A Study of Data Processing Employment Opportunities for High School Graduates in the Ogden Area with Implications for Secondary Business Education

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A STUDY OF DATA PROCESSING EMPLOYMENT OPPORTUNITIES FOR HIGH
SCHOOL GRADUATES IN THE OGDEN AREA WITH IMPLICATIONS
FOR SECONDARY BUSINESS EDUCATION

by
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CHAPTER I
INTRODUCTION

LaSalle\(^1\) found that while automation is increasing at an even accelerating pace, little emphasis is apparent in high school curriculums on the significance of automated processes for prospective office workers. He further stated that business education departments should study local situations and prepare students to qualify for available data processing employment.

The need for data processing training in the Ogden area is evident in the frequent requests\(^2\) by local employers for people trained in data processing.

**Statement of the Problem**

The purpose of this study was to:

1. Determine if firms using automated data processing equipment in the Ogden area would employ teen-age high school graduates in their data processing centers.

2. Determine the employment and advancement policies for

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\(^2\)"IRS seeks 14,000 to staff center in 1968," Ogden Standard Examiner, August 20, 1967, Sec. B, p. 1B; "IRS sends job applications to Brigham City residents," Ogden Standard Examiner, September 13, 1966, Sec. B, p. 1B.
teen-age high school graduates who could qualify for job entry data processing positions if these positions were found to be available.

3. Develop a suggested course of study that would help high school students meet the job entry requirements for data processing positions.

Objectives

Most specifically the purpose of this study was to help the schools better prepare students for the requirements of data processing employers by answering the following questions as they relate to teen-age high school graduates in the Ogden area:

1. How many data processing positions are available?
2. What data processing positions are available?
3. How many were hired during 1967 in data processing centers?
4. Are employers willing to train those who are employed by their firms for advancement in data processing?
5. To what extent should data processing be taught at the high school level?
6. What specific topics do employers feel should be taught at the high school level?
7. Will employers help train students enrolled in high school for data processing occupations?

Procedures

In order to complete this study a questionnaire was developed and sent to employers to obtain information which would answer the questions
listed in the objectives of the study. The employers included in the study were those which are listed as data processing employers by the Ogden Division of the Utah Department of Employment Security.

A ten percent random sample (3) of these employers was used as a pilot study to test the usefulness of the questionnaire. For the pilot study the questionnaires were mailed to the businesses involved.

After evaluation of the returned pilot study questionnaires as to their usefulness, necessary changes were made and the revised questionnaire was sent to the remaining employers on the employment security list. One week after the mailing of these questionnaires a follow-up telephone contact was made. Two weeks after the mailing of the questionnaire a final follow-up by telephone was made of the companies who had not yet returned their questionnaire.

The completed questionnaires were then tabulated in relation to the purpose and objectives of the study. The results are given in a percentage analysis. From the information received, a course of study was developed to help students meet the needs suggested by the employers.

**Importance of Study**

Even though attention to automation has been limited thus far in public schools, it appears evident now that business will ultimately demand preparation of office workers beyond the traditional bookkeeping, typewriting, and shorthand. . . . In addition, students should be willing to devote much time and effort to the automatic processes and to learning the new tasks involved.1

This is only one of many statements which have been made indicating that graduating business students will be facing challenging

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new work situations. If business education programs in the secondary schools are going to help students meet this challenge, they must provide realistic, up-dated training for their students.

Gibson\(^1\) states that all office workers will need to know how data is processed and programmed for computer use. He also recommends that business education departments should be teaching students about automated data processing equipment.

Students should not only become acquainted with this new automated equipment, but as Smith\(^2\) explains, it is imperative that students know how the use of this automated equipment affects the basic business operations.

The present study, other related studies, and current research seem to indicate that the teaching of data processing at the high school level is not only feasible but most desirable. . . . Although it is difficult to determine the number of high school students who will make use of specific skills in the area of data processing it could be safely asserted that more will use the general background information in data processing regardless of the vocation they choose for their life's work.\(^3\)

At the time this report was written there were five high schools in the Ogden area; four of these high schools were teaching a unit of data processing within other business classes and one was teaching a semester of data processing.


Limitations

The findings of this study will be limited by two factors: (1) the number of employers in the Ogden area with data processing equipment, and (2) the ability of these employers to interpret the questionnaire.
CHAPTER II
REVIEW OF RELATED LITERATURE

Because data processing is a new subject in those curriculums in which it has been instituted, very few definite guidelines and procedures have been established for developing these types of programs. The literature reviewed for this study was researched and presented as it related to the objectives of this study.

History

Data processing, as defined by Hass, is the processing of information through a series of planned actions to produce a desired result. Data processing is not something new but, as Jones explains, has existed since man's communication first began.

