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A SURVEY OF SOUTHWEST MISSOURI BUSINESS TEACHERS
ON INTEGRATING AUTOMATED DATA PROCESSING
INTO THE BUSINESS CURRICULUM OF THE SECONDARY SCHOOLS

by 6791

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CHAPTER I

INTRODUCTION

The classification of clerical and kindred occupations has been the fastest growing area of employment since 1900. Between 1900 and 1950, the number of employees classified as clerical workers increased 725%, and from 1950 to 1960, 32%.¹

Workers in this classification numbered approximately 10.5 million in 1965 (2.6 million secretaries, stenographers, and typists, and 7.9 million other clerical workers), which represents 15% of the total number of persons employed in the nation. It is estimated that by 1975 more than 14 million will be employed in clerical work.²

At the present time there is an acute manpower shortage in data processing, stenographic, clerical and other business related occupations.

These shortages emphasize the responsibility of the business education program in the secondary school. Today, even with the expanding college enrollments, more than 65% to 70% of high school graduates do not go on to college.³ The majority of

¹Melvin Barlow (ed.), Vocational Education, Yearbook of National Society for the Study of Education, (Chicago: U. of Chicago Press, 1965), p. 118.

²Barlow, p. 118.

³F. Kendrick Bangs, "Our Commitment to Research," The Balance Sheet, May, 1968, p. 397.

these graduates will enter the labor market upon finishing high school. Any vocational training that will be helpful for them in getting jobs must be obtained at the high school level.

Although high school students in business education may have objectives such as college preparatory, personal use, or general education, the primary objective of these courses has become vocational training. In a recent survey, a checklist covering standards for secondary school business courses and curricula was sent to nationally recognized business leaders from all sections of the country. This was not an all inclusive list of leaders in business education, but opinions of 24 well-known leaders were summarized. The majority believed that business programs and courses should be offered to facilitate job placement and contribute to the general education of the students; 88% believed that the primary objective of business education on the high school level should be job preparation or a combination of job preparation and general education.⁴

To encourage this vocational objective, with the passage of Public Law 88-210, Vocational Education Act of 1963, federal funds were made available for the first time to aid secondary schools with their business education program. This act requires that schools applying for federal funds must identify the students in the program and arrange to see that "vocational instruction will

⁴S. J. Wanous, "Curriculum Standards in Business Education, Part II," The Balance Sheet, October, 1968, pp. 52-53.

be designed to fit individuals for gainful employment in a recognized occupation."⁵

Since the passage of this 1963 vocational education legislation, there has been a steady increase of vocational education enrollments from 349,000 in 1964 to 8.1 million in 1968, and a prediction of 14 million in 1975.⁶ Business education is receiving a large portion of this increase, showing an increase of enrollment in federally aided programs from 730,904 students in 1965 to 1,572,325 students in 1967, with 63% of this total being secondary school students.⁷ The number of business education teachers increased from 15,718 in 1965 to 29,431 in 1967; while expenditures for business education increased from \$53,673,000 in 1965 to \$132,867,000 in 1967, with federal funds representing about 22% of the total expenditure.⁸

As federal funds become available to the high school under the Vocational Act, business education should change for the better in much the same way as vocational areas where federal funds have been available for years, as in agriculture, home economics, and distributive education.

⁵U. S. Department of Health, Education, and Welfare, Administration of Vocational Education, Rules and Regulations, Vocational Educational Bulletin No. 1, (Washington: U. S. Gov. Printing Office, 1967).

⁶Michael Russo, "Fourteen Million Vocational Students By 1975," American Education, March, 1969, p. 10.

⁷Roy W. Roberts, Vocational and Practical Arts Education, (New York: Harper & Row, 1971), p. 177.

⁸Roberts, p. 177.

Many high schools which lacked audio-visual equipment, copying equipment, tape and record players, video equipment, as well as business machines, are now obtaining these items with the help of federal funds. Similarly, some schools that had little or no chance of offering automated data processing courses are now starting to secure equipment for use in these courses.

As the business education departments of secondary schools across the nation begin to emphasize the vocational objectives of their courses, and begin to expand with additional teachers, new equipment, and increased enrollments, the business curricula is being evaluated and revised. It is criticized by many as being obsolete and not realistically providing the training necessary for clerical workers in the modern business world. New business courses are needed, as well as modification of existing courses.

For example, the developments in the automated data processing field have created new jobs, and therefore, a new vocational training need which requires new courses, and also modification of existing courses. Today, it is obvious that all future business workers need to be familiar with automated data processing.

If high schools are to adequately prepare students for jobs, there are changes which need to be made in the business curriculum. Students need to be trained in the skills of available jobs. A good business program must consider not only present manpower requirements and labor supply, but also probable future requirements.

F. Kendrick Bangs tells us in the next ten to twenty years, 60% of today's high school graduates will be in jobs that are not even known today.⁹ This changing nature of office jobs presents many problems for business educators. They must decide the kinds of jobs for which it can educate high school students, analyze the skills needed in these jobs, and adjust their programs to meet these needs.

The most outstanding change in office jobs is automation, or the processing of data automatically. If a prospective office worker is to fit into today's business world, he must be adequately prepared to accept and to understand those automated data processing fundamentals that he will face.

THE PROBLEM

The purpose of this study was (1) to determine the opinions of business leaders concerning automated data processing as part of the high school curriculum; (2) to study the various methods by which automated data processing can be integrated into existing courses; and (3) to examine the programs currently being offered, or being planned, in the secondary schools in southwest Missouri.

