THE APPLICATION AND DEVELOPMENT OF MACHINE ACCOUNTING PRACTICES FOR KANSAS SCHOOL DISTRICTS

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by

Clifford David Crum Jr.

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

Local school district financial management is not so much a plan for fiscal management per se as it is a vehicle for promoting the educational program. School finance is "complementary and subordinate to the central purpose of the schools . . . instruction."[1] Fiscal and educational policies and purposes overlap at many points and are so interwoven that they cannot always be separated in practice. It is generally regarded as unsatisfactory to attempt to separate these two aspects of administration, because it leads to arbitrary distinctions in which the primary function of the school may be lost to engrossing details of business management. Only for purposes of study and discusssion may financial aspects be considered apart from the education program, and then always with a clear recognition that the former cannot be appraised except in terms of the latter.[2]

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[1]Arthur B. Moehlman, School Administration, (Boston: Houghton Mifflin Company, 1951) p. 23.

[2]Paul R. Mort and Walter C. Reusser, Public School Finance, (New York: McGraw-Hill Book Co., 1951) p. 146.

I. THE PROBLEM

Statement of the problem. It is the purpose of this study to develop the application of machine accounting practices for use in Kansas school districts.

Specifically this study includes:

(1) an investigation of the historical background of machine accounting;

(2) all Kansas school systems known to be making use of the "Series 50" accounting machine manufactured by the International Business Machine Corporation;

(3) the determination of the initial cost for a minimum amount of equipment, installation, operation, and programming; and

(4) ascertaining when it would be economically feasible for a district to change from manual to machine accounting.

No attempts were made to measure the efficiency of how these schools are operating their mechanical accounting equipment.

Importance of the study. As pointed out by Joyner, there are very few areas of school administration where the boards of education and superintendents are confronted with more difficulty than in matters of accounting for school money and property. Operating schools has become a big business. In 1958, approximately $12 billion dollars were

spent for facilities, materials, and services.[3] He goes on to say that school management, like the management of any large industrial concern, must be operated on a business-like basis.[4]

Research in school business administration is greatly needed. Lewis has pointed out that the average business administrator's staff is so bogged down by the pressure of work which must be done that there is little time for research. Hence, school districts developing significant improvements in practice are extremely limited.[5] In reviewing developments in school business administration he further says:

> There is no area in the field of education where a dollar expended would give greater return to schools than in research in business administration. Since a single idea put into practice may result in savings of thousands of dollars such a program would be a sound investment.
>
> School business administration is the only billion dollar enterprise that attempts to run with so little research and so little information service for the improvement of practice.[6]

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[3]Schuyler C. Joyner, "Mechanized Equipment is Practical and Necessary," The Nation's Schools, 61 (May, 1958), p. 68.

[4]Ibid.

[5]John W. Lewis, "Business Administration," The School Executive, (January, 1955), pp. 62-63.

[6]Ibid.

In light of these needs, it is the aim of this study to gain insight into the problem of machine accounting as a possible solution towards a better method of handling the increased burden of record keeping for school districts within the State of Kansas.

Methods of procedure. This investigation covers (1) published and unpublished reports of professional associations, and materials in school administration, (2) an inquiry of thirty-seven Kansas high schools with an enrollment of 800 or more students to determine what machines were now being used for financial record keeping, and (3) case studies of schools known to this writer to be using punched card systems of accounting. The facts concerning the need of the "Series 50" accounting machine in school accounting have been secured by an inquiry form mailed to school districts similar in environment and size for the purpose of determining perceived accounting needs. The information gathered from the four schools using the punched card systems of accounting was obtained through personal interviews.

Based upon the statement of principles that were determined, selected aspects of accounting systems and procedures utilizing a particular type of machine were developed.

II. DEFINITIONS OF TERMS

Accounting Machine. The accounting machine is used

to obtain printed reports of data punched in the cards. It selects and reads data from cards, adds and subtracts, and prints on a sheet of paper data from individual cards or from accumulated totals. It is also known as a "tabulator."

