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A Study of Office Machines Knowledge and Skills Needed for Initial Employment in Chehalis and Centralia, Washington

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A STUDY OF OFFICE MACHINES KNOWLEDGE AND SKILLS NEEDED FOR INITIAL EMPLOYMENT IN CHEHALIS AND CENTRALIA, WASHINGTON

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INTRODUCTION

Until the 1967-1968 school year, the Adna School District, Adna, Washington had a very limited variety and number of office machines. As a result of the Vocational Education Act of 1963, the Adna High School now has several different types of office machines. Because the Adna School District operates an approved office occupations program, part of the cost of the new machines was paid for by Federal monies distributed by the Washington State Department of Public Instruction. When an investment of public money is made, the investor should attempt to invest it in a manner that will be of maximum benefit to the public. The best way to determine the proper investment is through research. This research should be local and used for local purposes. Haines (1:43) stated:

> The advancement of business education will not be served if graduate research workers, on the basis of a small and inadequate sample, attempt to generalize to business occupations in many firms over large geographic areas.

If educators in the Adna school are to justify the large investment in these machines, young people should be trained in such a manner as to be employable and competent operators of the office machines used by businesses in Chehalis and Centralia. The results of this study may

reveal the necessary information to enable the Adna school to train young people as competent operators of business machines.

I. THE PROBLEM

Statement of the Problem

The purpose of this study was to determine the amount of office machines knowledge and skills needed for initial employment in Chehalis, Washington and Centralia, Washington. It was hoped the study would serve as a basis to determine what office machines were being used, and the length of training period on each office machines as specified by businessmen in Chehalis and Centralia. In addition, the writer hoped to discover: (1) what machines, if any, were to be discontinued in the future; (2) what machines, if any, were going to be replaced; (3) what the replacement would be; (4) if any additional machines were going to be purchased; (5) if any machines were being used for which the company gives on-the-job training; (6) if any of the local firms contemplated the installation of electronic data processing equipment in the future.

Importance of the Study

All public secondary education is dependent upon the tax paying community for its support. One way to acquire

that support is to produce young people who are prepared in the area of business for which there is a demand within the local area. Careful research has revealed there has never been an attempt made in the Chehalis--Centralia vicinity to determine what machines should be included in the office machines courses of the area, or the amount of training that should be given on specific machines.

The office machines program in any school should provide training that will be used by the majority of the students taking the course. Mehan (26:163) stated that:

> The fact that an office machine is used extensively in business offices cannot, of and by itself justify classroom instruction on the proper operation of the machines. The office machine may have a highly specialized application limited to a single type of business; it may be too costly; or the time required to attain a marketable operating skill may not be available in the business curriculum.

This study endeavored to discover how much training is demanded for employees who use common office machines in the businesses located in Chehalis and Centralia. In addition, the writer would hope to determine how many office machines were in use in Chehalis and Centralia at the time of the study.

Delimitations of the Study

The study was confined to Chehalis and Centralia, Washington. The scope of the research investigation was restricted to firms listed in the yellow pages of the

Chehalis and Centralia telephone directory. A questionnaire, personal interviews, and telephone interviews were used to gather the data. The personal interviews were confined to those businesses dealing with the distribution, sales, and maintenance of office machines.

II. DEFINITIONS OF TERMS USED

Employable

An employable individual is one who possesses the necessary skills and knowledge to adequately perform the office duties for which the individual was hired. This may include a basic understanding of the operation of common office machines.

Competent Operator

Operators who are trained on specific machines to perform the operation of the machine with a minimum of error. One who operates a cash register in a grocery store is assumed to be a competent operator of the particular machine.

On-The-Job-Training

Training provided by a firm to persons who are on the payroll of the firm during the time of the training. This training may be on either a full-time or a part-time basis depending upon the complexity of the training.

Electronic Data Processing

Electronic data processing, or EDP, is the term used to describe the most advanced development in data processing--the processing of records with electronic systems.

Marketable Operating Skill

The minimal skill and knowledge necessary for the operation of an office machine on the job. The time required to attain a marketable operating skill differs with each office machines. An adding-listing machine may be completely mastered in a much shorter time than either the rotary or the key-driven calculator. Some types of office equipment, such as the bookkeeping and billing machines, require at least a full semester in order to obtain a marketable operating skill. There are other machines which are so simple and easy to operate that the necessary skill may be obtained on the job when the need arises. Because the demands of employers differ, the degree of operating skill will also differ with each job.

Instrument

This is a term used to refer to the questionnaire used in gathering the data for this report.

Common Office Machines

Common office machines are typewriters, adding listing machines, calculating machines, duplicating machines, the telephone, and copy machines.

III. PROCEDURE FOLLOWED

Development of the Instrument

Several survey instruments used in similar studies were obtained and from them a questionnaire was compiled (Appendix, pp. 92). Comments made by other authors and authorities in the field, were helpful in eliminating questions which had not been successful in obtaining the desired results on previous occasions.

The author was aware of the negative attitude most people have of lengthy questionnaires and an attempt was made to acquire the maximum information with a minimum of questions and pages. Each individual question was stated in a simple, easy to understand language.

In order to inform the potential respondents of the importance of the study, a letter of transmittal (Appendix, p. 95) was included with the questionnaire. The letter of transmittal explained the importance of the study and hopefully placed the respondent in the proper frame of mind for answering the questions on the questionnaire.

Selection of Sample

One of the major problems in drawing a sample of companies in a community is to obtain a complete list of businesses in that community. Because the Chehalis--Centralia area is rather small, the names and addresses of all of the major businesses in the area were found in the "yellow pages" of the Chehalis--Centralia telephone directory. Included in the sample were wholesale firms, retail firms, and professional people. The writer assumed that any businesses without a telephone would not affect the finding of the study. A questionnaire was sent to 125 major businesses listed in the telephone directory along with a letter of transmittal and a self-addressed return envelope. Forty-five business firms were contacted by telephone to determine specific brands of calculators being used and to determine if these business firms had a systematic method of machine replacement.

Collection of Data

Useable data were obtained from ninety-five businesses in the Centralia and Chehalis area. These returns represented 76 per cent of the businesses in the sample.

A tabulation of the results of the questionnaire was made. These results were compared with the courses of study for "office machines classes" as prescribed by authorities

in the field. After compiling the results of the study, a percentage analysis of the data was made. From the analysis of the data, conclusions and recommendations were drawn.

III. ORGANIZATION OF REMAINDER OF THESIS

Chapter II presents a review of literature that is related to the present investigation and that has been conducted within the last few years. Chapter III presents a brief history of Chehalis and Centralia, and the high schools in each community. Chapter IV presents the findings as they pertained to the office machines in use at the time of the study. Chapter V presents the findings that pertained to the length of training necessary on these machines for initial employment. Chapter VI presents a summary of the study along with conclusions and recommendations based on the findings of the study. Chapter VI also presents a list of recommendations for further research in the area of business education.

CHAPTER II

REVIEW OF LITERATURE

There are other investigators who have given attention to the amount of training necessary for the initial employment of office machines operators. These investigations were similar to this study in objectives, method and subject studied. The main differences between the present study and those previously conducted, is size and location of the sample areas. Those studies reviewed by the author were made in large metropolitan areas. The size and types of businesses used in the sample of these studies were large and varied.

The reviewed studies employed two techniques of data collection: (1) the questionnaire and (2) the interview. Although the majority of the investigators used the questionnaire technique, either method has its advantages and limitations. It is important to note that one investigator employed the questionnaire in his study but stated that the interview technique is better for pinpointing skills and knowledges.

I. RESEARCH RELATED TO THE PRESENT INVESTIGATION

The two studies most closely related to the present investigation were those made by Clow (9:1-24) in cooperation with Central Connecticut State College and Cook and

Cook and Maliche (7:1-9) at Wayne State University in Michigan. Cook and Maliche's study was similar to this study in that the researcher studied the opportunities and requirements for beginning office workers in Bay City, Michigan. Clow's investigation was related to the present research with its focus on business offices of Connecticut business firms.

Cook and Maliche's study of implications for business and distributive education of the current and projected use of machines in business, and of the necessity of in-school training for these machines was conducted in December of 1965. Survey research techniques were utilized and 239 companies were intereviewed. Specifically, the intent of Cook and Maliche's study (9:2-3) was to obtain the following information:

1. Type and number of machines used in business.
2. Training demanded by employers (by type and size of business) for personnel using this office equipment.
3. Extent of on-th-job training given by employers.
4. Implications for vocational education.
5. A survey research methodology which would provide a method for other communities to obtain accurate local data.

Among the significant findings of the Cook and Maliche (9:iv) study, it was found that:

1. Companies had about the same number of typewriters and adding/calculating machines.

2. Most of the adding/calculating machines were electric; most of the typewriters were manual.

3. The larger the company the greater the variety and number of office machines used.

4. Twenty-seven per cent of the companies had copying and duplicating machines.

5. Eighteen per cent of the companies had bookkeeping machines and approximately 14 per cent had dictating equipment.

6. Most companies did not require training on office machines prior to employment with the exception of typewriters.

7. Most companies did not administer skill-tests as a prerequisite for hiring.

8. Approximately one-third of the companies administered some type of on-the-job training. The larger the company the more likely the employee would receive some type of on-the-job training.

Based upon the data collected, Cook and Maliche (9:24) arrived at the following findings and conclusions:

1. There appeared to be a positive relationship between the size of the company and the types of machines utilized. That is, the larger the company the more likely it utilized copying, duplicating, electronic accounting machines, and electronic data processing equipment.

2. Electric machines (excluding typewriters) were more popular than their manually operated counterparts (e.g., businessmen preferred an electrically operated duplicating machine over one that was manually operated). However, it was suspected that the small proportion of electric typewriters reported in the study was due to the fact that almost half of the companies included in the sample had fewer than four employees. This seemed to indicate that the cost of electric typewriters was too expensive for the small companies.

3. Businessmen did not demand that their employees have training and/or experience in office machines with the exception of typewriters. This low demand for trained and experienced personnel seems to indicate that companies can train their employees (in a relatively short period of time) in the use of office machines.

4. There appeared to be a positive relationship between the size of the company and the length of the on-the-job training period. That is, larger companies tended to have longer training periods than smaller companies.

5. Approximately one-third of the companies reported that they administer some type of on-the-job training. It appeared that this on-the-job training was an informal, over the shoulder type of procedure. This further emphasized the ease with which most office machines can be learned on the job.

