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A survey of data processing instruction in state colleges in the United States in 1969

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A SURVEY OF DATA PROCESSING INSTRUCTION IN STATE COLLEGES IN THE UNITED STATES IN 1969

A Problem Submitted to the Graduate Division in Partial Fulfillment of the Requirements for the Degree of Master of Science

By

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[1]Donald Reese, "Survey of College Courses in Punched Card Mahhines and Installations of Punched Card Machines in the Knoxville Area," (Unpublished master's thesis, University of Tennessee, 1953), 109pp.

CHAPTER I

INTRODUCTION

Statement of the Problem

The purpose of this investigation is to study automated data processing instruction in a selected group of colleges in the United States. The specific areas to be covered include:

1. The present status of data processing on college campuses
2. The instructional staff for data processing
3. The curriculum and courses offered in data processing
4. The equipment available for data processing.

Need for the Study

With the coming of the "computer age," there is a need for people to be trained in the area of automated data processing. Some experts are predicting that 300,000 new jobs for computer programmers will be created by 1975. Already today, due to the lack of educational facilities, many times it is necessary for the companies with computers to initiate and maintain their own training programs. But, more and more, the colleges and universities are taking over the responsibility for the necessary training in this area.

To what extent have the colleges taken over this responsibility? This is the question that is being asked by both college administrators and industrial men. And, this is the question this investigation attempts to answer, not only for these groups, but also for others who may in some way benefit from this information.

Limitations

This investigation is limited to those responding, four-year colleges, not universities, in the United States who are solely state supported and who have an enrollment of between 3,000 and 11,500 as reported by The Education Directory of Higher Education.[1] There are eighty-three such colleges within these limitations. They are listed alphabetically according to state in the appendix.

In the state of New York, the state university system of colleges was considered to be state colleges in this study.

The investigation is also limited to the information included on the questionnaire which can be found in the appendix.

Definition of Terms

Computer--"A machine capable of accepting data and processing it by the application of mathematical and/or logical operations."[2]

Curriculum--"A systematic group of courses or sequences of subjects required for graduation or certification in a major field of study."[3]

Data processing--"The term refers primarily to such procedures as are carried out automatically by machines, principally the digital computer."[4]

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[1]U. S. Department of Health, Education and Welfare, Office of Education, The Education Directory of Higher Education, Part III (Washington, D.C.: U. S. Government Printing Office, 1969), 515pp.

[2]Harold A. Rodgers, Dictionary of Data Processing Terms (New York: Funk and Wagnalls, 1970), p. 17.

[3]Carter V. Good, Dictionary of Education (New York: McGraw Hill Book Company, Inc., 1959), p. 149.

[4]Rodgers, op. cit., p. vii.

Input/output--"Any of the hardware used in communicating with a computer."[1]

Language--"Any set of symbols and the rules governing inter-relationships between the symbols, which can be used to convey or represent information."[2]

Program--"All the courses in one field of study, such as business educationoor industrial trades, organized to fulfill the same general objectives and conducted along similar lines."[3]

Storage device--"A device that functions as a part or all of a device or array of devices capable of accepting data and holding it and from which the data can be retrieved at a later date."[4]

Related Research

The Charles William Roellig study[5] was concerned with data processing instruction in schools of business. Questionnaires were sent to the member schools of the American Association of Collegiate Schools of Business with fifty schools or 50 per cent responding.

He found that: (1) Thirty per cent offered no computer courses; (2) Forty-four per cent of the responding schools offered one course in computers; (3) No agreement in which computer courses to offer to

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[1]Rodgers, op. cit., p. 48.

[2]Rodgers, op. cit., p. 54.

[3]Good, op. cit., p. 416.

[4]Rodgers, op. cit., p. 105.

[5]Charles William Roellig, "A Survey to Determine the Adequacy of Computer Education Offered by American Undergraduate Schools of Business" (Unpublished master's thesis, San Diego State College, 1965), 116pp.

provide the student with the most knowledge in business computer application; (4) Of the schools offering one course in computers, 49.9 per cent offer either general orientation to computer business applications or basic computer applications; (5) Computer courses were rarely required courses; (6) Inclusion of computer programming in the offered courses was neglected in most of the schools surveyed.

The survey method was used in the computer study by Edward James Laurie.[1] Two questionnaires were mailed to 161 business firms and 2 college firms. Case studies, visitations, and library research were also utilized.

He found that: (1) Manufacturing firms were the heaviest users of computers; (2) Most of the data processing personnel were trained by firms using electronic data processing equipment or the equipment manufacturers; (3) Programmer, computer operator and peripheral equipment operator were the most frequently used job titles; (4) Payroll and inventory are the two most common uses of the computer in business; (5) Of the colleges involved in the study, 46 per cent offer general courses and 43 per cent offer detailed courses; (6) Eighty-eight per cent of the colleges are not teaching undergraduate courses or offering a graduate major; (7) College and business respondents agreed that knowledges for personnel should include computer coding, computer logic, and programming.