Card. The card is rectangular, made of firm but flexible paper stock. Punching and printing areas, captions, and other matter are normally printed on the face of the card.

Collator. The collator is a machine that will compare two sets of punched cards simultaneously, in order to match them or to merge them.

Mark-Sensing. Cards can also be punched automatically, without the use of key punching, through a medium known as mark-sensing. The cards marked in this manner, by a graphite pencil, are fed into another machine which electrically senses the graphite marks and punches corresponding holes into the desired position on the same card.

Key Punch. The punch is the basic means of transcribing data from source document to card. The IBM punch is an electrically operated key driven machine and is commonly called a "key punch."

Sorter. The sorter is a machine that arranges cards in any desired order according to the data punched into them. Also they separate the cards into groups having certain specific information.

Tabulator. See (Accounting Machine).

III. ASSUMPTIONS RELATIVE TO MACHINE ACCOUNTING

In order to place this study in its proper perspective certain assumptions are made as follows:

1. Additional expenditures can be justified because of the economic condition of the country, the demand for extension of the present educational program, new demands made upon the school, and an increasing enrollment in Kansas schools. Education is generally accepted as an investment in people.
2. The fiscal management of public schools is often one of the largest financial operations in the community. The citizens may rightfully inquire into the effectiveness of the financial management of one of its largest public enterprises. It is reasonable to examine the procedures followed, personnel required, equipment utilized, results achieved, economics effected, and operational reports presented.
3. The accounting systems and procedures are among the most important "tools" in the fiscal management of a school district.

4. The purposes of school district accounting are to provide financial information to the following:

Administrators. In the guidance of policy-making and decisions, financial data are required as basic current managerial information. Good financial records are essential "tools" of management.

Legislative Bodies. The board of education uses the financial data to shape its policy decisions, to evaluate the implementation of its adopted policies, and to insure the fidelity of management. Accurate current summaries are most important to the board. Other legislative bodies such as the state unit and the state legislature also need these data.

Investors. There is a great interest by investors in the soundness of municipal securities because they provide the capital for bond issues. Accounting reports are relied upon to give an overall picture of financial soundness.

The Personnel Employed. Because of the numerous payroll deductions, it is imperative that adequate cumulative records

be kept. Personnel accounting records and payroll procedures have come to play an important part in the lives of the citizens who have a great stake in the adequacy, accuracy, and permanence of their records.

5. Using mechancial equipment will not necessarily involve putting all present procedures on machines. The procedures must be examined. This involves the examination of the fundamental reasons for accounting, and the development of systems and procedures in terms of generally accepted principles. Machine accounting is unique in its ability to provide more and more detailed data through mechancial summarization of data, subsidiary ledgers, and postings. It can also then perform certain research functions.

The development of machine accounting systems and procedures assumes the application of generally accepted accounting principles relevant to school accounting.

CHAPTER II

BACKGROUND FOR THIS STUDY AS REVEALED IN CURRENT LITERATURE

Since this problem concerns a relatively new phase in machine accounting practices, no significant research was found concerning this study. Therefore, an attempt is made in this chapter to present general background information relative to the accounting practices of machine accounting for school districts. In an attempt to appropriately prepare the reader of this report for an analysis of basic data, the writer presents a discussion of the historical development of machine accounting systems, a general description of the impact of automation, and a general description of the significance of automation as it is related to school districts.

I. HISTORICAL DEVELOPMENT OF MACHINE ACCOUNTING

For nearly fifty years, the punched-card method of accounting has played an important part in handling, collecting, and tabulating data. It took seven years to compile the 1880 census. There was concern that the 1890 census, involving millions more people, could not be completed before the end of the decade. What threatened for a time to

become a crisis was averted by an invention which was to have great implications for the future -- the punched card. The inventor was Dr. Herman Hollerith, a statistician from Buffalo, New York. His machine made it possible to take the 1890 census of 50 million. The 1890 census data was placed on cards in the form of holes cut with a hand-operated punch. Dr. Hollerith's method of accounting was a success and a short time later, the U. S. Government, the Government of Austria-Hungary, and the New York Central Railroad adopted this new method of accounting.[1]

As soon as it became evident that giant surveys could be digested with speed and precision, those engaged with the technique of research became curious about this new mechanical aid.