6. Of the companies that administered on-the-job training, almost half did so for bookkeping (46%) and adding/calculating machines (45%).

7. Of the companies which had skill requirements, the majority utilized the method of "interview and on-the-job tryout" to determine the degree of new employee's skill-proficiency on all types of office machines with the exception of bookkeeping equipment.

As a result of Cook and Maliche's study, as well as the general literature on the topic, serious questions concerning the purchase of equipment through vocational educational funds were raised. After careful thought was given to these questions, their recommendations were (9:24):

1. The Michigan Department of Education is urged to cooperate in developing and financing a statewide study to determine if the findings in the Bay City areas are similar in other parts of the State. As part of this proposed study, it was recommended that the instrument in Appendix B (an outgrowth of this study and utilized as part of a research

project in Detroit) be used as the basic instrument for collection of the data.

2. No additional state and/or federal funds be allocated for the purchase of office machines with the exception of typewriters.

3. If the State should continue expending public funds for the acquisition of office machines, these funds should be used to rent, not purchase, equipment in order that the schools will not be "stuck" with obsolete equipment.

Clow's research (7:1) attempted to ascertain the types of office machines used in selected businesses of Connecticut; the number of employees using this equipment; and the business education curriculum implications of the increasing or decreasing use of any type or types of office machines. Questionnaires were sent to a sampling of Connecticut businesses to determine this information. A different questionnaire was sent to public high schools in order to identify the types of office machines on which instruction was given by the schools of the state.

The findings reported were based on 3,168 usable responses received from Connecticut businesses representing 61 per cent of the 5,232 businesses in the sample, and 124 responses representing 95 per cent of the 131 public high schools in the sample (25:23). The data with regard to the types of office machines used by the office personnel of selected Connecticut businesses revealed this information (7:3):

1. An almost 2 to 1 use of the ten-key adding machine over the full-key board adding machine.

2. The wide-spread use of the rotary and printing calculator.

3. Seven hundred seventy-nine (24.5 per cent of the respondents) businesses used bookkeeping and accounting machines in their offices.

4. Of the 1434 businesses who used a type of office duplicator, 503 (35 per cent) used the offset type of office duplicator.

5. Many full-time job opportunities are available for card punch machine and verifier machine operators.

6. Many full and part-time job opportunities exist for transcribing machine operators.

Clow made several recommendations relative to office machine training in the business education program. The high school business education curriculum implications of this study, with consideration accorded to the local labor market area needs, are (7:8):

1. The necessity to provide adequate instruction using the ten-key listing machine which is preferred by business 2 to 1 over the full-keyboard type.

2. Since the need for key-driven calculator operators was decreasing, the continued instruction use of key-driven calculator was questioned.

3. There was a need for increased card punch machine training to meet the increasing demand for this type of skill.

4. Because of the increased use of on-premise offset duplicating in the office of Connecticut businesses, instruction should be provided on the use of the offset process of copy reproduction.

5. Due to the many job opportunities available to people possessing this skill, increased training should be given in the area of machine transcribing activities.

6. Due to the increasing use of the printing calculator in the office of Connecticut businesses, increased instruction should be given on the use of the printing calculator.

It was mentioned by Templeman that key-driven calculators were no longer of much use. Clow was in agreement with Templeman in his recommendations. Clow does not, however, agree entirely with Cook and Maliche in his findings as he recommended increased instruction on the use of the printing calculator and transcribing machines. Cook and Maliche found that businessmen do not demand that their employees have training and/or experience in office machines with the exception of the typewriter. Because of the increased use of offset duplicating in Connecticut business offices, Clow recommended increased instruction on the use of the offset machines. Expressing his view on the offset, Warner (41:8-9) stated that the quality of the reproductions and the low unit costs involved were the primary reasons for the increased use of the offset duplicator. He further stated that the day was not too distant when offset duplication would replace many carbon and stencil duplicating processes, especially in larger businesses and schools.

II. STATUS OF OFFICE MACHINES EQUIPMENT IN AMERICAN BUSINESS OFFICES

In 1961 a new curriculum bulletin was being written for Cincinnati Office Practice Teachers. Because the members of the committee felt it was urgent to include in the bulletin those machines and procedures which were common to Cincinnati business firms, it was decided to survey local office machine practices in large and small business firms. Automated equipment such as sorters, collators, tabulators, and others were deliberately omitted since this type of instruction is not included in the typical high school office practice class. Key punch equipment, however, was included in the survey. The results of this survey, as submitted by Roman, were (32:122-123):

1. Although there appeared to be a trend toward companies utilizing printing calculators, 60 per cent of the firms surveyed indicated a recommendation for continued teaching of the key-driven calculators. Comments made by 40 per cent of the firms recommended no further teaching of key-driven calculators.

2. There appeared to be a definite trend in the increased use of offset duplicators. However, in the smaller business firms the fluid duplicator was still used in large numbers.

3. Attention should be focused on increased training on transcribing machines.

4. Copy machines should be included in the office machines class.

5. There was a definite trend toward increased use of electric rotary calculators.

Most of Roman's findings agreed with Clow's with the possible exception of number one. There was a six year time lapse between the two studies which would probably explain the difference in their findings. In contrast to the Bay City survey, the office machines survey by Roman (32:122) revealed that almost all of the respondents indicated that the major skills taught in the high school office practice class were of real value and were in line with good practices; even with automation. Table I gives a complete listing of instruction recommended or not recommended as compiled by Roman (32:122).

TABLE I

RECOMMENDED INSTRUCTION OF OFFICE MACHINES
USED IN THE CLASSROOM

		Instruction Recommended	Instruction Not Recommended
a.	Typewriters--Manual	96%	4%
b.	Typewriters--Electric	96%	4%
c.	Ten-key Adding-Listing Machines	84%	16%
d.	Transcribing Machines	87%	13%
e.	Duplicators (fluid, stencil, offset)	79%	21%
f.	Key Punch	77%	23%
g.	Copying Machines	72%	28%
h.	Bookkeeping Machines	69%	31%
i.	Rotary Calculators	64%	36%
j.	Key-Driven Calculators	60%	40%
k.	Full Keyboard Adding-Listing Machines	59%	41%
l.	Vari-Typers	38%	62%
m.	Shorthand Machines	28%	72%

Delta Pi Epsilon, through its National Research Committee, and South-Western Publishing Company cooperatively conducted two annual status surveys. The latest, as reported by Cook and Brown (3:391), may be of value to the business education profession in: (1) encouraging individual business education teachers to conduct local surveys to compare their situation in relation to data processing equipment and office machines with the data collected in these two national surveys and (2) providing data collected on a national basis which may rpovide clues to trends that are emerging in our subject matter area. The purpose of the second Delta Pi Epsilon survey (8:391) covering the years 1965-1966, was to determine:

1. The quantity and type of office machines being used for instructional purposes.
2. The number of schools that have sufficient diversification of office machines to offer a business machines unit of instruction or course.
3. The policies concerning the retention and maintenance of instructional office machines equipment.
4. Plans for the acquisition of new equipment within the next two years.
5. The extent to which community surveys were conducted to determine the relationship between machines used in local businesses and those found in the high schools.
6. The "profile" of a typical responding school in terms of its answers to these basic questions.

One of the basic purposes of the survey was to determine the quantity and type of office machines being used in high schools for instructional purposes. Table II (8: 392), summarizes the number of schools using each of seven basic types of machines. As would be assumed, Table II indicates that all of the responding schools had typewriters. Most of the respondents had four types of machines--typewriters, duplicators, adding-calculating, and dictating-transcribing machines in their schools. How many schools have sufficient diversification of machines to offer an office machines unit or course? Are these machines most commonly found in business? The answer to the first question will depend upon the value judgments of the individual teacher. Cook and Brown (8:391) had this comment:

> The authors would suggest, however, in order to have a minimal course the students should have access to at least three types of machines, in addition to typewriters.

The data collected in the second Delta Pi Epsilon survey, when analyzed, revealed that a significant number of larger schools have conducted community surveys to determine the needs of their students. It also established that a large number, or 76 per cent, of the respondents had not conducted such a survey. As a final statement the authors said:

> Business education departments--if they want to meet the needs of their students for a viable business education program--must get out of their ivory towers and determine what is happening to all of their students and what are the needs of the employers of students (8:394).

TABLE II

QUANTITY, TYPE, AND AVERAGE NUMBER OF OFFICE MACHINES USED IN THE CLASSROOM

Equipment	Number of Schools	Percent of Schools	Average Number of Machines
Typewriters	1924	100.00	56.67
Duplicating	1678	86.49	2.39
Adding-Calculating	1641	84.64	9.75
Dictating-Transcribing	1277	65.85	3.07
Copying	751	38.71	1.34
Billing-Bookkeeping	275	14.18	1.99
Data Processing	135	6.96	6.56

The business machine has become a fixed part of the environment of the business office and is an important factor in facilitating the work. The types of machines found in the office are determined by the nature of the work to be performed. Businessmen usually expect persons applying for office jobs to have some acquaintance with the function and operation of the common office machines (25:75). Malsbary (25:75) found that the following four pieces of office equipment were used by 10 per cent or more of all beginning office workers:

1. The ten-key adding machine.
2. The photocopying machine.
3. The full-keyboard adding machine.
4. The typewriter.

Malsbary's findings were in agreement with the Cook and Brown study. This, however, was in contradiction to the Cook and Maliche study in which they stated that employers do not insist on employees having a marketable skill on office machines.

III. THE BUSINESS MACHINES COURSE

Business machines courses are wide and varied in scope. Each community, and each individual teacher, will determine course content of an office machines class. Most administrators and teachers are not even aware of the needs of the

businesses in the community. This point was established by Cook and Brown (8:394) in their second survey.

The need for a course in business machines in our secondary schools has long been an established fact. Because the cost of business machines has usually been prohibitive, many secondary schools are offering such a course with a very limited amount of equipment. The Vocational Education Act of 1963 has made it possible for many schools to begin an office machines course or up-grade an existing one.

The primary objective of the business machines course is to develop vocational competency in the use of business machines (11:9). South-Western Publishing Company (28:1), in Bulletin Number 9 found:

> There is a definite need for more-rounded training in the various skills needed by the well-trained office worker. Among the most important of these skills is that of familiarity with various types of office machines.

