as shown in Table 4 which follows. To indicate a mean score of 4.0 or more, showing that the item was assessed necessary by workers, the symbol # appears next to the item. A mean score of 3.0-3.9, showing that workers assessed the item important on the survey instrument, is indicated by @ next to the item.

Verbal Skills - Importance

Workers consider 17 of the 19 items important in daily use; four of these 17 items are necessary in daily use. Listed below are the verbal items workers consider important listed in the order of their priority:

- (12) explaining service or trade terms to customer
- (5) being courteous to customer
- (5) questioning customer diplomatically
- (16) questioning written work order when order not complete or clear
- (4) informing customer of charges
- (7) being courteous to fellow employees
- (8) exchanging new ideas
- (9) getting accurate information on the telephone
- (18) being pleasant and courteous to supervisor
- (17) ordering or requesting parts, tools, or equipment
- (6) meeting or talking with customers discussing the service rendered
- (19) speaking clearly and distinctly so that he does not have to be asked to repeat
- (14) notifying supervisor of changes in work schedule
- (15) updating work schedule as required
- (10) offering assistance
- (11) requesting assistance of other employees or supervisor
- (13) scheduling work with supervisor
- (2) makes appointments by telephone
- (1) answers telephone

Table 4 - Items Ranked by Groups

Employees		Employers		Educators K-6		Educators 7-9		Educators 10-12		Educators 13-14		Educators 14+	
Group 1 A	Group 1 B	Group 2 A	Group 2 B	Group 3 A	Group 3 B	Group 4 A	Group 4 B	Group 5 A	Group 5 B	Group 6 A	Group 6 B	Group 7 A	Group 7 B
VERBAL ITEMS													
#12	#7	#10	#7	#3	#3	#3	#3	#4	#7	#7	#7	#3	#7
#3	#4	#11	@11	@19	#7	#9	#9	#6	#18	#3	#19	#7	#18
#5	@19	#7	@10	@7	@17	#6	#19	#7	#5	#4	#3	#18	@3
#16	@5	#16	@18	@7	@18	#19	#6	#18	#3	#9	#18	#16	@19
#4	@3	#8	@19	@14	@19	#1	#7	#1	#4	#19	#4	#5	@13
@7	@16	@3	@8	@15	@14	#5	@5	#5	#19	#5	#17	#17	@17
@8	@8	@14	@13	@18	@10	@17	@18	#9	#6	#15	@5	@12	@9
@9	@17	@17	@17	@8	@11	#7	@4	#19	#9	#18	@6	@13	@4
@18	@9	@18	@16	@11	@15	#12	@17	#16	#1	@11	@16	@9	@5
@17	@12	@9	@14	@12	@13	#10	@1	#3	#14	@12	@13	@19	@12
@6	@18	@13	@3	@16	@8	#4	@10	#12	#10	@15	@9	@4	@16
@19	@6	@19	@9	@9	@9	@16	@2	#10	#11	@17	@12	@10	@10
@14	11	@15	15	@10	4	@18	@11	#13	#12	@6	@15	@14	@8
@15	10	@5	12	@4	12	@2	@15	#17	#13	@8	@8	@6	@16
@10	2	6	5	@13	6	@1	8	#14	#17	@10	@11	@8	@14
@11	15	12	6	@5	16	@15	16	#2	#2	@13	@1	@15	@11
@13	13	4	4	@6	5	@13	13	#11	#15	@14	@10	@11	@15
2	14	1	1	1	1	@14	14	@8	@16	1	@14	1	1
1	1	2	2	2	2	8	12	@15	@8	2	@2	2	2
HANDWRITING ITEMS													
#24	#22	#22	@22	@20	@20	#20	#20	#23	#23	#20	#20	#20	#22
#25	@20	#23	@23	@21	@24	#21	#21	#20	#24	#21	#21	#21	@23
#22	@25	@20	@20	@22	@21	#22	#23	#24	#25	#22	#22	#22	@20
#23	@23	@21	@21	@23	@22	#23	#24	#25	#20	#23	#24	#23	@21
@21	@21	@25	@25	@24	@23	#24	#25	#22	#22	#24	#25	#24	@24
@20	@24	@24	@24	@26	@25	#25	#22	#21	@21	#25	@23	#25	@25
@26	28	26	26	@28	28	@26	@26	#28	#28	@26	@26	@26	26
28	26	28	28	@25	26	28	28	@26	@26	@28	28	@28	28
COMPOSITION ITEMS													
#31	@30	@30	@30	@33	@33	@33	@36	#37	#33	#33	@33	@37	@37
#29	31	@33	@31	@37	@32	@37	@37	#38	#32	@34	@34	@31	@33
#27	32	@34	@32	@32	@37	@38	@30	#33	#38	@37	@37	@33	@36
@34	29	29	@33	@34	@38	@32	@33	#34	@37	@29	@30	@36	@31
@30	34	37	@34	@27	34	@36	@38	#36	@35	@31	@38	@38	@27
@33	27	38	37	@38	30	@34	@33	#35	@36	@38	@32	@27	@30
@32	33	31	38	@31	27	@27	@34	#29	@34	@27	@27	@29	@34
35	37	32	27	@29	29	@29	@35	#31	@29	@32	@29	@34	@38
36	38	27	28	@30	31	@30	27	#32	@30	@30	@36	@35	32
37	36	36	29	@35	35	31	29	#27	@27	@36	31	@30	35
38	35	35	36	36	36	35	31	@30	31	35	35	32	29

= 4.0+ "necessary"

@ = 3.0-3.9 "important"

Verbal Skills - Frequency

Workers rate twelve of the verbal items "average, used some daily." Two of these twelve tasks have "much use each day." The verbal tasks workers use are listed below in the order of their frequency of use:

- (7) being courteous to fellow employees
- (4) informing customer of charges
- (19) speaking clearly and distinctly so that he does not have to be asked to repeat
- (5) questioning customer diplomatically
- (3) being courteous to customer
- (16) questioning written work order when order not complete or clear
- (8) exchanging new ideas
- (17) ordering or requesting parts, tools, or equipment
- (9) getting accurate information on the telephone
- (12) explaining service or trade terms to customer if necessary
- (18) being pleasant and courteous to customer
- (6) meeting or talking with customer to discuss the service rendered
- (11) requesting assistance of other employees or supervisor
- (10) offering assistance
- (2) making appointments on the telephone
- (15) updating work schedule as required
- (13) scheduling work with supervisor
- (14) notifying supervisor of changes in work schedule
- (1) answering telephone

Handwriting Skills - Importance

According to workers, seven of the eight listed handwriting tasks are important; four of those seven are necessary in daily use. The handwriting items workers considered important are listed below as ranked by their means:

- (24) writing clear, readable service orders
- (25) writing clear, readable short repair orders
- (22) filling out forms accurately, readably, and completely
- (23) recording inspection data accurately

- (21) writing legibly and accurately so that information is readable and complete
- (20) writing legibly and accurately so that information is readable and correct
- (26) writing clear, understandable procedures or letters
- (28) writing reports or letters neatly

Handwriting Skills - Frequency

Workers rate six of the handwriting items "average, used some daily" (assigned 3.0+ on Table 4). One of those six tasks is rated having "much use each day" (assigned 4.0+). The handwriting tasks are ranked below:

- (22) filling out forms accurately, readably, and completely
- (20) writing legibly and accurately so that information is readable and correct
- (25) writing clear, readable, short repair orders
- (23) recording inspection data accurately
- (21) writing legibly and accurately so that information is readable and complete
- (24) writing clear, readable service orders
- (28) writing reports or letters neatly
- (26) writing clear, understandable procedures or letters

Composition Skills - Importance

Workers rate seven of the eleven composition skills "important" (with a 3.0+ rating); and, three of those skills they consider "necessary in daily use" (with a 4.0+ rating). The tasks are listed below ranked according to the means:

- (31) writing sequentially; that is, step-by-step logical descriptions
- (29) getting the idea across in letters or reports
- (27) writing logical reports which make sense
- (34) explaining the terms of the trade to customers in writing when necessary
- (30) using acceptable grammar

- (33) using the terms of the trade in writing
- (32) using good spelling
- (35) writing operator's or worker's gripe sheets
- (36) writing reports of work to supervisor
- (37) scheduling work with supervisor
- (38) updating work schedule as required

Composition Skills - Frequency

One of the eleven composition items is rated "average, used some daily." None of the items is rated "necessary, some use each day." Listed in the order ranked by means, the items are:

- (30) using acceptable grammar
- (31) writing sequentially; that is, step-by-step logical descriptions
- (32) using good spelling
- (29) getting the idea across in letters or reports
- (34) explaining the terms of the trade to customers in writing when necessary
- (27) writing logical reports which make sense
- (33) using the terms of the trade in writing when necessary
- (37) scheduling work with supervisor
- (38) updating work schedule as required
- (36) writing reports of work to supervisor
- (35) writing operator's or worker's gripe sheets

Employers, Group 2

Subhypothesis One: $\mu_1 = \mu_2$; or the means of Group 1, workers, are equal to the means of Group 2, employers.

Verbal Skills

No a priori subhypotheses were generated for: A-3, A-7, A-8, A-14, A-15, A-16, A-17, B-8, B-10, B-15, B-17, and B-19 because the original, null hypothesis was retained for these items. Table 5 presents the findings for verbal skills.

TABLE 5 - SUBHYPOTHESIS 1
GROUP 2 - VERBAL SKILLS

Item	IMPORTANCE				Item	FREQUENCY			
	$\frac{\mu_1}{X}$	$\frac{\mu_2}{X}$	$\bar{X} - \bar{X}$	L.S.D. Value		$\frac{\mu_1}{X}$	$\frac{\mu_2}{X}$	$\bar{X} - \bar{X}$	L.S.D. Value
A-1	2.3	2.2	-.1	1.00791	B-1	2.3	2.0	-.3	.98432
A-2	2.7	1.7	-1.0*	.98174	B-2	2.7	1.6	-1.1*	.85820
A-3	4.2	3.9	-.3	.72506	B-3	3.8	3.1	-.7	.78720
A-4	4.0	2.5	-1.5*	.86703	B-4	4.2	2.1	-2.1*	.95817
A-5	4.1	3.0	-1.1*	.80396	B-5	3.9	2.5	-1.4*	.85301
A-6	3.5	2.7	-.8	.93673	B-6	3.1	2.4	-.7	1.01231
A-7	3.9	4.3	+.4	.73980	B-7	4.3	4.3	.0	.70102
A-8	3.7	4.0	+.3	.79042	B-8	3.7	3.5	-.2	.82038
A-9	3.6	3.6	.0	.75087	B-9	3.5	3.1	-.4	.90711
A-10	3.2	4.4	+.8*	.59735	B-10	2.8	3.9	+1.1*	.86996
A-11	3.0	4.3	+1.3*	.80790	B-11	2.9	4.2	+1.3*	.84026
A-12	4.5	2.7	-1.8*	.74322	B-12	3.4	2.7	-.7	.95152
A-13	3.0	3.6	+.6	.84553	B-13	2.6	3.5	+.9	.92376
A-14	3.5	3.8	+.4	.91130	B-14	2.4	3.2	+.8	.99586
A-15	3.3	3.5	+.2	.87360	B-15	2.6	2.9	+.3	.96609
A-16	4.1	4.1	.0	.75425	B-16	3.8	3.3	-.5	.85672
A-17	3.5	3.8	+.3	.78316	B-17	3.6	3.5	-.1	.95286
A-18	3.6	3.7	+.1	.67141	B-18	3.3	3.8	+.5	.64930
A-19	3.5	3.6	+.1	.82424	B-19	4.0	3.7	-.3	.87360

*Significant at the .05 level.

The mean scores of Group 1, workers, did not differ significantly from the mean scores of Group 2, employers for:

- (1) answering the telephone
- (3) being courteous to customers
- (6) meeting or talking with the customers to discuss the service rendered
- (7) being courteous to fellow employees
- (8) exchanging new ideas
- (9) getting accurate information on the telephone
- (13) scheduling work with supervisor
- (14) notifying supervisor of changes in work schedule
- (15) updating work schedule as required
- (16) questioning written work order when order not complete or clear
- (17) ordering or requesting parts, tools, or equipment
- (18) being pleasant and courteous to supervisor
- (19) speaking clearly and distinctly so that he does not have to be asked to repeat

However, the means of workers were significantly higher than the means of employers for both importance or frequency of use for:

- (2) making appointments by telephone
- (4) informing customer of charges
- (5) questioning the customer diplomatically

The mean of workers was lower than the mean of employers for the frequency of use of offering assistance (B-10) and for both the importance and the frequency of requesting assistance of other employees or supervisor (11).