Data processing has existed ever since man was first able to communicate his thoughts to other persons. As civilization progressed, man was able to develop his tools for communicating, recording, and processing his thoughts to ever-increasing stages of sophistication. Patchen concurs by stating that

... "data processing" has been around much longer than we have! Man has always been processing data of one sort

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or another... data was "processed" when record keeping began! Only the "electronic" part of data processing is new today.¹

This "processing of information" has received several refining features since it began. Morrow² suggests that the mechanization of information processing got underway with the introduction of the typewriter in the 1870's. Hass more directly refers to this mechanization in the field of data processing.

... data processing is certainly not new. The Romans processed data when they counted and taxed the populations of their conquests. However, data processing as we know it today stems from the time data was transformed into a form which could be processed by machines.

The birth of data processing as such may be fixed at sometime between 1880 and 1890.³

Need for Data Processing Instruction

From the beginning of data processing and with the aid of technological advancements, data processing has expanded and become a widely accepted method of processing information.⁴ Wood, Espegren and Kallaus are educators who realize that data processing is here to stay.


³Hass, Data Processing, 2.

Automated data processing is not just another fad that will pass from the scene in a few years. It is here to stay.1

The business teachers at all levels must realize that the computer--data processing is here to stay and will play a greater and greater role in our lives.2

With the increase in the use of data processing equipment and procedures one might well ask what responsibility the educational system should take in making students aware of how this expanding field of information processing will affect their lives. Weber believes that all citizens and workers should have a general knowledge of electronic data processing. He has stated that "each student in high school needs to know how electronic data processing will affect his personal, social, and economic life--now and in the future."3

Rusher mentions more specifically challenges presented to business educators.

Today, business educators are facing one of their biggest challenges--to revise the business curriculum to meet the needs of the automated office. To continue to offer the traditional courses alone will not prepare students sufficiently for the opportunities and responsibilities required by up-to-date business procedures.4

Pactor also realized that some changes must be made if we are going to keep curricula current.

2Norman F. Kallaus, "Where Do We Stand in Electronic Data Processing?" Business Education World, XLVI (June, 1966), 22.
The business education curriculum has undergone necessary changes from time to time to keep abreast of current changes and practices. We are now faced with revolutionary changes in the practices of recordkeeping and data processing. Is our curriculum in the high schools to become archaic by the omission of the latest practices which our pupils will have to face upon graduation? 

Roman says that business educators have faced challenges in the past that have come from office mechanization and that now we have a new challenge.

In the realm of offering new subjects at the high school, the challenge exists to classroom teachers to present an introductory course in data processing. Hayden indicates that this new challenge is not being met.

The high schools of America have not kept pace with the trend in business automation. Currently, only a handful provide orientation courses of more than a semester, but a change is in the making throughout the United States. In the immediate future, the high school business curriculum will offer, or include courses in data processing.

One of the major objectives of business education is to train students for occupational competency. Miller believes that if we do not include data processing in the curriculum we are not fulfilling this objective.

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Currently the increasing use of automated processes in office procedures, particularly data processing, by corporations and companies is curtailing the employment possibilities for business students upon graduation from high school.¹

Data Processing at the Secondary Level

From the literature reviewed to this point, apparently there is a need for data processing training within our educational system; but at what level should this training begin? Should, as previously quoted articles have mentioned, high school be the first introduction? If so, what classes should contain this data processing instruction?

Some school districts are experimenting with data processing instruction at the elementary level. One of these districts in Milwaukee reports that fifth graders have successfully undertaken a series of eight bi-weekly classes on such sophisticated topics as Hollerith Code, flow-charting and programming. According to Mr. Guznicažak, superintendent of the Franklin schools,

Instruction for the fifth graders was a little different than that for older students. The teacher explained how to operate a card sorter this way: "Hold in the starter button until you hear three klunks and then it will run automatically."²

Most of the emphasis for introduction to data processing, however, comes at the high school level. Haga expresses the need for a separate one-year data processing course at the high school level for all students.

¹Ibid.

There is a need for at least a one-semester and preferably a one-year high school course in automation and data processing; this course should be for all students not just those in the business curricula. . . . Some understanding of an automated society should be as valuable to students as an appreciation of the workings of our economy, basic English and simple mathematics.  

Bangs also emphasizes the need for data processing at the high school level. In his recent study he recommended that data processing be offered at the 10th grade level as an introduction, followed by two consecutive full-year programs at the 11th and 12th grades.  