IMPORTANCE OF THE STUDY

The most comprehensive curriculum study available on automated data processing is "Curricular Implications of

⁹Bangs, "Our Commitment to Research," p. 398.

Automated Data Processing for Educational Institutions," F. Kendrick Bangs working as principal investigator. This study, financed by United States Office of Education funds, started in 1966 and was published in 1968. Of 9,484 secondary schools surveyed, 19% had, or planned as of 1966, data processing courses. The high schools of the west south central and east south central sections of the United States had the lowest percentages, with only 2% of the secondary schools offering courses in data processing, and another 5% of the schools planning to start courses.¹⁰ These compare with 35% of New England high schools either offering courses or planning them, 34% of Mid-Atlantic high schools, and 25% of Pacific high schools.

These figures indicate this area of the United States as being extremely slow in instigating data processing instruction on the high school level.

This survey of 105 high schools in the southwest Missouri area had several objectives: (1) to determine the present number of high school business departments now offering courses in data processing, or planning to within three years; (2) to list difficulties encountered by these schools in starting their data processing program; (3) to determine the equipment each school has acquired; (4) to compare student selection methods and prerequisites from the various schools; and (5) to

¹⁰F. Kendrick Bangs, Principal Investigator, Curricular Implications of Automated Data Processing for Educational Institutions, (U. of Colorado, 1968), p. 191.

¹¹Bangs, Curricular Implications, p. 191.

acquire information from the business teachers conducting these classes on their personal methods, objectives, background for teaching data processing, and how they evaluate these courses.

It is hopeful that this survey can provide significant information to area high schools that have not added data processing to their business curriculum.

LIMITATIONS OF THE STUDY

This study was confined to the literature published between 1965 and 1971 found in the Kansas State University Library, including books, pamphlets, magazine articles, and research papers; and to replies received from business educators in southwest Missouri to a questionnaire concerning data processing instruction in their particular school. A copy of the questionnaire is included in the appendix.

DEFINITIONS OF THE TERMS

Only two terms are used which may need defining for the reader. The use of the term business education refers to all business courses in the curriculum, sometimes referred to as commercial courses, or office education courses.

The expressions automated data processing, electronic data processing, and data processing have been used interchangeably as meaning processing of data by machine rather than by hand.

CHAPTER II

REVIEW OF THE LITERATURE

Opinions Concerning Need for High School Data Processing Course

In the 1966-67 survey taken of 24 business leaders mentioned earlier, the question was presented whether data processing should be offered on the high school level. In response 84% believed that it should be offered in high schools--46% said the instruction should be offered as a unit in some business course that is open, on an elective basis, to all students, while the other 38% believed the instruction should be offered in a data processing course, offered as an elective to all students.¹²

In this same survey, 79% believed that the course on data processing should be primarily concerned with principles, processes, and terminology--not with the machinery of automation.¹³

In his latest Methods of Teaching Bookkeeping text, Boynton writes:

"All potential office workers upon graduation from high school should have as a minimum accomplishment: (1) an appreciation of the automated processing of data and its relationship to their field of specialization; (2) a visual familiarity with the wide variety of automated data processing machines; and (3) a speaking acquaintance with the basic vocabulary of automated data processing."¹⁴

¹²Wanous, p. 55.

¹³Wanous, p. 55.

¹⁴Lewis D. Boynton, Methods of Teaching Bookkeeping-Accounting, (Cincinnati: South-Western Publishing, 1970), p.521.

Amundson writes, "We are past the 'let's wait and see what happens' stage," because employers are heard voicing concern that high school programs have not provided their graduates with background and potential necessary to become skilled employees in data processing installations.¹⁵ He emphasizes that the purpose of data processing courses is not to replace existing courses, but to supplement and enrich those presently being offered, and should be open to all students, not just business students.¹⁶

In a follow-up study of business graduates from the Sterling Township High School, Andrew DeCraene reported the graduates believed they were weak in data processing, in machine operation, and in business letter writing.¹⁷

In a survey conducted by the writer in 1970, employers in Springfield, Missouri were asked if they believed data processing should be included in the Springfield high school curriculum. Seven employers gave an unqualified "yes"; one replied yes, if up-to-date equipment could be used; one said yes, at least the keypunch; and one answered yes, if helpful to some businesses. In a negative reply, one employer said his business did not use it; one replied not at present but

¹⁵Donald Amundson, "Develop a High School Data Processing Course," The Balance Sheet, September, 1969, p. 8.

¹⁶Amundson, pp. 8-9.

¹⁷Andrew DeCraene, "A Follow-Up Study of Graduates of Advanced Business Courses at Sterling Township High School for Years 1956, 1962 through 1966, with Implications for Curriculum Revision," (unpublished Master's thesis, Northern Illinois University, 1967).

perhaps in the future; and one said "no". Ten out of 13 replies, or about 77% favored inclusion of data processing on the high school level.¹⁸

Kargilis, in arguing in favor of high school courses, states what should and should not be taught in high school cannot be determined in isolation from the real day-to-day world. He outlines three levels of instruction in data processing which the high school can offer:

Acquaintanceship level--separate, introductory course.

Integrative approach --automated data processing concepts and skills integrated into other business subjects.

Vocational training --sequence of courses to develop marketable skill for employment.¹⁹

Suggestions on Data Processing Curriculum of High Schools

There are many job opportunities in the data processing field, which range in difficulty from the routine, repetitive skill operations of the card-punch operator to the planning of computer programs.

Automated data processing has also become a part of every day personal living in such ways as bank accounts, the monthly punched-card bills from utility companies, credit cards, billing

¹⁸Norma L. Lee, "A Survey of Springfield Employers Concerning the Effectiveness of High School Business Graduates as Clerical Employees," (unpublished research, Southwest Mo. State College, March, 1971).