Handwriting Skills

No a priori subhypotheses were generated for items A-21, A-22, A-23, A-26, B-20, B-21, B-22, or B-26, because the original, null hypothesis was retained for these items.

TABLE 6 - SUBHYPOTHESIS 1
GROUP 2 - HANDWRITING SKILLS

Item	IMPORTANCE				Item	FREQUENCY			
	$\underline{\mu}_1$	$\underline{\mu}_2$	$\bar{X} - \bar{X}$	L.S.D. Value		$\underline{\mu}_1$	$\underline{\mu}_2$	$\bar{X} - \bar{X}$	L.S.D. Value
A-20	3.7	3.6	-.1	.71714	B-20	3.5	3.3	-.2	.84252
A-21	3.8	3.6	-.2	.82347	B-21	3.2	3.2	.0	.87867
A-22	4.4	4.2	-.2	.83808	B-22	4.1	3.9	-.2	.98883
A-23	4.4	4.2	-.2	.70912	B-23	3.4	3.9	+.4	.88515
A-24	4.6	3.4	-.8*	.79682	B-24	3.2	3.0	-.2	.98174
A-25	4.6	3.6	-1.0*	.78478	B-25	3.5	3.1	-.4	1.00791
A-26	3.5	2.8	-.7	.95286	B-26	2.0	2.5	+.5	.80554
A-28	2.7	2.4	-.3*	.2424	B-28	2.2	1.9	-.3	.88944

*Significant at the .05 level.

The means of Group 1, workers, did not differ significantly from the means of Group 2, employers, for:

- (20) writing legibly and accurately so that information is readable and correct
- (21) writing legibly and accurately so that information is readable and complete
- (22) filling out forms accurately, readably, and completely

For the importance of the following handwriting items, workers' means were significantly higher than the means of employers:

- (A-24) writing clear, readable service orders
- (A-25) writing clear, readable short repair orders
- (A-28) writing reports or letters neatly

In addition, workers had significantly lower means than employers for the frequency of two handwriting items: recording inspection data accurately (B-23) and writing clear, understandable procedures or letters (B-26).

Composition Skills

No a priori subhypotheses were generated for A-30, B-27, B-30, B-31, B-32, and B-34 because the original, null hypothesis was retained for these items.

The means of Group 1, workers, did not differ significantly from Group 2, employers, for:

- (30) using acceptable grammar
- (32) using good spelling
- (34) explaining the terms of the trade to customer or to others in writing when necessary
- (35) writes operator's or worker's gripe sheets
- (36) writing reports of work to supervisor
- (37) scheduling work with supervisor
- (38) updating work schedule as required

TABLE 7 - SUBHYPOTHESIS 1
GROUP 2 - COMPOSITION SKILLS

Item	IMPORTANCE				Item	FREQUENCY			
	$\frac{\mu_1}{X}$	$\frac{\mu_2}{X}$	$\bar{X} - \bar{\bar{X}}$	L.S.D. Value		$\frac{\mu_1}{X}$	$\frac{\mu_2}{X}$	$\bar{X} - \bar{\bar{X}}$	L.S.D. Value
A-27	4.1	2.9	-1.3*	.83571	B-27	2.2	1.9	-.3	.88944
A-29	4.1	2.6	-1.5*	.80317	B-29	2.6	1.8	-.8*	.77991
A-30	3.3	3.3	.0	.89372	B-30	3.1	3.1	.0	.93944
A-31	4.2	2.7	-1.5*	.70102	B-31	2.9	2.7	-.2	.84478
A-32	3.1	2.7	-.4	.80396	B-32	2.9	2.6	0.3	1.00919
A-33	3.3	3.2	-.1	.71002	B-33	2.1	2.6	+.5	.80009
A-34	3.8	3.1	-.7	.78153	B-34	2.6	2.6	.0	.97329
A-35	2.8	2.0	-.8	.81104	B-35	1.3	1.8	+.5	.88372
A-36	2.7	2.1	-.6	.73463	B-36	1.7	1.7	.0	.85968
A-37	2.7	2.8	+.1	.64537	B-37	2.1	2.3	+.2	.82192
A-38	2.5	2.8	+.3	.77583	B-38	2.0	2.3	+.3	.87723

*Significant at the .05 level.

However, the means of Group 1, workers, were significantly higher than the means of Group 2, employers for the importance of writing logical reports which make sense (A-27) and for the importance of writing sequentially; that is, step-by-step logical descriptions (A-31).

Educators K-6, Group 3

Subhypothesis Two: $\mu_1 = \mu_3$; or, the means of Group 1, workers, are equal to the means of Group 3, educators K-6.

Verbal Skills

No a priori subhypotheses were generated for items A-3, A-7, A-8, A-14, A-15, A-16, A-17, B-8, B-10, B-15, B-16, B-17, and B-19 because the original, null hypothesis was retained for these items. Among the means of Group 1, workers, and Group 3, educators K-6, there were no significant differences for:

- (1) answering the telephone
- (2) making appointments on the telephone
- (3) being courteous to the customer
- (6) meeting or talking with customers to discuss the service rendered
- (7) being courteous to fellow employees
- (8) exchanging new ideas
- (9) getting accurate information on the telephone
- (10) offering assistance
- (11) requesting assistance of other employees or supervisor
- (13) scheduling work with supervisor
- (15) updating work schedule as required
- (17) ordering or requesting parts, tools, or equipment
- (18) being pleasant and courteous to supervisor
- I19) speaking clearly and distinctly so that he does not have to be asked to repeat

TABLE 8 - SUBHYPOTHESIS 2

GROUP 3 - VERBAL SKILLS

Item	$\frac{\mu_1}{X}$	$\frac{\mu_3}{X}$	$\bar{X} - \bar{X}$	L.S.D. Value	Item	$\frac{\mu_1}{X}$	$\frac{\mu_3}{X}$	$\bar{X} - \bar{X}$	L.S.D. Value
A-1	2.3	2.8	-.5	1.00791	B-1	2.3	2.4	-.1	.98432
A-2	2.7	2.8	+.1	.98174	B-2	2.7	2.4	-.3	.85820
A-3	4.2	4.4	+.2	.72506	B-3	3.8	4.0	+.2	.78720
A-4	4.0	3.2	-.8	.86703	B-4	4.2	2.9	-1.3*	.95817
A-5	4.1	3.1	-1.0*	.80396	B-5	3.9	2.7	-1.2*	.85301
A-6	3.5	3.0	-.5	.93673	B-6	3.1	2.8	-.3	1.01231
A-7	3.9	3.7	-.2	.73980	B-7	4.3	4.0	-.3	.70102
A-8	3.7	3.4	-.3	.79042	B-8	3.7	3.1	-.6	.82038
A-9	3.6	3.3	-.3	.75087	B-9	3.5	3.0	-.5	.90711
A-10	3.2	3.3	+.1	.59735	B-10	2.8	3.3	+.5	.86996
A-11	3.0	3.4	+.4	.80790	B-11	2.9	3.3	+.4	.84026
A-12	4.5	3.4	-.9*	.74322	B-12	3.4	2.9	-.5	.95152
A-13	3.0	3.2	+.2	.84553	B-13	2.6	3.2	-.6	.92376
A-14	3.4	3.6	+.2	.91130	B-14	2.4	3.4	+1.0	.99586
A-15	3.3	3.6	+.3	.87360	B-15	2.6	3.3	+.7	.96609
A-16	4.1	3.3	-.8*	.75425	B-16	3.8	2.8	+1.0*	.85672
A-17	3.5	3.8	+.3	.78316	B-17	3.6	3.7	+.1	.95286
A-18	3.6	3.6	.0	.67141	B-18	3.3	3.7	+.4	.64930
A-19	3.5	3.8	+.3	.82424	B-19	4.0	3.7	-.3	.87360

*Significant at the .05 level.

The means of workers were significantly higher than the means of educators K-6 for both the importance and the frequency of use of questioning the customer diplomatically (5). In addition, the means of Group 1, workers, were significantly higher than the means of Group 3, educators K-6, for the importance of explaining service or trade terms to the customer if necessary (A-12) and the importance of questioning written work orders when orders are not complete or clear (A-16). Further, the means of workers were significantly higher than those of educators for the frequency of informing the customer of charges (B-4).

For two items, the frequency of notifying the supervisor of changes in the work schedule (B-14) and questioning written work order when order not complete or clear (B-16), workers' means were significantly lower than educators K-6.

Handwriting Skills

Because the original, null hypothesis was retained for items A-21, A-22, A-23, A-26, B-20, B-21, and B-22, no a priori sub-hypotheses were generated for these items.

In comparing the means of Group 1, workers, with the means of Group 3, educators K-6, there were no significant differences for the following handwriting items:

- (20) writing legibly and accurately so that information is readable and correct
- (21) writing legibly and accurately so that information is readable and complete
- (22) filling out forms accurately, readably, and completely

TABLE 9 - SUBHYPOTHESIS 2
GROUP 3 - HANDWRITING SKILLS

Item	IMPORTANCE				L.S.D. Value	Item	FREQUENCY				L.S.D. Value
	$\frac{\mu_1}{X}$	$\frac{\mu_3}{X}$	$\bar{X} - \bar{X}$				$\frac{\mu_1}{X}$	$\frac{\mu_3}{X}$	$\bar{X} - \bar{X}$		
A-20	3.7	3.9	+.2		.71714	B-20	3.5	3.8	+.3		.84252
A-21	3.8	3.9	+.1		.82347	B-21	3.2	3.7	+.5		.87867
A-22	4.4	3.7	-.7		.83808	B-22	4.1	3.7	-.4		.98883
A-23	4.4	3.7	-.7		.70912	B-23	3.4	3.6	+.2		.88515
A-24	4.6	3.6	-1.0*		.79682	B-24	3.2	3.8	+.6		.98174
A-25	4.6	3.1	-1.5*		.78478	B-25	3.5	3.2	+.3		1.00791
A-26	3.5	3.4	-.1		.95286	B-26	2.0	2.6	+.6		.80554
A-28	2.7	3.2	+.5*		.2424	B-28	2.2	2.8	+.6		.88944

*Significant at the .05 level.

- (23) recording inspection data accurately
- (26) writing logical reports which make sense

However, the means of workers were significantly higher than the means of educators K-6 for the importance of:

- (A-24) writing clear, readable service orders
- (A-25) writing clear, readable short repair orders

In addition, the mean of workers was significantly lower than the mean of educators K-6 for the importance of writing reports or letters neatly (A-28).

Composition Skills

No a priori subhypotheses were generated for items A-30, B-27, B-30, B-31, B-32, and B-34 because the original, null hypothesis was retained for these items.

There were no significant differences between the means of Group 1, workers, and Group 3, educators K-6, for:

- (27) writing logical reports which make sense
- (32) using good spelling
- (34) explaining the terms of the trade to customers in writing
- (36) writing reports of work to supervisor

However, the means for workers were significantly higher than the means for educators K-6 for the importance of writing sequentially; that is, step-by-step, logical descriptions (A-31). On the other hand, workers assigned significantly lower importance and frequency of use to scheduling work with supervisor (37) than did educators K-6. And, workers assigned significantly lower frequency to:

TABLE 10 - SUBHYPOTHESIS 2
GROUP 3 - COMPOSITION SKILLS

Item	IMPORTANCE				Item	FREQUENCY			
	$\frac{\mu_1}{X}$	$\frac{\mu_3}{X}$	$\bar{X} - \bar{X}$	L.S.D. Value		$\frac{\mu_1}{X}$	$\frac{\mu_3}{X}$	$\bar{X} - \bar{X}$	L.S.D. Value
A-27	4.1	3.3	-.8	.83571	B-27	2.5	2.7	+.2	.94550
A-29	4.1	3.2	-.9*	.80317	B-29	2.6	2.5	-.1	.77991
A-30	3.3	3.1	-.2	.89372	B-30	3.1	3.8	-.3	.93944
A-31	4.2	3.2	-1.0*	.70102	B-31	2.9	2.5	-.4	.84478
A-32	3.1	3.3	+.2	.80396	B-32	2.9	3.0	-.1	1.00979
A-33	3.3	3.9	+.6	.71002	B-33	2.1	3.5	+1.4*	.90009
A-34	3.8	3.3	-.5	.78153	B-34	2.6	2.9	+.3	.97329
A-35	2.8	3.0	-.2	.81104	B-35	1.3	2.2	+1.9*	.88372
A-36	2.7	2.9	+.2	.73463	B-36	1.7	2.1	+.4	.85968
A-37	2.7	3.7	+1.0	.64537	B-37	2.1	3.0	+.9*	.82192
A-38	2.5	3.2	+.7	.77583	B-38	2.0	3.0	+1.0*	.87723

*Significant at the .05 level.