Not only educators, but businessmen as well, realize the need for data processing instruction in the high school. J. Stanford Smith, Vice President and Group Executive of General Electric's Information Systems says:

And why wait until college level to start giving your people a familiarity with computers? Most high schools give routine typing courses. Every high school which gives typing classes should also give a basic computer training class with a time-sharing computer.  

LaSalle, in his study of data processing manufacturers and equipment users found that 96 percent of the respondents felt that using ADP equipment should be one of the objectives of the secondary school.  


He also noted that 95 percent of the manufacturers and 85 percent of the users felt that the secondary schools should offer a course devoted to the study of automation.\(^1\)

In a survey of 31 nationally recognized business leaders, Wanous reported that "...84 percent of the leaders believed that instruction in automated data processing should be offered in secondary schools."\(^2\) Gibson stated that the trend of data processing instruction moving to the high school is increasing.

A phenomenon that is beginning to attract widespread notice is the movement of data processing to high schools. ...

It is probably not too much to say that this trend will intensify in the years ahead. By 1975, most data processing job entrance training should be the responsibility of the high school—not the community college.\(^3\)

Uthe gives another good reason why data processing should be offered at the high school level.

Since the high school is the highest educational organization that reaches the majority of the youth citizens, it must accept the responsibility for providing the facts and theories about automated data processing.\(^4\)

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\(^1\)LaSalle, "The Role of the Secondary School Business Education Department in Preparing Students for Employment."


\(^3\)E. Dana Gibson, "Job Entrance Data Processing Training Moving To The High School Level," SABE Data Processor, VIII (April, 1968), 15.

Bechner says that not only should "... data processing training begin at the high school level, but that the responsibility for this training belongs primarily in the business education field."\(^1\)

If data processing is to be taught at the high school level, where should it be taught within the curriculum structure? Haga, as quoted earlier, feels that a separate class is needed.\(^2\) Wood and Espegren believe that data processing should be taught in all vocational business classes as it relates to that subject.

Every student enrolled today in a vocational business course--stenographic, clerical, bookkeeping or distributive--must become familiar with the fundamentals of data processing. Automated data processing exists in some form on almost any office job.\(^3\)

Musselman summarizes the feelings of many business educators as to how data processing can be organized into a school's business curriculum.

Our large schools in metropolitan centers can and should offer comprehensive study in the field. Other high schools can offer units of instruction in selected courses that are already in their curricula.\(^4\)

**Course Content**

The content of a data processing course will be governed to a large extent by the time allotted to the subject. This will vary

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\(^2\)Haga, "Automation and You."

\(^3\)Wood and Espegren, "Data Processing An Introduction For Students."

depending on whether the course is a class of data processing only or if it is integrated within another class.\footnote{John C. Roman, "The Business Curriculum," South-Western Monograph 100 (Cincinnati: South-Western Publishing Company, 1966), 46.} Regardless of size of program, Jones explains some concepts which should be given to all data processing students.

The program should emphasize to the student the fact that the rapidly developing computer technology causes changes in the duties and operations he will perform from time to time and that, if he is to be able to retain his employment, he will have to be involved often in programs of continuing education. The student should be made aware of the occupations which exist and the background of education and work experience that is necessary for employment in each of these occupations.\footnote{Jones, Data Processing--An Old Shoe With A New Sole," p. 148.}

Bangs' recently completed study on data processing positions\footnote{Bangs and Hillestad, Curricular Implications Of Automated Data Processing.} gives more insight as to what should be taught to students interested in data processing.

First, employees in data processing for business do not need an extensive background in math as has been the idea of many teachers. Logic is the characteristic we are looking for in data processing personnel. . . .

Second, employees in data processing for business must understand systems. This means that at the secondary level we must teach the total business system—not isolated jobs in business—if our young graduates are to comprehend and progress in the field of data processing.\footnote{F. Kendrick Bangs, "Our Commitment To Research," The Balance Sheet, XLIX (May, 1968), 399.}

Dr. Joseph H. Morrow of the Equitable Life Assurance Society of the United States, in speaking to the California Business Education Association, stated that large users of data processing equipment felt
that students should be taught basic data processing concepts at the secondary level and not operation of specific computers.

I do know that it is the feeling at Equitable, and undoubtedly other large users of electronic data processing equipment agree, that it is possible to teach the techniques for a specific computer in three months or less either on the job or in specially designed short technical courses. . . .

It is, however, becoming increasingly useful for students to understand the concepts of the computer.

The writers reviewed on course content are well summarized by Rusher when she says that wherever possible data processing machines should be a part of instruction; however, basic principles should be stressed. When machinery is not available, data processing should be taught in each business class as it relates to that class with a separate course offered to introduce students to data processing concepts.1

Job Availability

Before data processing can be justified as a vocational course within the business area, there must be available employment for the graduates.2 Farsh points out that some schools do not offer data processing because they feel that only the college graduate can qualify for such positions. He, however, does not share this point of view as is evidenced by his statement that

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1Rusher, "Implications of Electronic Data Processing for Business Education."