¹⁹George Kargilis, "Data Processing - A Must for the High School," Business Education Forum, May, 1968, p. 15.

and mailing operations of record and book clubs, and college registrations and records.

Because of this wide variance from introduction to data processing for personal and general education, to the highly specialized vocational training, the amount of time and the depth a school can permit these courses is a crucial point. Each school system must decide for itself the number of data processing courses it can offer. The diversity of offerings will vary in proportion to the size of the school, as well as with the occupational needs of the community served by the school.

Haga points out that the curriculum of the schools with hardware, or data processing machines, will differ from the curriculum of schools without this equipment.²⁰

Willard Korn also writes that the curriculum depends upon the equipment available to the school, and he feels that this equipment is too expensive to justify for high school courses.²¹

Most business writers agree that without equipment the data processing instruction should be kept on an introductory level. Vocational skills would be difficult to acquire without equipment. For example, a course in programming would be ineffective and difficult without a computer.

²⁰Enoch Haga, "Introductory Automation & Data Processing for All High School Students," Business Education Forum, May, 1968, p. 16.

²¹Willard Korn, "Business Data Processing for the High School," Journal of Business Education, December, 1969, p. 110.

Haga goes on in his article to stress that whether the high school has hardware or not, a one-semester or one-year course in business data processing should be offered to all business students.²²

Korn gives a suggested course content for a general course in data processing as including unit-record equipment, input-output media and devices, arithmetic-logic functions of the computer, the control unit, introduction to programming, and an introduction to systems design, analysis and development.²³ He explained this course would provide a basis for either on-the-job training in business, or for taking further data processing courses at the post-secondary level.

In the nation-wide study, "Curricular Implications of Data Processing," a minimum of three courses are suggested. At 10th grade level a one-semester "Introduction to Data Processing" is proposed, followed in 11th grade with one year of "Computer Concepts and System Development," and in 12th grade with a semester of "Data Processing Application."²⁴

The Evanston, Illinois High School offers three courses in data processing which may be taken by their better book-keeping students. Their first course emphasizes unit-record equipment, such as the card punch, verifier, sorter, collator, interpreter, reproducer, and a 407 accounting machine. The

²²Haga, p. 17.

²³Korn, pp. 109-110.

²⁴Bangs, Curricular Implications, p. 78.

next two courses emphasize computer programming.²⁵ Although these advanced courses are electives for the better students, the authors believe all business education students can benefit from and should understand certain aspects of data processing.

To determine the status of data processing instruction in the business curriculum of Illinois secondary schools, Wayne Giles sent a questionnaire to 200 high schools, receiving 160 replies. He determined 94.4% of the schools replying did not offer a course in data processing; of the 5.6% which did have courses, a one-semester offered in 11th and 12th grades was the most prevalent.²⁶

South-Western Monograph No. 83 provides tables of the different types of business programs offered in high schools of various sizes. These tables provide the following figures on data processing courses offered:

Summary of 20 high schools in small cities under
10,000 population

<u>Course</u>	<u>No. of Schools Offering Course</u>
Introduction to Data Processing	3

Summary of 50 high schools in medium-size cities of
10,000 - 50,000 population

<u>Course</u>	<u>No. of Schools Offering Course</u>
Data Processing I	4
Key Punch	3
Introduction to Data Processing	20

²⁵Joseph A. Lesak and William G. Carpenter, "Accounting Students Learn Data Processing," Balance Sheet, February, 1968, p. 247.

²⁶Wayne E. Giles, "The Status of Data Processing Instruction in the Illinois Public Secondary Schools," (unpublished Master's thesis, Southern Illinois University, 1967).

Summary of 50 high schools in large cities of
50,000 - 1,000,000 population

<u>Course</u>	<u>No. of Schools Offering Course</u>
Introduction to Data Processing	25
Data Processing I	7
Data Processing II	4
Computer Programming	4
Key Punch	11
Data Processing Math	4

These figures were from random selections of schools in 1967, and are not used as ideal programs, but to show common practices.²⁷

Data Processing Integrated Into Other Business Courses

Since bookkeeping and accounting courses are basically a study of the processing of data, the inclusion of automated data processing principles is a logical expectation. The bookkeeping students should develop a higher degree of understanding and appreciation of the automated data processing field than the clerical or stenographic students.

After the business teacher has decided to illustrate the relationship of manual bookkeeping to automated data processing, he has several problems to solve: How deep shall he attempt to take his students in an understanding of this relationship? How much time can and should be taken from the first-year bookkeeping course to teach this relationship? Is the relationship covered in another business course? Answers will not be the same for all bookkeeping teachers.

²⁷Guidance in Business Education, South-Western Monograph No. 83, (Cincinnati: South-Western Publishing Co., 1967), pp.20-25.

In his Methods text, Boynton states the best time to relate automated data processing principles to bookkeeping is after the student has learned enough of the principles and procedures of manual bookkeeping to provide a background for seeing and appreciating the differences as well as the similarities. This could be any time after the student has completed the bookkeeping cycle. After the bookkeeping student has worked through the entire cycle a time or two, and perhaps after a practice set, he can better see and better understand differences in the procedures for processing the same or similar data, and also see the similarities and sameness in the results.