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[1]Edward James Laurie, "Applications of Domestic Digital Computing Systems in Businesses and Schools of Business in the United States" (Unpublished doctoral dissertation, University of California, Los Angeles, 1959), 440pp.

Recommendations were that high school and junior colleges not add specialized data processing, but educate regarding the ramifications of the world in which the computer is an integral and active part.

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of NABTE in the Elizabeth Tarpey study.[1] There was a return of 81 per cent.

She found that: (1) Of the respondents, 79.4 per cent offered data processing instruction; (2) Of the faculty, 81.54 per cent were full time: (3) There were 21 kinds of computers available and fifteen were made by the IBM Corporation; (4) The most frequently appearing kind was the 1620; (5) In 34 per cent of the institutions, the business department was responsible for the equipment, in 26 per cent there was central control, and in 21.9 per cent, the administration controlled the equipment; (6) Courses offered to business teachers usually on an elective basis and showed little continuity.

Method of Research

Under the normative survey method of research, the questionnaire was the technique used to gather the information for this study. "The questionnaire procedure normally comes into use when one cannot readily see personally all the people from whom he desires responses or where there is not particular reason to see them personally."[2]

The questionnaire and cover letter explaining the purpose of the study were sent to each of the eighty-three selected state colleges in the United States. Some states are not represented because they contained no colleges within the limitations of the study. Of the eighty-three colleges contacted, there were sixty-four respondents, or 77 per cent.

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[1] Elizabeth Tarpey, "Data Processing Training in Selected NABTE Institutions" (Unpublished master's thesis, Southern Illinois University, 1967), 62pp.

[2] Carter V. Good, A. S., and Douglas E. Scates, Methodology of Educational Research (New York: Appleton-Century-Crofts, Inc., 1941), p. 325.

A copy of the questionnaire and the cover letter are included in the appendix.

The colleges are divided according to locality into the five regions recognized by the National Business Education Association. They are known as: Eastern Business Education Association (Eastern); Southern Business Education Association (Southern); North Central Business Education Association (N. Central); Mountain Plains Business Education Association (Mt. Plains); and Western Business Education Association (Western). The states found within each are listed in the appendix.

CHAPTER II

INTERPRETATION OF DATA

The information that is contained in this chapter was obtained from the sixty-four completed questionnaires sent to eighty-three state colleges with enrollments between 3,000 and 11,500 in the United States.

The purpose of this chapter is to present in tabular form the responses to the questionnaire and to interpret them. It contains twenty-tables and each one deals with a facet of automated data processing in the responding state colleges in the United States.

As stated in Chapter I, the colleges are classified according to locality into the five regions recognized by the National Business Education Association.

Tables I through IX deal with the status of data processing at the responding colleges. Tables X through XIII discuss the instructional staff, while Tables XIV through XVIII are concerned with the curriculum. The equipment available is the topic discussed in Tables XIX through XXIII.

Of the sixty-four state colleges returning the questionnaires, fifty of these colleges offered courses in data processing. Table I shows that all responding colleges within the North Central region offer data processing courses. Only fourteen, or 22 per cent, of the sixty-four responding state colleges in the United States have no data processing courses.

TABLE I

COLLEGES OFFERING DATA PROCESSING COURSES

Response	Regions Eastern	N. Central	Southern	Mt. Plains	Western	Total
Yes	14	8	8	11	9	50
No	11	-	1	1	1	14
Total	25	8	9	12	10	64

Of the fifty responding schools offering data processing courses, only one, Northeast Louisiana State College, offered any data processing before 1958. Fifty per cent of the responding schools began to offer it between the years 1962 and 1965. Another 28 per cent began to offer data processing between 1966 and 1969.

The largest per centage of the fifty responding colleges offering data processing, 28 per cent, are located in the Eastern region of the National Business Education Association.

The national trend currently appears to be to offer data processing through the business departments according to Table III. This is true in twenty-two, or 44 per cent, of the responding colleges offering data processing. The second most common practice is to offer data processing through both the business and mathematics departments. This trend is followed fairly closely in all the regions except in the Eastern region where 43 per cent of the responding schools in that area have data processing in the business department, while 36 per cent offer it in the mathematics department and only 14 per cent of the schools offer it in both of these departments.