- (B-33) using the terms of the trade in writing
- (B-35) writing operator's or worker's gripe sheets
- (B-38) updating work schedule as required

than did educators K-6 for these tasks.

Educators 7-9, Group 4

Subhypothesis Three: $\mu_1 = \mu_4$; or the means of Group 1

workers, are equal to the means of Group 4, educators 7.

Verbal Skills

Because the original, null hypothesis was retained for items A-3, A-7, A-8, A-14, A-15, A-16, A-17, B-8, B-10, B-15, B-16, B-27, and B-19, no a priori subhypothesis were generated for these items.

There were no significant differences between the means of Group 1, workers, and Group 4, educators 7-9, for the following items:

- (4) informing customer of charges
- (5) questioning customer diplomatically
- (7) being courteous to fellow employees
- (11) requesting assistance of other employees or supervisor
- (13) scheduling work with supervisor
- (14) notifying supervisor of changes in work schedule
- (15) updating work schedule as required
- (18) being pleasant and courteous to supervisor

However, the means for workers were significantly higher than the means for educators 7-9 for the frequency of (B-12) explaining service or trade terms to customer if necessary. In addition, even though the null hypothesis was retained for (B-16) frequency of questioning written work order when order is not complete or clear,

TABLE 11 - SUBHYPOTHESIS #

GROUP 4 - VERBAL SKILLS

Item	IMPORTANCE				Item	FREQUENCY			
	$\frac{\mu}{X^1}$	$\frac{\mu}{X^4}$	$\bar{X} - \bar{X}$	L.S.D. Value		$\frac{\mu}{X^1}$	$\frac{\mu}{X^4}$	$\bar{X} - \bar{X}$	L.S.D. Value
A-1	2.3	4.3	+2.0*	1.00791	B-1	2.3	3.5	+1.2*	.98432
A-2	2.7	3.8	+1.1*	.98174	B-2	2.7	3.1	+.4	.85830
A-3	4.2	5.0	+.8*	.72506	B-3	3.8	4.7	+.9*	.78720
A-4	4.0	4.0	.0	.86703	B-4	4.2	3.7	-.5	.95817
A-5	4.1	4.3	+.2	.80396	B-5	3.9	3.9	.0	.85031
A-6	3.5	4.7	+1.2*	.93673	B-6	3.1	4.1	+1.0	1.01231
A-7	3.9	4.2	+.3	.73980	B-7	4.3	4.0	+.3	.70102
A-8	3.7	2.7	+1.0*	.79042	B-8	3.7	2.9	-.8	.82038
A-9	3.6	4.9	+1.3*	.75087	B-9	3.5	4.3	+.8	.90711
A-10	3.2	4.1	+.9*	.59735	B-10	2.8	3.4	+.6	.86996
A-11	3.0	3.7	+.7	.80790	B-11	2.9	3.0	+.1	.84026
A-12	4.5	4.2	-.3	.74322	B-12	3.4	2.3	-1.1*	.95152
A-13	3.0	3.4	+.4	.84553	B-13	2.6	2.8	+.2	.92376
A-14	3.4	3.4	.0	.91130	B-14	2.4	2.8	+.4	.99586
A-15	3.3	3.7	+.4	.87360	B-15	2.6	3.0	+.4	.96609
A-16	4.1	3.9	-.2	.75425	B-16	3.8	2.9	-.9*	.85672
A-17	3.5	4.3	+.8*	.78316	B-17	3.6	3.6	.0	.95286
A-18	3.6	3.9	+.3	.67141	B-18	3.3	3.8	+.5	.64930
A-19	3.5	4.6	+1.1*	.82424	B-19	4.0	4.3	+.3	.87360

*Significant at the .05 level.

when the multiple comparison was made between the means of Group 1, workers, and Group 4, educators 7-9, workers' mean was significantly higher for this item than was the mean of educators 7-9.

On the other hand, the means for workers were significantly lower than the means for educators 7-9 for both the frequency and the importance of two items:

- (1) answering the telephone
- (3) being courteous to the customer

Also, workers' means were significantly lower than educators 7-9 for the importance of:

- (A-2) making appointments by telephone
- (A-6) meeting or talking with customers to discuss the service rendered
- (A-8) exchanging new ideas
- (A-9) getting accurate information on the telephone
- (A-10) offering assistance
- (A-17) ordering or requesting parts, tools, or equipment
- (A-19) speaking clearly and distinctly so that he does not have to be asked to repeat

And, workers' means were significantly lower for frequency of (B-3) being courteous to customer.

Handwriting Skills

Because the original, null hypothesis was retained for items A-21, A-22, A-23, A-26, B-20, B-21, B-22, and B-26, no a priori subhypotheses were generated for these items.

Among the means of Group 1, workers, and Group 4, educators 7-9, there were no significant differences for any of the following handwriting tasks:

TABLE 12 - SUBHYPOTHESIS 3

GROUP 4 - HANDWRITING SKILLS

Item	IMPORTANCE				Item	FREQUENCY			
	$\frac{\mu}{X^1}$	$\frac{\mu}{X^4}$	$\bar{X} - \bar{X}$	L.S.D. Value		$\frac{\mu}{X^1}$	$\frac{\mu}{X^4}$	$\bar{X} - \bar{X}$	L.S.D. Value
A-20	3.7	4.7	+1.0*	.71714	B-20	3.5	4.0	+.5	.84252
A-21	3.8	4.6	+.8	.82347	B-21	3.2	3.7	+.5	.87867
A-22	4.4	4.5	-.1	.82808	B-22	4.1	3.3	-.8	.98883
A-23	4.4	4.3	-.1	.70912	B-23	3.4	3.7	+.3	.88515
A-24	4.6	4.3	-.3	.79682	B-24	3.2	3.7	+.5	.98174
A-25	4.6	4.3	-.3	.78478	B-25	3.5	3.4	-.1	1.00791
A-26	3.5	3.0	-.5	.95286	B-26	2.0	2.8	+.8	.80554
A-28	2.7	2.7	.0	.2424	B-28	2.2	2.6	+.4	.88944

* Significant at the .05 level.

- (21) writing legibly and accurately so that information is readable and complete
- (22) filling out forms accurately, readably, and completely
- (23) recording inspection data accurately
- (24) writing clear, readable service orders
- (25) writing clear, readable short repair orders
- (26) writing clear, understandable procedures or letters
- (27) writing reports or letters neatly

However, workers' means were significantly lower than the means of educators 7-9 for the importance of (A-20): writing legibly and accurately so that information is readable and correct.

Composition Skills

No a priori subhypotheses were generated for items A-30, B-27, B-30, B-31, B-32, and B-34, because the original, null hypothesis was retained for these items.

There were no significant differences between the means of Group 1 and Group 4 for the following items:

- (29) getting the idea across in letters or reports
- (30) using acceptable grammar
- (32) using good spelling
- (34) explaining the terms of the trade to customers in writing.

However, the mean of workers was significantly higher than the mean of educators 7-9 for the importance of task (A-31) writing sequentially; that is, step-by-step, logical descriptions. Workers' means were significantly lower than educators 7-9 for both the importance and the frequency of the following tasks:

- (36) writing reports of work to supervisor
- (37) scheduling work with supervisor
- (38) updating work schedule as required

TABLE 13 - SUBHYPOTHESIS 3
GROUP 4 - COMPOSITION SKILLS

Item	IMPORTANCE				Item	FREQUENCY			
	$\frac{\mu_1}{X^1}$	$\frac{\mu_4}{X^4}$	$\bar{X} - \bar{X}$	L.S.D. Value		$\frac{\mu_1}{X^1}$	$\frac{\mu_4}{X^4}$	$\bar{X} - \bar{X}$	L.S.D. Value
A-27	4.1	3.2	-.9*	.83571	B-27	2.5	2.6	+.1	.94550
A-29	4.1	3.3	-.8	.80317	B-29	2.6	2.5	-.1	.77991
A-30	3.3	3.1	-.2	.89372	B-30	3.1	3.6	+.5	.93944
A-31	4.2	2.8	-1.4*	.70102	B-31	2.9	2.5	-.4	.84478
A-32	3.1	3.7	-.6	.80396	B-32	2.9	3.1	+.2	1.00979
A-33	3.3	3.9	+.6	.71002	B-33	2.1	3.5	+1.4*	.90009
A-34	3.8	3.5	-.3	.78153	B-34	2.6	3.0	+.4	.97329
A-35	2.8	2.8	.0	.81104	B-35	1.3	3.0	+1.7*	.88372
A-36	2.7	3.7	+1.0*	.73463	B-36	1.7	3.9	+2.2*	.85968
A-37	2.7	3.9	+1.2*	.64537	B-37	2.1	3.7	+1.6*	.82192
A-38	2.5	3.8	+1.3*	.77583	B-38	2.0	3.4	+1.4*	.87723

*Significant at the .05 level.

In addition, workers' means were significantly lower than those of educators 7-9 for the frequency of use of two additional items:

- (B-33) using the terms of the trade in writing
- (B-35) writing operator's or worker's gripe sheets.

Educators 10-12, Group 5

Subhypothesis Four: $\mu_1 = \mu_5$; or, the means of Group 1, workers, are equal to the means of Group 5, educators 10-12.

Verbal Skills

Because the original, null hypothesis was retained for items A-3, A-7, A-8, A-14, A-15, A-16, A-17, B-8, B-10, B-15, B-16, B-17, and B-19, no a priori subhypotheses were generated for these items.

Comparing the means of the two groups, there were no significant differences between workers and Group 5, educators 10-12, for the following verbal items:

- (5) questions customer diplomatically
- (8) exchanges new ideas
- (12) explains service or trade terms to customer
- (16) questions written work order when order not complete or clear

But, the means for workers were significantly lower than the means for educators 10-12 both for importance and for frequency of use for items:

- (1) answering the telephone
- (2) making appointments by telephone
- (6) meeting or talking with customer to discuss the service rendered
- (10) offering assistance
- (11) requesting assistance of other employees or supervisor

TABLE 14 - SUBHYPOTHESIS 4

GROUP 5 - VERBAL SKILLS

Item	IMPORTANCE				Item	FREQUENCY			
	$\mu_{\bar{X}^1}$	$\mu_{\bar{X}^5}$	$\bar{X} - \bar{\bar{X}}$	L.S.D. Value		$\mu_{\bar{X}^1}$	$\mu_{\bar{X}^5}$	$\bar{X} - \bar{\bar{X}}$	L.S.D. Value
A-1	2.3	4.7	+2.4*	1.00791	B-1	2.3	4.2	+1.9*	.98432
A-2	2.7	4.2	+1.5*	.98174	B-2	2.7	3.9	+1.2*	.85820
A-3	4.2	4.6	+.4	.72056	B-3	3.8	4.6	+.8*	.78720
A-4	4.0	4.9	+.9*	.86703	B-4	4.2	4.6	+.4	.95817
A-5	4.1	4.7	+.6	.80396	B-5	3.9	4.7	+.8	.85301
A-6	3.5	4.8	+1.3*	.93673	B-6	3.1	4.4	+1.3*	1.01231
A-7	3.9	4.8	+.9*	.73980	B-7	4.3	5.0	+.7	.70102
A-8	3.7	3.8	+.1	.79042	B-8	3.7	3.6	-.1	.82038
A-9	3.6	4.7	+1.1*	.75087	B-9	3.5	4.4	+.9	.90711
A-10	3.2	4.5	+1.3*	.59735	B-10	2.8	4.1	+1.3*	.86996
A-11	3.0	4.2	+1.2*	.80790	B-11	2.9	4.1	+1.2*	.84026
A-12	4.5	4.6	+.1	.74322	B-12	3.4	4.1	+.7	.95152
A-13	3.0	4.5	+1.5*	.84553	B-13	2.6	4.1	+1.5*	.92376
A-14	3.4	4.3	+.9	.91130	B-14	2.4	4.2	+1.8*	.99586
A-15	3.3	3.9	+.6	.87360	B-15	2.6	3.8	+1.2*	.96609
A-16	4.1	4.6	+.5	.75425	B-16	3.8	3.8	.0	.85672
A-17	3.5	4.4	+.9*	.78316	B-17	3.6	4.0	+.4	.95286
A-18	3.6	4.8	+1.2*	.67141	B-18	3.3	4.9	+1.6*	.64930
A-19	3.5	4.7	+1.2*	.82424	B-19	4.0	4.5	+.5	.87360

*Significant at the .05 level.

