EVALUATION OF THE OFFICE MACHINES COURSES AT NORTHEASTERN STATE COLLEGE TAHLEQUAH, OKLAHOMA

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PREFACE

Adding-calculating machines are very important tools in the business office. They are used by a wide variety of office workers, including general clerks, payroll clerks, cost clerks, inventory clerks, billing clerks. They are also used by accountants, investment specialists, and others at the professional levels of business.

Consequently it becomes important that young people being trained for business be given satisfactory training in the use of these office machines. The purpose of this study is to evaluate the training students received on the key-driven calculator, rotary calculator, and ten-key adding machine, in the office machines courses at Northeastern State College in order to determine whether or not these courses are meeting the needs of the business students whose current employment demands office machine skills.

My sincere appreciation is expressed to Dr. Lloyd L. Garrison for his valuable guidance and assistance in the preparation of this study. Special thanks goes to Dr. Ida T. Smith for her inspiration, encouragement, and helpful suggestions.

Appreciation is also expressed to Dr. Howard W. Heding for his helpful criticisms of the questionnaires used to collect data for the study. A special thanks goes to Dr. Gordon F. Culver for his interest and willingness to serve on the writer's Advisory Committee in the final stages of the study.

Among many others who gave helpful information, I am indebted to the students and employers who contributed to this investigation by giving their time and opinions in answering the questionnaires.

Zoe Davis

TABLE OF CONTENTS

TABLE OF CONTENTS (Concluded)

LIST OF TABLES

CHAPTER I

INTRODUCTION

What machines are used in the business office? What fundamental processes are performed on these machines in the office? What degree of skill is required by an office machine operator? What machines should be included in the office machines courses at Northeastern State College? Are the office machines courses at Northeastern State College meeting the needs of the business education students whose successful employment demands office machine skills? Should the office machines courses on the college level give the student a general knowledge of fundamental processes of operation on the machines and develop proficiency on the job, or should the courses develop semi-proficiency, or should they develop proficiency in the use of the machines?

An evaluation of the office machines courses offered at Northeastern State College should be a source of help in discovering answers to these questions. The data obtained in this study should help answer these questions relative to the courses at Northeastern.

In a review of education research, Gilchrist states that

> . . . evaluation through research studies has provided excellent data for curriculum improvement and should be encouraged as a very practical way to identify strengths and weaknesses of courses.[1]

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[1]Robert S. Gilchrist, "The Educational Program: Adolescence," Review of Educational Research, XXIV, No. 1 (February, 1954), 49.

Problem to be Investigated

The study is concerned with the following question: Are the office machines courses at Northeastern State College meeting the needs of the business education students whose current employment demands office machine skills?

Purposes of the Study

The purposes of the study are:

1. To obtain opinions concerning the adequacies and inadequacies of office machines courses from former students now employed in business.
2. To obtain opinions from present employers concerning strengths and weaknesses of these students.
3. To determine from a study of these opinions whether or not office machines courses at Northeastern State College meet the needs of this particular group of students.
4. To derive conclusions from the findings as an aid in determining the direction of future development for the office machines courses in the Business Education Department at Northeastern State College.

In addition, the investigation proposes to accomplish the following secondary purposes:

1. To ascertain what machine skills taught in the office machines courses are very helpful, which are of some help, or which are of no help to the student on the job.

2. To ascertain from employers included in this study what degree of skill on the various office machines is required for a successful machine operator.
3. To determine whether or not there is a need for training on other office machines, not included in the courses.
4. To determine whether or not there is a need for other aspects of learning in the office machines courses.

Justification of the Problem

The challenge which led to this study arose from a desire to make the office machines courses at Northeastern State College practical to the business student on the job.

In order to keep the courses up to date there is a need to evaluate these courses in terms of the machines used in the office and in terms of the fundamental processes performed on these machines.

Lee says that "curricula must be reevaluated continuously and altered to meet business needs, if the collegiate schools are to be of the greatest service in preparing business leaders."[2]

Therefore, it would appear that this evaluation should be based upon evidence from research. According to Bebell, educational decisions should be based upon evidence which is the basis of action research.[3]

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[2]Dorothy Lee, "Changing Objectives in Business Education on the Collegiate Level in the United States" (unpub. Ph.D. dissertation, New York University, 1957), 81.

[3]Clifford Bebell, "Action Research and the Business Education Teacher," The National Business Education Quarterly, XXV (1957), 8.

Scope of the Study

The study will be limited to students who have completed not less than one course in office machines at Northeastern State College during the years of 1951 to 1958 and whose current employment in business demands the use of an office machine in performing a part of their duties.

The study will be limited primarily to the machine skills performed by the operators of the various machines found in the business firms in which these students are employed.

The study will be limited to the present employers of the students.

Clarification of Terms

The terms used in this study are to be understood as follows:

Office machines courses refers to the two office machines courses offered in the Business Education Department at Northeastern State College under the title of Business Practice 322 and 332. These courses include the following machines: ten-key adding listing machines, key-driven calculators, and rotary calculators.

Fundamental processes refers to addition, division, multiplication, subtraction and the application of these operations in developing the skills on the office machines.

Student refers to an individual who has completed either or both of the office machines courses at Northeastern State College and who is now employed in business where an office machine is used in performing a part or all of his duties.

Employer refers to the immediate supervisor or the individual who employed a student that is included in this study.

Office workers refer to all employees in the firm of the immediate supervisor or employer included in this study who use an office machine in performing at least a part of their duties.

Organization of the Study

The study is organized into five chapters. Chapter I includes the introduction to the study as it presents the problem, outlines the purposes, justifies the problem, limits the scope, clarifies some of the terms used in the study, and outlines the organization of the study.

Chapter II contains a report of the related literature.

Chapter III includes an outline of the procedure used in conducting the study.

Chapter IV includes the data collected and an analysis of the results.

Chapter V contains a general summary of the findings, the conclusions of the study, and the recommendations of the writer.

CHAPTER II

RELATED LITERATURE

The purpose of this chapter is to review the literature related to the study. This review is reported under these headings: (1) basic machine skills used in offices, (2) other aspects of training needed in offices, (3) degree of skill required for office machine operators, and (4) office machines used in offices.

Basic Machine Skills Used in Offices

A survey of writings dealing with machine skills used in offices indicates that skills vary from office to office and from machine to machine.

However, a study made by Brady indicates that "operators spend most of their machine-operation time performing the fundamental processes in the following order: addition, multiplication, subtraction and division."[1]

Therefore, it would appear to be very important that the student master the fundamental processes on the adding-calculating machines. Hughes and Reineke also emphasized this idea when they pointed out that

> regardless of the number of machines available, the student should finish the machines course with a thorough understanding of the principal functions of the machine, namely: addition,

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[1]Mary Margaret Brady, "Report of Office Survey on Uses and Standards for the Key-Driven Calculator," Business Education Forum, XIII, No. 3 (December, 1958), 30.

> subtraction, multiplication, and division. Problems that are relative to the fundamental operation of the machines, such as proration, percentage of increase and decrease, chain discounts, compound addition, and compound multiplication are realistic application of the fundamentals mentioned above, but are confusing and time consuming to the student who has not mastered the fundamental operations of the various machines.[2]

Office machines courses have been an integral part of business education for over thirty years. During the last five years more emphasis has been placed on speed and the "touch method" operation, especially on the ten-key adding machines and the key-driven calculators. According to Jones, "business now recognizes that in proportion to the amount of work being handled, the touch method is just as important in operating adding and calculating machines as in operating typewriters."[3]

Hughes and Reineke made the following observations from the results of a testing experiment concerning speed and accuracy in addition and multiplication:

1. Multiplication, particularly multiplication with decimals, seemed to be the most difficult for the students to work on all machines.

2. The degree of accuracy on the multiplication problems was lower than on the addition problems.

3. A greater number of problems were missed on the full-keyboard and ten-key listing machines than were missed on the rotary and key-driven calculators. This indicates there is still a great need for accuracy building on these machines.

The results indicate a need for increased accuracy drill in both addition and multiplication.[4]

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[2]Arthur E. Hughes and William H. Reineke, "Standards for Adding and Calculating Machines," The Balance Sheet, XXXVIII, No. 4 (December, 1956), 166.