TABLE II

DATES WHEN DATA PROCESSING COURSES FIRST TAUGHT IN RESPONDING COLLEGES

Region	Before 1958	1958-61	1962-65	1966-69	Unknown	Total
Eastern	-	1	3	9	1	14
N. Central	-	1	5	1	1	8
Southern	1	-	3	3	1	8
Mt. Plains	-	2	8	-	1	11
Western	-	2	6	1	-	9
Total	1	6	25	14	4	50

TABLE III

DEPARTMENTS RESPONSIBLE FOR DATA PROCESSING COURSES
IN RESPONDING COLLEGES

Regions	Business	Mathematics	Both	Other	Total
Eastern	6	5	2	1	14
N. Central	3	-	2	3	8
Southern	6	-	1	1	8
Mt. Plains	4	1	5	1	11
Western	3	1	3	2	9
Total	22	7	13	8	50

On the national level, 50 per cent of the state colleges which participated and offer data processing courses require at least one course of data processing in their accounting programs, 40 per cent require it in their business education and marketing programs according to Table IV.

The schools offering data processing in the Western region consistently require more data processing in their business programs than the national average. The schools in the Southern region require as much as or more than the national average except in the business education programs. This could be caused by the lack of such a program. The schools in the Mountain Plains region keep pace with the national average in all areas except in organization and administration programs. The Eastern and North Central regions require less data processing courses in their business programs than the national average.

According to Table V, of the fifty state colleges offering data processing courses, twenty-one, or 42 per cent, of the colleges offering data processing have at least one program in data processing. The largest number of state colleges offering data processing programs is found in the Western region.

In Table VI, twelve of the twenty-one state colleges offering data processing programs confer at least one degree program in this area. Eleven have two-year programs. The most notable is in the Mountain Plains region where four of the five state colleges with data processing programs have two-year programs, and five of the five have degree programs.

TABLE IV

BUSINESS PROGRAMS IN WHICH
DATA PROCESSING COURSES REQUIRED
IN RESPONDING COLLEGES

Regions	Accounting	Bus. Ed.	Finance	Marketing	Organization & Administration	Other
Eastern	6	5	1	3	3	1
N. Central	2	3	2	2	2	-
Southern	5	3	4	4	3	-
Mt. Plains	6	5	4	6	3	-
Western	6	4	4	5	4	-
Total	25	20	15	20	15	1
Per cent of total schools*	50	40	30	40	30	2

*Percentage based on the fifty schools offering data processing courses.

In Table VII, enrollments are shown for nineteen of the twenty-six programs in data processing. No information was available concerning the other seven schools offering data processing courses. Of these nineteen programs, eleven have enrollments of one to fifty students.

In the responding state colleges offering data processing courses, 92 per cent use their equipment for purposes in addition to training according to Table VIII.

TABLE V

RESPONDING COLLEGES WITH PROGRAMS IN DATA PROCESSING

Regions	Total Colleges Responding	Colleges with Programs	Per Cent of Colleges*
Eastern	14	2	14
N. Central	8	5	63
Southern	8	3	38
Mt. Plains	11	5	45
Western	9	6	67
Total	50	21	42

*Percentage of the schools in that region which offer data processing.

TABLE VI

TYPES OF DATA PROCESSING PROGRAMS OFFERED IN RESPONDING COLLEGES

Regions	Types of Programs		
	One-Year Program	Two-Year Program	Degree Program
	Number of Respondents		
Eastern	2	-	-
N. Central	1	3	2
Southern	-	2	1
Mt. Plains	-	4	5
Western	-	2	4
Total	3	11	12

TABLE VII

NUMBER OF STUDENTS IN DATA PROCESSING PROGRAMS
IN RESPONDING COLLEGES

Regions	Number of Students 1-50	51-100	100-150	Over 150
	Number of Respondents			
Eastern				
One-year Program	1	-	-	-
N. Central				
Two-year Program	2	1	-	-
Degree Program	-	-	1	-
Southern				
Two-year Program	1	-	-	-
Degree Program	-	-	1	-
Mt. Plains				
Two-year Program	3	-	1	-
Degree Program	2	1	1	-
Western				
Two-year Program	1	1	-	1
Degree Program	1	-	-	-

TABLE VIII

RESPONDING COLLEGES IN WHICH EQUIPMENT USED FOR PURPOSES
IN ADDITION TO EDUCATIONAL TRAINING

Regions	Use for Other Purposes	Use for Training	Unknown
	Number of Respondents		
Eastern	13	-	1
N. Central	8	-	-
Southern	7	1	-
Mt. Plains	10	1	-
Western	8	1	-
Total	46	3	1

In the forty-six colleges which used their equipment for more than educational training purposes, all used the equipment for college administration. A few used the equipment for research, industry, and other purposes not stated.

TABLE IX

PURPOSES FOR WHICH DATA PROCESSING EQUIPMENT USED OTHER THAN TRAINING IN RESPONDING COLLEGES

Regions	Industry	College Administration	Research	Other
	Number of Respondents			
Eastern	-	13	2	2
N. Central	-	8	-	1
Southern	1	7	2	1
Mt. Plains	3	10	4	-
Western	1	8	2	1
Total	5	46	10	5

Table X shows the number of full-time instructors, part-time instructors, and graduate students on assistantships employed at the various colleges in data processing area. It does not show the total at any particular college. In the majority of the schools, there are one to three full-time instructors and/or one to three part-time instructors.