Nothing could be farther from the truth. It may come as a surprise to many business teachers, but most of the entry jobs in the area of data processing are available to the high school graduate.¹

Cook agrees with Parsh.

Basically, a high school education is sufficient for securing employment in a data processing installation. This has been so in the past, is the pattern today, and was the projected pattern for the future in all but two job classifications—systems analysts and supervisors. In the latter cases, approximately 40 percent of the companies have and will hire persons with no more than high school training for even these two positions.²

Jones made a survey in Ohio to determine if data processing jobs were available for high school graduates. Using the 54 occupations recommended by Business and Automation she surveyed 69 computer installations. Her survey showed that

Of these 54 occupations, 27 were found to be first-level entry occupations—occupations for which a clerical worker with no more than a high school education and with no work experience might qualify.³

Bangs found that jobs high school students can obtain will not soon be obsolete.

Computer manufacturers indicated that little change would take place in computers in the next three to ten years... thus, many of the jobs now available will continue to be prevalent for several years to come.⁴


³Jones, "Data Processing--An Old Shoe With A New Sole."

⁴Bangs and Hillestad, Curricular Implications Of Automated Data Processing.
Wenner summarizes data processing job availability for recent high school graduates in the following statements:

The jobs in mechanical and electronic data processing were also examined to determine which jobs were open to recent high school graduates. At that time, there were only two positions which recent high school graduates could not obtain because further education and also a number of years of data processing experience were required by the majority of employers.

This information, then does show that the field of data processing does have a place for recent high school graduates. It also shows that a course in data processing at the high school level can be of significant value to these persons in seeking employment in this field.1

**Successful Programs**

One way to help evaluate the need for and usefulness of a program is to examine those already in existence and see what results they have accomplished.2 Miller reports that the new data processing program at Southport High School has created much enthusiasm among the students taking the class.

We were able to arrange for visitations in a large insurance office, two of the city's largest banks, plus an opportunity to visit the IBM Operators Training School. . . . One could notice the increase in interest among the students after each one of these visitation. . . .

. . . . . . . . . . . . . . . . . . . . . . . .

The students, even in the one-semester course, go about the work with great interest and desire; it is amazing how much they are accomplishing.

Miller goes on to say that the businessmen are most willing to cooperate in making the program a success. After having one of the city's

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1 Wenner, "A High School Orientation Course In Data Processing," p. 49.

2 Factor, "Data Processing Instruction In The High School? Yes!" p. 187.
bankers spend more than two hours of his time to give the class a tour of the bank, Miller gives the closing statement of their conversation.

When we were leaving and I was trying to be gracious in thanking him for his tremendous efforts, he replied, "You may return the favor by permitting us to interview these girls for positions upon their graduation next June."

Carpenter and Nickels report the same student enthusiasm and success of their program by being able to help students obtain work as a result of this new training.

With one or more courses as a background, ten students worked full-time in data processing during the summer of 1967. Wages ranged from $1.75 to $2.95 per hour. All students agreed that wages were not the prime incentive. The opportunity to broaden and apply their formal education and to secure the first job in data processing were the two most important factors.

Several students have demonstrated exceptional proficiency. These students have been employed and are currently employed in computer operations, as computer programmers and system analysts. Many students are also employed in keypunching and tab operations. Even minimum training in data processing has qualified students to enter this field.

Carpenter and Nickels conclude that even students who are not vocationally oriented in business are taking the courses as a base for post-secondary education.

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Summary

The literature reviewed indicated a definite need for data processing training at the high school level. Course content will be governed to a large extent by the needs of the area served by the high school. The data processing programs researched were considered successful by the sponsors. None of the sponsors reported a lack of jobs for their data processing graduates. The outstanding feature of the reported data processing programs being offered is that they not only provide employment opportunities for the exceptional student but also for those who are not highly skilled.¹

CHAPTER III

PROCEDURES AND FINDINGS

To meet the objectives of this study it was necessary to (1) select a population, (2) prepare, test, disperse, and collect the questionnaires, and (3) tabulate the collected data. The following paragraphs explain the procedures used to obtain the needed information.

Selection of Data Processing Employers

The method used to select a population was to obtain, from the local state employment office, a list of employers that used data processing equipment. Mr. Warren T. Caldwell, Manpower Specialist for the Ogden Division of the Utah Department of Employment Security, was contacted and was asked for a complete list of data processing employers in the Ogden area. A list of twenty-three businesses consisting of both governmental and private agencies was secured.