[3]D. T. Jones, "How to Teach the Ten-Key 'Touch Method' on Adding Machines and Printing Calculators," Business Education Forum, VIII (October, 1953), 35.

[4]Ibid., pp. 166, 167.

In conclusion, it would appear that the fundamental processes--addition, subtraction, multiplication and addition--are the basic skills for machine operations on the adding-calculator machines.

Other Aspects of Training Needed in Offices

The literature indicates that a number of peripheral skills should be developed along with the skills in the four fundamental processes in order to perform the tasks most frequently performed by the office machine operator.

Brady concluded from an office survey of uses and standards for the calculator that

> . . . a number of peripheral skills should be developed. Some of the most important are dexterity in handling many small slips of paper from which numbers are obtained; correct placement of the decimal point; conversion of common fractions to decimal equivalents; addition of numbers arranged horizontally as well as vertically; proof of all work performed or checking to indicate verification; remembering the answer to record it after the machine is cleared; and the writing of legible numbers. Practice should be provided in the reading of handwritten as well as printed numbers.[5]

A study of the literature indicates that more stress should be placed on correct placement of the decimal point. Brady pointed out that "managers generally agree that the greatest weakness of operators is inaccuracy in the placement of the decimal point."[6]

According to many writers, a good arithmetic background is essential for office machines courses. Huffman says that "Perhaps the most

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[5]Brady, p. 30.

[6]Ibid., p. 29.

important prerequisite to calculating-machine instruction is competency in the fundamental operations of arithmetic."[7]

Research studies and professional writings also reveal that businessmen are more concerned about inaccuracies, wasted time, and general inefficiencies than they are with high speed in machine operation. Economy of operation is a general goal of every business organization.

Degree of Skill Required for Office Machine Operators

A survey of writings which deal with the degree of skill the office requires for the office machine operator indicates, in general, that most businessmen are not disturbed to a great extent if well-trained office machine operators are not available. Most businessmen feel that they can teach a new employee in a fairly short time enough about a machine for her to do the job. Many, too, feel that their job and ways of performing it are just a little different from those of another company and prefer to use their own methods of instructing the new employee.

However, Brady says that

> office managers prefer to hire trained operators but because of their scarcity, partially trained or wholly untrained operators are often employed and are given on-the-job training to meet the minimum requirements of a particular job.[8]

Research shows, according to Chambers, that more than 80 per cent

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[7]Harry Huffman, "How Much Calculating Machine Instruction in Clerical Practice?" Business Education World, XXXIX (March, 1954), 38.

[8]Brady, p. 29.

of the business organizations are classified as small firms; therefore, an acquaintance of several different kinds of machines is needed.[9]

In addition, Low concluded from a survey of offices that

> all potential office workers should have sufficient skill in the operation of all office machines to enable them to go into one-girl offices and do all of the clerical jobs.[10]

Since machines may be custom built to fit the needs of a given company, and thus become more complicated, training of operators will be done less by schools and more by manufacturers of the machines. More people will be needed to provide information for the machines rather than to operate them.

Elliott says that

> electronics will not make employees obsolete but perhaps will displace them. The more we learn about these machines, the more we become aware of the fact that it is going to take people to tell them what to do; to operate them; and to interpret the results produced.[11]

Then if employees will be relocated with new machines, Whale suggests that students should develop certain qualities in preparing for future office work: "a logical mind, interest, good human relations, initiative, accuracy, ability to take directions, ability to write well, neatness, courtesy."[12]

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[9]Ima M. Chambers, "Guidance in Business Machines," American Business Education, XIII, No. 2 (December, 1955), 99.

[10]Alice L. Low, "A Survey to Determine the Type of Office Machines Used, Number of Employees Hired, and Educational Preparation of the Clerical Employees in Various Offices in Hibbing, Minnesota," National Business Education Quarterly, XXVII, No. 1 (October, 1958), 50.

[11]J. Douglas Elliott, "Will Electronics Make People Obsolete?" Office Management Series No. 136, The Impact of Computers on Office Management (October, 1957), p. 53.

[12]Leslie Whale, "What's Automation Been up to in Detroit?" Business Education World, XXXVIII (October, 1957), 30.

Stutsman describes the future this way:

> It is not unreasonable to look forward to the time when most routine clerical operations will be performed at night by machines; when data covering the day's operations will be transmitted to a central point at the close of business; when these data will be processed, virtually without human intervention, during the night; and when, at the start of business the following day, management will have current operating data analyzed, evaluated and compiled in a manner which best lends itself to that type of thinking most machines cannot ever replace--executive judgment.[13]

Office Machines Used in Offices

A review of the literature indicates that many kinds of office machines are used in the office, but that the typewriter leads the list of "most used machines" with the adding listing machine ranking second to the typewriter.

A salesman for a large machine manufacturing firm reported that

> the most popular machine used in the office other than the typewriter is the adding listing machine. Seventy to seventy-five per cent of all adding and listing machines sold last year (1957) were of the 10-key variety. Regardless of the size of the office, the type of office--insurance, real estate, wholesale or large industrial office the 10-key was most popular.[14]

Then what are some of the other office machines used in the office? According to the Kennedy study in 1955, the machines most frequently used were the "typewriter, comptometer, bookkeeping machines, IBM machines, and duplicating machines--mimeograph."[15]

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[13] Galen Stutsman, "Business Machines," American Business Education, XIII, No. 2 (December, 1955), 75.

[14] "Report by Office Practice Area Group at the Eastern Business Teachers Association Conference in Boston," American Business Education, XV, No. 1 (October, 1958), 16.

[15] Kathryn Ann Kennedy, "A Follow-up Study and Job Analysis of the 1952 and 1953 Graduates of the Clerical Practice Department of the Somerville (Massachusetts) High School," National Business Education Quarterly, XXV (October, 1956), 42.

Another survey of business offices made by McBride reveals that the typewriter is the most used office machine--elite being the most popular type. Electric adding machines are the most used machine other than the typewriter.[16]

Reed concluded from a survey of Oklahoma City (Oklahoma) offices that "almost all of the office employees are required to utilize one or more office machines in addition to the typewriter."[17]

Then, it would appear that the typewriter and the adding listing machines should be basic machines for all office machines courses.

Summary

This chapter has been an attempt to review related literature with reference to (1) machine skills used in offices, (2) other aspects of training needed in offices, (3) degree of skill required for office machine operators, and (4) office machines used in offices.

The reader should keep in mind that the study is concerned primarily with the adding-calculating machines which includes adding listing machines, key-driven and rotary calculators.

A study of the literature reveals that office machine operators spend most of their machine-operation time performing the fundamental processes in the following order: addition, multiplication, subtraction and division.

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[16]William J. McBride, "Survey of Office Machines in the Beloit, Wisconsin, South Beloit, Illinois, Area," National Business Education Quarterly, XXVII, No. 1 (October, 1958), 53.

[17]James Ralph Reed, "Circumstances Surrounding the Employment of Beginning Office Workers in Oklahoma City" (unpub. Ed.D. dissertation, University of Oklahoma, 1955), 89.

A good arithmetic background is an important prerequisite to office-machine instruction.

Review of the literature also reveals that more stress should be placed on placement of the decimal point.

The typewriter is the most used office machine with the adding listing machine ranking second to the typewriter. Based on only the Oklahoma City study, most of the office employees are required to utilize one or more office machines in addition to the typewriter.

CHAPTER III

PROCEDURE

The writer's purpose in this chapter is to give an explanation of the steps taken in analyzing the problem. It will be recalled that the objectives of the investigation were: (1) to obtain opinions of students who had completed a course or courses in office machines at Northeastern State College and their immediate employers concerning the training received in these courses and (2) to derive conclusions from the findings which would aid in determining the direction of future developments for the office machines courses.

Decisions had to be made as to the method of research to be used. According to Good, a survey investigation may be used for the following purposes:

1. To secure evidence concerning the existing situation or current condition.
2. To identify standards with which to compare present conditions in order to plan the next step.
3. To determine how to take the next step (having determined where we are and where we wish to go).[1]

Consequently, a survey investigation was deemed a suitable technique for securing data relevant to the purposes of this study.