- (13) scheduling work with supervisor
- (18) being pleasant and courteous to supervisor

In addition, workers' means were significantly lower for the importance of:

- (A-4) informing customer of charges
- (A-7) being courteous to fellow employees
- (A-9) getting accurate information on the telephone
- (A-17) ordering or requesting parts, tools, or equipment
- (A-19) speaking clearly and distinctly so that he does not have to be asked to repeat

Also, workers' means were significantly lower than the means of educators 10-12 for the frequency of use of:

- (B-3) being courteous to customer
- (B-14) notifying supervisor of changes in work schedule
- (B-15) updating work schedule as required

Handwriting Skills

Because the null hypothesis was retained for A-21, A-22, A-23, A-26, B-20, B-21, B-22, and B-26, no a priori subhypotheses.

In comparing the means of workers, Group 1, with the means of Group 5, educators 10-12, there were no significant differences for either importance or frequency for:

- (21) writing legibly and accurately so that information is readable and complete
- (22) filling out forms accurately, readably, and completely

However, workers' means were significantly lower than those of educators 10-12 for the importance of two tasks:

- (A-20) writing legibly and accurately so that information is readable and correct
- (A-28) writing reports or letters neatly

In addition, the means of workers were significantly lower than the for educators 10-12 for the frequency of four handwriting items:

TABLE 15 - SUBHYPOTHESIS 4
GROUP 5 - HANDWRITING SKILLS

Item	IMPORTANCE				L.S.D. Value	FREQUENCY				L.S.D. Value
	$\frac{\mu_1}{X}$	$\frac{\mu_s}{X}$	$\frac{\mu_1}{X} - \frac{\mu_5}{X}$			Item	$\frac{\mu_1}{X}$	$\frac{\mu_s}{X}$	$\frac{\mu_1}{X} - \frac{\mu_5}{X}$	
A-20	3.7	4.7	+1.0*	.71714	B-20	3.5	4.0	+.5	.84252	
A-21	3.8	4.2	+.4	.82347	B-21	3.2	3.9	+.7	.87867	
A-22	4.4	4.5	+.1	.83808	B-22	4.1	4.0	-.1	.98883	
A-23	4.4	4.9	+.5	.70912	B-23	3.4	4.9	+1.5*	.88515	
A-24	4.6	4.7	+.1	.79682	B-24	3.2	4.7	+1.5*	.98174	
A-25	4.6	4.7	+.1	.78478	B-25	3.5	4.7	+1.2*	1.00791	
A-26	3.5	3.4	-.1	.95286	B-26	2.0	3.1	+1.1*	.80054	
A-28	2.7	4.2	+1.5*	.2424	B-28	2.2	3.5	+1.3*	.88944	

*Significant to the .05 level.

- (B-23) recording inspection data accurately
- (B-24) writing clear, readable service orders
- (B-25) writing clear, readable, short repair orders
- (B-26) writing clear, understandable procedures or letters

Composition Skills

Since the null hypothesis was retained for items A-30, B-27, B-30, B-31, B-32, and B-34, no a priori subhypotheses were generated for these items.

There were no significant differences between the means of Group 1, workers, and Group 5, educators 10-12, in either importance or frequency for:

- (27) writing logical reports which make sense
- (29) getting the idea across in letters or reports
- (30) using acceptable grammar
- (31) writing sequentially; that is, step-by-step, logical descriptions
- (34) explaining the terms of the trade to customers in writing when necessary

But, the means of workers were significantly lower than the means for educators 10-12 for both the importance and the frequency of use of six composition tasks:

- (32) using good spelling
- (33) using the terms of the trade in writing when necessary
- (35) writing operator's or worker's gripe sheets
- (36) writing reports of work to supervisor
- (37) scheduling work with supervisor, and
- (38) updating work schedule as required.

TABLE 16 - SUBHYPOTHESIS 4
GROUP 5 - COMPOSITION SKILLS

Item	IMPORTANCE				Item	FREQUENCY			
	$\frac{\mu_1}{X}$	$\frac{\mu_1}{X}$	$\bar{X} - \bar{X}$	L.S.D. Value		$\frac{\mu_1}{X}$	$\frac{\mu_1}{X}$	$\bar{X} - \bar{X}$	L.S.D. Value
A-27	4.1	4.1	.0	.83571	B-27	2.5	3.1	+.6	.94550
A-29	4.1	4.2	+.1	.80317	B-29	2.6	3.2	+.6	.77991
A-30	3.3	3.8	+.5	.89372	B-30	3.1	3.2	+.1	.93944
A-31	4.2	4.2	.0	.70102	B-31	2.9	2.6	-.3	.84478
A-32	3.1	4.2	+1.1*	.80396	B-32	2.9	4.1	+1.2*	1.00979
A-33	3.3	4.7	+1.4*	.71002	B-33	2.1	4.5	+2.4*	.90009
A-34	3.8	4.5	+.7	.78153	B-34	2.6	3.5	+.9	.97329
A-35	2.8	4.3	+1.5*	.81104	B-35	1.3	3.7	+2.4*	.88372
A-36	2.7	4.5	+1.8*	.73463	B-36	1.7	3.7	+2.0*	.85968
A-37	2.7	4.8	+2.1*	.64537	B-37	2.1	3.8	+1.7*	.82192
A-38	2.5	4.8	+2.3*	.77583	B-38	2.0	4.0	+2.0*	.87723

*Significant at the .05 level.

Educators 13-14, Group 6

Subhypothesis Five: $\mu_1 = \mu_6$; or that the means of Group 1, workers, are equal to the means of Group 6, educators 13-14.

Verbal Skills

Following the retention of the original, null hypothesis, no a priori subhypotheses were generated for A-3, A-7, A-8, A-14, A-15, A-16, A-17, B-20, B-21, B-22, and B-26.

There were no significant differences between the means of workers, Group 1, and educators 13-14, Group 6, for all of the following verbal items:

- (1) answering telephone
- (2) making appointments by telephone
- (3) being courteous to the customer
- (4) informs customer of charges
- (5) questioning customer diplomatically
- (6) meeting or talking with customers to discuss the service rendered
- (7) being courteous to fellow employees
- (8) exchanging new ideas
- (9) getting accurate information on the telephone
- (10) offering assistance
- (11) requesting assistance of other employees or supervisor
- (12) explaining service or trade terms to customer if necessary
- (14) notifying supervisor of changes in work schedule
- (15) updating work schedule as required
- (16) questioning written work order when ordered not complete or clear
- (17) ordering or requesting parts, tools, or equipment
- (19) speaking clearly and distinctly so that he does not have to be asked to repeat

The two instances where significant differences between the means

TABLE 17 - SUBHYPOTHESIS 5

GROUP 6 - VERBAL SKILLS

Item	IMPORTANCE				Item	FREQUENCY			
	$\frac{\mu_1}{X}$	$\frac{\mu_6}{X}$	$\bar{X} - \bar{X}$	L.S.D. Value		$\frac{\mu_1}{X}$	$\frac{\mu_6}{X}$	$\bar{X} - \bar{X}$	L.S.D. Value
A-1	2.3	2.9	+.6	1.00791	B-1	2.3	3.2	+.9	.98432
A-2	2.7	2.5	-.2	.98174	B-2	2.7	3.1	+.4	.85820
A-3	4.2	4.3	+.1	.72506	B-3	3.8	4.1	+.3	.78720
A-4	4.0	4.3	+.3	.86703	B-4	4.2	4.0	-.2	.95817
A-5	4.1	4.1	.0	.80396	B-5	3.9	3.9	.0	.85301
A-6	3.5	3.6	+.1	.93673	B-6	3.1	3.9	+.8	1.01231
A-7	3.9	4.6	+.7	.73980	B-7	4.3	4.7	+.4	.70102
A-8	3.7	3.5	-.2	.79042	B-8	3.7	3.3	-.4	.82038
A-9	3.6	4.2	+.6	.75087	B-9	3.5	3.5	.0	.90711
A-10	3.2	3.5	+.3	.59735	B-10	2.8	3.2	+.4	.86996
A-11	3.0	3.8	+.8	.80790	B-11	2.9	3.3	+.4	.84026
A-12	4.5	3.8	-.7	.74322	B-12	3.4	3.5	+.1	.95152
A-13	3.0	3.5	+.5	.84553	B-13	2.6	3.7	+1.1*	.92376
A-14	3.4	3.4	.0	.91130	B-14	2.4	3.2	+.8	.99586
A-15	3.3	3.8	+.5	.87360	B-15	2.6	3.5	+.9	.96609
A-16	4.1	4.0	-.1	.75425	B-16	3.8	3.8	.0	.85672
A-17	3.5	3.8	+.3	.78316	B-17	3.6	4.0	+.4	.95286
A-18	3.6	4.0	+.4	.67141	B-18	3.3	4.1	+.8*	.64930
A-19	3.5	4.2	+.7	.82424	B-19	4.0	4.4	+.4	.87360

*Significant at the .05 level.

occurred and where Group 1, workers, showed significantly lower means for the frequency of items than did Group 6, educators 13-14, were:

- (B-13) scheduling work with supervisor
- (B-18) being pleasant and courteous to supervisor

Handwriting Skills

Because the null hypothesis was retained for A-21, A-22, A-23, A-26, B-20, B-21, B-22, and B-26, no a priori subhypotheses were generated for these items.

After comparing the means for the two groups, there were no significant differences between the means for these items dealing with handwriting skills:

- (21) writing legibly and accurately so that information is readable and complete
- (22) writes reports or letters neatly
- (23) recording inspection data accurately
- (24) writing clear, readable service orders
- (25) writing clear, readable short repair orders

However, the means for workers were significantly lower than the means for educators 13-14 for the importance of:

- (A-28) writing reports or letters neatly

and the frequency of:

- (A-26) writing clear, understandable procedures or letters.

Composition Skills

After retaining the original, null hypothesis for items A-30, B-27, B-30, B-31, B-32, and B-34, no a priori subhypotheses were generated for these items.

TABLE 18 - SUBHYPOTHESIS
GROUP 6 - HANDWRITING SKILLS

Item	$\frac{\mu}{X^1}$	$\frac{\mu}{X^1}$	$\bar{X}-\bar{X}$	L.S.D. Value	Item	$\frac{\mu}{X^1}$	$\frac{\mu}{X^1}$	$\bar{X}-\bar{X}$	L.S.D. Value
A-20	3.7	4.6	+.9*	.71714	B-20	3.5	4.3	+.8	.84252
A-21	3.8	4.6	+.8	.82347	B-21	3.2	4.1	+.9	.87667
A-22	4.4	4.6	+.2	.83808	B-22	4.1	4.1	.0	.98883
A-23	4.4	4.6	+.2	.70912	B-23	3.4	3.7	+.3	.88515
A-24	4.6	4.5	-.1	.79682	B-24	3.2	3.9	+.7	.98174
A-25	4.6	4.5	-.1	.78478	B-25	3.5	3.9	+.4	1.00791
A-26	3.5	3.5	.0	.95286	B-26	2.0	3.3	+1.3*	.80554
A-28	2.7	3.3	+.6*	.2424	B-28	2.2	2.9	+.7	.88944

*Significant at the .05 level.

TABLE 19 - SUBHYPOTHESIS 5

GROUP 6 - COMPOSITION SKILLS

Item	IMPORTANCE				Item	FREQUENCY			
	$\frac{\mu_1}{X}$	$\frac{\mu_1}{X}$	$\bar{X} - \bar{X}$	L.S.D. Value		$\frac{\mu_1}{X}$	$\frac{\mu_1}{X}$	$\bar{X} - \bar{X}$	L.S.D. Value
A-27	4.1	3.7	-.4	.83571	B-27	2.5	3.1	+.6	.94550
A-29	4.1	3.7	-.4	.80317	B-29	2.6	3.1	+.5	.77991
A-30	3.3	3.4	+.1	.89372	B-30	3.1	3.3	+.2	.93944
A-31	4.2	3.7	-.5	.70102	B-31	2.9	2.9	.0	.84478
A-32	3.1	3.5	-.4	.80396	B-32	2.9	3.2	+.3	1.00979
A-33	3.3	4.0	+.7	.71002	B-33	2.1	3.5	+1.4*	.90009
A-34	3.8	3.9	+.1	.78153	B-34	2.6	3.4	+.8	.97329
A-35	2.8	2.9	+.1	.81104	B-35	1.3	2.5	+1.2*	.88372
A-36	2.7	3.2	+.5	.73463	B-36	1.7	3.0	+1.3*	.85968
A-37	2.7	3.9	+1.2*	.64537	B-37	2.1	3.4	+1.3*	.82192
A-38	2.5	3.7	+1.2*	.77583	B-38	2.0	3.3	+1.3	.87723

*Significant to the .05 level.