Preparation, Distribution and Collection of Questionnaires

After a review of "Evaluative Criteria For Survey Instruments In Business Education" and consultation with the graduate committee chairman, a four-page questionnaire was prepared. This questionnaire has been included in appendix B of this report. The objectives listed in Chapter I were used as a basis for the questions to be included in the questionnaire.
Copies of this questionnaire were then mailed to three employers randomly selected from those submitted by the employment security office as a pilot study. These questionnaires were all returned within ten days. After evaluation of the returned pilot study questionnaires as to their usefulness, necessary changes were made and the revised questionnaire was prepared. This revised questionnaire was then mailed to the remaining employers on the employment security list.

One week after the mailing of these questionnaires a telephone contact was made to the eight employers who had not yet returned their questionnaire. Two weeks after the mailing of the questionnaire a final follow-up was made by telephone. After this final follow-up, responses were obtained from all twenty-three employers.

**Tabulation of Data**

The completed questionnaires were then tabulated manually. The responses on each questionnaire were transferred to one master copy of the questionnaire. The results of the survey will be reported later in this chapter in a percentage analysis.

**Utilization of Data**

From the results of this survey and suggestions given by employers on the questionnaires a course of study was developed to help students meet the needs suggested by the employers. The topics of instruction requested by employers were of a general nature. To be more specific in the areas of instruction requested, textbooks on data processing were consulted. The resulting course of study is presented in appendix C.
Findings

The purpose of this study was to determine if data processing positions were available to teen-age high school graduates in the Ogden area, the results of which would give direction for data processing programs in the secondary schools. The remainder of this chapter reports the results obtained from the questionnaires.

The responses of four of the twenty-three companies involved in this study were given verbally as they had misplaced the questionnaires and did not employ high school graduates in their data processing programs. Five of the twenty-three companies had, within the last six months, moved their data processing operations from Ogden to other cities so that at the time the questionnaires were sent out they had no data processing employment available. Therefore, the results and percentages given in this chapter are based on the remaining eighteen companies which have data processing equipment in the Ogden area.

Question 1.

The first question asked of the employers was if they employed teen-age high school graduates in their data processing operations. Eight (44.4%) indicated that they did hire teen-age high school graduates for data processing positions.

Question 2.

Next the employers were asked how many teen-age high school graduates they hired in 1967. As can be seen in table one, six employers hired from one to five graduates; one employer hired from six to ten graduates; one employer hired between eleven and fifteen graduates.
TABLE 1
TEEN-AGE HIGH SCHOOL GRADUATES EMPLOYED IN DATA PROCESSING POSITIONS DURING 1967

<table>
<thead>
<tr>
<th>Number of Employers</th>
<th>Number of Graduates Employed</th>
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<tr>
<td></td>
<td>1-5</td>
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<tr>
<td>6</td>
<td>X</td>
</tr>
<tr>
<td>1</td>
<td></td>
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Question 3.
When asked how many jobs were suitable for teen-age high school graduates, the indication was that more positions were suitable than were being filled. As table two shows, four employers indicated one to five jobs were suitable; two employers stated that six to ten jobs were suitable; one employer had sixteen to twenty suitable positions and one other listed thirty-four jobs as suitable for teen-age high school graduates.

TABLE 2
NUMBER OF POSITIONS SUITABLE FOR TEEN-AGE HIGH SCHOOL GRADUATES

<table>
<thead>
<tr>
<th>Number of Employers</th>
<th>Number of Suitable Employment Positions</th>
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<tr>
<td></td>
<td>1-5</td>
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<tr>
<td>4</td>
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<tr>
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<td>1</td>
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*This employer listed 34 suitable positions.
Question 4.

The number of positions suitable for high school graduates are classified by job title in question four. The job titles are:

- control clerk
- sorter operator
- electric accounting machine operator
- encoder operator
- keypunch operator
- verifier operator
- tape librarian
- computer programmer
- computer operator trainee
- computer equipment operator
- computer input and output processor

Question 5.

Promotion policy of high school graduates was the topic of question five. All employers (44.4%), that employed the high school graduates, indicated that advancements were made without a further education requirement.

Question 6.

This question specifically asked employers if additional training were required for advancement, would they provide that training. Again all employers (44.4%) that hired high school graduates said they would provide additional training when required.

Question 7.

Regarding the high school's responsibility to provide training for data processing occupations, eight (44.4%) of the employers felt that the high school should prepare students for data processing employment.

Question 8.

When the employers were asked which business courses contributed most to the preparation of data processing employees, they did not agree
except that shorthand was relatively unimportant. Table number three reports by percentage the diversity of responses given as to the importance of business courses for prospective data processing employees.