To assist business teachers with a starting point in integrating data processing instruction into the bookkeeping course, Boynton provides the following ten-day unit outline:

- I Simple speed-up methods for processing bookkeeping and accounting data.
- II Common business machines used for processing bookkeeping and accounting data.
- III Design of forms for automated methods of processing data.
- IV Introduction to punched card data processing.
- V Punched card data processing--unit record machines.
- VI Flow charting.
- VII Computers.
- VIII Media used for instructing data processing machines.
- IX Job opportunities in automated data processing.
- X Field trip to local data center.²⁸

The foregoing outline should be modified and varied to suit the peculiarities of each individual situation. In

²⁸Boynton, pp. 526-540.

schools where some of the material has been covered outside the bookkeeping class, it need not be duplicated.

In a two-year bookkeeping curriculum, Parsh believes six to eight weeks should be spent on an orientation to the field of data processing, and what its effect will be on bookkeeping and recordkeeping procedures of business.²⁹

Walker recommends that the fundamentals of automated data processing be integrated into instructional units throughout the entire bookkeeping course.³⁰ He believes the student should know the fundamental principles of debit and credit, and basic bookkeeping principles; but rather than concentrating upon manual, repetitive work, the bookkeeping course should be geared to theory development, interpretative analysis, flowcharts, system and procedure charts, and other aspects of data processing.

Hanna also writes that high school bookkeeping should undergo a major transformation--a transformation from its emphasis on manual recordkeeping to an emphasis on business data processing.³¹

Data processing instruction can be integrated into other business courses with ease. Schools offering Office Practice, or Clerical Practice, often include an orientation

²⁹Clair Parsh, "The Future of Business Education," The Balance Sheet, December, 1968, p. 163.

³⁰Marian P. Walker, "Prediction for 2000 A.D.: Bookkeeping Will be Dropped From the High School Curriculum," Journal of Business Education, February, 1969, pp. 199-200.

³¹J. Marshall Hanna, "The New High School Accounting Course," Business Education World, February, 1969, p. 9.

to data processing in the course. Practice sets are now available which contain realistic projects using punched cards, mark-sensed cards, checks and deposit tickets printed in magnetic ink, and work-flow diagrams, with no special equipment necessary.

McNutt writes that the key-punch unit should be emphasized in high school because of the employment possibilities available.³² She states this instruction could be integrated into Office Practice, or into a business machines course.

McNutt also suggests teaching the function of the sorter along with filing instruction.³³ The filing course should cover the increasing role which electronic equipment plays in this activity; for example, storage of information on tape, punched-card, and disk.

Aspects of data processing might be touched on in courses of General Business, Basic Business, or Economics. Wherever applicable, the principles of data processing should be illustrated and discussed.

Kallaus writes that experience has shown that the "integrated route" is a useful starting point in teaching data processing, with concepts taught from an application approach.³⁴ This method stresses basics, such as vocabulary,

³²Sara Jean McNutt, "Teaching Data Processing," Business Education Forum, May, 1968, p. 23.

³³McNutt, p. 24.

³⁴Norman F. Kallaus, "Integrating Data Processing Concepts in Business Classes," Business Education Forum, March, 1968, p. 23.

machines functions, and social and economic effects of automation.

Summary of Opinions Regarding Data Processing Courses

Although there are obstacles yet to overcome in initiating a program, the majority of business leaders believe that instruction in automated data processing belongs in the business curriculum of the secondary school. This instruction can consist of an introductory course of one-semester or one-year in length, or it might be integrated units into existing business courses, such as bookkeeping, business machines, and clerical practice.

If the high school owns, or has access to, data processing equipment, additional courses in data processing should be offered to provide vocational training and skills. These advanced and specialized courses have little value without equipment.

Because automated data processing has become a part of every day personal living, all students need an introduction to these concepts for their personal use and their general education.

CHAPTER III

PROCEDURE

In order to determine data processing offerings in the high schools of Southwest Missouri, a listing of school districts of this area was obtained from the Placement Bureau, Southwest Missouri State College, Springfield, Missouri. This list contained 99 high schools, to which the writer added the six high schools in Springfield, Missouri.

An introductory letter and a questionnaire form (see appendix A and B) were mailed to the business instructor, or bookkeeping instructor, of each of these 105 high schools.

The letter explained the purpose of the survey was to provide material for a master's report for Kansas State University. The business teachers were informed of Bang's curricular study of data processing which stated only seven percent of the schools in this area of the United States offered, or had planned, data processing programs in 1966.

A group of area business teachers previewed questionnaire, indicated questions about which they felt an uncertainty might exist, and estimated the time required to complete the form at five minutes. They judged the questions as fair and meaningful.

The business teacher was first requested to indicate the number of students in their high school by checking one

of the following: less than 200 students; 201-399 students; 400-599 students; 600-999 students; and over 1000 students.

The next question asked if their high school offered courses in automated data processing, and if so, the date they were initiated. If the answer to this was no, the next question asked if the school planned to offer these courses within the next three years. If the answer to this was also no, the questionnaire was completed, because all of the following questions dealt with the data processing program being offered or being planned.

For the schools answering yes to either of the foregoing questions, 17 additional questions were asked, falling into five broad categories: the departments of the school which were involved in the programs offered; the areas of study and the equipment used; selection of the students for the courses; the qualifications and training of the teachers of these courses; and the evaluation of the program, and the problems connected with offering it.

All the questions required only a check mark for an answer except this last category referring to problems which had been encountered. Two opinion-type questions were asked: What administrative problem has your school found to be the most serious in establishing the program and in operating it? What instructional problem has been the most serious? In replying, the business teacher was required to write a sentence or short paragraph.

A stamped, self-addressed envelope was enclosed with the questionnaire and letter, to facilitate the return of the form.

The writer offered to report the results of this survey to any of these business teachers requesting them.