In comparing the two groups, the means of workers, Group 1, did not differ significantly from the means of Group 6, educators 13-14 for the following composition items:

- (27) writing logical reports which make sense
- (29) getting the idea across in letters or reports
- (30) using acceptable grammar
- (31) writing sequentially; that is, step-by-step logical descriptions
- (32) using good spelling
- (34) explaining the terms of the trade to customers in writing

However, the means of workers were significantly lower than the means of educators 13-14 for both the frequency and the importance of two items:

- (37) scheduling work with supervisor
- (38) updating work schedule as required

In addition, workers' means were significantly lower than the means of educators 13-14 for the frequency of two items:

- (B-35) writing operator's or worker's gripe sheets
- (B-36) writing reports of work to supervisor

Educators 14+, Group 7

Subhypothesis Six: $\mu_1 = \mu_7$; or, the means of Group 1, workers, are equal to the means of Group 7, educators 14+.

When comparing the means of Group 1, workers, and Group 7, educators 14+, there were no significant differences between the groups for the following verbal items:

- (1) answering the telephone
- (2) making appointments by telephone
- (3) being courteous to the customer

TABLE 20 - SUBHYPOTHESIS 6

GROUP 7 - VERBAL SKILLS

Item	IMPORTANCE				Item	FREQUENCY			
	$\frac{\mu}{X^1}$	$\frac{\mu}{X^1}$	$\bar{X} - \bar{X}$	L.S.D. Value		$\frac{\mu}{X^1}$	$\frac{\mu}{X^1}$	$X - X$	L.S.D. Value
A-1	2.3	2.8	.5	1.00791	B-1	2.3	2.7	.4	.98432
A-2	2.7	2.4	-.3	.98174	B-2	2.7	2.4	-.3	.85820
A-3	4.2	4.4	.2	.72506	B-3	3.8	3.9	.1	.78720
A-4	4.0	3.7	-.3	.86703	B-4	4.2	3.4	-.8	.95817
A-5	4.1	4.0	-.1	.80396	B-5	3.9	3.4	-.5	.85301
A-6	3.5	3.6	.1	.93673	B-6	3.1	3.2	.1	1.01231
A-7	3.9	4.4	.5	.73980	B-7	4.3	4.6	.3	.70102
A-8	3.7	3.5	-.2	.79042	B-8	3.7	3.3	-.4	.82038
A-9	3.6	3.9	.3	.75087	B-9	3.5	3.6	.1	.90711
A-10	3.2	3.7	.5	.59735	B-10	2.8	3.3	.5	.86996
A-11	3.0	3.2	.2	.80790	B-11	2.9	3.0	.1	.84026
A-12	4.5	3.9	-.6	.74322	B-12	3.4	3.4	.0	.95152
A-13	3.0	3.9	.9	.84553	B-13	2.6	3.7	+1.1*	.92376
A-14	3.4	3.7	.3	.91130	B-14	2.4	3.1	.7	.99586
A-15	3.3	3.5	.2	.87360	B-15	2.6	3.0	.4	.96609
A-16	4.1	4.2	.1	.75425	B-16	3.8	3.4	-.4	.85672
A-17	3.5	4.0	.5	.78316	B-17	3.6	3.7	.1	.95286
A-18	3.6	4.3	.7*	.67141	B-18	3.3	4.0	.7	.64930
A-19	3.5	3.9	.4	.82424	B-19	4.0	3.9	-.1	.87360

*Significant at the .05 level.

- (4) informing customer of charges
- (5) questioning customer diplomatically
- (6) meeting or talking with customers to discuss the service rendered
- (7) being courteous to fellow employees
- (8) exchanging new ideas
- (9) getting accurate information on the telephone
- (10) offering assistance
- (11) requesting assistance of other employees or supervisor
- (12) explaining service or trade terms to customer if necessary
- (14) notifying supervisor of changes in work schedule
- (15) updating work schedule as required
- (17) ordering or requesting parts, tools, or equipment
- (19) speaking clearly and distinctly so that he does not have to be asked to repeat

But the means of the groups did differ when workers assigned a significantly lower mean to the importance of (A-18) being pleasant and courteous to the supervisor, and, also, a significantly lower mean to the frequency of (B-13) scheduling work with supervisor.

Handwriting Skills

No a prior subhypotheses were generated for A-21, A-22, A-23, A-26, B-20, B-21, and B-22 because the null hypothesis was retained for these items.

There were no significant differences between the means of Group 1, workers, and Group 7, educators 14+ for either importance or frequency of use for:

- (21) writing legibly and accurately so that information is readable and complete
- (22) filling out forms accurately, readably, and completely
- (23) recording inspection data accurately
- (24) writing clear, readable service orders
- (25) writing clear, readable short repair orders
- (26) writing clear, understandable procedures or letters

TABLE 21 - SUBHYPOTHESIS 6
GROUP 7 - HANDWRITING SKILLS

Item	IMPORTANCE				Item	FREQUENCY			
	$\frac{\mu_1}{X}$	$\frac{\mu_1}{X}$	$\bar{X} - \bar{X}$	L.S.D. Value		$\frac{\mu_1}{X}$	$\frac{\mu_1}{X}$	$\bar{X} - \bar{X}$	L.S.D. Value
A-20	3.7	4.5	+.8*	.71714	B-20	3.5	3.8	+.3	.84252
A-21	3.8	4.3	+.5	.82347	B-21	3.2	3.8	+.6	.87867
A-22	4.4	4.5	+.1	.83808	B-22	4.1	4.3	+.2	.98883
A-23	4.4	4.3	-.1	.70912	B-23	3.4	3.9	+.5	.88515
A-24	4.6	4.3	-.3	.79682	B-24	3.2	3.8	+.6	.98174
A-25	4.6	4.3	-.3	.78478	B-25	3.5	3.8	+.3	1.00791
A-26	3.5	3.3	-.2	.95286	B-26	2.0	2.8	+.8	.80554
A-28	2.7	3.2	+.5*	.2424	B-28	2.2	2.6	+.4	.88944

*Significant at the .05 level.

There were significantly lower means for the importance of (A-28) writing reports or letters neatly, and for the importance of (A-20) writing legibly and accurately so that the information is readable and correct.

Composition Skills

Because the original, null hypothesis was retained for items A-30, B-27, B-30, B-31, B-32, and B-34, no a priori subhypotheses were generated for these items.

There were no significant differences between the means of Group 1, workers, and Group 7, educators 14+ in either importance or frequency for the following composition-related items.

- (27) writing logical reports which make sense
- (29) getting the idea across in letters or reports
- (30) using acceptable grammar
- (31) writing sequentially; that is, step-by-step logical spelling
- (32) using good spelling
- (34) explaining the terms of the trade to customers in writing if necessary

There were, however, significant differences between the means of workers and educators 14+ for both the importance and frequency of:

- (36) writing reports of work to supervisor
- (37) scheduling work with supervisor,

where workers' means were significantly lower.

In addition, workers' means were significantly lower than educators 14+ for the frequency of two items:

- (B-33) using the terms of the trade in writing, when necessary
- (B-35) writing operator's or worker's gripe sheets

TABLE 22 - SUBHYPOTHESIS 6
GROUP 7 - COMPOSITION SKILLS

Item	IMPORTANCE			L.S.D. Value	Item	FREQUENCY			L.S.D. Value
	$\frac{\mu}{X}^1$	$\frac{\mu}{X}^1$	$\bar{X} - \bar{X}$			$\frac{\mu}{X}^1$	$\frac{\mu}{X}^1$	$\bar{X} - \bar{X}$	
A-27	4.1	3.5	-.6	.83571	B-27	2.5	3.0	+.5	.94550
A-29	4.1	3.3	-.8	.80317	B-29	2.6	2.6	.0	.77991
A-30	3.3	2.9	-.4	.89372	B-30	3.1	3.0	-.1	.93944
A-31	4.2	3.7	-.5	.70102	B-31	2.9	3.1	+.2	.84478
A-32	3.1	2.8	-.3	.80396	B-32	2.9	2.8	-.1	1.00979
A-33	3.3	3.7	-.4	.71002	B-33	2.1	3.5	1.4*	.90009
A-34	3.8	3.2	-.6	.78153	B-34	2.6	3.0	+.4	.97329
A-35	2.8	3.2	+.4	.81104	B-35	1.3	2.8	+1.5*	.88372
A-36	2.7	3.6	+.9*	.73463	B-36	1.7	3.3	+1.6*	.85968
A-37	2.7	3.8	+1.1*	.64537	B-37	2.1	3.7	+1.6*	.82192
A-38	2.5	3.6	+1.1*	.77583	B-38	2.0	3.0	+1.0*	.87723

*Significant at the .05 level.

Summary

The original, null hypothesis, that there is no significant difference among the means of the seven groups, was retained for 26 of the 38 items; it was rejected for twelve items. The number of groups which rejected items varied from zero to six, see Appendix II.

After applying the Least Significant Difference (L.S.D.) test and comparing the multiple means, there were 124 rejections of the subhypotheses of an optimum total of 532. The frequency or rejection was 23.31%, or, approximately one out of four of the subhypothesis items was rejected.

On the basis of rejections at the level of significance, Group 6, educators 13-14, showed the fewest significant differences from the means of Group 1, workers, in items dealing with frequency of use.

Group 6, educators 13-14, and Group 7, educators 14+, had the fewest significant differences from the mean of workers for the composite total of the three skill areas. For importance, Group 6, educators 13-14, showed the fewest significant differences from the mean of Group 1, workers. So far as importance and frequency of use, the groups which showed the fewest significant differences from the means of Group 1, workers, were Group 6, educators 13-14, and Group 7, educators 14+.

The groups whose means showed the highest number of significant differences from the means of Group 1, workers, for importance, frequency, and total was Group 5, educators 10-13. And the group showing

the fewest items whose means were higher than Group 1, workers,
was Group 2, employers.

V. SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Summary

Introduction of the Problem

The main purpose of the study was to determine the importance and the frequency of use of certain communication skills to job-entry-level mechanics, as assessed by employers, educators at various levels, and industrial mechanics on the job. The communication skills investigated for importance and for frequency of use were: verbal, handwriting, and composition skills.

Procedures

The instrument used for the study was a survey-questionnaire consisting of thirty-eight communication-related tasks. The instrument was sent to a selected sample of respondents representing: workers (industrial mechanics), employers, and educators at various levels. The study employed a one-way analysis of variance design (fixed model). The F-statistic was used in the analysis.

Method of Treatment

The instrument was mailed to each of the seven population groups. Follow-up mailings were sent until ten respondents were accumulated for each of the seven groups to make a total population of seventy respondents.

Conclusions

In consideration of the limitations of this study, the following hypotheses were tested and are offered with appropriate conclusions:

1. There is no significant difference among the mean scores of the seven groups.

Based on the significant differences among the mean scores of the seven groups, this hypothesis is rejected. The seven groups do not agree in their assessment of the importance or the frequency of use by entry-level industrial mechanics of the communication skills investigated by this study.

2. The means of Group 1, workers, are equal to the means of Group 2, employers.

Based on the results of this study, this subhypothesis is rejected. Workers and employers do not agree in their assessment of the importance or the frequency of use by entry-level industrial mechanics of the communication skills investigated by this study.

3. The means of Group 1, workers, are equal to the means of Group 3, educators K-6.

Based on the significant differences between the mean scores of the two groups, this hypothesis is rejected. Workers and educators K-6 do not agree in their assessment of the importance or the frequency of use by entry-level industrial mechanics of the communication skills investigated by this study.

4. The means of Group 1, workers, are equal to the means of Group 4, educators 7-9.

Based on the results of this study, this subhypothesis is rejected. Workers and educators 10-12 do not agree in their assessment of the importance or the frequency of use by entry-level industrial mechanics of the communication skills investigated in this study.