> Upon leaving the Census Bureau in 1896, Dr. Hollerith organized the Tabulating Machine Company and in 1901 introduced the basic form of a numeric-punch keyboard for preparing cards for further processing. In 1911, the Tabulating Machine Company merged into the Computing-Tabulating-Recording Company which was the forerunner of the International Business Machines Corporation.[2]

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[1]"New Methods for Knowing," International Business Machines, Form No. 500-0002 (January, 1960) pp. 6-9.

[2]Melvin Loyd Edwards, "The Effect of Automation on Accounting Jobs" (unpublished Ed.D dissertation, The University of Oklahoma, Norman, 1959).

II. IMPACT OF AUTOMATION

The literature analyzed for ideas appropriate to the presentation of information relating to the impact of automation was obtained from reading periodicals directly concerned with problems of accounting and record keeping.

Gibson, in his article on how automation would affect business education in the future, made the following statement:

> Let me warn you in advance. I'm going to challenge you to a new way of thinking and to a new way of life for most of you. As most of you know, there is a tremendous demand for our product--office workers. But how many of you know that tomorrow, through automation, what it takes a worker five days to produce now will be produced then in two days? The trend is toward skilled and semiskilled workers.[3]

The obsolescence of manual methods of record-keeping is emphasized by the following statement:

> It is generally agreed that machine--and particularly electronic-technology since World War II has made possible the automation of almost any phase of record-keeping or data-processing.[4]

It is evident that the use of punched-card accounting

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[3]Dana Gibson, "Office Automation: How It Will Affect Business Education in the Future," Balance Sheet, November, 1957, p. 100.

[4]Owen P. Gardner, "Automation Gains Momentum," Journal of Machine Accounting, August, 1959, pp. 40-41.

systems constitutes a better method of accomplishing economical accounting based on rapid and accurate data processing. Machine accounting is not limited to any one specific phase of business or accounting. The literature reveals that machine accounting methods are equally as important to other enterprises such as banking, industry, public utilities, schools, and government agencies.

III. AUTOMATION AS IT IS RELATED TO SCHOOLS

In few other areas of school administration is more difficulty experienced by the boards of education and the superintendents than in matters related to accounting for school money and property.[5]

> The objective of school business administration is to provide service. Evidence that these services are not being properly dispensed calls for an examination of the organization of the business office and a re-evaluation of its operations in terms of the demands which invariably accompany growth and expansion.[6]

School administrators have become increasingly aware of the difficulty in completing the necessary clerical work to insure prompt payment of invoices, the inability to supply

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[5]Barbara Taylor, "Machine Accounting in Small School Systems," School Board Journal, March, 1954, pp. 47-48.

[6]Ibid.

cost figures upon request, consolidation of school districts which bring about larger enrollments, the need to employ personnel, and the need for a more streamlined and expedient method of performing the various functions of the business office.

Another stimulus to the use of automation in the school accounting field can be contributed to the increased enrollment of our schools. "Enrollment in Public Schools increased more than 1.2 million pupils from the total of 36,037,937 in 1959-60 to 37,244,284 in 1960-61. There are almost 1½ million more pupils enrolled today than were enrolled 10 years ago."[7]

Public school enrollments for the State of Kansas in grades one through twelve inclusive have increased 118,834 from the total of 328,973 in 1950 to 447,807 in 1960. The Progress Report of the Educational Planning Commission for the State of Kansas predicts an increase of 75,479 from the total of 447,807 in 1960 to 523,286 in 1970. This includes grades one through twelve.[8]

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[7]"School Statistics: 1960-61," N.E.A. Research Bulletin, 39 (February, 1961), p. 3.