CHAPTER IV

RESULTS OF THE SURVEY

Number and Size of High Schools Which Replied

A total of 105 questionnaire forms and letters were mailed to business teachers of Southwest Missouri high schools. A return of 83, or 79 percent was received.

The questionnaire was also completed by the data processing instructor at Graff Area Vocational-Technical School, Springfield, Missouri, which offers a data processing program available to the Springfield high school students. The information on this return has been included later in this chapter, and is not a part of the data summarized for the 83 high school returns.

To give an indication of the size of schools providing information, the returns were classified as to the number of students in the high school. The breakdown of the 83 returns by number of students is as follows:

<u>No. of Students</u>	<u>No. of Schools</u>
Less than 200	35
200 - 399	19
400 - 599	13
600 - 999	6
Over 1000	<u>10</u>
Total	83

Number of Schools With, or Planning, Data Processing Programs

In reply to the question of whether the school now offers courses in data processing, or plans to within the next three

years, 61 replies answered no. This represented 73.5% of the schools which responded. The remaining 26.5% of the returns has been separated into three levels of instruction:

- 6 schools (7.2%) with courses or programs.
- 6 schools (7.2%) planning a program within 3 years.
- 10 schools (12.1%) with data processing instruction integrated into other business courses.

In order to determine if the size of the school plays a part in whether a data processing program is offered, the following table reflects the foregoing figures by size of school:

<u>Level of Instruction</u>	<u>Under</u>				<u>Over</u>
	<u>200</u>	<u>201-399</u>	<u>400-599</u>	<u>600-999</u>	<u>1000</u>
No program or plans	32	16	7	2	4
With courses	1	1	2		2
With plans for course	1		3		2
With integrated units	<u>1</u>	<u>2</u>	<u>1</u>	<u>4</u>	<u>2</u>
Total schools	35	19	13	6	10

Data Obtained From Schools With Data Processing Courses

Data processing courses were initiated at two of the high schools in 1965, at three schools in 1968, and at one school in 1969.

In reply to which department had responsibility for the data processing instruction, all six marked the business department, with one also checking the mathematics department.

The areas of study covered by each school, and the grade level of each were indicated as the following:

<u>Course</u>	<u>No. of Schools</u>	<u>Grade Level</u>	
	<u>Offering</u>	<u>11th & 12th</u>	<u>12th</u>
Introduction to Data Processing	4	1	3
Unit Record System	1		1
Data Processing Application	2	1	1
Introduction to Systems	1	1	
Systems Analysis	1		1
Computer Programming	4	2	2
Data Processing Mathematics	1		1

Three schools offering courses indicated they have no equipment. However, two of these three schools have access to equipment at Rolla, Missouri, including use of a computer. The other three schools all possess key punch simulators, and one indicated possession of a desk-top computer.

The business educators were asked what degree of skill they wished their students to attain: familiarity, vocational, or wiring. All marked familiarity, with the exception of one which marked vocational skill on the key punch. A footnote mentioned their students acquired enough skill to go on the job with people who had had extensive key punch training.

The number of students presently enrolled in data processing courses ranged from 13 students in the school with less than 200 students, to 31 students enrolled in the school with over 1000 students.

Three schools indicated that no selection of students is done, one school goes by grade average of a specific course, and one relies upon student interest.

There were not many course prerequisites required by these schools; four marked typing and introduction to business, two marked math, without indicating what level of math was considered necessary, and one checked science.

In reply to how data processing was first introduced, three replied as a unit in another class, one used a practice set, two said it was mentioned in other classes, one was correlated with accounting, and one said it was organized into an

introductory class. The primary objective four of the schools gave was to provide general knowledge about data processing, three schools marked to provide acquaintanceship skill in equipment, three said to provide knowledge of business applications, and two indicated vocational preparation of their students.

Two questions were directed toward the teachers of the courses. In response to the question of how they got into teaching data processing, four teachers said they were very interested in it and asked to do it, two had had some class work and thought they'd like teaching it, one mentioned it seemed to be the progressive thing to do to improve the department, and one thought someone had to do it.

Then the teachers were asked how they acquired the data processing background necessary to teach the courses. Four had attended data processing workshops, one had attended a manufacturers' school, three had college or night classes in it, three studied programmed texts on their own, and one had work experience in data processing.

The greatest administrative problem encountered with the program at one school was getting the state department to approve the courses, while another mentioned getting their administration to see the need and importance was their biggest problem. In operating the program, four schools gave cost or finance as the greatest problem.

Only four teachers listed instructional problems. One remarked that sending their computer programs to Rolla (150

miles) meant a week's lapse between the student writing it, and in seeing a print out. Another gave time and equipment as an instructional problem, one listed changing systems and limited material available for schools, and the fourth said poor mathematical background of students enrolled for the course was their greatest instructional problem.

Information From Schools Planning a Program

Six schools indicated on their questionnaire that they planned to start data processing programs within three years. Although all of their plans were tentative, five indicated their program will be under the Business Department, and four believed Introduction to Data Processing will be their initial area of study.

It was yet too early for these schools to determine student selection method or course prerequisites.

Credit was given for the impetus to start the program in one school to the administration, and in two schools to the business education faculty.

It was impossible to give relevant answers to the entire questionnaire due to these programs being in the planning stage.

Data Processing Integrated Into Other Business Courses

Ten schools provided information concerning data processing instruction integrated into existing business courses. The courses containing this instruction was five schools which included it with Clerical Practice, two with Secretarial Practice, three in Bookkeeping, and one in Office Machines.