Two important phases of general procedure were followed in the

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[1]Carter V. Good, Introduction to Educational Research (New York, 1959), p. 167.

investigation: (1) the development of two questionnaires and (2) the selection of respondents.

The Questionnaires

The investigator would have preferred to collect the data through personal interviews, but time and circumstances rendered this impossible. The questionnaire, in spite of its limitations, was selected as a technique to obtain the desired information.

Hillway says that

> the written questionnaire may be regarded as a substitute for the personal interview. Because of the relative ease and speed with which it can be distributed by mail over a large geographical area, the questionnaire has definite advantages in survey research. It saves both time and expense.[2]

After making an examination of pertinent literature and research methods, two questionnaires were prepared. One of the questionnaires was designed to obtain opinions concerning the adequacies and inadequacies of training received in office machines courses at Northeastern State College from the students employed in business who had completed a course or courses in office machines (Business Practice 322 and 332) during the years of 1951 to 1958. This questionnaire included the following information:

1. General information concerning the student; such as, name of business firm for which the student worked, name of immediate supervisor or employer, present position with the firm.
2. Machines the students used in the office.

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[2]Tyrus Hillway, Introduction to Research (Boston, 1956), p. 175.

3. The degree to which the training received on the machines included in the courses--ten-key adding machines, key-driven calculators, and the rotary calculators--had been helpful to the student in performing his duties in current job.
4. Other training that should be offered on the machines included in the office machines courses at Northeastern.

In order to pretest the questionnaire, it was mailed to former graduates who had office machines training for their suggestions. As a result of the pretest, some revisions were made in the questionnaire. A copy of the questionnaire is included in the appendix.

Then, a questionnaire was designed to obtain the opinions of the immediate supervisors or employers of these students as to the strengths and weaknesses of the training received in office machines courses. This questionnaire included such information as (1) the adequacy of the training received by students at Northeastern for doing office work in the business firm and (2) the type and degree of training needed by students in preparing for jobs using office machines.

The questionnaire was informally pretested by interviews with businessmen in different kinds of business firms; such as, employment, transportation, oil, public utilities.

A copy of the questionnaire used in the survey is included in the appendix.

Selecting the Respondents

The next step in the investigation of the present study was to compile a list of all students who had completed one or both of the

courses (Business Practice 322 and 332) at Northeastern State College. The names of the students were secured from the class record books for the years of 1951 to 1958. Then, the addresses of the students were obtained from the registrar, alumni office, and the placement office.

The survey type of study involves the problem of the selection of the population to be sampled. "The sample, then," according to Hillway, "should be as nearly representative of the whole group as possible."[3] Since there were only 265 students who took the office machines courses during the years 1951 to 1958, it was possible to send questionnaires to all these students.

Of the 265 questionnaires mailed, 195 or 73.6 per cent were returned. These 195 questionnaires revealed that 52 students were using one or more of the office machines included in the study to perform a part of their duties in their current business employment. One half of these 52 students were enrolled in office machines courses during the years of 1957 and 1958. The other 26 students were enrolled during the years of 1952 to 1956 inclusive. Twenty-seven of the 52 students took both office machines courses.

Since this study is concerned only with those students currently employed in business and using the office machines included in this study to perform part of their duties, the findings reported in Chapter IV are based upon the 52 students who were using one or more office machines.

It was decided that business employers should, also, be able to supply some valuable information concerning strengths and weaknesses of

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[3]Ibid., p. 184.

the training the students received in the office machines courses. The employers selected for this study were limited to the current employers of the 52 students included in the study.

Questionnaires were mailed to employers of these students. Of the 35 questionnaires returned, four were unusable--two employers wrote detailed letters; two did not complete questionnaires. Therefore, opinions of only 31 employers were included in the study.

Summary

In this chapter the writer has reviewed the major decisions which were necessary in the selection of the method of research to be used, the preparation of the questionnaires, and the selection of the respondents for the study.

A survey investigation was the method of research used to collect data relevant to the study.

One of the purposes of the investigation was to obtain opinions of the students who had completed one or both of the office machines courses at Northeastern State College and their immediate employers concerning the training received in these courses. Two questionnaires were developed to collect this information. One of the questionnaires was designed to obtain student opinions concerning the adequacies and inadequacies of the office machines courses. This questionnaire included the following information:

1. General information concerning the student; such as, name of business firm for which the student worked, name of immediate supervisor or employer, present position with the firm.

2. Names of machines now in use by these employees.
3. The degree to which the training received on the machines--ten-key adding listing machines, key-driven calculators, and the rotary calculators--included in the courses has been helpful to the student in performing his duties in the current job.
4. Other training that should be offered on the machines included in the office machines courses at Northeastern.

The second questionnaire was designed to obtain the opinions of the immediate supervisors of employers of these students as to strengths and weaknesses of the students' training received in these courses. This questionnaire included such information as (1) the adequacy of the training received by students at Northeastern for doing office work in the business firm and (2) the type and degree of training needed by students in preparing for jobs using office machines.

Opinions of 52 students and 31 employers of these students were included in the study.

CHAPTER IV

RESULTS

Are the office machines courses at Northeastern State College meeting the needs of the business education students whose current employment demands office machine skills?

In order to know first hand how well the training received in the office machines courses are meeting the needs of the students in the business world, a survey was made by mailing questionnaires to former office machine students of Northeastern State College, Tahlequah, Oklahoma, who are now employed in business, and also to their employers.

The writer's purpose in this chapter, then, is to present and analyze the results of this survey. The data obtained from the questionnaires are presented and analyzed under two main headings: (1) student evaluation of the office machines courses and (2) employer evaluation of the training students received in the office machines courses.

Student Evaluation of the Office Machines Courses

As was stated in Chapter III, this evaluation is based upon the information given by 52 students who are currently using one or more of the office machines included in the study. In this study, it will be recalled that a student refers to an individual who completed one or both of the office machines courses at Northeastern State College and who is now employed in business where one or more office machines are

used in performing his duties. If a student completed one course, he received training only on two machines. Since some of the students had taken only one office machines course, each returned questionnaire was checked to see if the student had received course training on the machine for which he had given information. If the student had not received training in the office machines courses, his opinions concerning this particular machine were not included.

Student evaluation of the office machines courses is discussed under these headings: (1) office machines used by students in present job and per cent of total working time spent on each machine, (2) training received on the key-driven calculator, (3) training received on the rotary, (4) training received on the ten-key adding machine, (5) training needed on the machines, (6) other aspects of training, (7) other suggested office machines, and (8) comments concerning office machine training.

Office machines used by students in present job and per cent of total working time spent on each machine. As was stated in Chapter II, this study is concerned primarily with the adding-calculating machines. However, based on the findings shown in Table I, the students use various office machines on the job. The ten-key adding machine was the most used office machine and the rotary calculator ranked second. To be more specific, of the 52 students who used office machines to perform part of their duties on the job, 46 operated the ten-key adding machine and 32 used the rotary calculator. A majority of these 52 students used two or more office machines listed in the study to perform their duties in present employment. Fifty-two per cent of the 52 students used two different office machines included in the study, 25 per cent used three

or four different machines, and 23 per cent used only one office machine.

TABLE I

OFFICE MACHINES USED BY 52 STUDENTS IN PRESENT EMPLOYMENT AND PER CENT OF TOTAL WORKING TIME SPENT ON MACHINES

Machines	Number of Students Using Machines	Per Cent of Total Working Time Spent on Machine			
		1-24	25-49	50-74	75-100
Full-Keyboard Adding Machine	9	8	-	-	1
Ten-Key Adding Machine	46	29	9	7	1
Key-Driven Calculator	7	4	3	-	-
Rotary Calculator	32	28	2	2	-
Printing Calculator	1	1	-	-	-
Posting Machine	6	2	1	2	1
Transcribing Machine	3	2	1	-	-
Liquid Process Duplicator	5	5	-	-	-
Stencil Process Duplicator	4	4	-	-	-

This table should be read as follows: Nine students used the full-keyboard adding machine. Of these 9 students, 8 spent 24 per cent or less of their working time on the full-keyboard adding machine, while 1 spent from 75 to 100 per cent on the machine.