Since the typewriter has been established as a universal part of business, most schools are equipped with these machines. Machines which many authorities consider basic to any extension of the machine instruction beyond typewriting are:

1. Adding-listing machines.
2. Calculating machines.
3. Duplicating machines.

The amount of time allotted for training on the various types of machines will depend on the objective of the course. The objective may be to attain:

1. A working knowledge of the machines.
2. A mastery of the fundamentals of the machine.
3. Vocational skills.

Manufacturers of key-driven calculators and bookkeeping machines recommend 300 hours of instructional time to achieve a high degree of vocational skill (28:3). This time can be reduced by stressing fundamentals for which the machine is most frequently used. The key-driven calculator, for example, is used for addition and multiplication 90 per cent of the time. Division and subtraction are more readily accomplished on other types of calculating and adding machines. Table III shows the amount of time required to reach the various levels of skill in office machines operation as reported in Bulletin Number 9. Curtsinger (11:10) stated that the Shawnee High School, located in Louisville, Kentucky, used this schedule to teach the various machines:

1. Ten-key adding machine . . . . . 30 hours
2. Printing calculator . . . . . 30 hours
3. Key-driven calculator . . . . . 30 hours
4. Rotary calculator . . . . . 40 hours
5. Printing card punch . . . . . 30 hours

TABLE III

TIME REQUIRED TO REACH VARIOUS LEVELS OF SKILL IN OFFICE MACHINE OPERATION

TYPE OF MACHINE	NUMBER OF HOURS		
	Working Knowledge	Mastery of Fundamentals	Vocational Skill
Full-keyboard adding-listing machine	10	20	30
Ten-key adding listing	10	20	30
Rotary-driven calculator	10	30	40
Key-driven calculator	20	55	180
Duplicators	10	25	90
Billing machines	10	25	40
Bookkeeping machines	10	30	40
Transcribing machines	10	20	30

The length of time devoted to instruction on the different types of machines is as varied as the machines included in the course. Harry (16:17) stated:

> Students are in the class for two periods daily for the entire school year. One class period is spent on the keydriven calculator throughout the year. The other class period is spent on another machine, changing machines by rotation method at approximately six-week intervals.

The author noted, with interest, the wide variation between no further training recommended on the key-driven calculator, as stated by previous researchers, to one full year of instruction disclosed by Harry. On other machines, students gained sufficient knowledge of various operations to permit them to hold jobs as beginning operators. At the end of the school year, students should have achieved acceptable working ability on six machines in addition to the key-driven calculator (16:18).

Buchen (6:303) claimed that the following three machines should dominate the office machines class: The ten-key adding machine, the transcription machine, and the key punch machine. After much reading in the area, he (6:304) was convinced that these machines were essential to any office machines course.

In order to offer an effective class in office machines, a teacher should know how to operate each machine used for classroom training purposes. Additionally, the

instructor should know which machines are used in his local area most frequently (6:303). On this premise, there are a lot of ineffective office machines courses being offered. Table IV indicates the rank order of business machines recommended (28:4) for pre-employment training which should aid the teacher and the administration in the selection of machines for an office machines course.

TABLE IV

RANK ORDER OF BUSINESS MACHINES RECOMMENDED FOR PRE-EMPLOYMENT TRAINING AS COMPUTED BY THE WEIGHTED INDEX SYSTEM

Equipment Items	Rank Order
Standard, Manual Typewriter	1
Ten-Key, Electric, Adding Machine	2
Rotary, Fully-Automatic Calculator	3
Switchboard	4
Standard, Electric Typewriter	5
Key-Driven Calculator	6
Addressing Machine	7
Full-Keyboard, Bookkeeping Machine	8
Full-Keyboard, Electric, Adding Machine	9
Ten-Key, Printing Calculator	10
Long-Carriage, Manual Typewriter	11
Key Punch	12
Rotary, Semi-Automatic Calculator	13
Dictating Machine, Disc	14
Transcribing Machine, Disc	15
Photographic Duplicator (Ozalid)	16
Fluid, Electric Duplicator	17
Dictating and Transcribing Machine, Combination	18
Offset Duplicator (Multilith)	19
Posting Machine, No Typewriter Keyboard	20
Transcribing Machine, Belt	21
Executive Model, Electric Typewriter	22
Dictating Machine, Belt	23
Multigraph	24
Long-Carriage, Electric Typewriter	25
Full-Keyboard, Manual, Adding Machine	26
Electric Cash Register	27
Billing Machine, Typewriter Keyboard	28
Bookkeeping Machine, Ten-Key	29
Ten-Key Manual, Adding Machine	30
Transcribing Machine, Tape	31
Dictating Machine, Tape	32
Manual, Stencil Duplicator	33
Manual, Fluid Duplicator	34
Mailing Machine	35
Checkwriter, Manual	36
Teletype	37
Crank-Driven Calculator	38
Transcribing Machine, Cylinder	39
Dictating Machine, Cylinder	40

CHAPTER III

A BRIEF HISTORY OF CHEHALIS--CENTRALIA, AND THE HIGH SCHOOLS IN EACH COMMUNITY

Because the Chehalis and Centralia area was so diversified, there were few businesses of large scale located there. A brief history of the area may explain why the community has never developed their industries on a large scale.

I. CHEHALIS

Mr. J. B. Chapman, the founder of Chehalis, was one of the first persons to make definite mention that the portion of Oregon lying north of the Columbia River be a separate Territory. On June 24, 1844, the territory north of the Columbia was created into what was designated as the Vancouver District. At the same time the territory was divided and all west of the Cowlitz River and north to 54 degrees, 40 minutes, was given the name of Lewis. The exact date of the creation of Lewis County was December 19, 1845.

From 1862 to 1874 Claquato, which lies four miles west of present Chehalis, was the county seat. In 1851, Mr. and Mrs. S. S. Saunders took out a Donation Land Claim and started what is now the city of Chehalis. Because the

first post office was located in Saunder's home, the town was called Saundersville. On May 8, 1858, with the opening of the post office, Chehalis had its first birthday. On September 23, 1870, the post office was transferred to the McFadden home and the name was changed to Chehalis, an Indian word meaning "shifting and shining sands."

During the period of early development of the community the Saunders family was alone in what is now Chehalis. There were settlers coming into the surrounding area, however, and settling in what is now Claquato, Napavine, Adna, Boistfort, and other towns in Lewis County.

As the town grew, several small businesses developed to meet the needs of the community. Lumbering, farming of a diversified type, poultry, fruit, and berries constituted the livelihood of most of the people in the community. At the time of the study there were only a few businesses of a very large scale. The businesses included a cannery, three tire recapping industries, two redi-mix firms, a brick and tile company, and Wayne's Photo Finishing. These, along with the ordinary firms common to any community, comprised the business firms of Chehalis.

For the past ten years, Chehalis has had a population of approximately 5,000 people. With the expanding economy of the region, it is anticipated that the community will gain in population.

Establishment of a High School in Chehalis

The Chehalis school district, which was organized in 1889, was the third to be organized in Lewis County. The first high school to be organized in the county was also located in Chehalis in 1889.

The need for the provision of education was recognized early. In 1847, Governor Abernethy stated:

> The cause of education demands your attention. School districts should be formed in the several counties and schoolhouses built. Teachers should be employed by the people, I have no doubt, and thus pave the way for more advanced institutions.

In 1909, a new brick high school was constructed in Chehalis and served the community until 1951. A new high school was built in 1951, which is presently in operation.

The enrollment of the Chehalis High School, at the time of this writing was 748. There were 252 students enrolled in the vocational business education classes. In addition to the vocational business education classes, there were an undetermined number of students taking business courses that were not classified as vocational. The system had two teachers who were vocationally certified and two who were not.

The business curriculum of the Chehalis High School consisted of the following courses:

1. Typing
2. Shorthand
3. Stenography
4. Office Machines
5. Office Practice

The office machines course comprised such machines as typewriters, calculators, duplicating machines, and adding-listing machines.

II. CENTRALIA

The location of Centralia is near the Chehalis River 22 miles south of Olympia and mid-way between Seattle, Washington and Portland, Oregon. Its location makes it a major trading center for inhabitants located between these two metropolitan areas.

Although he did not take out a land claim at the time, George Waunch, the first settler in Centralia, built a rude log home in 1845. The first settler in Centralia to take a land grant was a negro by the name of George Washington who took out his claim in 1852. Located in Borst Park is a marble monument in memory of George Washington.

The population north of the Columbia grew rather slowly at first. In 1850, of the 13,000 inhabitants of the Oregon Territory, only 1,000 were north of the Columbia

River. Socially, politically, and economically that small number was an isolated community in the Oregon Commonwealth. It was that isolation which led to residents north of the Columbia to demand their own territorial government.

Centralia was settled in the 1850's as Centerville and was incorporated in 1886. The community was known as Centerville from then until 1891 when it adopted the name Centralia.

Centralia, like Chehalis, developed from the logging industry. In addition, coal mining and railroading contributed to its development. During the last twenty years the area has diversified to a point where dairying, poultry, fruit, berries, and many types of small manufacturing firms play a major part in the city's economy. At the time of this study the largest single payroll was Centralia Community College, the oldest in the state.

At the time of the study the population of Centralia was approximately 10,000 and was increasing. The expansion of the college and the construction of a large steam plant for the generating of electricity were contributing factors to its growth.

Establishment of a High School in Centralia

The first schools in Centralia were located in the homes of the inhabitants and were taught by any individuals

who would take the responsibility. In 1867, the first school, as such, was established in Centralia.

The Centralia High School was built in 1911 and served the community until the present time. During the spring of 1968, a new high school was started and is under construction at the present time. It should be completed and ready for use by fall of 1969. The enrollment at Centralia High School during the 1967-68 school year was 755 students. The school employs three full-time vocationally certified business teachers and offers the following business courses:

1. Typing I
2. Typing II
3. Personal typing
4. Shorthand
5. General business
6. Bookkeeping
7. Note hand
8. Record keeping
9. Machine transcription

The school has never had a specific course in business machines. They do teach some of the machines as a part of advanced typing. However, upon completion of the new high school, there will be a course in office machines taught as a separate class.

Chapter IV presents an analysis of the office machines that were used in the business community of Chehalis and Centralia.

CHAPTER IV

OFFICE MACHINES USED IN CHEHALIS AND CENTRALIA

The discussion in this chapter centers around the office machines that were actually in use in the Chehalis and Centralia area at the time of the study. The data, with regard to the types of machines that were being used, are presented throughout Chapter IV.

Of the 125 selected companies to which questionnaires were sent, data were collected from ninety-five of them. This represents a 76 per cent return.