### TABLE 3

**IMPORTANCE OF BUSINESS SUBJECT FOR DATA PROCESSING EMPLOYMENT**

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<td>0.0</td>
<td>0.0</td>
<td>44.4</td>
</tr>
<tr>
<td>Accounting</td>
<td>11.1</td>
<td>11.1</td>
<td>16.7</td>
<td>0.0</td>
<td>5.5</td>
</tr>
<tr>
<td>Office Practice</td>
<td>5.5</td>
<td>5.5</td>
<td>22.2</td>
<td>5.5</td>
<td>5.5</td>
</tr>
<tr>
<td>General business courses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>such as Business Math</td>
<td>5.5</td>
<td>27.8</td>
<td>5.5</td>
<td>5.5</td>
<td>0.0</td>
</tr>
</tbody>
</table>

The table does indicate that accounting and general business courses were more important than other classes listed.

Question 9.

Eight (44.4%) of the employers felt that business education departments should offer a course devoted specifically to a study of data processing.

Question 10.

A wide variety of responses were obtained to the questions, "At what level should the course be offered?" and "How long should the course be?" One employer (5.5%) replied that a full year course should be offered at each of the 10th, 11th, and 12th grade levels. One employer (5.5%) stated that an introduction to data processing should
be integrated into another business course at the 10th grade followed by data processing courses in the 11th and 12th grades. One employer (5.5%) said that a one-year course in data processing should be offered at the 10th grade level. Four employers (22.2%) suggested a full-year data processing course in either the junior or senior year.

Question 11.

In response to part (a) of this question the following course titles were suggested:

- Computer Science
- Introduction to Data Processing
- Basic Computer Systems
- Automatic Data Processing

Four of the employers who employed high school graduates did not respond to this part of the question. From part (b) the topics that employers requested be included in the full-year course are listed below:

- The history of data processing
- The development of data processing
- The vocabulary of data processing
- Types of data processing equipment
- Employment opportunities in data processing
- Orientation to data processing
- Coding
- Sorting
- Block diagraming
- Flow charting
- Programming
- Machine operation
- Optics
- Telecommunications
- Social impact of data processing
- Data processing in the future

Question 12.

None of the employers responded as to what topics should be discussed in a short unit of data processing because they all felt
that a separate course should be included in the high school curriculum.

Question 13.

When asked if formal instruction on data processing machines should be offered, those employing high school graduates (44.4%) responded as indicated in table four.

<table>
<thead>
<tr>
<th>TABLE 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATA PROCESSING MACHINES WHICH STUDENTS SHOULD BE TRAINED TO OPERATE</td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
<tr>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>------------------------------</td>
</tr>
<tr>
<td>Keypunch machines</td>
</tr>
<tr>
<td>Tabulating machines</td>
</tr>
<tr>
<td>Sorters</td>
</tr>
<tr>
<td>Collators</td>
</tr>
<tr>
<td>Accounting machines</td>
</tr>
<tr>
<td>Electronic computers</td>
</tr>
</tbody>
</table>

Question 14.

Of the eight employers (44.4%) that hired high school graduates, six (33.3%) reported that they would cooperate with business education departments to provide students with data processing machine training.
CHAPTER IV
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The objectives of this study were to learn the following about the Ogden area:

1. How many data processing positions are available for the high school graduate?
2. What data processing positions are available for the high school graduate?
3. How many high school graduates were hired during 1967 in data processing centers?
4. Are employers willing to train high school graduates who are employed by their firms for advancement in data processing?
5. To what extent should data processing be taught at the high school level?
6. What specific topics do employers feel should be taught at the high school level?
7. Will employers help train students enrolled in high school for data processing occupations?

A list of twenty-three data processing employers in the Ogden area was obtained from the Ogden division of the Utah Department of Employment Security. Five of the twenty-three companies had transferred their data processing operations within the last six months; therefore, the
results of the study were obtained from eighteen data processing employers in the Ogden area.

Eight of the eighteen data processing employers hired teen-age high school graduates. There were more jobs reported as suitable for high school graduates than were being filled by these graduates at the time the study was conducted.

Promotion to higher positions was available without further education. For the advanced positions requiring additional training, the companies were willing to train the graduates they hired.

All of the companies that hired high school graduates felt that data processing should be taught at the high school level varying from a minimum of one year to a maximum of three years. General topics to be included in a data processing course were suggested by the employers. More detailed information about these topics was secured from textbooks. From these two sources a course of study was developed and presented in appendix C.

Six of the eight companies that hired high school graduates reported that they would provide instruction on the companies' equipment for data processing students.