TABLE X

NUMBER AND STATUS OF INSTRUCTORS
OF DATA PROCESSING COURSES
IN RESPONDING COLLEGES

Regions	Number of Instructors of Data Processing			
	1-3	4-6	7-9	10 and Over
	Number of Respondents			
Eastern				
Full-time	5	-	-	-
Part-time	7	1	-	1
Grad. Assts.	1	-	-	-
N. Central				
Full-time	5	1	-	-
Part-time	5	2	-	-
Grad. Assts.	-	-	-	-
Southern				
Full-time	5	-	-	-
Part-time	4	-	-	-
Grad. Assts.	-	1	-	-
Mt. Plains				
Full-time	9	1	-	-
Part-time	8	-	-	-
Grad. Assts.	1	-	-	-
Western				
Full-time	5	1	-	1
Part-time	7	-	-	-
Grad. Assts.	2	1	-	-

The master's degree is the degree most often held by the data processing instructor. Nationwide, the master's degree is held by 69 per cent of the responding data processing instructors. Although the percentage may not be exactly the same in all regions, the percentage of those with master's degrees range from a low of 58 per cent

in the Western region to a high of 87 per cent in the North Central region. The next degree most often held by data processing instructors in the state colleges responding is the doctorate.

TABLE XI

DEGREES HELD BY DATA PROCESSING INSTRUCTORS IN RESPONDING COLLEGES

Regions	Degrees				
	Doctorate	Master's	Bachelor's	None	Unknown
	Number of Instructors				
Eastern	4	24	5	-	2
N. Central	11	26	3	-	-
Southern	1	10	1	-	-
Mt. Plains	6	23	6	-	-
Western	10	22	5	1	-
Total	22	104	20	1	2

From the information given in the questionnaires, it was found that forty-one, or 82 per cent, of the colleges have data processing instructors who have some business experience as shown in Table XII.

The average number of years per instructor per college range from one to ten years with the largest number falling between one to six years of business experience as shown in Table XIII. This, however, does not mean that all the instructors at a college have business experience; therefore, it should not be interpreted that most of the data processing instructors have business experience.

TABLE XII

EXTENT OF BUSINESS EXPERIENCE
OF DATA PROCESSING INSTRUCTORS
IN RESPONDING COLLEGES

Regions	Yes	No	Unknown
	Number of Respondents		
Eastern	10	3	1
N. Central	7	1	-
Southern	6	2	-
Mt. Plains	10	1	-
Western	8	1	-
Total	41	8	1
Percentage of Total	82	16	2

TABLE XIII

AVERAGE NUMBER OF YEARS OF EXPERIENCE IN BUSINESS
OF DATA PROCESSING INSTRUCTORS IN RESPONDING COLLEGES

Regions	Number of Years 1-3	4-6	6-9	10	Unknown*
	Number of Respondents				
Eastern	1	4	-	1	2
N. Central	2	2	-	-	3
Southern	1	2	2	-	1

TABLE XIII (cont'd)

AVERAGE NUMBER OF YEARS OF EXPERIENCE IN BUSINESS OF DATA PROCESSING INSTRUCTORS IN RESPONDING COLLEGES

Regions	Number of Years 1-3	4-6	7-9	10	Unknown*
	Number of Respondents				
Mt. Plains	4	2	1	-	-
Western	2	2	1	-	-
Total	10	12	4	1	6

*Those colleges which indicate in the first part of question ten that their instructors had previous business experience, but in the second part of the question did not indicate how much experience.

Table XIV denotes the number of semester hours available in data processing in the various colleges offering data processing. Thirty, or 60 per cent, of the colleges which have data processing courses offer only from one to ten hours in data processing. The second group of hours in data processing most frequently offered was from twenty-one to thirty hours.

Of the several computer languages, those which were most frequently taught were Fortran and COBOL(Common Business Oriented Language) according to Table XV.

Table XVI shows that those courses most frequently offered were: Introduction to Data Processing, Punched Card Data Processing, Data Processing II, and Systems Design. The course content would not necessarily be the same in all instances.