Table V reveals a list of the different types of businesses to which questionnaires were sent. Also, shown in Table V is the number of questionnaires actually returned by each classification and the per cent of return.

There are two items in Table V that should be kept in mind. They are:

1. Only one cafe was included in the questionnaire because it was felt that it was the only one large enough to merit inclusion.
2. There were groups within the miscellaneous group that responded at a higher rate than 61.1 per cent. For example, four furniture stores were included and three, or 75 per cent, responded.

Analysis of Table V shows that total questionnaires returned were greatest in the following types of businesses:

1. Implement dealers, 100 per cent.
2. Lawyers, 84.6 per cent.
3. Lumber yards and related, 82.3 per cent.
4. Grocery stores and food processing, 77.7 per cent.

Included in the returns were six blank questionnaires accompanied by brief explanations. One respondent stated death of the proprietor as the reason for returning the blank questionnaire. There were three firms that stated their employees were not required to have any knowledge of office machines operation. One firm commented, "Our employees have no use for any of these machines." Another company had this comment, "None of these machines used at the present time." A third firm stated that their employees were not required to have any knowledge of office machines and enclosed the following explanation:

> As I do not need any office equipment outside of an adding machine and could use a typewriter, but don't have one, I don't feel qualified to answer your questionnaire. For that reason, I am sending back your information sheet blank.

There were two respondents that stated they didn't feel they had sufficient knowledge to answer the questions on the questionnaire accurately. One remarked, "Our knowledge is very limited so we cannot help you." The manager of another firm indicated that he couldn't be of much help. There was one blank questionnaire returned with no explanation of why it was not completed.

TABLE V

DIFFERENT TYPES OF BUSINESSES IN THE CHEHALIS AND CENTRALIA AREA THAT RESPONDED TO THE INQUIRY

Type of Machine	Total Sent	Total Returned	Percent of Return
Financial	13	9	69.2
Professional: Accountants	8	6	75.0
Lawyers	13	11	84.6
Dentists	1	1	100.0
Insurance/Real Estate	21	16	76.2
Grocery Stores & Food Processing	9	7	77.7
Retail Stores--General Merchandise	4	3	75.0
Lumber Yards & Related	17	14	82.3
Hardware Stores	4	3	75.0
Tire Stores	3	2	66.6
Implement Dealers	3	3	100.0
Cafes	1	1	100.00
Car Dealers	6	4	66.6
Clothing Stores	4	3	75.0
Miscellaneous	18	11	61.2
Totals	125	95	76.0

The questionnaire was made as compact as possible with the hope that a short questionnaire would be received and completed with more sincerity by the respondents. There were five major areas of inquiry on the questionnaire. The five areas were:

1. The amount of instruction on business machines offered by business education departments.
2. The replacement of office machines.
3. The addition of new types of office machines.
4. The extent of on-the-job training in office machines.
5. The installation of electronic data processing equipment.

I. SHOULD BUSINESS EDUCATION DEPARTMENTS OFFER INSTRUCTION ON DIFFERENT TYPES OF BUSINESS MACHINES

The primary purpose of any business machines course should be to train prospective employees with a marketable skill in the operation of the common office machines that were being used in the local area. In addition to knowing the different types of machines that were being used in ninety-five businesses in Chehalis and Centralia at the time of the study. No attempt was made to determine the exact brand of each type of office machine, with the exception of the calculator, since, in most cases, the operation of the different brands of a specific machine is very

similar. Specific brands of calculators were sought because the survey indicated more key-driven calculators were in use in Chehalis and Centralia than there are in other areas as revealed by similar studies.

Table VI indicates various types of machines and the number of businesses in the sample that felt training should be given in the business education departments of local schools. An analysis of Table VI shows the following:

1. That of the 20 firms listing full-keyboard adding-listing machines, 13 or 65 per cent, stated there should be training while 5, or 25 per cent, stated training was not necessary. Two, or 10 per cent, gave no response.

2. Of the 59 businesses listing ten-key adding-listing machines, 48 or 81.3 per cent, indicated training should be given in high school. One, or 1.8 per cent, said training was not necessary and 10, or 16.9 per cent, did not respond.

3. There were 16 firms owning printing calculators. Nine, or 56.2 per cent favored training in the business education departments and 7, or 43.8 per cent gave no response.

4. Eleven firms owned key-driven calculators. Of the 11, 8 or 72.7 per cent, favored training in high school. There were none indicating "No" and 3, or 27.3 per cent, did not respond.

5. Fifteen firms owned rotary calculators. Of these, 13 or 86.6 per cent favored high school training; none answered no training, and 2 or 13.4 per cent did not respond.

6. There were 7 firms owning electronic calculators. Six, or 85.7 per cent indicated training in high school. One or 14.3 per cent stated no training necessary in high school.

7. Fourteen firms listed fluid duplicators and 11, or 78.5 per cent, indicated training in high school while 3, or 21.5 per cent gave no response.

8. Of the 17 firms owning stencil duplicators, 11 or 64.7 per cent, favored high school training and 6, or 35.3 per cent, gave no response.

9. There were 17 firms listing transcribing machines. Fourteen, or 82.3 per cent, indicated high school training and 3, or 17.7 per cent, gave no response.

10. Ninetten firms listed reproducing machines of some type. Eleven, or 57.8 per cent favored high school training on these machines while 2, or 10.5 per cent, stated no high school training; six, or 31.7 per cent, did not respond.

11. There were 13 businesses listing accounting machines. Of these, 9 or 69.2 per cent indicated training in high school was necessary. Two, or 15.9 per cent stated no training in high school and 2 or 15.9 per cent gave no response.

12. Seventy-nine firms owned typewriters. Of these, 70, or 88.6 per cent, indicated training was necessary in the business education departments; there were none stating no training, and 9 or 11.4 per cent that did not respond.

13. Of the 18 firms owning posting machines, 13 or 72.2 per cent favored high school training. One, or 5.6 per cent stated no training and 4, or 22.2 per cent did not respond.

TABLE VI

TOTAL NUMBER OF THE 95 RESPONDING BUSINESSES IN CHEHALIS AND CENTRALIA THAT FELT BUSINESS MACHINES SHOULD BE TAUGHT IN LOCAL SCHOOLS

TYPE OF MACHINE	SHOULD BE TAUGHT			Total
	Yes	No	No Response	
Typewriter	70	0	9	79
Ten-key adding machine	48	1	10	59
Transcribing machine	14	0	3	17
Full-keyboard adding machine	13	5	2	20
Rotary calculator	13	0	2	15
Posting machine	13	1	4	18
Fluid Duplicator	11	0	3	14
Stencil duplicators	11	0	6	17
Reproducer	11	2	6	19
Printing calculator	9	0	7	16
Accounting machine	9	2	2	13
Key-driven calculator	8	0	3	11
Electronic calculator	6	1	0	7
Others	4	0	0	4
Key-punch machine	1	0	2	3
Sorter	1	0	2	3
Verifier	0	0	1	1
Interpreter	0	0	0	0
Collator	0	0	1	1
Computer	0	0	1	1
TOTALS	242	12	64	318

NOTE: The total column represents the total number of companies in the sample that actually owned each type of office machine.

Further analysis of Table VI, page 42, indicates the machines that local businesses felt should be included in the high school business education departments. The following six types of machines, arranged from highest percentage to lowest percentage, were given a 75 per cent or better, "Yes" response by the firms in the sample:

1. Typewriters 88.6 per cent.
2. Rotary calculators 86.6 per cent.
3. Electronic calculators 85.7 per cent.
4. Transcribing machines 82.3 per cent.
5. Ten-key adding machines 81.3 per cent.
6. Fluid-duplicators 78.5 per cent.

It was interesting to note that of the 16 firms owning printing calculators, 56.2 per cent favored training in high school and that of the 15 firms owning rotary calculators, 86.6 per cent favored training in high school.

II. TOTAL NUMBER OF EACH TYPE OF BUSINESS MACHINE THAT WAS CURRENTLY IN USE

Of the 20 business machines listed in question number one, 12 machines were listed quite regularly, three only once, and one not at all. Table VII presents a list of the 20 machines in order of frequency. There were no businesses in the sample that were using interpreter machines.

Only one business listed a verifier, and only one listed a collator, as machines that were being used.

Typewriters

As may be expected, Table VII reveals that more firms owned more typewriters than any other single type of machine. There were 79 firms listing 280 typewriters. The average number of typewriters per firm was 3.5 machines. There was no attempt made to determine the number of elite and the number of pica type machines in use in Chahalis and Centralia at the time of the study as the operation of the two types is the same. Also, the length of training would be identical.

Even though there were just as many companies that owned adding-listing machines (79) as owned typewriters (79), the firms actually owned a total of 191 adding machines and 280 typewriters. This difference in total machines owned resulted from a higher average number of typewriters owned per company.

TABLE VII

OFFICE MACHINES USED BY 95 BUSINESSES
IN CHEHALIS AND CENTRALIA
IN ORDER OF FREQUENCY

Type of Machine	Number of Businesses Using	Number of Machines
Typewriter	79	280
Ten-key adding machine	59	140
Full-key adding machine	20	51
Reproducer	19	20
Posting machine	18	25
Transcribing machine	17	34
Stencil duplicator	17	17
Rotary calculator	16	28
Printing calculator	15	23
Fluid duplicator	14	14
Accounting machine	13	16
Key-driven calculator	11	20
Other	12	21
Electronic calculator	7	13
Key-punch	3	4
Sorter	3	3
Verifier	1	1
Collator	1	1
Computer	1	1
Interpreter	0	0

Adding-listing Machines

There were 79 businesses that were using adding-listing machines. Of the 79 businesses, 20 firms owned 51 full-keyboard adding-listing machines. This represents slightly better than 2.5 machines per company and 25.3 per cent of the total adding-listing machines owned. Fifty-nine firms owned 140 ten-key adding-listing machines for an average of slightly less than 2.4 machines per company. The ten-key adding listing machines represent 74.7 per cent of the total adding-listing machines owned.

Calculators

Table VII also reveals that there were 42 calculators listed by the 95 businesses in Chehalis and Centralia that responded to the inquiry. Of the 49 firms owning calculators, 11 firms reported 20 key-driven calculators. This represented an average of 1.8 machines owned per company and 23.8 per cent of the total calculators owned. There were 16 firms owning 28 rotary calculators for an average of slightly better than 1.7 machines per company. The rotary calculators accounted for 33.3 per cent of the total calculators owned. Fifteen businesses reported owning 23 printing calculators. The average number of printing calculators owned per company was slightly better than 1.5 machines and represented 27.2 per cent of the total calculators listed. Seven firms

listed 13 electronic calculators. This represents slightly less than two machines per company and represents 15.5 per cent of the total calculators owned.