The kind of office machine used by the 52 students included in the study seemed to vary with the students' occupations. For example, a larger per cent of accountants used the ten-key adding machine to perform part of their duties; whereas, a larger per cent of the secretaries used the rotary calculator to perform their duties in the office.

Forty-three students, or 82.7 per cent, used office machines included in the study less than one-half of their total working time to perform their duties in the office. More specific information is given in Table I, page 22.

Training received on the key-driven calculator. There were 7 students who used the key-driven calculator to perform part of their duties in current employment. One of these 7 students did not receive his training on the key-driven calculator in the office machines course at Northeastern State College; therefore, the opinions of this student are not included in this section of the study.

The data concerning the training received on the key-driven calculator are presented under the following headings: (1) frequency of using the key-driven calculator in performing certain machine operations, and (2) degree to which the training received on the key-driven calculator has been helpful to the students in current employment.

(1) Frequency of using the key-driven calculator in performing certain machine operations. The machine operations included in this study were selected from the subject content of the office machines courses. The following machine operations on the key-driven calculator were checked by the students as to frequency of use: division, fractions, left-to-right multiplication, stroke wheel multiplication, checking and balancing ledger accounts, figuring percentages, figuring discounts, checking invoices, figuring payrolls, adding and checking sales reports, figuring unit cost, and making extensions on inventories. The students used the following rating scale to indicate how often they performed certain machine operations on the key-driven calculator: never, occasionally, fairly often, or frequently.

A study of the data in Table II shows that all of these machine operations were performed to some degree by some of the students who used the key-driven calculator. Figuring unit cost was the most frequently performed machine operation on the key-driven calculator. One half or more of the students who used the key-driven calculator performed the following machine operations: division, left-to-right multiplication, figuring percentages, discounts, and unit cost.

(2) Degree to which the training received on the key-driven calculator has been helpful to the students in current employment. The students also rated the machine operations on the key-driven calculator as to the degree of helpfulness the training received in these machine operations had served them in current employment. In rating the training received on the key-driven calculator, the students used this scale: training not needed, little or no help, some or average help, much or very helpful.

According to the findings reported in Table III, page 26, 50 per cent of the students found that the training received in figuring percentages and discounts was "very helpful" in performing their duties in current employment.

A comparison of results in Table II and III reveals that student training is more meaningful when compared with frequency of using machines in performing machine operations. There appears to be a relationship between the degree of helpfulness and frequency of using the key-driven calculator. For example, a majority of the students who indicated training "not needed" did "not use" the key-driven calculator to perform their duties.

TABLE II

FREQUENCY OF VARIOUS MACHINE OPERATIONS PERFORMED BY SIX STUDENTS WHO USED THE KEY-DRIVEN CALCULATOR

Machine Operations	Never	Occasionally	Fairly Often	Frequently
Division	2	3	1	-
Fractions	4	1	1	-
Left-to-Right Multiplication	2	3	-	1
Stroke Wheel Multiplication	5	-	-	1
Checking and Balancing Ledger Accounts	4	-	1	1
Figuring Percentages	2	-	2	2
Figuring Discounts	2	1	1	2
Checking Invoices	4	-	1	1
Figuring Payrolls	4	-	1	1
Figuring Unit Cost	3	-	-	3
Making Extensions on Inventories	4	-	1	1
Adding and Checking Sales Reports	5	-	-	1

This table should be read as follows: Of the 6 students who used the key-driven calculator, 2 students never used the machine to divide, 3 used the machine occasionally to divide, and 1 used the machine fairly often to divide.

TABLE III

DEGREE TO WHICH THE TRAINING RECEIVED ON THE KEY-DRIVEN CALCULATOR HAS BEEN HELPFUL TO SIX STUDENTS IN CURRENT EMPLOYMENT

Machine Operations	Training Not Needed	Little or no Help	Some or Average Help	Much or Very Helpful
	Number Responding			
Division	4	-	-	2
Fractions	6	-	-	-
Left-to-Right Multiplication	2	2	-	2
Stroke Wheel Multiplication	6	-	-	-
Checking and Balancing Ledger Accounts	4	-	1	1
Figuring Percentages	2	1	-	3
Figuring Discounts	2	-	1	3
Checking Invoices	4	-	-	2
Figuring Payrolls	4	-	1	1
Figuring Unit Cost	3	-	1	2
Making Extensions on Inventories	4	-	-	2
Adding and Checking Sales Reports	5	-	-	1

This table should be read as follows: Of the 6 students who used the key-driven calculator in current employment, 4 did not need the training received in division while 2 found the training in division very helpful. Note: This table has more significance when compared with Table II as to the number using the key-driven calculator.

Training received on the rotary calculator. There were 32 students who used the rotary calculator to perform a part of their duties in current employment. One of these 32 students received his training on the rotary calculator on the job; hence, the opinions of this student are not included in this section of the study.

The data concerning the training received on the rotary calculator are presented under these headings: (1) frequency of using the rotary calculator in performing certain machine operations, and (2) degree to which the training received on the rotary calculator has been helpful to the students in current employment.

(1) Frequency of using the rotary calculator in performing certain machine operations. The machine operations performed on the rotary calculator included in this study were: constant addition, constant subtraction, constant multiplication, fixed decimals in division, accumulative multiplication, figuring discounts, multiplication by addition and subtraction, payroll extensions, percentages, and a table of chain discount equivalents. The students used the following rating scale to indicate how often they performed these machine operations on the rotary calculator: never, occasionally, fairly often, or frequently.

A study of Table IV, page 28, reveals that 50 per cent or more of the students who used the rotary calculator performed the following machine operations: constant addition, constant subtraction, constant multiplication, fixed decimal in division, accumulative multiplication, figuring discounts, and percentages. Very few of the students used a table of chain discount equivalents, figured payrolls, or multiplied by addition and subtraction.

TABLE IV

FREQUENCY OF VARIOUS MACHINE OPERATIONS PERFORMED ON THE ROTARY CALCULATOR BY 31 STUDENTS

Machine Operations	Never	Occasionally	Fairly Often	Frequently
Constant Addition	13	9	6	3
Constant Subtraction	16	10	2	3
Constant Multiplication	7	7	5	12
Fixed Decimals in Division	8	9	5	9
Accumulative Multiplication	11	14	2	4
Figuring Discounts	12	9	3	7
Multiplication by Addition and Subtraction	21	5	3	2
Payroll Extensions	24	3	1	3
Percentages	4	7	6	14
A Table of Chain Discount Equivalents	26	2	1	2

This table should be read as follows: Of the 31 students who used the rotary calculator, 13 students never used the rotary calculator to perform duties which envolved constant addition, 9 occasionally used the machine to perform constant addition, 6 fairly often used the machine to perform constant addition, and 3 frequently used the machine to perform constant addition.

(2) Degree to which the training received on the rotary calculator has been helpful to the students in current employment. The students also rated the machine operations on the rotary calculator as to the degree of helpfulness the training received in these machine operations has been to them in current employment. In rating the training received on the rotary calculator, the students used this scale: training not needed, little or no help, some or average help, much or very helpful.

Based on the findings shown in Table V, page 30, it seems apparent that the 31 students using the rotary calculator have found training on certain machine operations more helpful than other machine operations in current employment. Figuring percentages and using fixed decimal in division were rated "very helpful."

A comparison of results in Table IV and V reveals that student training is more meaningful when compared with frequency of using machines in performing machine operations. For example, many of the students who indicated training "not needed" in various machine operations did "not use" the rotary calculator to perform these machine operations.

Training received on the ten-key adding machine. There were 45 students who used the ten-key adding machine to perform a part of their duties in current employment. The data concerning the training received on the ten-key adding machine are analyzed under the following headings: (1) frequency of using the ten-key adding machine in performing certain machine operations, and (2) degree to which the training received on the ten-key adding machine has been helpful to the students in current employment.