Conclusions

As a result of this study one can conclude that employment for high school graduates is available in data processing installations in the Ogden area and that these employers provide additional training for advancement within the company.
Because the employers who are willing to hire teen-age high school graduates indicated a need for a one-year course in data processing at the secondary level and also expressed a willingness to cooperate in this training, a one-year data processing course of study has been developed and is included in the appendix of this report. In order for the suggested course of study to be successful, the cooperative use of the data processing equipment at these centers would be necessary.

**Recommendations**

Suggested recommendations indicated by the findings of this study are:

1. Business education departments in the high schools of the Ogden area should offer a one-year course of instruction in data processing.
2. If an exploratory business course is offered, an introductory unit on data processing should be included.
3. Coordination should take place between the high schools and local businesses to secure equipment for data processing training.
APPENDIX
Dear Mr. Stauffer:

Following is a list of the companies which employ data processing personnel in the Ogden area:

- Hill Air Force Base
- U. S. Forest Service
- Internal Revenue Service Center
- U. S. Defense Depot
- Weber State College
- Employment Security Office
- Ogden City Offices
- Utah State Tax Commission
- Utah State Highway Department
- Boeing Company
- Marquardt Corporation
- Bank of Utah

I hope this information will be of value to you in your study.

Yours truly,

Warren T. Caldwell
Manpower Specialist
Appendix B

4451 South 2450 West
Roy, Utah
July 30, 1968

Dear Sir:

Should high schools have data processing courses in their curriculum? What should high school students know to prepare themselves for data processing occupations? Your experience with data processing can help business educators answer these and other important questions.

If better instruction is to be made available to students interested in data processing positions, the schools must work together with businessmen to determine what skills and concepts the students should understand. The data obtained from the enclosed survey form will aid business educators in your area to help provide students with a more profitable and realistic training.

Since most of the responses merely call for a check-mark, the survey should not take much of your time. A stamped, self-addressed envelope is included for your convenience.

A summary of the results of the study will be made available to you by checking the appropriate box on the enclosed questionnaire.

Sincerely,

Val C. Stauffer
QUESTIONNAIRE

Name of Business Organization_____________________________________________________

Name of Respondent________________________________________________________________

Position________________________________________________________________________

Directions:

1. Place a check-mark in the appropriate blank.

2. Comment as fully as possible where requested.

1. Do you offer data processing employment to teen-age high school graduates? (If your answer to this question is no, you need not complete the rest of the questionnaire; return the questionnaire in the envelope provided.)

Yes_____  No_____ 

2. How many teen-age high school graduates did you employ during 1967 in data processing positions?

   1 - 5 ____  11 - 15 ____  Above 20 (please specify) ____
   6 - 10____  16 - 20 ____

3. How many data processing positions in your company are suitable for teen-age high school graduates?

   1 - 5 ____  11 - 15 ____  Above 20 (please specify) ____
   6 - 10____  16 - 20 ____

4. Which data processing positions in your firm are suitable for teen-age high school graduates? (please list)

5. Is promotion to a higher position available without further education?

   Yes_____  No_____
6. Will you train employees for advancement?
   Yes____   No____

7. Do you believe that high schools need to include preparation for data processing occupations in their curriculum? (If the answer to this is no, you may return the questionnaire without reading further.)
   Yes____   No____

8. In your opinion, which of the following business education courses would best prepare students for positions in data processing? (Rank in order of importance by placing a check-mark in the appropriate column in terms of the following scale:)

   5 4 3 2 1

   a. Typewriting 5 - Extremely important
   b. Shorthand 4 - Very important
   c. Accounting 3 - Important
   d. Office Machines 2 - Slightly important
   e. Office Practice 1 - Relatively unimportant
   f. General business courses such as Business Math

9. Do you believe that business education departments should offer a course of study devoted specifically to a study of data processing?
   Yes____   No____

10. If your answer to number 9 was "Yes":

   a. At what level should the course be offered?
      1. Sophomore (10th)____
      2. Junior (11th)____
      3. Senior (12th)____
      4. Other ____

   b. How long should the course be?
      1. One-half year ____
      2. One full year ____
      3. Integrated as a unit within an existing course ____
      4. Other (please specify) ____
If your answer to ten "b" was one or two, answer number eleven "a" and "b".

If your answer to ten "b" was three, answer twelve "a" and "b".

11. a. What would you suggest as a title for the course?

b. Check the topics which should be included in the course:

1. ___ The history of data processing
2. ___ The development of data processing
3. ___ The vocabulary of data processing
4. ___ Types of data processing equipment
5. ___ Employment opportunities in data processing
6. ___ Orientation to data processing
7. ___ Coding
8. ___ Sorting
9. ___ Block diagraming
10. ___ Flow charting
11. ___ Programming
12. ___ Machine operation
13. ___ Other (please specify)

12. a. How long should the unit be?