Six schools provided Introduction to Data Processing, on 11th and 12th grade levels, and two schools included Data Processing Applications, on the same grade levels. Four schools have key punch simulators, and no other equipment.

The primary objective of including data processing instruction was given by six schools to provide general knowledge about data processing, while two said vocational preparation of students, and one said to provide knowledge of business applications and provide acquaintanceship skill in equipment.

On the question of how they got started teaching data processing, three teachers replied they were interested in it, and asked to do it, one replied he just added it to the course plan as an additional unit, one felt it was needed, one was asked to by the administration, and one had worked in the field and thought he'd like teaching it.

Three teachers attended data processing workshops to get the background to prepare to teach it, two studied programmed texts, two had had college classes, and one had work experience and on-the-job training in data processing.

As the greatest administrative and operating problem, four again replied cost or financing. Instructional problems mentioned were the difficulty of teaching concepts with only a simulator key punch and no other equipment, and another said no equipment. One school replied, "No problems, students were highly motivated."

Instruction in Data Processing Available in Vocational Schools

The percentage shown for schools with no courses nor any planned (73.5%) is distorted somewhat by the fact this includes three Springfield High Schools which replied in this category; however, these schools can send students to Graff Area Vocational School, located in Springfield, and the students can receive extensive training there. This program was initiated in 1963, and includes the following areas of study:

<u>Course</u>	<u>Grade Level</u>
Introduction to Data Processing	Senior & Post High
Unit Record System	Senior & Post High
Data Processing Applications	Senior & Post High
Introduction to Systems	Senior & Post High
Systems Analysis	Post High
Computer Programming	Senior & Post High
Data Processing Math	Senior & Post High

To match this impressive list of courses, the Graff Area Vocational School indicates the following equipment at their school:

- 3 Key punch machines
- 1 Sorter
- 1 Verifier
- 2 Computers
- 1 Accounting machine
- 1 Collator
- 2 Reproducers
- 1 Interpreter

The degree of skill desired for the students was answered as being familiarity for all these machines except on the computer, which was marked vocational skill desired.

There were 95 area high school students enrolled in this data processing program at the Graff Area Vocational School. These students were selected by test scores on certain aptitude tests, and by grade point average.

The administration of the school provided the impetus to start the program, which was introduced as a series of courses. The primary objective of this program is vocational preparation of the students. The only way the program has been changed since it started has been by adding courses and equipment, determined by **assessing industrial requirements**.

The instructors got started teaching data processing by the administration requesting it, and the background consists of work experience, and attending manufacturers' schools.

The only problem listed in connection with the data processing program was the initial cost of the equipment.

Another high school referred to a future program of data processing in their area vocational-technical school, to which their high school students may attend half day. No information was obtained from this vocational school as the program is in the planning stage.

CHAPTER V

SUMMARY OF THE RESULTS AND CONCLUSIONS OF THE STUDY

Summary of the Findings

Of the six schools presently having data processing programs, only two had programs prior to 1966, with four high schools adding programs during the next three years. These percentages correspond to those stated in the nation-wide study, Curricular Implications, of 7 percent for this area of the United States. Two schools out of 83 results in 2.4 percent offering courses in 1966, and 4.8 percent planning courses, totaling 7.2 percent at the time of this national research.

At present, 7.2 percent of the high schools replying have programs, and another 7.2 percent have programs planned to start within three years. This indicates an increase of 100 percent. However, progress appears extremely slow when it is considered that this increase covered six years; two schools offered courses in 1965, three added courses in 1968, and one in 1969. Apparently none have been instigated during the past two years. Also, this current rate of 14.4 percent still ranks far below the 35% of New England high schools and 34% of Mid-Atlantic high schools which, in 1966, offered or had planned data processing programs.

A summary concerning the size of school in relation to

whether it offered a data processing program or not reveals the following percentages:

<u>Size of School</u>	<u>No. of Replies</u>	<u>No. with plans or programs</u>	<u>Percent</u>
Under 200	35	2	5.7%
200-399	19	1	5.3%
400-599	13	5	38.2%
600-999	6	0	0.0%
Over 1000	10	4	40.0%

Although the medium-size and large high schools show a much higher percentage than the small schools, the absence of any programs in the schools of 600-999 students prevents any accurate hypotheses of size of school to percentage of programs. In fact, the smallest category of schools had a higher rate than two larger categories. This should provide encouragement for small schools which feel they are too limited in size to add data processing to their curriculum.

In combining the data from schools with programs, schools with plans for programs, and schools offering instruction by integrating units into other courses, we find the following facts.

In 11 out of 12 responses, the Business Department had the responsibility for the instruction. Introduction to Data Processing was the area of study of the majority of returns, with 14 marking it, followed by Data Processing Applications in 4 schools, and Computer Programming in 4 schools. Most schools kept instruction on the 12th grade level; however, 5 schools permitted 11th graders along with 12th.

The number of students attracted to the program was approximately 7 percent in the small school which offered

courses, and 3 percent in the largest school. Half of the schools do no student selection, nor do they require many prerequisites, with typing and introduction to business being the ones most required.

None of the schools had equipment, other than key punch simulators and one school with a desk-top computer. However, two schools used equipment at another location. The degree of skill most instructors desired for their students was familiarity of the equipment.

The primary objective of data processing instruction was to provide general knowledge about data processing.

The data collected on the instructors of the data processing courses indicates a great interest on their part; 11 teachers were interested in it and asked to teach it, and another 3 had had class work or worked in the field and thought they'd like teaching it. Their data processing background was chiefly acquired by attending workshops, closely followed by college and night classes, and by studying programmed texts on their own.