Brands of Calculators

Table VIII presents a list of 49 firms in Chehalis and Centralia that were using calculators and indicates specific brands owned as indicated by the firms that were contacted. Table III reveals that 49 firms used 84 calculators. Of the 84, 27 or 32.1 per cent were Marchants. Eleven firms, or 20.2 per cent listed the Monroe. There were 15 businesses, or 17.8 percent, that indicated Underwood-Olivetti. There were another 15 firms that indicated Victor. One firm indicated a Remington, another listed a Burroughs, 1 stated a Lagomarsino Totalia, and 1 listed a Clary.

TABLE VIII

THE DIFFERENT BRANDS AND THE NUMBER OF CALCULATORS POSSESSED BY 49 FIRMS LOCATED IN CHEHALIS AND CENTRALIA LISTED IN ORDER OF FREQUENCY

Brand of Calculator	Number of Each
Marchant	27
Monroe	17
Underwood-Olivetti	15
Victor	15
Friden	6
Remington	1
Burroughs	1
Clary	1
Lagomorsino Totalia	1
Total	84

Duplicating Machines

As shown in Table VII, page 45, there were 31 firms reporting duplicating machines. Of the 31, there were 14 firms owning fluid duplicators and there was an average of one machine per company. The fluid duplicators represented 45.1 per cent of the total duplicators owned. There were 17 firms owning stencil duplicators. This was an average of one machine per company. The businesses owning stencil duplicators represented 54.9 per cent of the total duplicators owned by the 95 firms in Chehalis and Centralia that responded to the survey instrument.

Transcribing Machines

Seventeen businesses listed 34 transcribing machines. This was an average of two transcribing machines per company.

Reproducers

There were 19 firms reporting ownership of 20 reproducers. There was no attempt made to determine the number of dry type reproducers and the number of wet type. The 19 firms represented 100 per cent of the firms owning reproducers.

Accounting Machines

Table VII, page 45, further reveals that there were 31 businesses owning accounting machines and posting machines. Of the 31 firms, there were 13 businesses listing 16 accounting machines. This represented an average of slightly better than 1.2 machines per company, and 51.6 per cent of the total accounting and posting machines. Eighteen firms reported owning 25 posting machines. They averaged slightly less than 1.4 posting machines per company and represent 58.4 per cent of the total accounting and posting machines.

Other Machines

There was a space provided at the bottom of question number one on the instrument for "other machines." On tabulating results, it was found that three respondents had listed adding machines in this space even though adding machines had been listed previously as a specific machine. Two firms listed IBM proof transit machines in the space entitled "other machines." There were two respondents who had copy machines listed for the last item even though they, too, were specific machines that preceded "other machines" on the survey instrument.

Table IX gives a complete breakdown of the 95 businesses in Chehalis and Centralia that responded to the survey. Shown in Table IX is the total number of companies that owned each specific business machine and the total number that did not own machines of each specific type. Also, the per cent of companies owning machines and the per cent of companies not owning machines is revealed.

TABLE IX

NUMBER AND PER CENT OF THE 95 BUSINESSES IN CHEHALIS AND CENTRALIA THAT POSSESSED MACHINES AT THE TIME OF THE STUDY

Types of Machines	Companies With Machines	
	Number	Per Cent
Full-keyboard adding	20	16.0
Ten-key adding	59	47.2
Printing calculator	16	12.8
Key-driven calculator	11	8.8
Rotary calculator	15	12.0
Electronic calculator	7	5.6
Fluid duplicator	14	11.2
Stencil duplicator	17	13.7
Transcribing machine	17	13.7
Key-punch machine	3	2.4
Verifier	1	.8
Sorter	3	2.4
Interpreter	0	0.0
Collator	1	.8
Reproducer	19	15.2
Accounting machine	13	10.4
Typewriter	79	63.2
Computer	1	.8
Posting machine	18	14.4

III. NUMBER OF ELECTRIC AND MANUAL BUSINESS MACHINES OWNED

Table X, page 54, indicates the total number of electric and manual business machines owned by 95 businesses in Chehalis and Centralia at the time of the study. An analysis of Table X indicates:

1. Of the 51 full-keyboard adding-listing machines, 9 or 17.6 per cent were manual and 42, or 82.4 per cent were electric.

2. There were 140 ten-key adding-listing machines. Of this number, there were 12 or 8.5 per cent that were manual and 128, or 91.5 per cent that were electric.

3. Of the 28 printing calculators, 3 or 10.7 per cent were manual. The remaining 25 were electric and represent 89.3 per cent of the total.

4. There were 20 key-driven calculators of which 4 were manual. This constitutes 20 per cent of the total with the remaining 16, or 80 per cent being electric.

5. There were 23 rotary calculators with 2 being indicated as manual. This represents slightly less than 9 per cent manual. The other 21, or 91 per cent, being electric.

6. Seventeen stencil duplicators were listed as being used. Of the 17, 10 or 58.8 per cent were manual; 7 or 41.2 per cent were electric.

7. There were 14 fluid duplicators, 8 of which were manual. This represented 57.1 per cent of the total. The remaining 6, or 42.9 per cent, were electric.

8. Of the 280 typewriters listed, 196 were manual, which represented 70 per cent of the total. The other 84, or 30 per cent, were electric.

TABLE X

NUMBER OF ELECTRIC AND MANUAL MACHINES OWNED BY 95 BUSINESSES IN CHEHALIS AND CENTRALIA

Types of Machines	Number of Machines	Number of Electric Machines	Number of Manual Machines
Full-key adding	51	42	9
Ten-key adding	140	128	12
Printing calculator	28	25	3
Key-driven calculator	20	16	4
Rotary calculator	23	21	2
Electronic calculator	13	13	0
Fluid duplicator	14	6	8
Stencil duplicator	17	7	10
Transcribing machine	34	34	0
Key-punch machine	4	4	0
Verifier	1	1	0
Sorter	3	1	2
Interpreter	0	0	0
Collator	1	1	0
Reproducer	20	20	0
Accounting machine	16	16	0
Typewriter	280	84	196
Computer	1	1	0
Posting machine	25	20	5
Totals	691	440	251

As revealed in Table X, the total number of machines owned by all businesses, both electric and manual, was 691. Of the 691 machines, there were 440 electric, or 63.6 per cent of the total machines. The remaining 251 were manual and represent 36.4 per cent of the total machines listed in Table X.

A portion of question number one which stated, "Length of instruction by semester for each machine listed," will be presented in Chapter V, as it was felt the material could be presented more appropriately there. The reason for placing this part of question number one in this location was that Chapter V presents an analysis of knowledge and skills needed by office machines operators for initial employment in Chehalis and Centralia. This training may have been received in high school, or on-th-job training, as indicated by the respondents.

CHAPTER V

KNOWLEDGE AND SKILLS NEEDED BY OFFICE MACHINES OPERATORS FOR INITIAL EMPLOYMENT IN CHEHALIS AND CENTRALIA

If local business education departments were to train prospective employees for initial employment as operators of business machines, it was important that the training be of adequate length and breadth to satisfy local demands. It was equally as important for local business education departments to train prospective business machines operators on the machines that were actually being used by local business firms at the time of this study. Chapter V presents the knowledge and skills needed for initial employment of office machines operators, as indicated by 95 Chehalis and Centralia business firms that responded to the evaluation instrument.

It will be recalled that a portion of question number one was to be discussed in Chapter V. The discussion of Chapter V will start with that portion.

I. LENGTH OF HIGH SCHOOL INSTRUCTION BY SEMESTER FOR EACH TYPE OF OFFICE MACHINE

As a part of question number one on the survey instrument, the businesses in Chehalis and Centralia, to whom the instrument was sent, were asked to indicate if training in

local high schools was considered necessary for each of 20 machines listed. If their response was "Yes" they were to have indicated, in the space provided on the instrument, the length of the training period by semesters.

Table XI reveals the length of the training period for each machine that was listed as indicated by the 95 businesses that responded to the survey instrument. Analysis of Table XI indicates:

1. The majority of the firms felt that one semester was sufficient training for both the full-keyboard and the ten-key adding machine.
2. Very few companies indicated training for any machine on a one and one-half semester basis.
3. One firm indicated only one semester of training for the computer while two firms indicated two years for the same machine.
4. One semester of training was indicated most often for all machines except the typewriter.

Full-keyboard Length of Training

It was interesting to note that of the 20 firms owning full-keyboard adding machines, as shown in Table IX, page 52, that 16 indicated one semester of training, one indicated one year, none indicated one and one-half semesters, 1 indicated two years, and 2 did not respond. This would mean that 80 per cent or 16 firms, felt that one semester was enough training for the full-keyboard adding machine. One, or 5 per cent stated one year and another one stated 2 years. There were 2, or 10 per cent, that did not respond to this question.

TABLE XI

KNOWLEDGES AND SKILLS NEEDED FOR INITIAL BUSINESS MACHINES EMPLOYMENT IN 95 CHEHALIS AND CENTRALIA BUSINESS ESTABLISHMENTS

Type of Machine	Length of Training			
	1 Sem.	1 Year	1½ Sem.	2 Years
Full-keyboard adding	16	1	0	1
Ten-key adding	41	10	0	0
Printing calculator	9	2	0	0
Key-driven calculator	7	1	0	1
Rotary calculator	11	2	2	1**
Electronic calculator	9*	2	0	0
Fluid duplicator	10	2	0	0
Stencil duplicator	13	3	0	0
Transcribing machine	11	5	0	0
Key-punch	0	3	0	2**
Verifier	1	0	0	0
Interpreter	0	0	0	0
Collator	0	0	0	0
Reproducer	6	0	0	0
Accounting machine	6	6	0	0
Typewriter	3	24	3	34
Computer	1	0	0	2**
Posting machine	10	5	0	0
Totals	154	66	5	41

*Four firms indicated one semester but did not own machines.

**Did not own machines.

Ten-key Adding Machines

Of the 59 companies owning ten-key adding machines, 41, or 69 per cent, indicated one semester of training; 10, or 17 per cent indicated one year. None indicated one and on-half semesters, and none indicated two years. There were eight firms, or 14 per cent that did not indicate the length of training time necessary.