TABLE V

DEGREE TO WHICH THE TRAINING RECEIVED ON THE ROTARY CALCULATOR HAS BEEN HELPFUL TO 31 STUDENTS IN CURRENT EMPLOYMENT

Machine Operations	Training Not Needed	Little or no Help	Some or Average Help	Much or Very Helpful
	Number Responding			
Constant Addition	14	4	7	6
Constant Subtraction	14	5	6	6
Constant Multiplication	7	2	10	12
Fixed Decimals in Division	7	2	7	15
Accumulative Multiplication	7	6	10	8
Figuring Discounts	12	2	8	9
Multiplication by Addition and Subtraction	17	4	6	4
Payroll Extensions	19	4	3	5
Percentages	5	2	6	18
A Table of Chain Discount Equivalents	21	5	2	3

This table should be read as follows: Of the 31 students who used the rotary calculator in current employment, 14 did not need training in constant addition, 4 found training in constant addition of little or no help, 7 found training in constant addition to be of some or average help, and 6 found training in constant addition to be very helpful. Note: This table has more significance when compared with Table IV as to the number using the rotary calculator.

(1) Frequency of using the ten-key adding machine in performing certain machine operations. The machine operations performed on the ten-key adding machine included in this study were: division, fixed decimal point in multiplication, left-to-right multiplication, multiplication by addition and subtraction, adding and checking invoices, adding daily and monthly reports, and figuring payrolls. These machine operations were rated by the students as to frequency of use. The students used the following rating scale to indicate how often they performed these machine operations on the ten-key adding machine: never, occasionally, fairly often, or frequently.

A study of Table VI reveals that training in adding and checking

TABLE VI

FREQUENCY OF CERTAIN MACHINE OPERATIONS PERFORMED ON THE TEN-KEY ADDING MACHINE BY 45 STUDENTS

Machine Operations	Never	Occasionally	Fairly Often	Frequently
Division	38	4	2	1
Fixed Decimal Point in Multiplication	31	7	6	1
Left-to-Right Multiplication	23	5	7	10
Multiplication by Addition and Subtraction	25	13	6	1
Adding and Checking Invoices	10	6	7	22
Adding Daily and Monthly Reports	4	3	7	31
Figuring Payrolls	31	2	4	8

This table should be read as follows: Of the 45 students who used the ten-key adding machine, 38 never used the machine to divide, 4 used the machine to divide occasionally, 2 used the machine to divide fairly often, and 1 used the machine to divide frequently.

invoices and adding daily and monthly reports were the most "frequently" performed machine operations on the ten-key adding machine. Eighty-four per cent of the students "never" divided on the ten-key adding machine, and 70 per cent "never" used a fixed decimal point in multiplication or figured payrolls.

(2) Degree to which the training received on the ten-key adding machine has been helpful to the students in current employment. A study of Table VII, page 33, reveals the degree to which the training received on the ten-key adding machine has been helpful to 45 students in current employment. Training received in adding and checking invoices and adding daily and monthly reports were rated "very helpful." Training received in left-to-right multiplication was of "average help" to the students.

A comparison of results in Table VI and VII reveals that student training is more meaningful when compared with frequency of using machines in performing machine operations. For example, a majority of the students who indicated training "not needed" in various machine operations did "not use" the ten-key adding machine to perform machine operations.

Training needed on the machines. The 52 students included in the study gave their opinions concerning whether or not more training should be offered on the key-driven calculator, rotary calculator, and ten-key adding machine in the office machines courses at Northeastern State College. An analysis of the data revealed that approximately 28 per cent of the students suggested that more training should be offered on the key-driven calculator, 48 per cent on the rotary calculator (Marchant),

TABLE VII

DEGREE TO WHICH THE TRAINING RECEIVED ON THE TEN-KEY ADDING MACHINE HAS BEEN HELPFUL TO 45 STUDENTS IN CURRENT EMPLOYMENT

Machine Operations	Training Not Needed	Little or no Help	Some or Average Help	Much or Very Helpful
	Number Responding			
Division	34	2	2	7
Fixed Decimal Point in Multiplication	27	6	4	8
Left-to-Right Multiplication	20	6	3	16
Multiplication by Addition and Subtraction	22	4	10	9
Adding and Checking Invoices	14	1	6	24
Adding Daily and Monthly Reports	7	2	6	30
Figuring Payrolls	27	2	5	11

This table should be read as follows: Of the 45 students using the ten-key adding machine, 34 did not need the training received in division, 2 found that the training received in division has been of little or no help, 2 of some or average help, and 7 very helpful. Note: This table has more significance when compared with Table VI as to the number using the ten-key adding machine.

50 per cent on the rotary calculator (Monroe), and 46 per cent on the ten-key adding machine.

Other aspects of training. In addition to the training in the fundamental processes--addition, subtraction, multiplication and division--other machine skills are considered important in the office machines courses at Northeastern State College.

The students indicated whether or not additional training should be given in the following machine skills in the office machines courses: fundamentals of arithmetic, prorating (such as income and expense), problems containing actual business papers, and a machine practice set. A study of Table VIII reveals that over one half of the students believed that additional training should be devoted to these machine skills except for fundamentals of arithmetic. Of the 52 students responding, 71 per cent suggested that more training be given to machine problems--to include actual papers such as checks, invoices, payrolls; 60 per cent believed more training in prorating of income and expenses would be helpful; 58 per cent indicated a machine practice set be included in the training; only 38 per cent proposed that more time be devoted to the fundamentals of arithmetic.

In addition to the machine skills included in the questionnaire, the students suggested that the courses should place more emphasis on the following aspects of training: Memorizing formulas for calculator operations, speed building drills, operational short cuts, mental check of decimal place setting, and predetermination of decimal points.

Other suggested office machines. As was stated in Chapter I, the machines courses at Northeastern State College included the key-driven calculator, rotary calculator, and the ten-key adding machine. Based

upon their experience in the office, the students suggested other machines that should be included in the office machines courses at the college level. Five students listed posting machines and stencil duplicators; 3 listed bookkeeping machines and IBM Key Punch; 2 listed check protectors and dittos; others one each: printing calculator, Friden Calculator, and Thermo-Fax.

TABLE VIII

STUDENT OPINIONS CONCERNING CERTAIN OTHER ASPECTS OF TRAINING IN THE OFFICE MACHINES COURSES

Other Aspects of Training in the Office Machines Courses	Need More Training Number Responding Yes	No
Fundamentals of arithmetic	20	32
Prorating (such as income and expense)	31	21
Problems containing actual business papers (such as checks, invoices, payrolls, inventories)	37	15
A machine practice set	30	22

This table should be read as follows: Based upon the students' experience in the office, 20 indicated more training should be given in the fundamentals of arithmetic in the office machines courses at Northeastern State College, while 32 thought more training was not needed.

Comments concerning office machine training. Additional comments and suggestions were made by the students based on their own experiences in business as follows:

Since leaving Northeastern and entering the business field, I have discovered that I could have used one whole semester on each kind of machine that I studied rather than nine weeks. One of the most common uses of a rotary calculator that I have found is division by a fixed decimal.

It is my opinion that the introduction of actual business papers into the course would give the course a more practical meaning and prepare the student better for the business world. The key-driven and rotary calculators are more frequently used by employees who specialize in accounting and payroll procedures and will be used a great deal of the time. However, the adding machines will usually be used by secretaries and office personnel who have occasion to add figures and are not the primary machine used.

The Friden calculator, we believe, is the best calculator--it does everything but talk. The knowledge of calculators is imperative in today's business world, but any machine is accessible, too, if you have a good basic knowledge of the fundamental rules of arithmetic.

I think more emphasis should be put on determining the decimal on calculators.

I visit on an average of one company every 3 to 4 days. The ten-key is most often seen with a rotary calculator next. For me, speed was the most noticeable problem.

As a result of my experience, I suggest that a greater emphasis in office machines classes be placed upon speed and practical knowledge of many machines.

I think elimination of key-driven calculators and substitution of rotary training, and enough rotary and ten-key machines for the entire class to use at the same time would be more effective.

In my experience I have found that very much emphasis is placed upon accuracy. Just as in using the typewriter--accuracy first and speed second.