The greatest problem, either administrative or instructional, was cost of the program, and lack of equipment.

The Springfield area vocational school offers the most extensive program in the Southwest Missouri area. However, they indicated an enrollment of 95 students from the 5 Springfield high schools, all of which have over 1000 students. Students are selected by test scores and grade point averages; therefore, the program is for superior students only.

Indications are that other area vocational schools are planning data processing programs, which will be accessible to area high school students.

Conclusions from the Survey

From a thorough study of the data received from the area high schools, the following conclusions and recommendations were reached:

1. The percentage of high schools offering data processing instruction is increasing, but extremely slow. At the present rate of increase (4 schools in 6 years) it would take 156 years for the 105 high schools of Southwest Missouri to all offer data processing courses.

2. Data processing courses are being offered in all sizes of high schools. Schools which believed they were too small should consider adding a program.

3. Introduction to Data Processing is the area of study usually offered. This is an excellent medium for fulfilling both vocational training and general educational objectives.

4. At the present time, data processing instruction is integrated into other business courses more than by offering separate courses. The review of literature, Chapter 2, mentioned integrated instruction as an excellent starting point to build a program. Schools offering no data processing instruction at all should attempt to integrate this material into bookkeeping or clerical practice courses.

5. From the data presented by high schools with programs,

it is shown that equipment is not a "must" before starting courses. The fact that two schools found off-school facilities to use should prod other business teachers to investigate this possibility.

6. One obstacle to starting data processing courses is the teacher's feeling of inadequacy to handle the concepts. This survey has shown several ways business teachers have overcome this obstacle--data processing workshops, night classes, self-study through programmed texts, and others. All business teachers should begin a course of study to acquire a background in data processing.

7. Although area vocational schools are able to offer extensive programs, they are available mainly for superior students only. The Springfield High Schools should offer introductory courses in data processing for all business students, as well as for general educational purposes. This also applies to other high schools which will send students to area vocational schools in the future.

Implications from the Research

Haga states there are five obstacles to the development of high school data processing courses:

1. Automated data processing is still the unknown.
2. There is no book available.
3. Some business educators have been propagandized into believing data processing is not for the high school level.
4. Common misconception that hardware is necessary for instruction.

5. Administration and department chairmen drag their feet.³⁵

This study dispelled the first four of these obstacles listed. It is up to each high school, and the business teacher in particular, to dispel the last obstacle.

Successful teachers do not "wait and see"; they use their initiative to overcome obstacles. Wanous asks business teachers, "Are our business programs we are offering in high school meeting needs of our students in today's world?"³⁶ This question must, sooner or later, be answered by every business teacher.

³⁵Haga, p. 16.

³⁶Wanous, p. 55.

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APPENDIX A. Letter of Transmittal

525 W. College
Aurora, Missouri
April 26, 1971

Dear Business Instructor:

May I please have five minutes of your time?

As a fellow business teacher, I am striving to complete my master's degree in Business Education this summer at Kansas State University. To fulfill my master's report requirement, I am researching the topic, "Integrating Automatic Data Processing Into the High School Curriculum." As I am currently living in Southwest Missouri, and am attending school at SMS, I have chosen this area of the country to survey.

In 1968, in a nation-wide study, F. Kendrick Bangs published figures showing percentages of schools either offering data processing courses, or intending to start such courses. The high schools of the south central section of the United States had the lowest percentages, with only 2% offering courses in data processing, and 5% intending to start courses. The east south central area had identical percentages. These compare with 35% of New England high schools either offering courses or planning to start them, 34% in Mid-Atlantic high schools, and 25% in Pacific high schools. These figures indicate our area is extremely slow in adding data processing courses to our high school curriculum.

The purpose of this study is to determine if during the three year interim more high schools have instigated data processing programs, or if they plan to do so in the near future.

The questionnaire is written to require only a check mark for most answers. I would greatly appreciate your returning the form in the enclosed, stamped envelope the same day you receive it. If you would like to read the results of this Southwest Missouri survey, just indicate this on the questionnaire.

Many thanks!

Very truly yours,

Norma L. Lee

APPENDIX B. Questionnaire

SURVEY OF HIGH SCHOOL AUTOMATIC DATA PROCESSING COURSES

1. How many students are presently enrolled in your high school?
☐ Less than 200 ☐ 201-399 ☐ 400-599 ☐ 600-999 ☐ Over 1000
2. Does your school offer courses in automated data processing at the present time? If so, when were they initiated?
☐ Yes ☐ No _____ Date they began
3. Do you anticipate that your school will offer such courses within the next three years?
☐ Yes ☐ No
4. Which departments have/will have responsibility for data processing instruction?
☐ Business ☐ Math ☐ Science ☐ Ind.Arts ☐ Other (write in which)
5. What areas of study are/will be covered in this program, and what grade level is each intended for?

	<u>Offered</u>	<u>Gr. Level</u>
Introduction to Data Processing	_____	_____
Unit Record Systems	_____	_____
Data Processing Applications	_____	_____
Introduction to Systems	_____	_____
Systems Analysis	_____	_____
Computer Programming	_____	_____
Other (what?)	_____	_____
6. Indicate the number of pieces of equipment your school has now, or plans to acquire, for instructional purposes.

<input type="checkbox"/> Key punch	<input type="checkbox"/> Accounting Machine	<input type="checkbox"/> Key punch simulator
<input type="checkbox"/> Sorter	<input type="checkbox"/> Collator	<input type="checkbox"/> Reproducer
<input type="checkbox"/> Verifier	<input type="checkbox"/> Paper tape equipment	<input type="checkbox"/> Interpreter
<input type="checkbox"/> Computer	<input type="checkbox"/> Other (what?)	
7. What degree of skill do you wish your students to attain in using this equipment?