Printing Calculators

Table IX, page 52, shows that there were 16 firms owning printing calculators. Table XI reveals that of the 16, 9 or 56.3 per cent favored one semester of training. There were 2, or 13 per cent that indicated one year, and 5 or 30.7 per cent did not indicate a preference.

Key-driven Calculators

Eleven firms owned key-driven calculators. Of the 11, 7 or 63.3 per cent, showed one semester as the length of training necessary. None indicated one and one-half semesters. One, or 9 per cent, marked one year and one indicated two years. There were 3 businesses, or 27.7 per cent, that did not make a choice of training time.

Rotary Calculators

There were 15 businesses owning rotary calculators and of the 15, 11 or 73.3 per cent, indicated one semester of

training. Two firms, or 13.3 per cent showed one year and 2 indicated one and one-half semesters as the amount of training necessary in high school. One firm that did not indicate ownership of a machine, indicated two years of training.

Electronic Calculators

Seven firms owned electronic calculators. Of the 7, 5 or 71.3 per cent, indicated one semester and 2, or 28.7 per cent marked one year. None of the firms indicated one and one-half semesters and none chose two years.

Fluid Duplicators

There were 14 businesses that reported ownership of fluid duplicators. Ten, or 71.4 per cent said one semester as shown in Table XI, page 58. Two, or 14.3 per cent indicated one year of training. Another two firms did not respond to length of time.

Stencil Duplicators

Of 17 businesses owning stencil duplicators, 13 or 76.5 per cent, preferred one year. One firm, or 6 per cent did not respond and 3, or 17.5 per cent indicated one year.

Transcribing Machines

Seventeen businesses owned transcribing machines. Of these, 11 or 64.7 per cent, showed one year and 5, or 29.4

per cent, indicated one year of training in high school. One firm, or 5.9 per cent did not indicate a choice of time required.

Key-punch Machines

Three firms reported owning key-punch machines and all indicated one year of training. There were 2 firms indicating 2 years of training as shown in Table XI, that did not own the machine.

Reproducers

Of the 19 firms indicating ownership of reproducers, 6 or 31.5 per cent, disclosed one semester of training and 13 or 68.5 per cent, did not respond as to length of training necessary. One firm commented, "No training necessary." The comment of still another business was, "Very little training required."

Accounting Machines

There were 13 businesses that owned accounting machines. Sic firms or 46.2 per cent, said one semester and another 6 indicated one year of training. One, or 7.6 per cent did not respond to length of training.

Typewriters

Of the 79 firms owning typewriters, only 3, or 3.8 per cent indicated one semester of training. There were 24

or 30.3 per cent indicating one year; 3 or 3.8 per cent indicated one and one-half semesters and 34, or 43 per cent which indicated two years. Fifteen, or 18.9 per cent failed to indicate the length of high school training. Table IX, page 52, showed that 63.2 per cent of the 95 businesses in Chehalis and Centralia owned typewriters and 36.8 per cent did not.

Posting Machines

Eighteen businesses reported the ownership of posting machines. Ten, or 55.5 per cent indicated one year of training in high school; 5 or 27.7 per cent showed one year and 3, or 16.8 per cent did not respond to length of training time required.

Total Responses

There were 226 responses to the length of the high school training required for initial employment on the twenty business machines listed in Table XI, page 58. Of these responses, 154 or 57.9 per cent, indicated one semester. Sixty-six, or 24.8 per cent showed one year of training; 5, or 1.9 per cent stated one and one-half semesters and 41, or 15.4 per cent preferred two years of training in high school on the various machines. One semester was indicated most often and one and one-half semesters was mentioned the least.

II. CONTEMPLATED OFFICE MACHINES REPLACEMENTS BY 95 BUSINESSES IN CHEHALIS AND CENTRALIA

The survey instrument asked, "Are you contemplating replacing any of your office machines now in use with another type of office machine?" There were 10 firms, or 10.5 per cent of the 95 firms in Chehalis and Centralia that indicated they planned to replace some of their office machines. The machines to be replaced and their replacement as indicated by the 10 firms were:

1. Fluid duplicator to be replaced with a dry type duplicator.
2. Accounting and posting machine to be replaced by a computer. This firm indicated that they planned to be 90 per cent computerized within two years.
3. Manual typewriter to be replaced with an electric typewriter--this change was indicated by two different firms.
4. Posting machine (manual) to be replaced with an electric machine.
5. A Royfax 100 to be replaced with a Smith-Corona Electromatic Copy Machine.
6. A sensimatic posting machine to be replaced by an IBM 360-40 computer. This firm mentioned that they planned to be fully electronic within one year.
7. An adding machine replaced with an electronic calculator.
8. Cash register replaced with a new cash register. Brand names were not mentioned.
9. An Underwood-Sunstrand posting machine replaced by a National Cash Register.

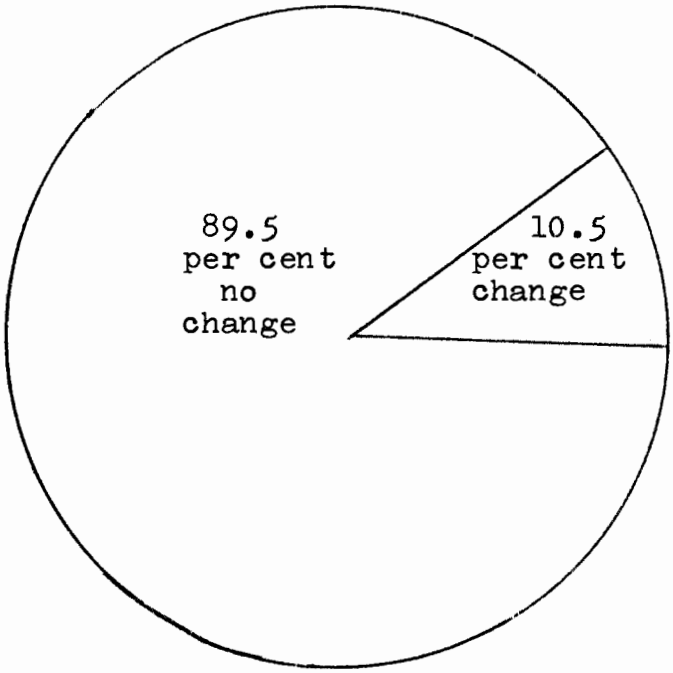
It is interesting to note that of the 10 businesses indicating a change, 2, or 20 per cent were changing to the computer. Figure 1, located on page 65, shows in graphic form the percentage of firms that were and were not contemplating replacement of their business machines at the time of the study.

Scheduled Plan of Replacements

Those firms that indicated machine replacement were contacted by telephone and sked if they had any systematic plan of replacement. There were none of the establishments that indicated a planned procedure of replacement. Some of their comments were:

1. Not until they break down or until maintenance becomes a problem. We are trying out new electronic calculators and are very impressed with them as they are three times as fast as our old calculators.
2. No systematic system of replacement and we request new machines through our main office only when maintenance becomes a problem or when volume warrants more machines.
3. Replace through home office as machines wear out.
4. Only when a newer and better model comes out.

Replacement with another type of machine



Additional Machines

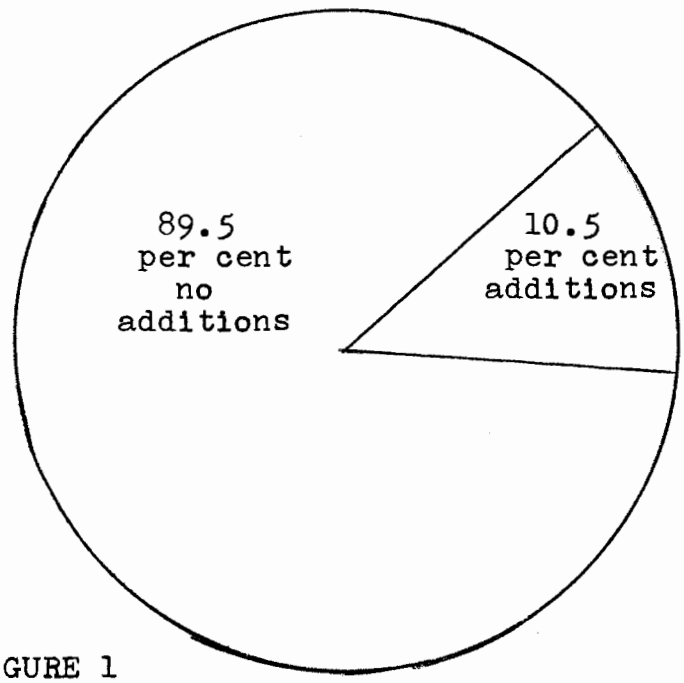


FIGURE 1

SOME CONTEMPLATED OFFICE MACHINE REPLACEMENTS AND ADDITIONAL OFFICE MACHINES PURCHASES BY 95 CHEHALIS AND CENTRALIA BUSINESSES

III. CONTEMPLATED PURCHASE OF ADDITIONAL BUSINESS MACHINES BY 95 FIRMS IN CHEHALIS AND CENTRALIA

There were 10 businesses responding to the survey instrument that indicated they planned to purchase additional business machines. As shown in Tigure 1, there were the same number of firms, but not necessarily the same firms, indicating the purchase of additional machines as there were firms that planned to replace one machine with another. Of those indicating purchase of additional machines, however, three firms planned the purchase of two additional machines of different types. The additional machines that were contemplated to be purchased were:

1. High speed proof machine.
2. Key-punch.
3. Addressograph.
4. Calculator.
5. Postage machine (two firms).
6. Copying machine (three firms).
7. Bookkeeping machine.
8. MTST Magnetic tape selectric typewriter (IBM).
9. Ten-key teller machine.
10. IBM 360-40 computer. This firm stated they intended to be fully electronic in one year.

There were two firms, or 20 per cent, that indicated purchase of postage machines and three, or 30 per cent of those purchasing additional machines, indicated the purchase of copying machines. As revealed in Figure 1, 85, or 89.5 per cent of the firms responding did not anticipate the purchase of any additional machines.

Necessary Training on Additional Machines

As a part of question three, the respondents were asked to indicate the length of training necessary on the additional machines for initial employment. Table XII lists the additional machines to be purchased and reveals the amount of training necessary for initial employment. Of the ten firms responding to length of training time necessary for initial employment on the new machines purchased, 30 per cent indicated one year and another 30 per cent indicated one semester.