Employer Evaluation of the Training Students Received in the Office Machines Courses

As was stated in Chapter III, this evaluation is based upon the information given by 31 employers. In this study it will be recalled that an employer refers to the immediate supervisor or the individual who employed a student included in this study.

Employers rated the students' office machine training by indicating whether or not the students needed more training in placement of decimal points in the proper place, addition, subtraction, multiplication, or division on the various office machines in order to perform their office duties satisfactorily. A majority of the current employers indicated that the training the students received on the key-driven calculator, rotary calculator, and ten-key adding machine was satisfactory.

Employer evaluations are discussed in the following paragraphs under these headings: (1) training students received on the key-driven calculator, (2) training students received on the rotary calculator, (3) training students received on the ten-key adding machine, (4) other aspects of training, (5) suggested office machines, and (6) comments and suggestions.

Training students received on the key-driven calculator. Sixty-eight per cent of the firms did not use the key-driven calculator. Therefore, opinions of only 10 employers were considered in this tabulation. A study of Table IX reveals that only one employer specified additional training in addition, subtraction, multiplication, and division would have been helpful to the student using the key-driven calculator.

Training students received on the rotary calculator. Opinions of 20 employers were considered in this tabulation. A study of Table X reveals that a majority of the employers indicated that the students did not need additional training on the rotary calculator in order to perform the duties in their firms. However, six employers emphasized a need for "more training" in decimal placement.

TABLE IX

EMPLOYER OPINIONS CONCERNING THE TRAINING STUDENTS RECEIVED ON THE KEY-DRIVEN CALCULATOR

Machine Operations	Students Need More Training Number Responding	
	Yes	No
Ability to add	1	9
Ability to subtract	1	9
Ability to multiply	1	9
Ability to divide	1	9
Ability to place decimal points in proper place	-	10

This table should be read as follows: One employer suggested students needed additional training in addition, while 9 thought more training was not needed.

TABLE X

EMPLOYER OPINIONS CONCERNING THE TRAINING STUDENTS RECEIVED ON THE ROTARY CALCULATOR

Machine Operations	Students Need More Training Number Responding	
	Yes	No
Ability to add	4	16
Ability to subtract	4	16
Ability to multiply	5	15
Ability to divide	5	15
Ability to place decimal points in proper place	6	14

This table should be read as follows: Four employers suggested students needed additional training in addition on the rotary calculator, while 16 thought more training was not needed.

Training students received on the ten-key adding machine. Of the 31 employers responding, 5 indicated that the ten-key adding machine was not used in their firm. Therefore, the findings are based on the opinions of only 26 of the reporting employers.

As shown in Table XI, a majority of the students did not need additional training on the ten-key adding machine for job performance. According to 5 employers, "more training" should be given to multiplication and placement of decimal points; 6 suggested "more training" was needed in addition and subtraction; and only 4 suggested "more training" should be given to division. Six employers indicated that their employees did not use the ten-key adding machine to divide.

TABLE XI

EMPLOYER OPINIONS CONCERNING THE TRAINING STUDENTS RECEIVED ON THE TEN-KEY ADDING MACHINE

Machine Operations	Students Need More Training Number Responding	
	Yes	No
Ability to add	6	20
Ability to subtract	6	20
Ability to multiply	5	21
Ability to divide	4	16
Ability to place decimal points in proper place	5	21

This table should be read as follows: Six employers suggested students needed additional training in addition, while 20 thought more training was not needed. Note: Six employers indicated that their employees did not use the ten-key adding machine to divide.

Other aspects of training. The employers expressed their opinions concerning the students' need for more training in the fundamentals of arithmetic, use of business terms and forms, office procedures, and in organizing work. According to two-thirds or more of the employers, the students did not need further training in these aspects of learnings. Table XII gives additional information concerning the employers' opinions.

TABLE XII

THIRTY-ONE EMPLOYERS' OPINIONS CONCERNING CERTAIN OTHER ASPECTS OF TRAINING IN THE OFFICE MACHINES COURSES

Other Aspects of Training	Students Need More Training Number Responding	
	Yes	No
Fundamentals of arithmetic	3	28
Office procedures	8	23
In the use of business terms and forms	10	21
Organizing work	8	23

This table should be read as follows: Three employers indicated that the students employed in their firm needed more training in the fundamentals of arithmetic, while 28 thought more training was not needed.

Suggested office machines. The employers, as well as the students, suggested other machines that should be included in the office machines courses at the college level. Two employers suggested training on the mechanical tabulating equipment; others one each: suggested training on the dictaphone, Burroughs Sensimatic Posting Machine, and Burroughs "Moon Hopkins" Bookkeeping Machine.

Comments and suggestions. Comments from two of the employers ran as follows:

> If a better correlation could be made between accounting and machine operation, students would be better prepared. Perhaps a course keeping a simple set of books completely on machines. In other words teach accounting as applied to machine operation.

> Normally, graduate accountants and business administration students use calculators and adding machines to a certain degree in the performance of their jobs; however, the academic requirements of their jobs are more dependent upon professional background rather than manipulation of machines. Another factor that may enter the picture is that we have machine accounting through our IBM installation.

Training For All Office Workers Who Used an Office Machine

In addition to the questionnaire, certain other information was requested from employers of the students concerning office machine training for all office machine workers.

These data revealed that approximately 78 per cent of the employers specified that "training should be given" at the college level on the ten-key adding machine and rotary calculator. Fifty per cent of the employers specified that "training should be given" on the key-driven calculator, posting machine, liquid process duplicator and stencil process duplicator.

The employers rated the degree of skill required for office workers on the various office machines in their firms according to this scale: proficiency in the use of the machine--turning out operators who can perform the duties of a machine operator without further training; semi-proficiency--fairly well trained operator with further training on the job; acquaintanceship--a general knowledge of the fundamental

processes of operation with proficiency developed on the job. These data revealed that "proficiency skill" should be developed on the ten-key adding machine, key-driven calculator, and rotary calculator; "semi-proficiency skill" should be developed on the posting machine, liquid duplicator and stencil duplicator; "acquaintanceship" developed on the billing machine.

Summary

The writer's purpose in this chapter has been to present and analyze the results of the survey. The data obtained from the questionnaires were presented and analyzed under two main headings: (1) student evaluation of the office machines courses and (2) employer evaluation of the training students received in the office machines courses.

Based on actual performance in current employment, 52 students were found to be using one or more of the office machines included in the study.

According to the findings, the students used various office machines to perform their duties in current employment, with the ten-key adding machine and the rotary calculator being the most used office machines. A majority of these students used two or more office machines listed in the study.

Fifty per cent or more of the students included in the study believed additional training on the key-driven calculator, rotary calculator, and ten-key adding machine was not necessary in order to perform their duties in current employment.

A majority of the current employers believed the training the

students received in the office machines courses on the key-driven calculator, rotary calculator, and ten-key adding machine was satisfactory.

Other machine skills checked by respondents included: fundamentals of arithmetic, prorating (such as income and expense), problems containing actual business papers, and a machine practice set. Except for the fundamentals of arithmetic, additional training in these machine skills was recommended by more than one half of the students. Only 38 per cent indicated more time should be devoted to the fundamentals of arithmetic.

Two-thirds or more of the employers said the students needed "no additional training" in fundamentals of arithmetic, office procedures, use of business terms and forms, or in organizing work. [illegible]

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This study is concerned with the following question: Are the office machines courses at Northeastern State College meeting the needs of the business education students whose current employment demands office machine skills?

The data for this study were collected through a survey by means of two questionnaires. One of the questionnaires was used to obtain the opinions and current practices of the students now employed in business concerning the adequacies and inadequacies of the office machines courses at Northeastern State College. Only those students who had completed a course or courses in office machines (Business Practice 322 and 332) during the years of 1951 to 1958 were included in the study. The second questionnaire was used to obtain the opinions of the immediate supervisors or employers of these students as to strengths and weaknesses of the students' training received in these courses. (See appendix for complete information concerning the content of the two questionnaires.)

The results of the study are summarized in the following paragraphs.

General Summary

Based on actual performance in current employment, 52 students were found to be using one or more of the office machines included in the study. The findings of the study are based upon responses received from these 52 students and 31 employers of these students.