6. The means of Group 1, workers, are equal to the means of Group 6, educators 13-14.

Based on the results of this study, this subhypothesis is rejected. Workers and educators 13-14 do not agree in their assessment of the importance or the frequency of use by entry-level industrial mechanics of the communication skills investigated in this study.

7. The means of Group 1, workers, are equal to the means of Group 7, educators 14+.

Based on the significant differences between the mean scores of the two groups, this subhypothesis is rejected. Workers and educators 14+ do not agree in their assessment of the importance or the frequency of use by entry-level industrial mechanics of the communication skills investigated in this study.

To summarize, there are significant differences among the groups which indicate that the seven groups do not agree on either the importance of certain communication skills or the frequency of use of these communication skills by entry-level industrial mechanics.

Further, neither employers nor any of the five groups of educators agree with workers on either importance or frequency of use of the communication skills investigated in this study.

Implications

Based upon the results and the conclusions of this study, the investigator offers the following observations. This section will draw inferences based on relationships to the items rated "necessary" by Group 1, workers, as shown under importance in Table 4.

Investigator's Observations Regarding Employers

Employers tend to underestimate the importance of communication skills required by entry-level industrial mechanics in all three of the communication skill categories investigated. In addition, employers do not place the same priorities or rank order on these skills as do workers. Based upon their understanding of required communication skills, as indicated in this study, employers who hire entry-level industrial workers will be disappointed in the communication skills of their new hires to the level of significance of this study--or 95 percent of the time.

Investigator's Observations Regarding K-6 Educators

Of the five groups of educators, Group 3, educators K-6, have the lowest estimate of the importance of communication skills to entry-level industrial workers. Educators' low expectations and low priorities at this beginning level of education are especially prejudicial to the student for several reasons, some of which are set forth below:

1. Many, if not most, curricula are built on the "spiral" model where each unit builds on the one preceding it. If the student does not acquire the skill at the level it is offered, he finds subsequent lessons difficult if not impossible.
2. If the student has not acquired the acceptable level of skill, his frustration in future encounters may become an "acting out" activity indicating his frustration, hostility, or boredom.
3. Students who are deficient in interpersonal communication skills make incomplete or poor personal adjustments; hence, these students are more apt to drop out of the school program or, although they remain physically in school, they are mentally "turned off."
4. The ability to write logically indicates an ability to think logically which is an intrinsic part of value setting and decision-making.
5. Frustration and boredom, resulting from an inadequate level of skill, will probably contribute to building poor attitudes and work habits.
6. At successively higher levels of education, it becomes more difficult for the student to learn and for the instructor to teach because the student has to un-learn unsuccessful models and then learn acceptable models.

Investigator's Observations Regarding 7-9 Educators

Group 4, educators 7-9, is the second level of educators to which the student has been exposed. Both of these levels of educators underrate the importance of several skills which the worker rates "necessary." At the time when the student is entering the preparation or specialization stage, he may also be made aware for the first time that he is deficient in certain communication skills. These skills are essential to industry and required by post-secondary

institutions. Until now, none of his educational experiences have prepared him to perform these required skills. He is faced with the necessity for entering the job market and, at the same time, acquiring the communication skills which are considered part of the K-9 curricula. Faced with these demands, the student may react in any of the following ways:

1. He may try to "fake" the skills.
2. He may try to acquire the necessary skills.
3. He may become frustrated, or bored and "act up," or become a school discipline problem.
4. He may drop out of school.

Investigator's Observations Regarding 10-12 Educators

Educators 10-12 assess almost all of the communication items as top priority. Placing highest importance on every item results in monotony. It is not feasible to make every item a top-priority item.

Such high ratings by educators 10-12 may be due to several factors or a combination of factors. Probably all of the items shown below contribute in some measure to educators' 10-12 high ratings of communication skills:

1. Students' nearness to the job market.
2. State-mandated graduation competencies.
3. Underestimate of importance by the two lower levels of educators.

Investigator's Observations Regarding Educators 13-14

This group of educators shows good awareness of the needs and priorities of workers. However, like the other groups of educators (excepting Group 5), this group of educators underestimates workers' needs for the specific kind of composition skills workers require.

Investigator's Observations Regarding Educators 14+

Although there is total agreement so far as handwriting tasks are concerned, educators 14+ underestimate the importance to the worker of verbal communication with the customer in what are potentially sensitive areas: explaining service or trade terms and informing the customer of charges. In addition, educators at this level consider no composition skills "necessary" to workers.

The university level of education has a responsibility to make an accurate assessment of the need of the nonacademic, as well as the academic, student. Further, it is the university's duty to teach teachers what to teach, how to teach it, and to respond to the needs of the whole community. Those composition items which relate to the ability to organize and to think logically do not hold priority when educators 14+ review the needs of the nonacademic, general, or industrial student. The university level of education must respond to the needs of the nonacademic or general students who, in the case of industrial workers, have stated their unfulfilled communication needs.

Recommendations

Recommendations for Action

1. Employers and workers should participate on training program advisory committees. This would permit employers another channel of communication with the worker regarding his needs. Such participation would afford both worker and employer an opportunity to describe needs and need levels when curriculum or program design is being considered or modified.

2. In-service training and workshops for teachers of language arts K-12 should include areas of student need and level of need for the nonacademic, general, or vocational student. Such information must be from current research drawn from identified job markets.

3. Workshops for teachers of language arts K-12 should emphasize the methodology for teaching expository writing. This is the style of writing identified by workers as "necessary." Expository writing requires training in logical organization, setting priorities, and decision-making.

4. Workshops for teachers of language arts K-12 should emphasize that there is a need for students at all levels to be taught to write or to print so that students' writing is readable, neat, accurate, and complete.

5. There is a need, especially at the lower, elementary level, to initiate interpersonal communication in the classroom which

clarifies issues, verifies information, and which deals with potentially sensitive areas in a positive manner. There is a trend throughout the groups to emphasize communication tasks which involve the relationship between the worker and the authority figure. This trend is especially apparent at the elementary level and it is accomplished by a lack of awareness for the need to interact with peers and with others. "Others" in the future would include: clients, customers, peers, parents, etc.

Recommendations for Further Research

1. This kind of a study of communication or basic skills needs, conducted on a three-way perception basis involving educators, employers, and employees, should be replicated in other identified job markets such as health, resort, law enforcement, and social work.
2. The methodology and instrument used in this study should be investigated in other geographical areas with select populations which include: English as a foreign language, English as a second language, communication skills for industry taught as a dialect or a second dialect.
3. Curricula at the bachelors, masters, and doctoral levels should be investigated to discern whether they reflect the needs of language arts teachers who need to teach expository composition to the "general" or nonacademic student as well as to academic students.

4. Curricula at the bachelors, masters, and doctoral levels should be investigated to determine whether or not they reflect the needs of K-12. But especially curricula for all elementary level teachers should place greater emphasis on students' verbal skills and involving interpersonal relationships. These would include interrelationships with peers and "others" in addition to relationship with the teachers in communication-sensitive areas.

5. Curricula at the bachelors, masters, and doctoral levels should be investigated to determine whether or not they reflect the need for and the priority for teaching a style of handwriting or printing to general, as well as to academic students. This style of writing should be readable, neat, correct, and complete.

5. Curricula at the bachelors, masters, and doctoral levels should emphasize and incorporate the interdisciplinary approach so that content is presented concurrently with basic skills. Hence, the student would find his "career" interest inseparable from basic skills.

6. This study should be replicated using the same process of selection for the employers and educators, but using as the group of workers job-entry-level industrial mechanics who are not members of a cooperative work experience program.

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APPENDICES

Appendix I

**QUESTIONNAIRE OF
VERBAL AND WRITTEN COMMUNICATION SKILLS
USED BY INDUSTRIAL MECHANICS**

Marking Instructions

In the left column, you are asked to circle a number from 1-5 that most closely indicates your thinking about the IMPORTANCE of the described communication skills which might be used by industrial mechanics (such jobs as automotive mechanics, diesel mechanics, heavy maintenance mechanics, small appliance repairmen, heavy construction workers, and flight technologists). In the right column, you are asked to circle a number from 1-5 which most closely represents your thinking about how often or how FREQUENTLY the communication skill might be used by industrial mechanics. The statements represented by the two sets of numbers are printed above the right and left columns of numbers.

Example:

IMPORTANCE	HOW OFTEN
1 2 3 4 5 Writes clear, readable orders	1 2 3 4 5

In this sample, the person indicated that the task was important, but not essential and that it was used sometimes—occasionally.

- | | |
|---|-----------------------------|
| 1. Necessary for getting job and in daily use | 1. Much use each day. |
| 2. Necessary in daily use | 2. Some use each day |
| 3. Important, but not essential | 3. Average, used some daily |
| 4. Helpful | 4. Sometimes—occasionally |
| 5. Seldom Needed | 5. Almost never |

This is a follow-up of a questionnaire sent you about a month ago. If you have already returned the questionnaire, please disregard this request. If you have not yet completed and returned the form, we would appreciate it. The information will be used to update course content and teaching materials. The coded number is for machine sorting purposes only.

TASKS

IMPORTANCE	HOW OFTEN	ITEM No.
1 2 3 4 5 Answers telephone	1 2 3 4 5	1
1 2 3 4 5 Makes appointments by telephone	1 2 3 4 5	2
1 2 3 4 5 Is courteous to customer	1 2 3 4 5	3
1 2 3 4 5 Informs customer of charges	1 2 3 4 5	4
1 2 3 4 5 Questions customer diplomatically	1 2 3 4 5	5
1 2 3 4 5 Meets or talks with customers either over-the-counter or as service manager discussing the service rendered	1 2 3 4 5	6
1 2 3 4 5 Is courteous to fellow employees	1 2 3 4 5	7
1 2 3 4 5 Exchanges new ideas	1 2 3 4 5	8
1 2 3 4 5 Gets accurate information on telephone	1 2 3 4 5	9

1 2 3 4 5 Offers assistance	1 2 3 4 5	10
1 2 3 4 5 Requests assistance of other employees or supervisor	1 2 3 4 5	11
1 2 3 4 5 Explains service or trade terms to customer if necessary	1 2 3 4 5	12
1 2 3 4 5 Schedules work with supervisor	1 2 3 4 5	13
1 2 3 4 5 Notifies supervisor of changes in work schedule	1 2 3 4 5	14
1 2 3 4 5 Updates work schedule as required	1 2 3 4 5	15
1 2 3 4 5 Questions written work order when order not complete or clear	1 2 3 4 5	16
1 2 3 4 5 Orders or requests parts, tools, or equipment	1 2 3 4 5	17
1 2 3 4 5 Is pleasant and courteous to supervisor	1 2 3 4 5	18
1 2 3 4 5 Speaks clearly and distinctly so that he does not have to be asked to repeat	1 2 3 4 5	19

Writing

1 2 3 4 5 Writes legibly and accurately so that information is readable and correct	1 2 3 4 5	20
1 2 3 4 5 Writes legibly and accurately so that information is readable and complete	1 2 3 4 5	21
1 2 3 4 5 Fills out forms such as invoices, time cards, inspection forms, part orders, warranty claims, and quality control checks accurately, readability, and completely	1 2 3 4 5	22
1 2 3 4 5 Records inspection data accurately	1 2 3 4 5	23
1 2 3 4 5 Writes clear, readable service orders	1 2 3 4 5	24
1 2 3 4 5 Writes clear, readable, short repair orders	1 2 3 4 5	25

Composition-Related

1 2 3 4 5 Writes clear, understandable procedures or letters	1 2 3 4 5	26
1 2 3 4 5 Writes logical reports which make sense	1 2 3 4 5	27
1 2 3 4 5 Writes reports or letters neatly	1 2 3 4 5	28
1 2 3 4 5 Gets the idea across in letters or reports	1 2 3 4 5	29
1 2 3 4 5 Uses acceptable grammar	1 2 3 4 5	30
1 2 3 4 5 Writes sequentially, that is, step-by-step logical descriptions	1 2 3 4 5	31
1 2 3 4 5 Uses good spelling	1 2 3 4 5	32
1 2 3 4 5 Uses the terms of the trade in writing when necessary	1 2 3 4 5	33
1 2 3 4 5 Explains the terms of the trade to customers or to others in writing when necessary	1 2 3 4 5	34
1 2 3 4 5 Writes operator's or worker's gripe sheets	1 2 3 4 5	35
1 2 3 4 5 Writes reports or work to supervisor	1 2 3 4 5	36
1 2 3 4 5 Schedules work with supervisor	1 2 3 4 5	37
1 2 3 4 5 Updates work schedule as required	1 2 3 4 5	38
1 2 3 4 5 Notifies customer or supervisor, in writing, of changes in planned work, if necessary	1 2 3 4 5	39