TABLE XII

TRAINING NECESSARY ON ADDITIONAL OFFICE MACHINES FOR INITIAL EMPLOYMENT IN CHEHALIS AND CENTRALIA

	Length of Training		
	1 Sem.	1 Year	No Response
High speed proof machine		1	
Key-punch			1
Addressograph			1
Calculator		1	
Postage machine*			
Copy machine	1		
Bookkeeping machine**			
MTST Magnetic tape selectric typewriter (IBM)	1		
Ten-key teller machine	1		
IBM 360-40 Computer		1	

IV. MACHINES FOR WHICH ON-THE-JOB TRAINING WAS GIVEN BY 95 CHEHALIS AND CENTRALIA BUSINESS FIRMS

There were some business machines used by businesses which, because of the tremendous cost, were seldom, if ever, taught in the high schools. Then too, there were high schools which had not been fortunate enough to have an office machines course as a part of the curriculum. For this reason, it was felt that a question relating to on-the-job training should be included in the evaluation instrument.

In response to the question, "Do you have any machines for which you give on-the-job training?", there were 59, or 62.1 per cent of the 95 firms in the Chahalis and Centralia areas that responded "No." There were 36, or 37.9 per cent that stated "Yes." Of the 36 stating "Yes," there were some firms that mentioned more than one machine for which on-the-job training was given.

Length of On-The-Job Training Period

Table XIII presents the length of the on-the-job training period as indicated by the 36 firms that responded to question number four on the survey instrument. It is interesting to note that 24, or 66.6 per cent of the firms that indicated on-the-job training either did not know the length of training time, or neglected to indicate it if they did know.

TABLE XIII

OFFICE MACHINES FOR WHICH ON-THE-JOB TRAINING WAS GIVEN AND THE AMOUNT OF TIME DEVOTED TO THAT TRAINING BY 95 CHEHALIS AND CENTRALIA FIRMS

Type of Machine	No. of Firms	Equivalent to			
		1 Sem.	1 Year	2 Years	?*
Full-keyboard adding machine	1	1			
Ten-key adding machine	6				6
Printing calculator	4				4
Rotary calculator	2	1			1
Electronic calculator	1	1			
Bookkeeping machine	3	1			2
Posting machine	7	3			4
Copy machine	3	1			2
Proof machine	2	2			
Key-punch (Teletype)	1				1
Linotype	1				1
Cash register	1				1
Fluid duplicator	1				1
Dictating machine	1				1
TWX	1		1		
Data processing (IBM)	1		1		
Totals	36	10	2		24

*Indicates firms that indicated on-the-job training but did not indicate the length of the training period.

None of the firms indicating adding machines mentioned a specific brand. There was one firm listing a full-keyboard adding machine and stated that one semester, or a period of time equal to one semester, of on-the-job training was sufficient. There were six, or 100 per cent of the firms indicating on-the-job training for the ten-key adding machine that stated they did not know the length of the on-the-job training period. One firm made the comment, "As needed."

There were four firms indicating that they gave on-the-job training for the printing calculator and all four either neglected to indicate the length of on-the-job training, or they did not know. No specific brand name was mentioned. Two firms indicated on-the-job training for the rotary calculator. One, or 50 per cent said one semester and the other one did not indicate any specific time. One firm stated the electronic calculator as a machine for which on-the-job training was given and said a period of time equal to one semester was enough training.

Three firms owned bookkeeping machines and gave on-the-job training for them. Again, no specific brand was mentioned. Of the three, one, or 33.3 per cent indicated one semester of training and 66.6 per cent did not state the length of the on-the-job training.

Seven businesses revealed that they offered on-the-job training for the posting machine. One firm stated a Burroughs Sensimatic and the others did not mention brand names. There were three of the respondents, or 42.8 per cent who indicated one semester of training and four, or 57.2 per cent who did not respond to length of the on-the-job training period.

There were three firms indicating use of copy machines. Two of these firms said they owned Zerox machines and the other one didn't mention brand. One business indicated a period of time equal to one semester and two did not reveal the length of the on-the-job training time.

Two firms stated they gave on-the-job training for proof machines and both indicated one semester for the length of the training. Neither firm disclosed a specific brand of machine.

V. BUSINESSES IN CHEHALIS AND CENTRALIA THAT WERE EQUIPPED WITH ELECTRONIC DATA PROCESSING OR CONTEMPLATED THE INSTALLATION OF IT

Businesses have been processing data for many years. Some of the data processing has been payroll, accounts receivable and inventory. As technological advances occur, there will be more and more applications for data processing. For this reason, it was felt that one of the questions

on the evaluation instrument should seek information about the use, and contemplated use, of data processing in Chehalis and Centralia at the time of this study. Question five stated, "Does your firm contemplate the installation of electronic data processing in the future?"

Of the 95 businesses responding to the evaluation instrument, there were 25 or 26.3 per cent, that responded to question number five. One of the 25 firms made the following comment:

> Who knows? Looks like the machines are here to stay so it is very possible that we will make some changes in the future but at this time I don;t have the answer.

There were 12 establishments, or 48 per cent, that answered "No" to question five. One firm stated, "We have this service on payroll." Another had this comment, "Not locally. All equipment mentioned above is in use in some cities our company serves." One business said, "Not at this installation." Another respondent sent this message:

> We are a small retail store and employ four to five people. All we need is a typewriter and an adding machine plus a cash register.

The remaining seven firms all indicated that they were branch offices and that they used the data processing facilities located in other cities. Some of their messages were:

> On the local level no. However, our regional accounting departments, credit offices and buying offices are computerized. Much of our buying is done via stock

tickets returned to the data processing center for processing and writing of replacement orders.

At the present time, the main office of this company has a very complete line of data processing equipment. This office is on a time-sharing plan with G.E. in Seattle. This is a teletype installation here connected to a computer in Seattle.

We are a branch store with headquarters in Seattle. Our accounting, billing, inventory control, etc. are done by EDP from our home office.

Our firm is almost 100 per cent converted to data processing at the home office, Pocatello. The Pocatello office then sends directly to other major terminals, who in turn direct our records via U. S. or other mailing facilities.

There were three other firms making similar comments.

There was unanimous agreement among the 12 firms answering "No", that there would be no electronic data processing installed locally.

There were 12, or 48 per cent of those who responded "Yes" to question five. Some of their comments follow:

1. Now in use.
2. Possibly.
3. Indefinite.
4. Fully electronic within one year.
5. We are already on ASB Computer Tacoma.
6. One stated "Yes" with no further explanation.
7. "On Line" system Burroughs (two firms).

There were four firms that gave a more detailed response in regard to the extent of explanation. Some of their statements were:

> In approximately five years we look forward to having high speed data processing equipment in our office.
>
> We expect to become 90 per cent computerized within a two year period.
>
> We have been automated with electronic data processing equipment since 1960 but all data processing is done at our electronic systems center in Tacoma. We have automated our checking account, savings account, Xmas Club, mortgage loans, installment credit loans and are continually finding new applications for it. Not only do we need people for programming and related jobs for input to the computer, but on the local level we need people who understand automation to the extent that they can read and understand the reports being generated. A basic background in the fundamentals of accounting seems to still be the best prerequisite.

As might be expected, the findings indicated that the larger the firm the more apt they were to have electronic data processing. One small firm indicated that the cost was prohibitive. On the local level, the financial institutions seem to be the leaders in the installation of data processing equipment. The very nature of their work is probably the reason. In addition, they are among the largest employers.

Chapter VI will present a summary of the entire study and offer recommendations and conclusions arrived at after further examination of the data and findings.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

I. SUMMARY

The purpose of this study was to determine the amount of office machines knowledge and skills needed for initial employment in Chehalis and Centralia. An allied problem was to discover what office machines were being used, and the length of training period on each office machine as specified by businessmen in Chehalis and Centralia. Specifically, the study was conducted to determine answers to the following:

1. Should business education departments offer instruction on business machines and the amount of training necessary for initial employment.
2. What machines were going to be replaced and what the replacement would be.
3. If any additional machines were going to be purchased and if "Yes," what type of machines were to be purchased.
4. If any machines were being used for which the company gave on-the-job training and the amount of training that was given.
5. If any of the local firms contemplated the installation of electronic data processing equipment in the future.

A questionnaire was compiled and sent to 125 businesses located in Chehalis and Centralia. The names of the firms were obtained from the Chehalis and Centralia telephone

directory. There was a letter of transmittal and a stamped, self-addressed envelope included with the survey instrument. A total of 95 responses were obtained. The 95 responses represented 76 per cent of the firms in the sample. There were 45 business establishments that were contacted by telephone to determine the specific brands of calculators that were being used and to determine if these business firms had a systematic method of machine replacement.

Should Business Education Departments Offer Instruction on Different Types of Business Machines?

There were several machines listed in the sample that local businesses felt should be included in the high school business education program. The following machines, arranged from highest to lowest percentage, were given a "Yes" response by the responding firms:

1. Of the 79 firms owning typewriters, 70, or 88.6 per cent indicated training in high school. There were none stating "No" training and nine, or 11.4 per cent that did not respond.

2. Rotary calculators were listed by 15 firms. Of these, 13, or 86.6 per cent, favored high school training; none responded "No" and two, or 13.4 per cent did not respond.

3. Electronic calculators were listed by seven businesses. Six, or 85.7 per cent favored training in high school.

4. There were 17 firms owning transcribing machines. Fourteen, or 82.3 per cent indicated training in the high school, and three, or 17.7 per cent gave no response.

5. Of the 59 firms owning ten-key adding-listing machines, 48, or 81.3 per cent, indicated training should be given in high school and 10, or 16.9 per cent did not respond.

6. Fluid duplicators were owned by 14 businesses and of these, 11, or 78.5 per cent stated training in high school was necessary.

Adding-listing machines. There were 79 businesses that were using adding-listing machines. Of these, 20 firms listed 51 full-keyboard adding-listing machines. This represents slightly better than 2.5 machines per company and 25.3 per cent of the total adding-listing machines owned. There were 59 businesses that listed 140 ten-key adding-listing machines for an average of slightly less than 2.4 machines per company. The ten-key adding-listing machines represented 74.7 per cent of the total adding-listing machines owned.