TABLE XIV

NUMBER OF SEMESTER HOURS AVAILABLE
IN DATA PROCESSING IN RESPONDING COLLEGES

Regions	Number of Semester Hours 1-10	11-20	21-30	Over 30	Unknown
	Number of Respondents				
Eastern	13	1	-	-	-
N. Central	3	-	5	-	-
Southern	4	2	1	-	1
Mt. Plains	6	-	3	2	1
Western	4	1	2	2	-
Total	30	4	11	4	1

TABLE XV

COMPUTER LANGUAGES TAUGHT
IN RESPONDING COLLEGES

Regions	Computer Languages Autocoder	COBOL	Fortran	RPG	SPS	PL/1	Other
	Number of Respondents						
Eastern	3	5	10	1	1	1	2
N. Central	5	5	6	2	3	1	3
Southern	1	7	6	-	-	-	2
Mt. Plains	4	8	10	-	-	-	1
Western	-	7	8	3	2	2	2
Total	13	32	40	6	6	4	6

TABLE XVI

DATA PROCESSING COURSES OFFERED
IN RESPONDING COLLEGES

Course Titles	Regions					
	Southern	Eastern	Mt. Plains	N. Central	Western	Total
	Number of Respondents					
Intro. to DP	8	13	8	8	7	44
DP II	4	3	7	4	6	24
Systems Design	2	3	7	5	7	24
Punched Card DP	4	3	6	5	3	21
Advanced DP	5	2	2	5	4	18
Basic DP	2	2	6	4	4	18
DP III	1	1	5	3	4	14
Seminar in DP	2	-	4	2	3	11
DP Math	1	3	-	2	4	10
Field Project	2	-	3	3	-	8
Bus. Application	-	-	5	-	-	5
Digital Comp. Programming	-	-	3	-	-	3
Control Panel Wiring	-	-	2	-	-	2
Methods of Teach.	-	-	-	1	1	2

Table XVII shows the course titles and the number of semester hours for which each course is offered at the state colleges. Most of the courses were offered for three credit hours.

TABLE XVII

NUMBER OF HOURS
FOR WHICH RESPONDING COLLEGES
OFFERED DATA PROCESSING COURSES

Course Titles	Number of Semester Hours Credit 1	2	3	4	5	Total
	Number of Respondents					
Intro. to DP	3	5	33	3	-	44
Advanced DP	-	-	15	2	1	18
Basic DP	-	3	13	2	-	18
Punched Card DP	2	3	14	1	1	21
DP Math	1	2	6	-	1	10
DP II	1	3	18	-	2	24
DP III	1	1	10	1	1	14
DP IV	-	-	1	-	-	1
Seminar in DP	1	2	6	1	1	11
Systems Design	1	1	17	3	2	24
Field Project	-	-	6	-	2	8
Bus. Application	-	1	4	-	-	5
Control Panel Wiring	-	-	1	1	-	2
Digital Comp. Programming	-	1	2	-	-	3
Methods of Teaching	-	-	1	1	-	2
Total	10	22	147	15	10	204

Table XVIII, like Table XVII, has not been divided into regions because of the low number of responses. The table shows the specific courses required for the one-year, two-year, and degree programs in data processing. Data Processing II, Introduction to Data Processing, Data Processing III, and Systems Design were the most frequently required courses in all programs. Please note that Data Processing II is required more frequently than Introduction to Data Processing.

TABLE XVIII

DATA PROCESSING COURSES REQUIRED
FOR DATA PROCESSING PROGRAMS
IN RESPONDING COLLEGES

Course Titles	Programs			
	One-year	Two-year	Degree	
	Number of Respondents			
DP II	1	9	7	17
Intro. to DP	1	6	8	15
Systems Design	1	7	7	15
DP III	-	7	6	13
Punched Card DP	-	7	4	11
Advanced DP	1	5	3	9
Basic DP	-	4	4	8
Seminar in DP	-	2	5	7
Field Project	-	5	2	7
DP Math	-	4	2	6
Control Panel Wiring	-	1	1	2

The various types of computers used and the number of colleges using each is shown in Table XIX. The predominate make of computers used in instruction is that of IBM (International Business Machines). Of those responding schools using computers made by IBM, it was found that fourteen computers are Model 1400. The newest model, however, is Model 360. Eight schools have this model.

TABLE XIX

MAKES OF COMPUTERS USED
IN RESPONDING COLLEGES

Regions	Makes of Computers									
	IBM					RCA	Honeywell	CDC	Other	None
	1620	1130	1400	360	Other					
	Number of Respondents									
Eastern	1	3	2	-	2	2	1	-	2	2
Southern	-	4	4	-	1	-	-	-	-	-
Mt. Plains	-	2	4	3	-	-	-	1	-	1
N. Central	2	-	3	3	-	-	-	-	-	1
Western	4	2	1	2	-	-	2	2	2	-
Total	7	11	14	8	3	2	3	3	4	4

According to Table XX, those pieces of equipment most commonly available in the colleges offering data processing are the keypunch, sorter, interpreter, and reproducer. The specific number of pieces in use at the colleges are not shown here because in some cases as many as half the colleges in a region did not indicate the number

available as asked, but merely checked that the equipment is available. Therefore, a clear, overall picture could not be given.