1. Three weeks
2. Six weeks
3. Nine weeks
4. Other (please specify)

b. Check the topics which should be included in this unit:

1. ___ The history of data processing
2. ___ The development of data processing
3. ___ The vocabulary of data processing
4. ___ Types of data processing equipment
5. ___ Employment opportunities in data processing
6. ___ Orientation to data processing
7. ___ Coding
8. ___ Sorting
9. ___ Block diagraming
10. ___ Flow charting
11. ___ Programming
12. ___ Machine operation
13. ___ Other (please specify)

13. Do you believe that business education departments should offer formal instruction on:

   Yes  No

   a. Key-punch machines
   b. Tabulating machines
   c. Sorting machines
d. Collating machines

e. Accounting machines

f. Electronic computers

g. Other (please specify)

14. Would you cooperate with business education departments which possess no automated data processing equipment to provide students with formal instruction on your equipment?

Yes____ No____

15. Would you like to receive a summary of the results of this study?

Yes____ No____
Appendix C

COURSE OF STUDY

This suggested one-year data processing course is a result of two sources:

1. Topics requested by employers responding to the questionnaire for this study.
2. Texts reviewed during three years of teaching data processing.

Course Description

This is a one-year vocational course in data processing. The main emphasis is upon (1) data processing as a part of a business enterprise, and (2) a familiarization with unit record and electronic computer equipment and procedures. When the student completes the course he will be prepared for an entry-level data processing position.

General Course Objectives

Upon successful completion of this course the student will be able to do the following:

1. Discuss in essay form the importance of current data to the operation of a business.
2. Relate orally the important (as given in class) historical developments of both mechanical and electronic data processing.
3. List and describe five levels of data systems.
4. Using unit record equipment, prepare a summarized sales report from given source documents.

5. Prepare a flow chart of a given procedure and from the chart develop a simple workable computer program.

Course Outline

I. A Review of the Business Organization
   A. How it is organized
   B. Information channels in business
   C. Importance of information in business
   D. Methods of moving information--data systems
   E. Levels of data systems:
      1. Manual
      3. Integrated systems
      4. Punched-card systems
      5. Electronic systems

II. Information Handling and Data Processing
   A. History and development of data processing
   B. The data processing cycle
   C. Data processing--the manual system
   D. Data processing--the unit-record system
   E. Punched card and code concepts
   F. Punched card format

III. Unit-record Equipments: Function and Operation
   A. Keypunch
   B. Sorter
   C. Collator
   D. Tabulator
IV. Business Information Systems
   A. Total systems concept
   B. Systems and subsystems relationships
   C. Systems and data processing

V. Management and Data Processing
   A. Data and decisions
   B. Internal structure for data processing
   C. The data processing service organization

VI. The Electronic Computer System
   A. Computer history
   B. Review of data processing cycle
   C. Basic vocabulary
   D. Basic capabilities

VII. Elements of the E.D.P. system
   A. Hardware
   B. Software
   C. Input/output media

VIII. Computer Procedures
   A. Defining and analyzing problems
   B. Flow charting
   C. Computer control concepts
   D. Simple programming
   E. Computer arithmetic
   F. Problem solving
IX. Simple System Application
   A. Following established procedures
   B. Preparing flow chart
   C. Preparing and running program
   D. Analyzing results

X. Other Information Systems
   A. Data communication systems
   B. Optics
   C. Telecommunications

XI. Data Processing, Automation and the Future
   A. Social and economic implications
   B. The changing world
   C. Our challenge
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Published Reports


Unpublished Material


VITA

Val C. Stauffer

Candidate for the Degree of

Master of Business Education

Report: A Study of Data Processing Employment Opportunities for High School Graduates in the Ogden Area with Implications for Secondary Business Education

Major Field: Business Education

Biographical Information:

Personal Data: Born September 10, 1940, in Logan, Utah; son of Henry C. and Alice S. Stauffer; married Karleen Allen of Hyrum, Utah; three children—Ronald Kent, Randall Clair, and Richard Lynn.

Education: Attended Lincoln Elementary School in Hyrum, Utah; South Cache High School also in Hyrum; graduated with a B.S. degree from Utah State University in 1964; awarded an M.S. in Business Education from Utah State University in 1970.

Professional Experience: Presently (1969) instructor in business education at Dixie Junior College, St. George, Utah; August 1964 to May 1968, teacher-coordinator in business education at Bonneville High School, Ogden, Utah; taught adult evening classes at Weber State College and Bonneville High School during secondary teaching experience.