Appendix II
Comparison of Rejections
Importance

<u>Item</u>	<u>Null</u>	<u>$\mu_1 = \mu_2$</u>	<u>$\mu_1 = \mu_3$</u>	<u>$\mu_1 = \mu_4$</u>	<u>$\mu_1 = \mu_5$</u>	<u>$\mu_1 = \mu_6$</u>	<u>$\mu_1 = \mu_7$</u>	<u>No. of Groups Rejecting*</u>
A-1	Rejected	Rejected	Rejected	Rejected*	Rejected*	Rejected	Rejected	2
A-2	Rejected	Rejected*	Rejected	Rejected*	Rejected*	Rejected	Rejected	3
A-3	Retained	Rejected	Rejected	Rejected*	Rejected	Rejected	Rejected	1
A-4	Rejected	Rejected*	Rejected	Retained	Rejected*	Rejected	Rejected	2
A-5	Rejected	Rejected*	Rejected*	Rejected	Rejected	Retained	Rejected	2
A-6	Rejected	Rejected	Rejected	Rejected*	Rejected*	Rejected	Rejected	2
A-7	Retained	Rejected	Rejected	Rejected	Rejected*	Rejected	Rejected	1
A-8	Rejected	Rejected	Rejected	Rejected*	Rejected	Rejected	Rejected	1
A-9	Rejected	Retained	Rejected	Rejected*	Rejected*	Rejected	Rejected	2
A-10	Rejected	Rejected	Rejected	Rejected*	Rejected*	Rejected	Rejected	2
A-11	Rejected	Rejected*	Rejected	Rejected	Rejected*	Rejected	Rejected	2
A-12	Rejected	Rejected*	Rejected	Rejected	Rejected	Rejected	Rejected	2
A-13	Rejected	Rejected	Rejected	Rejected	Rejected*	Rejected	Rejected	1
A-14	Retained	Rejected	Rejected	Retained	Rejected	Retained	Rejected	0
A-15	Retained	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	0
A-16	Retained	Retained	Rejected*	Rejected	Rejected	Rejected	Rejected	1
A-17	Retained	Rejected	Rejected	Rejected*	Rejected*	Rejected	Rejected	2
A-18	Rejected	Retained	Retained	Rejected	Rejected*	Rejected	Rejected*	2
A-19	Rejected	Rejected	Rejected	Rejected*	Rejected*	Rejected	Rejected	2
A-20	Rejected	Rejected	Rejected	Rejected*	Rejected*	Rejected*	Rejected*	4
A-21	Retained	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	0
A-22	Retained	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	0
A-23	Retained	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	0
A-24	Rejected	Rejected*	Rejected*	Rejected	Rejected	Rejected	Rejected	2
A-25	Rejected	Rejected*	Rejected*	Rejected	Rejected	Rejected	Rejected	2
A-26	Retained	Rejected	Rejected	Rejected	Rejected	Retained	Rejected	0
A-27	Rejected	Rejected*	Rejected	Rejected*	Retained	Rejected	Rejected	2
A-28	Rejected	Rejected*	Rejected*	Retained	Rejected*	Rejected*	Rejected*	5
A-29	Rejected	Rejected*	Rejected*	Rejected	Rejected	Rejected	Rejected	2
A-30	Retained	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	0
A-31	Rejected	Rejected*	Rejected*	Rejected*	Retained	Rejected	Rejected	3
A-32	Rejected	Retained	Rejected	Rejected	Rejected*	Rejected	Rejected	1
A-33	Rejected	Retained	Rejected	Rejected	Rejected*	Rejected	Rejected	1
A-34	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	0
A-35	Rejected	Rejected	Rejected	Retained	Rejected*	Rejected	Rejected	1
A-36	Rejected	Rejected	Rejected	Rejected*	Rejected*	Rejected	Rejected*	3
A-37	Rejected	Rejected*	Rejected*	Rejected*	Rejected*	Rejected*	Rejected*	6
A-38	Rejected	Rejected*	Rejected	Rejected*	Rejected*	Rejected*	Rejected*	5

*Significant at the .05 level.

Appendix III
Comparison of Rejections
Frequency

<u>Item</u>	<u>Null</u>	<u>$\mu_1 = \mu_2$</u>	<u>$\mu_1 = \mu_3$</u>	<u>$\mu_1 = \mu_4$</u>	<u>$\mu_1 = \mu_5$</u>	<u>$\mu_1 = \mu_6$</u>	<u>$\mu_1 = \mu_7$</u>	<u>No. of Groups Rejecting*</u>
B-1	Rejected	Rejected	Rejected	Rejected*	Rejected*	Rejected	Rejected	2
B-2	Rejected	Rejected*	Rejected	Rejected	Rejected*	Rejected	Rejected	3
B-3	Rejected	Rejected	Rejected	Rejected*	Rejected*	Rejected	Rejected	2
B-4	Rejected	Rejected*	Rejected*	Rejected	Rejected	Rejected	Rejected	2
B-5	Rejected	Rejected*	Rejected*	Retained	Rejected	Retained	Rejected	2
B-6	Rejected	Rejected	Rejected	Rejected	Rejected*	Rejected	Rejected	1
B-7	Rejected	Retained	Rejected	Rejected	Rejected	Rejected	Rejected	0
B-8	Retained	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	0
B-9	Rejected	Rejected	Rejected	Rejected	Rejected	Retained	Rejected	0
B-10	Retained	Rejected*	Rejected	Rejected	Rejected*	Rejected	Rejected	2
B-11	Rejected	Rejected*	Rejected	Rejected	Rejected*	Rejected	Rejected	2
B-12	Rejected	Rejected	Rejected	Rejected*	Rejected	Rejected	Retained	1
B-13	Rejected	Rejected	Rejected	Rejected	Rejected*	Rejected*	Rejected	3
B-14	Rejected	Rejected	Rejected*	Rejected	Rejected*	Rejected	Rejected	2
B-15	Retained	Rejected	Rejected	Rejected	Rejected*	Rejected	Rejected	1
B-16	Retained	Rejected	Rejected	Rejected*	Retained	Retained	Rejected	1
B-17	Retained	Rejected	Rejected	Retained	Rejected	Rejected	Rejected	0
B-18	Rejected	Rejected	Rejected	Rejected	Rejected*	Rejected*	Rejected	2
B-19	Retained	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	1
B-20	Retained	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	0
B-21	Retained	Retained	Rejected	Rejected	Rejected	Rejected	Rejected	0
B-22	Retained	Rejected	Rejected	Rejected	Rejected	Retained	Rejected	0
B-23	Rejected	Rejected	Rejected	Rejected	Rejected*	Rejected	Rejected	1
B-24	Rejected	Rejected	Rejected	Rejected	Rejected*	Rejected	Rejected	1
B-25	Rejected	Rejected	Rejected	Rejected	Rejected*	Rejected	Rejected	1
B-26	Retained	Rejected	Rejected	Rejected	Rejected*	Rejected*	Rejected	2
B-27	Retained	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	0
B-28	Rejected	Rejected	Rejected	Rejected	Rejected*	Rejected	Rejected	1
B-29	Rejected	Rejected*	Rejected	Rejected	Rejected	Rejected	Retained	1
B-30	Retained	Retained	Rejected	Rejected	Rejected	Retained	Rejected	0
B-31	Retained	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	0
B-32	Retained	Rejected	Rejected	Rejected	Rejected*	Rejected	Rejected	1
B-33	Rejected	Rejected	Rejected*	Rejected*	Rejected*	Rejected*	Rejected	5
B-34	Retained	Retained	Rejected	Rejected	Rejected	Rejected	Rejected	0
B-35	Rejected	Rejected	Rejected*	Rejected*	Rejected*	Rejected*	Rejected*	5
B-36	Rejected	Retained	Rejected	Rejected*	Rejected*	Rejected*	Rejected	4
B-37	Rejected	Rejected	Rejected*	Rejected*	Rejected*	Rejected*	Rejected*	5
B-38	Rejected	Rejected	Rejected*	Rejected*	Rejected*	Rejected*	Rejected*	5

* Significant at the .05 level.

Appendix IV
 Summary of
 Rejections by Population Groups

	<u>Group 2</u>	<u>Group 3</u>	<u>Group 4</u>	<u>Group 5</u>	<u>Group 6</u>	<u>Group 7</u>	<u>Total</u>
Importance	13	9	15	20	4	6	67
Frequency	6	7	9	21	8	6	57
	—	—	—	—	—	—	—
TOTAL	19	16	24	41	12	12	124
							—————

Appendix V
Direction of
Significant Differences

<u>Item</u>	<u>Group 2</u>	<u>Group 3</u>	<u>Group 4</u>	<u>Group 5</u>	<u>Group 6</u>	<u>Group 7</u>	<u>Item</u>	<u>Group 2</u>	<u>Group 3</u>	<u>Group 4</u>	<u>Group 5</u>	<u>Group 6</u>	<u>Group 7</u>
A-1			+	+			B-1			+	+		
A-2	-		+	+			B-2	-		+	+		
A-3			+				B-3			+	+		
A-4	-		0	+			B-4	-	-				
A-5	-	-	+		0		B-5	-	-	0		0	
A-6				+			B-6				+		
A-7				+			B-7	0					
A-8				+			B-8						
A-9	0		+	+			B-9					0	
A-10	+		+	+			B-10	+			+		
A-11	+			+			B-11	+			+		
A-12	-	-					B-12		-				0
A-13				+			B-13			+	+		+
A-14			0		0		B-14		+		+		
A-15							B-15				+		
A-16	0	-					B-16		-	0	0		
A-17	0	+	+				B-17		0				
A-18	0		+			+	B-18			+	+		
A-19		+	+				B-19						
A-20		+	+	+	+	+	B-20						
A-21							B-21	0					
A-22							B-22					0	
A-23							B-23					+	
A-24	-	-					B-24					+	
A-25	-	-					B-25					+	
A-26					0		B-26					+	+
A-28	-	+	0	+	+	+	B-28					+	
A-27	-		-	0			B-27						
A-29	-	-					B-29	-					0
A-30	0						B-30	0					
A-31	-	-	-	0			B-31					0	
A-32				+			B-32					+	
A-33				+			B-33						
A-34							B-34	0					
A-35		0	+				B-35		+	+	+	+	+
A-36	+	+					B-36		+	+	+	+	+
A-37	+	+	+	+	+	+	B-37		+	+	+	+	+
A-38		+	+	+	+	+	B-38		+	+	+	+	+

0 means are equal to means of Group 1, workers.

+ means are significantly higher than means of Group 1, workers.

- means are significantly lower than means of Group 1, workers

Significant at the .05 level.