According to the findings, the students used various office machines to perform their duties in current employment, with the ten-key adding machine and the rotary calculator being the most used office machines. A majority of these students used two or more office machines listed in the study.

Fifty per cent or more of the students included in the study believed additional training on the key-driven calculator, rotary calculator, and ten-key adding machine was not necessary in order to perform their duties in current employment.

A majority of the current employers believed the training the students received in the office machines courses on the key-driven calculator, rotary calculator, and ten-key adding machine was satisfactory.

Summary of Findings Concerning Key-Driven Calculator

There were only 6 students who used the key-driven calculator in current employment.

The students checked the following machine operations according to frequency of using machines and degree to which training has been helpful in current job: division, fractions, left-to-right multiplication, stroke wheel multiplication, checking and balancing ledger accounts, figuring percentages and discounts, checking invoices, figuring payrolls and unit cost, adding and checking sales reports, and making extensions on inventories. Of these machine operations, figuring unit cost was the most "frequently" performed operation on the key-driven calculator. Adding and checking sales reports and stroke wheel

multiplication were the "least" performed operations. In performing their duties, 3 of the 6 students using a key-driven calculator found that the training received in figuring percentages and discounts was "very helpful."

Sixty-eight per cent of the firms did not use the key-driven calculator. Only one employer specified that additional training in addition, subtraction, multiplication, and division would have been helpful to the employed student who used the key-driven calculator.

Summary of Findings Concerning Rotary Calculator

The rotary calculator ranked second in the office machines most used by the students in their present employment.

Eighty-seven per cent of the students included in the study used the rotary calculator to perform their duties in current employment.

The students checked the following machine operations according to frequency of using machines and degree to which training has been helpful in current job: constant addition, subtraction, and multiplication; fixed decimals in division; accumulative multiplication; figuring discounts; multiplication by addition and subtraction; payroll extensions; percentages; and using a table of chain discount equivalents. Of these machine operations performed on the rotary calculator, constant multiplication and percentages were the most "frequently" performed. A table of chain discount equivalents was the "least" performed operation. Fifty per cent or more of the students did not figure payrolls, multiply by addition and subtraction, or use constant subtraction. In performing their duties in current employment, approximately 50 per cent of the

students found that the training received in figuring percentages and using fixed decimal in division was "very helpful."

A majority of the employers indicated that the students needed no additional training on the rotary calculator in order to perform the duties in their firms. Six employers emphasized a need for more training in decimal placement.

Summary of Findings Concerning Ten-Key Adding Machine

The ten-key adding machine ranked first in the office machines most used by the students in current employment.

Ninety per cent of the students included in the study used the ten-key adding machine to perform their duties in current employment.

The students checked the following machine operations according to frequency of using machines and degree to which training has been helpful in current job: division, fixed decimal point in multiplication, left-to-right multiplication, multiplication by addition and subtraction, adding and checking invoices, adding daily and monthly reports, and figuring payrolls. Of these machine operations on the ten-key adding machine, adding daily reports, monthly reports, and invoices were the most "frequently" performed. Fifty per cent or more of the students did "not use" a fixed decimal point in multiplication, multiply by addition and subtraction, or figure a payroll. Approximately 50 per cent of the students found that the training received in adding daily and monthly reports, adding and checking invoices, and left-to-right multiplication was "very helpful" in performing their duties in current employment.

Nine per cent of the employers indicated that additional training on the ten-key adding machine was necessary in order for the student to perform the duties in their firm. Six employers reported their employees did not use the ten-key adding machine to divide.

Summary of Findings Concerning Other Aspects of Training

Other machine skills checked by respondents included: fundamentals of arithmetic, prorating (such as income and expense), problems containing actual business papers, and a machine practice set. Except for the fundamentals of arithmetic, additional training in these machine skills was recommended by more than one half of the students. Only 38 per cent indicated more time should be devoted to the fundamentals of arithmetic.

Two-thirds or more of the employers said the students needed "no additional training" in fundamentals of arithmetic, office procedures, use of business terms and forms, or in organizing work. Thirty-two per cent of the employers believe the students "need more training" in the use of business terms and forms.

Conclusions

Two general conclusions seem evident from this investigation.

1. Training received in the basic fundamental processes performed on the ten-key adding machine, key-driven calculator, and rotary calculator appear to be adequate for a majority of the currently employed students who received their training in the office machines courses at Northeastern State College.

2. Ten-key adding machine and the rotary calculator were the most used office machines.

Recommendations

From a study of the findings and conclusions, the investigator makes the following recommendations:

1. In the office machines courses (Business Practice 322 and 332) at Northeastern State College, more emphasis should be placed on the ten-key adding machine and rotary calculator and less emphasis on the key-driven calculator.
2. All machine operations which were performed "frequently" and were found to be "very helpful" should be strongly emphasized in the office machines courses.
3. All machine operations which were performed "occasionally" or "fairly often" and of "average help" should be included in the office machines courses.
4. A similar study should be made to find out whether or not the office machines courses at Northeastern State College are meeting the needs of the business education students who are currently employed as teachers of business subjects.

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APPENDIX

The following pages contain a copy of each questionnaire used to gather data for the study.

QUESTIONNAIRE CONCERNING THE TRAINING RECEIVED IN THE OFFICE MACHINES COURSES AT NORTHEASTERN STATE COLLEGE

(For Students Who Have Had Courses)

The purpose of this questionnaire is to determine whether or not the business machines courses at Northeastern State College are meeting the needs of the students on the job. If you use an office machine in performing your duties in your present job, please fill out and return the questionnaire in the enclosed envelope as soon as possible. This information will be appreciated and will be helpful in improving instructions in these courses.

If you are not using an office machine, please sign your name and return the questionnaire in the enclosed envelope. Any suggestions for improvement of the courses will be appreciated.

1. General Information

   Your Name _____

   Name of business firm for which you work _____

   Your present position with the firm _____

   Name of your immediate supervisor or employer _____

   Business address of your supervisor or employer _____
   Street

   _____
   City State

2. Did you take an employment test to secure your job? Yes____ No _____

   If your answer is yes, what was the name, type and/or description of test?

   _____

3. In Column I check the machines you are using in your present job.

   In Column II write the brand name of the machines you are using; for example, Royal, Marchant, Comptometer.

   In Column III check the appropriate column to indicate approximately what proportion of your total working time you use the machines checked in Column I in performing your duties in the office.

Machines	Column I Check Machines Used	Column II Brand Name of Machines Used	Column III Per Cent of Total Working Time Spent on Machine			
			1-24	25-49	50-74	75-100
Full-Keyboard Adding Machine						
Ten-Key Adding Machine						
Key-Driven Calculator						
Rotary Calculator						
Printing Calculator						

Machines	Check Machines Used	Brand Name Of Machines Used	Per Cent of Total Working Time Spent on Machine 1-24	25-49	50-74	75-100
Posting Machine	_____	_____	____	____	____	____
Transcribing Machine	_____	_____	____	____	____	____
Liquid Process Duplicator	_____	_____	____	____	____	____
Stencil Process Duplicator	_____	_____	____	____	____	____

4. This part of the questionnaire is devoted to securing, based upon your experience in the office, the degree to which the training received in the Office Machines Courses (Business Practice 322 and 332) at Northeastern has been helpful to you in performing your duties in your present job.

   Please circle the number in the column on the right side of the page to indicate how helpful the training received in Office Machines Courses has been to you on the job. Use the key at the top of the column.

   Please circle the number in the column on the left side of the page to indicate how often you use the training in your present job. Use the key at the top of the column.

   If you do not use the machine, leave all operations listed below that particular machine blank.