TABLE XX

NUMBER OF RESPONDING COLLEGES IN WHICH EQUIPMENT AVAILABLE

Types of Equipment	Regions					Total
	Eastern	N. Central	Southern	Mt. Plains	Western	
	Number of Respondents					
Colleges Offering Data Processing	14	8	8	11	9	50
Keypunch	14	8	8	10	9	49
Sorter	13	6	8	9	9	45
Interpreter	12	6	6	8	4	36
Reproducer	11	5	8	8	3	35
Collator	10	5	7	8	3	33
Verifier	11	5	5	7	5	33
Accounting Machine	6	8	4	4	-	17
Flexowriter	2	-	2	1	1	6
Digital Graph Plotter	-	1	1	-	1	3

The input/output devices most commonly available as shown on Table XXI include: the console typewriters, card readers, and card punch machines. According to the table, the responding schools offering

data processing in the Eastern region had more different kinds of input/output devices than the colleges in the other regions.

TABLE XXI

TYE AVAILABILITY OF INPUT/OUTPUT DEVICES IN RESPONDING COLLEGES

Types of Equipment	Regions					Total
	Eastern	N. Central	Southern	Mt. Plains	Western	
	Number of Respondents					
Card Reader	9	8	6	8	6	37
Card Punch	11	8	-	8	7	34
Console Typewriter	7	5	7	8	6	33
Manual Keyboard	9	-	3	2	2	16
Paper Tape Reader	2	-	3	-	1	6
Alphameric Optical Reader	1	1	1	-	-	3
Cathode Display Tube	1	1	1	-	-	3
Another Computer	-	-	1	-	1	2
Teletype	2	-	-	-	-	2
MICR Reader	-	-	-	-	-	-

Table XXII shows the various types of storage devices available in the colleges. Of the fifty colleges, thirty-four have disk packs. This is by far the most commonly used storage device in the responding colleges.

TABLE XXII

NUMBER OF RESPONDING COLLEGES IN WHICH VARIOUS STORAGE DEVICES AVAILABLE

Types of Equipment	Regions: Eastern	N. Central	Southern	Mt. Plains	Western	Total
	Number of Respondents					
Disk Packs	8	8	5	8	5	34
Magnetic Tape	4	4	2	6	3	19
Ferrite Core	1	3	2	2	5	13
Drum	4	-	3	-	3	10
Electronic Tubes	1	-	-	-	-	1

Of the accessories shown on Table XXIII, the card trays, card trucks, and storage equipment are used most frequently by the fifty colleges.

TABLE XXIII

NUMBER OF RESPONDING COLLEGES IN WHICH VARIOUS ACCESSORIES AVAILABLE

Types of Equipment	Regions: Eastern	N. Central	Southern	Mt. Plains	Western	Total
	Number of Respondents					
Card Trays	14	3	6	7	5	35
Card Racks	13	3	5	4	5	30
Storage Equipment	10	3	6	1	4	24
Card Trucks	9	2	2	4	1	18
Paper Handling Devices	7	3	5	-	3	18

CHAPTER III

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this investigation was to study automated data processing in a selected group of state colleges in the United States. The specific areas considered include:

1. The present status of data processing on college campuses
2. The instructional staff for data processing
3. The curriculum and courses offered in data processing
4. The equipment available for data processing.

The questionnaires were sent to eighty-three selected state colleges in the United States. Of those selected, there were sixty-four respondents of which fifty offered data processing courses.

Conclusions

The current trend in the responding colleges is toward offering data processing courses. Seventy-eight per cent of the responding colleges offer data processing courses. While the Eastern region has the largest actual number of responding colleges offering data processing courses, the North Central region has the highest percentage. The Eastern region has 56 per cent of the twenty-five responding selected colleges offering data processing courses in that region, while the North Central has 100 per cent of the eight responding selected colleges offering data processing courses in that region.

Fifty per cent of the fifty responding colleges offering data processing courses began to do so between the years of 1962 and 1965.

However, Northeast Louisiana State College began to offer data processing courses as early as 1954.

The business department is responsible in 44 per cent of the responding colleges for offering the data processing courses. This department is more frequently responsible than any other department. This is found to be true in all regions.

Most of the responding colleges require at least one data processing course to be taken by persons majoring in the business programs. Of those, 50 per cent of the responding colleges who offer data processing require at least one course of data processing in their accounting programs. Forty of these colleges require data processing in business education and marketing programs.

Forty-two per cent of the colleges offering data processing courses have at least one program in data processing. The two-year and degree programs are offered more frequently than the one-year program.

Information was available concerning the enrollments in the data processing programs for nineteen of the schools offering data processing programs. Eleven of these programs have enrollments of one to fifty students.

In 92 per cent of the responding colleges offering data processing courses, the data processing equipment is used for purposes in addition to training. These colleges use the equipment for college administration, while a few of the responding colleges use the equipment for research, industry, and other purposes not stated.

The people who teach the data processing courses are usually either part-time or full-time instructors with a few graduate assistants. The instructor most often has a master's degree and some business experience, usually one to six years.