Appendix VI

A: IMPORTANCE

- 5. Necessary for getting job and in daily use
- 4. Necessary in daily use
- 3. Important, but not essential
- 2. Helpful
- 1. Seldom Needed

IDENTIFICATION OF GROUPS:

- (1) Employees
- (2) Employers
- (3) Educators K-6 Elementary
- (4) Educators 7-9 Junior
- (5) Educators 10-12 High School
- (6) Educators 13-14 Community College
- (7) Educators 14+ University

(1)	(2)	(3)	Group Number (4)	(5)	(6)	(7)	Computed F	ISD .05
<u>A-1 Answers telephone</u>								
2.300	2.200	2.800	4.300	4.700	2.900	2.800	7.4250	1.00791
<u>A-2 Makes appointments by telephone</u>								
2.700	1.700	2.800	3.800	4.200	2.500	2.400	6.0791	.98174
<u>A-3 Is courteous to customer</u>								
4.200	3.900	4.400	5.000	4.600	4.300	4.400	2.1232	.72506
<u>A-4 Informs customer of charges</u>								
4.000	2.500	3.200	4.000	4.900	4.300	3.700	6.3851	.86703
<u>A-5 Questions customer diplomatically</u>								
4.100	3.000	3.100	4.300	4.700	4.100	4.000	4.8271	.80396
<u>A-6 Meets or talks with customers either over-the-counter or as service manager discussing the service rendered</u>								
3.500	2.700	3.000	4.700	4.800	3.600	3.600	5.7135	.93673
<u>A-7 Is courteous to fellow employees</u>								
3.900	4.300	3.700	4.200	4.800	4.600	4.400	2.1299	.73980
<u>A-8 Exchanges new ideas</u>								
3.700	4.000	3.400	2.700	3.800	3.500	3.500	2.1951	.79042
<u>A-9 Gets accurate information on telephone</u>								
3.600	3.600	3.300	4.900	4.700	4.200	3.900	5.0946	75087
<u>A-10 Offers Assistance</u>								
3.200	4.400	3.300	4.100	4.500	3.500	3.700	6.1601	.59735
<u>A-11 Requests assistance of other employees or supervisor</u>								
3.000	4.300	3.400	3.700	4.200	3.800	3.200	2.9358	.80790
<u>A-12 Explains service or trade terms to customer if necessary</u>								
4.500	2.700	3.400	4.200	4.600	3.800	3.900	6.3586	.74322
<u>A-13 Schedules work with supervisor</u>								
3.000	3.600	3.200	3.400	4.500	3.500	3.900	2.7389	.84553
<u>A-14 Notifies supervisor of changes in work schedule</u>								
3.400	3.800	3.600	3.400	4.300	3.400	3.700	1.0229	.91130
<u>A-15 Updates work schedule as required</u>								
3.300	3.500	3.600	3.700	3.900	3.800	3.500	.4343	.87360
<u>A-16 Questions written work order when order not complete or clear</u>								
4.100	4.100	3.300	3.900	4.600	4.000	4.200	2.1429	.75425
<u>A-17 Orders or requests parts, tools, or equipment</u>								
3.500	3.800	3.700	4.300	4.400	3.800	4.000	1.3789	.78316
<u>A-18 Is pleasant and courteous to supervisor</u>								
3.600	3.700	3.600	3.900	4.800	4.000	4.300	3.3972	.67141
<u>A-19 Speaks clearly and distinctly so that he does not have to be asked to repeat</u>								
3.500	3.600	3.800	4.600	4.700	4.200	3.900	2.6243	.82424

A: IMPORTANCE

5. Necessary for getting job and in daily use
4. Necessary in daily use
3. Important, but not essential
2. Helpful
1. Seldom Needed

IDENTIFICATION OF GROUPS:

- (1) Employees
- (2) Employers
- (3) Educators K-6 Elementary
- (4) Educators 7-9 Junior
- (5) Educators 10-12 High School
- (6) Educators 13-14 Community College
- (7) Educators 14+ University

Group Number							Computed F	LSD .05
(1)	(2)	(3)	(4)	(5)	(6)	(7)		
<u>A-20 Writes legibly and accurately so that information is readable and correct</u>								
3.700	3.600	3.900	4.700	4.700	4.600	4.500	3.7259	.71714
<u>A-21 Writes legibly and accurately so that information is readable and complete</u>								
3.800	3.600	3.900	4.600	4.200	4.600	4.300	1.8034	.82347
<u>A-22 Fills out forms such as invoices, time cards, inspection forms, part orders, warranty claims, and quality control checks accurately, readably, and completely</u>								
4.400	4.200	3.700	4.500	4.500	4.600	4.500	1.1222	.83808
<u>A-23 Records inspection data accurately</u>								
4.400	4.200	3.700	4.300	4.900	4.600	4.300	2.1667	.70912
<u>A-24 Writes clear, readable service orders</u>								
4.600	3.400	3.600	4.300	4.700	4.500	4.300	3.1920	.79682
<u>A-25 Writes clear, readable, short repair orders</u>								
4.600	3.600	3.100	4.300	4.700	4.500	4.300	4.4969	.78478
<u>A-26 Writes clear, understandable procedures or letters</u>								
3.500	2.800	3.400	3.000	3.400	3.500	3.300	.6378	.95286
<u>A-27 Writes logical reports which make sense</u>								
4.100	2.900	3.300	3.200	4.100	3.700	3.500	2.3618	.83571
<u>A-28 Writes reports or letters neatly</u>								
2.700	2.400	3.200	2.700	4.200	3.300	3.200	4.0822	.2424
<u>A-29 Gets the idea across in letters or reports</u>								
4.100	2.600	3.200	3.300	4.200	3.700	3.300	3.8622	.80317
<u>A-30 Uses acceptable grammar</u>								
3.300	3.300	3.100	3.100	3.800	3.400	2.900	.8251	.89372
<u>A-31 Writes sequentially; that is, step-by-step logical descriptions</u>								
4.200	2.700	3.200	2.800	4.200	3.700	3.700	6.1860	.70102
<u>A-32 Uses good spelling</u>								
3.100	2.700	3.300	3.700	4.200	3.500	2.800	3.4126	.80396
<u>A-33 Uses the terms of the trade in writing when necessary</u>								
3.300	3.200	3.900	3.900	4.700	4.000	3.700	3.9370	.71002
<u>A-34 Explains the terms of the trade to customers or to others in writing when necessary</u>								
3.800	3.100	3.300	3.500	4.500	3.900	3.200	3.1622	.78153
<u>A-35 Writes operator's or worker's gripe sheets</u>								
2.800	2.000	3.000	2.800	4.300	2.900	3.200	5.7162	.81104
<u>A-36 Writes reports of work to supervisor</u>								
2.700	2.100	2.900	3.700	4.500	3.200	3.600	8.9859	.73463
<u>A-37 Schedules work with supervisor</u>								
2.700	2.800	3.700	3.900	4.800	3.900	3.800	9.9146	.64537
<u>A-38 Updates work schedule as required</u>								
2.500	2.800	3.200	3.800	4.800	3.700	3.600	7.5506	.77583

Appendix VIII

B: HOW OFTEN--FREQUENCY

5. Much use each day
 4. Some use each day
 3. Average, used some daily
 2. Sometimes--occasionally
 1. Almost never

IDENTIFICATION OF GROUPS:

- | | |
|---------------------|-------------------|
| (1) Employees | |
| (2) Employers | |
| (3) Educators K-6 | Elementary |
| (4) Educators 7-9 | Junior |
| (5) Educators 10-12 | High School |
| (6) Educators 13-14 | Community College |
| (7) Educators 14+ | University |

Group Number							Computed	LSD .05
(1)	(2)	(3)	(4)	(5)	(6)	(7)	F	
<u>B-1 Answers telephone</u>								
2.300	2.000	2.400	3.500	4.200	3.200	2.700	4.9541	.98432
<u>B-2 Makes appointments by telephone</u>								
2.700	1.600	2.400	3.100	3.900	3.100	2.400	5.6793	.85820
<u>B-3 Is courteous to customer</u>								
3.800	3.100	4.000	4.700	4.600	4.100	3.900	3.6885	.78720
<u>B-4 Informs customer of charges</u>								
4.200	2.100	2.900	3.700	4.600	4.000	3.400	6.2407	.95817
<u>B-5 Questions customer diplomatically</u>								
3.900	2.500	2.700	3.900	4.700	3.900	3.400	6.2565	.85301
<u>B-6 Meets or talks with customers either over-the-counter or as service manager discussing the service rendered</u>								
3.100	2.400	2.800	4.100	4.400	3.900	3.200	4.2007	1.01231
<u>B-7 Is courteous to fellow employees</u>								
4.300	4.300	4.000	4.000	5.000	4.700	4.600	2.2481	.70102
<u>B-8 Exchanges new ideas</u>								
3.700	3.500	3.100	2.900	3.600	3.300	3.300	.9453	.82038
<u>B-9 Gets accurate information on telephone</u>								
3.500	3.100	3.000	4.300	4.400	3.500	3.600	2.8426	.90711
<u>B-10 Offers Assistance</u>								
2.800	3.900	3.300	3.400	4.100	3.200	3.300	2.0336	.86996
<u>B-11 Requests assistance of other employees or supervisor</u>								
2.900	4.200	3.300	3.000	4.100	3.300	3.000	3.2482	.84026
<u>B-12 Explains service or trade terms to customer if necessary</u>								
3.400	2.700	2.900	2.300	4.100	3.500	3.400	3.1346	.95152
<u>B-13 Schedules work with supervisor</u>								
2.600	3.500	3.200	2.800	4.100	3.700	3.700	2.6786	.92376
<u>B-14 Notifies supervisor of changes in work schedule</u>								
2.400	3.200	3.400	2.800	4.200	3.200	3.100	2.4853	.99586
<u>B-15 Updates work schedule as required</u>								
2.600	2.900	3.300	3.000	3.800	3.500	3.000	1.3959	.96609
<u>B-16 Questions written work order when order not complete or clear</u>								
3.800	3.300	2.800	2.900	3.800	3.800	3.400	1.9983	.85672
<u>B-17 Orders or requests parts, tools, or equipment</u>								
3.600	3.500	3.700	3.600	4.000	4.000	3.700	.3441	.95286
<u>B-18 Is pleasant and courteous to supervisor</u>								
3.300	3.800	3.700	3.800	4.900	4.100	4.000	4.6084	.64930
<u>B-19 Speaks clearly and distinctly so that he does not have to be asked to repeat</u>								
4.000	3.700	3.700	4.300	4.500	4.400	3.900	1.1431	.87360

B: HOW OFTEN--FREQUENCY

5. Much use each day
 4. Some use each day
 3. Average, used some daily
 2. Sometimes--occasionally
 1. Almost never

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 (7) Educators 14+ University

Group Number							Computed F	ISD .05
(1)	(2)	(3)	(4)	(5)	(6)	(7)		
<u>B-20 Writes legibly and accurately so that information is readable and correct</u>								
3.500	3.300	3.800	4.000	4.000	4.300	3.800	1.2558	.84252
<u>B-21 Writes legibly and accurately so that information is readable and complete</u>								
3.200	3.200	3.700	3.700	3.900	4.100	3.800	1.2039	.87867
<u>B-22 Fills out forms such as invoices, time cards, inspection forms, part orders, warranty claims, and quality control checks accurately, readably, and completely</u>								
4.100	3.900	3.700	3.300	4.000	4.100	4.300	.8844	.98883
<u>B-23 Records inspection data accurately</u>								
3.400	3.900	3.600	3.700	4.900	3.700	3.900	2.4068	.88515
<u>B-24 Writes clear, readable service orders</u>								
3.200	3.000	3.800	3.700	4.700	3.900	3.800	2.4822	.98174
<u>B-25 Writes clear, readable short repair orders</u>								
3.500	3.100	3.200	3.400	4.700	3.900	3.800	2.3325	1.00791
<u>B-26 Writes clear, understandable procedures or letters</u>								
2.000	2.500	2.600	2.800	3.100	3.300	2.800	2.2074	.80554
<u>B-27 Writes logical reports which make sense</u>								
2.500	2.200	2.700	2.600	3.100	3.100	3.000	1.0398	.94550
<u>B-28 Writes reports or letters neatly</u>								
2.200	1.900	2.800	2.600	3.500	2.900	2.600	2.6581	.88944
<u>B-29 Gets the idea across in letters or reports</u>								
2.600	1.800	2.500	2.500	3.200	3.100	2.600	2.7808	.77991
<u>B-30 Uses acceptable grammar</u>								
3.100	3.100	2.800	3.600	3.200	3.300	3.000	.5698	.93944
<u>B-31 Writes sequentially; that is, step-by-step logical descriptions</u>								
2.900	2.700	2.500	2.500	2.600	2.900	3.100	.5925	.84478
<u>B-32 Uses good spelling</u>								
2.900	2.600	3.000	3.100	4.100	3.200	2.800	1.8306	1.00979
<u>B-33 Uses the terms of the trade in writing when necessary</u>								
2.100	2.600	3.500	3.500	4.500	3.500	3.500	5.8072	.90009
<u>B-34 Explains the terms of the trade to customers or to others in writing when necessary</u>								
2.600	2.600	2.900	3.000	3.500	3.400	3.000	1.0416	.97329
<u>B-35 Writes operator's or worker's gripe sheets</u>								
1.300	1.800	2.200	3.000	3.700	2.500	2.800	6.4780	.88372
<u>B-36 Writes reports of work to supervisor</u>								
1.700	1.700	2.100	3.900	3.700	3.000	3.300	9.4072	.85968
<u>B-37 Schedules work with supervisor</u>								
2.100	2.300	3.000	3.700	3.800	3.400	3.700	5.7970	.82192
<u>B-38 Updates work schedule as required</u>								
2.000	2.300	3.000	3.400	4.000	3.300	3.000	4.7475	.87723