Length of training period. The firms in the sample were asked to indicate by semester, the length of training on business machines in high school necessary for initial employment. Their responses were:

1. The majority of the firms felt one semester was sufficient.

2. Very few indicated training for any machine on a one and one-half semester basis.

3. One firm indicated one semester of training for the computer while two indicated two years for the same machine.

The typewriter was the only machine for which two years of

high school training was indicated more often than one semester. Of the 79 firms listing typewriters, only three, or 3.8 per cent indicated one semester of training. There were 24 firms, or 30.3 per cent that indicated one year; three, or 3.8 per cent said one and one-half semesters and 34, or 43 per cent indicated two years of training.

Machine Replacement and Type of Replacement

There were 10 businesses, or 10.5 per cent of the 95 businesses in Chehalis and Centralia that indicated replacement of some of their office machines. The changes, and indicated replacements, were:

1. A fluid duplicator to be replaced with a dry type duplicator.
2. Two firms indicated they would replace a manual typewriter with an electric typewriter.
3. Two firms indicated they planned to replace an accounting and posting machine with a computer.
4. One firm indicated replacement of a cash register with a new cash register. Brand was no mentioned.
5. One firm indicated replacement of an adding machine with an electronic calculator.
6. A Royfax 100 to be replaced with a Smith-Corona Electromatic Copy Machine.
7. One firm indicated replacing a posting machine (manual) with an (electric) machine.
8. An Underwood-Sunstrand posting machine replaced by a National Cash Register.

Machines Purchased and Types of Purchases

There were 10 firms that indicated they planned to purchase additional business machines. The machines were:

1. High speed proof machine.
2. Key-punch machine.
3. Addressograph.
4. Calculator. No brand was mentioned.
5. Postage machine.
6. Copying machine.
7. Bookkeeping machine.
8. MTST Magnetic tape selectric typewriter (IBM).
9. Ten-key teller machine.
10. IBM 360-40 computer.

Length of Training on the Additional Machines

Two firms did not respond to length of training necessary on the additional machines purchased. One firm stated, "No idea," three, or 30 per cent indicated one year and one said one semester.

On-The-Job Training

There were 59, or 62.1 per cent of the 95 firms in Chehalis and Centralia that responded "No" to on-the-job training and 36, or 37.9 per cent that stated "Yes." Some firms mentioned more than one machine for which on-the-job

training was given. Ten firms, or 27.7 per cent, indicated one semester, or a period of time equal to one semester of training. Two firms, or 5.5 per cent stated one year and none of the businesses indicated two years of on-the-job training. It is interesting to note that 24, or 66.6 per cent, indicated that they gave on-the-job training but did not indicate the length of the on-the-job training time.

Electronic Data Processing Equipment

Of the 95 businesses responding to question number five on the instrument which stated, "Does your firm contemplate the installation of electronic data processing in the future," there were 25, or 26.3 per cent that responded to the question. Twelve establishments, or 48 per cent of those responding said "No." Seven firms indicated that they were branch offices and that they used the data processing facilities located in other cities.

There were 12, or 48 per cent of the 25 firms that responded to question number five, that stated "Yes." One firm stated that they needed trained people for programming and related jobs for input to the computer and on the local level; personnel were needed who understood automation to the extent that they could read and understand the reports that were being generated. A background in the fundamentals of accounting was cited as a prerequisite.

II. CONCLUSIONS

This study has resulted in the compilation of data relating to the types of business machines that were in use in Chehalis and Centralia, Washington, in 1968 and with the necessary office machines knowledge and skills needed for initial employment. The following conclusions appear to be valid for the area studied. Based on the data collected, the following seem to be appropriate:

1. There appears to be a definite need for high schools in the Chehalis and Centralia area to teach business machines.

2. There are enough key-driven calculators in use in the area to merit continued teaching of this machine in the local schools. The fairly even distribution of the rotary, printing, and key-driven calculators would indicate that all three types of machines should be included in the office machines program in the local high schools.

3. Of the companies listing adding-listing machines, the ten-key adding machine constituted 74.7 per cent of the total machines listed. This would indicate a large preference for this machine by local firms.

4. There appears to be enough ten-key adding-listing machines in use to indicate that high schools should have three times as many ten-key machines as they do full-key-

board machines in the office machines course.

5. Business firms in Chehalis and Centralia seem to prefer electric machines to manual machines. The exceptions being the fluid duplicator, stencil duplicator, sorter, and typewriter. The many small firms in the sample may account for this.

6. Businesses in Chehalis and Centralia prefer their typists to have two years of training in high school. There were 30.3 per cent indicating one year and 43 per cent that stated two years of training in high school.

7. There appears to be a growing need for employees who have had training in electronic data processing.

8. There appears to be job opportunities developing for people who are trained on the computer.

9. Businesses in Chehalis and Centralia indicate job opportunities may exist for people trained to operate the electronic calculator.

10. There were 79 firms listing 280 typewriters. Of these, 84 were electric and 196 were manual. This would indicate that job opportunities exist for typists on both the electric and the manual typewriter.

11. There were 36 businesses, or 39 per cent of the firms that responded, that stated they gave on-the-job training. This would suggest that employment opportunities are present for on-the-job training on office machines.

12. There were 84 calculators used by businesses. Of these, there were 27 Marchants, 17 Monroes, 15 Victors, and 15 Fridens. This indicates that businesses in Chehalis and Centralia use the Marchant more than any other one brand of calculator.

13. There appears to be no specific plan of machine replacement for office machines in Chehalis and Centralia.

14. There were 17 firms using a total of 34 transcribing machines. This would indicate job opportunities are available for personnel trained on transcribing machines.

III. RECOMMENDATIONS

Based upon much deliberation and careful analysis of the data in this study, the following recommendations are offered to facilitate preparation of future office machines operators and other business employees in the Chehalis and Centralia area:

1. There is a necessity to provide instruction on the ten-key adding-listing machine which is preferred three to one over the full-keyboard adding-listing machine by local firms.

2. Since local firms continue to use the key-driven calculator proportionately as much as the rotary and printing calculator, local schools should continue to teach this machine. If this machine is not now owned, however, its purchase would be questioned.

3. The vast majority of the firms included in the sample favored office machines training in the high school. Because of this, high schools in the local area should take advantage of the federal monies available to equip their office machines departments.

4. Because job opportunities are increasing in electronic data processing, students should be encouraged to pursue training in this area.

5. Schools in the Chehalis and Centralia area should provide two years of typing since a majority of firms feel that two years of training is essential.

6. Local schools should include both electric and manual typewriters in their business machines departments. There should be twice as many manual machines as there are electric.

7. The length of the training period for all machines except the typewriter, accounting machine, and the computer should not exceed one semester.

8. Schools in the local area should provide training on a balanced number of calculators including the Marchant, Monroe, Underwood-Olivetti, Victor and the Friden.

9. Because of the increasing use of the electronic calculator, schools should include this machine in their office machines departments.

10. Local schools should attempt to work more closely with business firms in the area to ascertain what business machines are being used. Replacements should be made when new machines are found to exist in local business firms.

Recommendation for Additional Research

The data collected in this study reveals the office machines used in Chehalis and Centralia and the amount of office machines training necessary for initial employment in Chehalis and Centralia. The following recommendations for further study are suggested, using a variety of research techniques:

1. Should the expected level of competency attained by high school students in the area of office machines be acquaintanceship or vocational competency?

2. What are the on-the-job training opportunities in the area of electronic data processing?

3. What is the length of time required for on-the-job training in electronic data processing in order to become vocationally competent?

4. What specific brands of calculators should high schools be training students on?

5. How much on-the-job training is required for vocational competence on the common office machines.

This study was an attempt to discover the needs of local business firms with regard to the amount of training necessary for initial employment on the common office machines. In addition, the writer hoped to ascertain what business machines should be taught in the local schools.

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APPENDIX

RETURN TO:
(Mr.) Clare W. Johnson
Rt. 4, Box 122
Chehalis, Washington

DO NOT WRITE IN THIS SPACE
Date Mailed _____
Date Returned _____

OFFICE MACHINES KNOWLEDGE AND SKILLS NEEDED FOR INITIAL EMPLOYMENT

1. Should business education departments offer instruction on the following types of equipment? If your answer is YES, indicate length of time instruction should be and the number now in use in your office.

YES	NO		MACHINES Now In Use No. Elect.	Man.	One Sem.	One Year	One and One Half Sem.	Two Years
__	__	a. Full-keyboard adding-listing machines						
__	__	b. Ten-key adding-listing machines						
__	__	c. Key-driven calculators						
__	__	d. Printing calculators						
__	__	e. Rotary calculators						
__	__	f. Electronic calculators						
__	__	g. Fluid duplicators						
__	__	h. Stencil duplicators						
__	__	i. Key-punch machines						
__	__	j. Transcribing machines						
__	__	k. Verifiers						
__	__	l. Sorters						
__	__	m. Interpreters						
__	__	n. Collators						
__	__	o. Reproducers						
__	__	p. Accounting machines						
__	__	q. Typewriters						
__	__	r. Computers						
__	__	s. Posting machines						
__	__	t. Others						

2. Are you contemplating replacing any of your office machines now in use with another type of machine? Yes___No___Type to be replaced_____

   If your answer Yes, what type of office machine is being considered as the replacement?_____

3. Are you contemplating adding any type of new office machine not discussed in this questionnaire? Yes___No___

   If your answer is Yes, what type of office machines are being considered as additions?_____

   _____ _____ _____

   Indicate amount of training necessary on these new machines for initial employment. 1 Sem___ 1 Year___ 1½ Sem___ 2 Years___.

4. Do you have any machines for which you give on-the-job training? Yes___ No ___.

   If yes, which machines? _____

   _____

   _____

   Indicate amount of training you give on these machines. 1 Sem____ 1 Year____ 1½ Sem____ 2 Years____

5. Does your firm contemplate the installation of electronic data processing in the future? Yes____ No____

   To what extent if answer is yes.

January 12, 1968
RFD 4, Box 122
Chehalis, Washington

Gentlemen:

I have become interested in the amount of knowledge and skill necessary for initial employment on different types of office machines used in our area. Therefore, as partial fulfillment of the requirements for the Master of Education Degree, I am endeavoring to organize a series of criteria by which I may be able to determine what machines are being used and the amount of training that should be provided by the schools in our area.

Your help is needed to help determine the relative importance of the criteria. It would be very much appreciated if you would evaluate the items on the enclosed questionnaire and place it in the mail as soon as possible. A self-addressed envelope has been provided for your convenience.

Thank you.

Sincerely,

(Mr.) Clare W. Johnson

Enclosures

Please note:
The signature has been redacted due to security reasons