How often do you use the machine to perform the following operations?	How helpful was machine training in your present job?
1 Never	1 Training not needed
2 Occasionally	2 Little or no help
3 Fairly Often	3 Some or average help
4 Frequently	4 Much or very helpful

Key-Driven Calculator

1 2 3 4	Division	1 2 3 4
1 2 3 4	Fractions	1 2 3 4
1 2 3 4	Left-to-right Multiplication	1 2 3 4
1 2 3 4	Stroke Wheel Multiplication	1 2 3 4
1 2 3 4	Checking and Balancing Ledger Accounts	1 2 3 4
1 2 3 4	Figuring Percentages	1 2 3 4
1 2 3 4	Figuring Discounts	1 2 3 4
1 2 3 4	Checking Invoices	1 2 3 4
1 2 3 4	Figuring Payrolls	1 2 3 4

How often do you use the machine to perform the following operations?		How helpful was machine training in your present job?
1 Never 2 Occasionally 3 Fairly Often 4 Frequently		1 Training not needed 2 Little or no help 3 Some or average help 4 Much or very helpful
1 2 3 4	Figuring Unit Cost	1 2 3 4
1 2 3 4	Making Extension on Inventories	1 2 3 4
1 2 3 4	Adding and Checking Sales Reports	1 2 3 4
Rotary Calculator		
1 2 3 4	Constant Addition	1 2 3 4
1 2 3 4	Constant Subtraction	1 2 3 4
1 2 3 4	Constant Multiplication	1 2 3 4
1 2 3 4	Fixed Decimals in Division	1 2 3 4
1 2 3 4	Accumulative Multiplication	1 2 3 4
1 2 3 4	Figuring Discounts	1 2 3 4
1 2 3 4	Multiplication by Addition and Subtraction	1 2 3 4
1 2 3 4	Payroll Extensions	1 2 3 4
1 2 3 4	Percentages	1 2 3 4
1 2 3 4	A Table of Chain Discount Equivalents	1 2 3 4
Ten-Key Adding Machine		
1 2 3 4	Division	1 2 3 4
1 2 3 4	Fixed Decimal Point in Multiplication (When the total number of decimal places do not equal five, add enough zeros to equal five so the comma will be the decimal)	1 2 3 4
1 2 3 4	Left to Right Multiplication	1 2 3 4
1 2 3 4	Multiplication by Addition and Subtraction	1 2 3 4
1 2 3 4	Adding and Checking Invoices	1 2 3 4
1 2 3 4	Adding Daily and Monthly Reports	1 2 3 4
1 2 3 4	Figuring Payrolls	1 2 3 4

5. Based upon your experience in the office, should more training be offered on the machines in the office machines courses at Northeastern?

   Please check yes or no.

Machines Included in the Office Machines Courses at Northeastern	Is More Training Needed on the Machine? Yes	No
Key-Driven Calculator	_____	_____
Ten-Key Adding Machine	_____	_____
Rotary Calculator (Marchant)	_____	_____
Rotary Calculator (Monroe)	_____	_____

6. Based upon your experience in the office, should other office machines be included in the office machines courses at Northeastern State College?
   Yes_____ No_____.

   If yes, please list machines_____

7. Based upon your experience in the office, should more training be given in the following aspects of the office machines courses at Northeastern:

   Please check yes or no.

Fundamentals of arithmetic	Yes____	No____
Prorating (such as income and expense)	Yes____	No____
Problems containing actual business papers (such as checks, invoices, payrolls, inventories)	Yes____	No____
A machine practice set	Yes____	No____

   Other aspects of training that should be included or emphasized more:____

   _____

   _____

8. Comments and suggestions for improving the office machines courses at Northeastern State College:

QUESTIONNAIRE CONCERNING THE TRAINING RECEIVED IN THE OFFICE MACHINES COURSES AT NORTHEASTERN STATE COLLEGE

(For Employers)

The purpose of this questionnaire is to obtain information that may be used in improving instruction in the office machines courses at Northeastern State College, Tahlequah, Oklahoma. The questions in Part I relate to the adequacy of the training received by students at Northeastern for doing office work in your firm. Part II asks for general information concerning the type and degree of training needed by students in preparing for jobs using office machines.

Part I

This section of the questionnaire is concerned only with the training (name of student) , an office worker in your employ, received in the office machines courses at Northeastern State College.

1. Did the student need more training on the following office machines in order to perform his duties in your firm?

   If the machine or one of the fundamental processes on the machines is not used in your firm, please check this in the "Not Used" column.

   For the machines or operations required in your firm, please check yes or no in the "Was More Training Needed on the Machine?" column concerning the adequacy of training.

Office Machines	Not Used	Was More Training Needed on the Machine? Yes	No
Ten-Key Adding Listing Machine	___	_____	_____
Ability to add	___	_____	_____
Ability to subtract	___	_____	_____
Ability to multiply	___	_____	_____
Ability to divide	___	_____	_____
Ability to place decimal points in the proper place	___	_____	_____

Office Machines	Not Used	Was More Training Needed on the Machine? Yes	No
Key-Driven Calculator	____	_____	_____
Ability to add	____	_____	_____
Ability to subtract	____	_____	_____
Ability to multiply	____	_____	_____
Ability to divide	____	_____	_____
Ability to place decimal points in the proper place	____	_____	_____
Rotary Calculator	____	_____	_____
Ability to add	____	_____	_____
Ability to subtract	____	_____	_____
Ability to multiply	____	_____	_____
Ability to divide	____	_____	_____
Ability to place decimal points in proper place	____	_____	_____

2. Did the student need training on other machines that were not listed in question 1? Yes_____ No_____

   If yes, please list machines_____

3. Did the student need more training in the following aspects of learning?

   Please check yes or no.

   Fundamentals of arithmetic Yes_____ No_____

   Office procedures Yes_____ No_____

   In the use of business terms and forms Yes_____ No_____

   Organizing work Yes_____ No_____

   Other aspects of training that should be included or emphasized more:

   _____

Part II

This section of the questionnaire is concerned with the training for all office workers who use office machines in performing some of their duties in your firm.

1. Is college training necessary on the following office machines for employment of office workers who use office machines in performing some of their duties in your firm? Check your answer in the "Is Training Necessary?" column.

   If answer is yes, please circle the number in the "Degree of Training Required" column to indicate the degree of skill performance necessary for employment of office workers in your firm.

   The degree of skill required in operating the following machines may be judged according to this scale:

   1 Proficiency in the use of the machines--turning out operators who can perform the duties of a machine operator without further training.

   2 Semi-proficiency--fairly well trained operator with further training on the job.

   3 Acquaintanceship--a general knowledge of the fundamental processes of operation--proficiency developed on the job.

Office Machines	Is Training Necessary?	Degree of Training Required
Ten-Key Adding Listing Machine	Yes__ No__	1 2 3
Key-Driven Calculator	Yes__ No__	1 2 3
Printing Calculator	Yes__ No__	1 2 3
Rotary Calculator	Yes__ No__	1 2 3
Liquid Process Duplicator	Yes__ No__	1 2 3
Stencil Process Duplicator	Yes__ No__	1 2 3
Billing Machine	Yes__ No__	1 2 3
Posting Machine	Yes__ No__	1 2 3
Transcribing Machine	Yes__ No__	1 2 3
Other Machines:_____		1 2 3
_____		1 2 3

2. Comments or suggestions for better trained machine operators:

VITA

Zoe Velma Davis

Candidate for the Degree of

Education Specialist

Thesis: EVALUATION OF THE OFFICE MACHINES COURSES AT NORTHEASTERN STATE COLLEGE, TAHLEQUAH, OKLAHOMA

Major Field: Higher Education

Biographical:

Personal data: Born near Bloomer, Arkansas, the daughter of Claude E. and Audra (White) Davis.

Education: Attended Fair View Grade School near Spiro, Oklahoma; graduated from Spiro High School; received the Bachelor of Science degree from Northeastern State College, with a major in Business Education, in May, 1939; received the Master of Science degree from Oklahoma State University, with a major in Business Education, in August, 1949; completed requirements for the Education Specialist degree in May, 1961.

Professional experience: Entered the field of teaching in 1941; taught Business Education in Pryor High School and Tahlequah High School; served as Supervisor of Business Education in Bagley Training School, Northeastern State College; taught Business Education in Northeastern State College.

Professional organizations: Member of the National Education Association, Oklahoma Education Association, United Business Education Association, Mountain Plains Business Education Association, Pi Omega Pi, Delta Pi Epsilon, Delta Kappa Gamma, Kappa Delta Pi.