	<u>Familiarity</u>	<u>Vocational</u>	<u>Wiring</u>
Key punch	_____	_____	_____
Verifier	_____	_____	_____
Sorter	_____	_____	_____
Reproducer	_____	_____	_____
Collator	_____	_____	_____
Paper tape equipment	_____	_____	_____
Accounting machine	_____	_____	_____
Computer console	_____	_____	_____
Computer programs	_____	_____	_____
Other	_____	_____	_____

APPENDIX B. Questionnaire (Continued)

8. How many students are now enrolled in data processing courses? ____
9. How do you select students for these courses?
 ____ Test scores ____ Grade point average ____ Other (how?)
 ____ No selection is done ____ Grade point average, specific courses
10. What was the primary reason for starting these courses in your school?
11. What courses are prerequisites for the DP program?
 ____ Math ____ Bkbp/Acctg. ____ English
 ____ Science ____ Office procedures ____ Other (what?)
 ____ Typing ____ Intro. to Business
12. Who more than anyone else provided the impetus to start the program?
 ____ Administration ____ Business education faculty
 ____ Community or parents ____ Math and/or science faculty
 ____ Business & Industry ____ Eng./Ind. Arts faculty
 ____ Equipment manufacturers ____ Students
 ____ Other
13. When it was decided to include data processing in the curriculum, how was it introduced?
 ____ Mentioned in other classes ____ Used as a practice set
 ____ Introduced as unit in another ____ Organized an introductory
 class class
 ____ Organized as series of courses ____ Other (how?)
14. What is the primary objective of your department in offering data processing instruction?
 ____ Vocational preparation of students ____ Provide knowledge of
 ____ Provide general knowledge about DP ____ business applications
 ____ Provide acquaintanceship skill in ____ Other (what?)
 equipment.
15. How has your DP program changed since you started it?
 ____ Added courses ____ Added equipment ____ Selection of
 ____ Combined courses ____ Objectives have changed ____ students
16. How do you determine needed changes?
17. How did you get started teaching in DP courses?
 ____ Asked to by the administration
 ____ Interested in it and asked to do it
 ____ Thought someone had to do it
 ____ Had worked in the field and thought I'd like teaching it
 ____ Had some class work and thought I'd like teaching it
 ____ Other

APPENDIX B. Questionnaire (Concluded)

18. How did you get the DP background to prepare for teaching it?

- | | |
|--|--|
| <input type="checkbox"/> Attended manufacturers' schools | <input type="checkbox"/> College classes |
| <input type="checkbox"/> Attended DP workshops | <input type="checkbox"/> Had work experience in DP |
| <input type="checkbox"/> Attended night classes | <input type="checkbox"/> Studied programmed texts |
| <input type="checkbox"/> Military training | <input type="checkbox"/> on my own |
| <input type="checkbox"/> Other | <input type="checkbox"/> On-the-job training |

19. What administrative problem has your school found to be the most serious in establishing your program?

In operating it?

20. What instructional problem has been the most serious?

Name & School

A SURVEY OF SOUTHWEST MISSOURI BUSINESS TEACHERS
ON INTEGRATING AUTOMATED DATA PROCESSING
INTO THE BUSINESS CURRICULUM OF THE SECONDARY SCHOOLS

by

NORMA L. LEE

B.S. in Education
Southwest Missouri State College, 1953

AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1971

In order to provide realistic vocational training on the secondary school level, business leaders across the nation recommend that instruction in automated data processing be integrated into the business education curriculum. This can be done by offering new courses, as well as by modification of existing business courses.

In a nation-wide curriculum study conducted by the U. S. Office of Education in 1966, of 9,484 secondary schools surveyed, 19% had, or had planned, data processing courses. The high schools of the west south central and the east south central sections of the United States had the lowest rate, with 2% offering courses, and another 5% planning programs. This total of 7% compared with New England high schools total of 35% either having courses or planning them, 34% of Mid-atlantic high schools, and 25% of Pacific high schools.

The purpose of this study was to determine the present number of high schools of Southwest Missouri which have, or plan within three years, instruction in automated data processing; and to obtain specific information about the programs which do exist.

A questionnaire was sent to the business department of 105 high schools, which comprise the Southwest Missouri area. A total of 83, or 79% was returned. It was found that 61 schools had no automated data processing instruction; 6 had one or more courses and another 6 had plans to begin courses within three years, totaling 14.4% of the returns; and 10

schools had units integrated into other business courses, primarily the Clerical Practice course.

In 11 out of 12 schools, the Business Department had the responsibility for this instruction, with Introduction to Data Processing being the area of study most often offered, followed by Data Processing Applications, and Computer Programming. Most schools kept this instruction on the 12th grade level, did no student selection for the courses, and required no prerequisites other than typing and basic business for a few schools.

It was found that data processing courses are being offered in all sizes of high schools. None of these schools had equipment other than key punch simulators, and one school owned a desk-top computer. However, two schools used equipment at another location.

The business teachers of the schools offering this instruction indicated a high interest in, and a desire to teach, this subject. The teachers had acquired their background in data processing mainly by attending workshops, college and night classes, and by self-study with programmed texts.

The greatest problem encountered with a data processing program, either administrative or instructional, was the cost of the program, and the lack of equipment.

The Graff Area Vocational-Technical School, Springfield, Missouri, also completed the questionnaire. Although they offer an extensive data processing program, it is available to superior high school students only.