Sixty per cent of the responding colleges who offer data processing courses have only from one to ten semester hours in this area.

Of the several computer languages, the ones most frequently taught in the responding colleges include Fortran and Common Business Oriented Language.

The data processing courses which are most frequently offered in the responding colleges include: Introduction to Data Processing, Data Processing II, Punched Card Data Processing, and Systems Design.

The responding colleges most generally offer the data processing courses for three semester hours credit.

Those courses most frequently required for data processing programs in the responding colleges include: Introduction to Data Processing, Data Processing II, Data Processing III, and Systems Design.

The brand of computer used by 73 per cent of the responding colleges is the IBM. The IBM Models 1400 and 1130 are the most frequently used models of the IBM computers.

The data processing equipment most commonly available in the responding colleges, not including the computer, are: keypunch, sorter, interpreter, and reproducer.

The input/output devices most commonly available in the responding colleges offering data processing courses include: Console typewriters, card readers, and card punch machines.

In the responding colleges offering data processing courses, the storage device used by 68 per cent of the colleges is the disk pack.

The accessories used most frequently by the responding colleges are the card trays and card trucks.

Recommendations

Just as companies formerly trained their own accountants, today's businesses are having to train their own programmers and others in the data processing field. The current status of data processing in the responding state colleges is an appalling one. Forty-seven per cent of the responding state colleges offer one to ten hours in data processing. This is a beginning, but hardly adequate when you consider that 22 per cent of the responding state colleges offer no courses in data processing. It is recommended that the colleges and universities of today expand their curricula to include programs in the areas of data processing.

Individuals majoring in programs in the business field need at least a basic knowledge of what data processing entails, since they will probably encounter it in whatever field they pursue. Therefore, it is recommended that at least a basic course in data processing be required for business majors.

It is recommended that the instructional staff be upgraded to include better educated individuals who have experience in the field of data processing. At the time of this study, 16 per cent of the

instructors have a bachelor's degree or no degree at all. This situation definitely needs to be rectified. In addition, only 82 per cent of the instructors had business experience. The more business experience in data processing and the greater the extent of the education of the instructors, the better will be the quality of instruction available to the student.

The students enrolled in data processing courses should be exposed to a wider variety of storage devices, input/output devices, and the various accessories in data processing. It is recommended that a wider variety of equipment used in the data processing area be made available for the students utilization so that they may be familiar with it whenever it is incurred in the business world.

APPENDIX

APPENDIX A

903 South Taylor
Pittsburg, Ks. 66762
April 2, 1969

College Name
Street Name
City, State Zip Code

Dear Sir:

As a research study for partial fulfillment of the requirements of the Master's degree in business education at Kansas State College of Pittsburg, I am contacting a selected group of state colleges to determine if and to what extent data processing courses are offered.

I would certainly appreciate your assistance with this study by completing the enclosed questionnaire. Questions are constructed so that it will take a minimum amount of time to answer them. All information will be confidential and will be used only to compile data for this study.

This study will show what percentage of the selected state colleges participating have data processing in their curriculum. And, of those offering data processing, an overall view of their programs.

A self-addressed stamped envelope is enclosed for your convenience. I would appreciate your cooperation in completing and returning the questionnaire at your earliest convenience. Thank you for your assistance.

Respectfully yours,

Mrs. Linda E. Christy

APPENDIX B

QUESTIONNAIRE

NAME OF COLLEGE_____

STATUS

1. Does your college offer data processing courses? Yes___ No___ If not, please return the questionnaire in the enclosed envelope.

2. When were data processing classes first offered at your institution?_____

3. Your data processing classes are offered as a part of which department? (Please check all that apply) Business Department___ Mathematics Department___ A separate department___

4. Is one or more classes in data processing required for graduation in any of the following business programs? (Please check all that apply) Accounting___ Business Education___ Finance___ Marketing___ Office Administration___

5. Do you offer a program in data processing? Yes___ No___ If so, which of the following does it include? (Check all that apply) One-year program___ Two-year program___ Four-year degree program___

6. How many majors do you have in the one-year program?_____ In the two-year program?_____ In the degree program?_____

7. Is your equipment used for purposes other than training? Yes___ No___ If so, which of the following is it used for? (Check all that apply) Private industry___ College administration___ Other (Please specify)_____

INSTRUCTIONAL STAFF

8. How many full-time teachers do you employ in the data processing area?_____ Part-time teachers?_____ Graduate students on assistantships?_____

9. Indicate by number the highest degree held by each of the data processing instructors? Doctorage_____ Masters_____ Bachelors_____ None_____ Other (Specify)_____

10. Do the teachers in data processing have business experience in this area? Yes_____ No_____ If so, what is the average number of years?_____

CURRICULUM

11. In data processing courses, how many semester hours are available?___ Quarter hours?_____ Trisemester hours?_____

12. Which of the following languages are taught? Autocoder___ COBOLS___ Fortran___ Other (Please specify)_____

13. In an effort to survey the courses you offer, the following chart lists possible course titles. The first column contains the course title; the second column is to be filled in with the number of credit hours available for that course; the third, fourth, and fifth columns are to be checked if that course is required to fulfill that particular program.

TITLE	HOURS		PROGRAMS		
	Sem	Qtr	1 yr.	2 yr.	degree
Intro. to Data Processing					
Adv. Data Processing					
Basic Computing Machines					
Punched Card Data Proc.					
Data Processing Math					
Programming II					
Programming III					
Seminar in Data Proc.					
Data Proc. Systems Design					
Data Proc. Field Project					
Other					

EQUIPMENT

14. Which computer console do you utilize? (Please indicate company name and the series number?_____

15. Please indicate the number of each of the followingpieces of equipment available for data processing instruction. Key Punch_____ Verifier_____ Sorter_____ Interpreter_____ Reproducer_____ Flexowriter_____ Collator_____ Digital graph plotter_____ Other (Please specify)_____

16. Please indicate the number of each of the input/output devices available for instruction. Manual keyboard_____ Console typewriter_____ Card reader_____ Card punch_____ Paper tape reader_____ Paper tape punch_____ Another computer_____ Cathode display tube_____ Alphameric optical reader_____ MICR reader_____ Other (Please specify)_____

17. Please check the following storage devices available for instruction. Drum___ Magnetic tape___ Ferrite cores___ Disk packs___ Electronic tubes___ Other (Please specify)_____

18. Please check if the following accessories are available for instruction. Card trays___ Card trucks___ Card racks___ Storage equipment___ Paper-handling devices___ Other (Please specify)_____

APPENDIX C

NATIONAL BUSINESS EDUCATION ASSOCIATION REGIONS

EASTERN BUSINESS EDUCATION ASSOCIATION: Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

SOUTHERN BUSINESS EDUCATION ASSOCIATION: Alabama, Arkansas, Florida Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia, Puerto Rico, the Virgin Islands, and the Canal Zone.

NORTH CENTRAL BUSINESS EDUCATION ASSOCIATION: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.

MOUNTAIN PLAINS BUSINESS EDUCATION ASSOCIATION: Colorado, Kansas Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming.

WESTERN BUSINESS EDUCATION ASSOCIATION: Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Guam.

APPENDIX D

SELECTED STATE COLLEGES

ALABAMA: Florence State College.

ARKANSAS: Arkansas A & M College, Henderson State College.

CALIFORNIA: California State College-Fullerton, California State College-Hayward, California State College-Pomona.

COLORADO: Colorado State College, Southern Colorado State College.

CONNECTICUT: Central Connecticut State College.

GEORGIA: Georgia Southern College, Georgia State College, West Georgia College.

IDAHO: Boise State College.

ILLINOIS: Chicago State College, Northeastern Illinois State College.

KANSAS: Fort Hays Kansas State College, Kansas State College of Pittsburg, Kansas State Teachers College.

LOUISIANA: Francis T. Nichols State College, Grambling College, Northeast Louisiana State College.

MARYLAND: Morgan State College, Towson State College.

MASSACHUSETTS: Massachusetts State College at: Boston, Bridgewater, Fitchburg, Salem, and Westfield.

MICHIGAN: Ferris State College.

MINNESOTA: Mankato State College, St. Cloud State College.

MISSOURI: Central Missouri State College, Northeast Missouri State College, Northwest Missouri State College, Southeast Missouri State College, Southwest Missouri State College.

MONTANA: Eastern Montana College.

NEW JERSEY: Glassboro State College, Jersey City State College, Montclair State College, Peterson State College, Trenton State College.

NEW YORK: State University of New York College of: Brockport, Buffalo, Cortland, Fredonia, Geneseo, New Platz, Oneonta, Oswego, Plattsburgh, Potsdam.

NORTH CAROLINA: North Carolina College at Durham.

APPENDIX D
(Continued)

SELECTED STATE COLLEGES

OKLAHOMA: Central State College, East Central State College, Northeastern State College, Southwestern State College.

OREGON: Portland State College, Southern Oregon College.

PENNSYLVANIA: Bloomsburg State College, Claifornia State College, Clarion State College, Edinboro State College, Kutztown State College, Millersville State College, Shippensburg State College, West Chester State College.

RHODE ISLAND: Rhode Island College.

SOUTH DAKOTA: Northern State College.

TEXAS: Lamar State College--Technical, Pan American College, Sam Houston State College, Southwest Texas State College, Stephen F. Austin State College, Prairie View A & M College.

UTAH: Weber State College.

VIRGINIA: Old Dominion College, Virginia State College-Norfolk Division.

WASHINGTON: Central Washington State College, Clark College, Eastern Washington State College, Western Washington State College.

WEST VIRGINIA: West Liberty State College.

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