[8]"The School of Tomorrow for Kansas," A Progress Report of the Educational Planning Commission, Kansas State Teachers Association, Revised (May, 1960), pp. 19, 26.

managed at all."[10] A former university president expressed it similarly, "Even though it is but a service division, the better the business office, the better the institution."[11]

IV. WHEN SHOULD A SCHOOL DISTRICT INSTALL MACHINE ACCOUNTING?

Grieder and Rosentengel asserted that school districts "with 100 or more employees can well afford to consider installing machines for all financial and payroll accounting."[12] Dr. Nelson, professor of education administration at the University of Southern California said, "In most cases, an elementary district with 1500 pupils, or a high school district with 1000 pupils, can justify machine accounting."[13]

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[10]Henry C. Morrison, The Management of the School Money, (Chicago: University of Chicago Press, 1932), p. 19.

[11]Lloyd Morey, "Leaves from a President's Notebook," School and Society, 82 (December, 1955), p. 196.

[12]Calvin Grieder and William E. Rosenstengel, Public School Administration, (New York: The Ronald Press Co., 1954), p. 467.

[13]Nation's Schools. "Machine Accounting and Related Services for School Administration." Nation's Schools, 61 (May, 1958), p. 75.

Other writers in the field, namely, Taylor[14] and Hill[15] have suggested figures ranging from 50 to 150 employees.

In the opinion of the writer, there are other factors in addition to the number of employees or the enrollment that determine the advisability of machine accounting. These include the total number of financial transactions; the number of funds and accounts necessary (these will vary from school district to school district); the amount of detailed information desired; the future growth and expanded services to be provided; and the costs of a minimum amount of equipment.

The three basic machines or the minimum amount of equipment are composed of the printing card punch, the sorter, and the accounting machine. For schools with an enrollment between 1,000 and 1,500 students, the costs of purchasing this equipment would be prohibitive. Consequently, institutions making use of accounting machines will do so on a monthly rental basis. Statements relating to the actual costs of a minimum amount of equipment will be given in a later chapter.

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[14]Barbara Taylor, "Machine Accounting Systems in Small School Systems," American School Board Journal, March, 1954, p. 48.

[15]Frederick A. Hill, "Machine Accounting, When and Why," School Board Journal, 124 (March, 1952) pp. 40-42.

CHAPTER 3

RESPONSE TO THE INQUIRY FORM

The inquiry form used in this study was constructed with the idea of receiving data to determine what kind of machines are presently being used in our Kansas school systems as well as determining possible machine accounting needs. The inquiry form may be found in the appendix.

I. TECHNIQUE

All high schools with an enrollment of 800 or more were selected to receive the inquiry form. The criteria for the selection of schools with an enrollment of 800 or more students was based upon the following:

(1) Schools known to the writer to be using punched-card installations, and
(2) Information obtained from related literature.

The cut off point of 800 seems justified by the very limited application of machine accounting in the group of 37 schools surveyed. It is, therefore, reasonable to assume that no schools smaller than 800 are using the series 50 machine.

II. RESULTS

Table I on page 19 shows the location of the Kansas schools receiving the inquiry form, the total enrollment of all students in kindergarten, grade school, and high school,

the total number of corresponding faculty members in each school, and the machines in use (other than typewriters and adding machines).

From the results of the returned inquiry form, Table I gives the following information:

(1) 37 per cent lack any type of an accounting machine,

(2) 17 per cent of the schools are making use of the posting machine,

(3) 17 per cent of the schools have calculators,

(4) 60 per cent of all schools reporting are making use of the verifax,

(5) 5 schools or approximately 14 per cent of the schools reporting make use of both the verifax copier and calculator,

(6) Only 2 schools, less than ½ of 1 per cent, in the State of Kansas reports making use of punched-card accounting,

(7) 2 schools have indicated they are considering punched-card installation, and

(8) From 37 inquiry forms mailed, the writer received replies from 36 schools giving a 97.3 per cent net return.

In summarizing written comments added to the bottom of the inquiry forms, several administrators have indicated

TABLE I

MACHINE ACCOUNTING PRACTICES USED IN CERTAIN KANSAS HIGH SCHOOL DISTRICTS

Location of Ks. Schools	**Enrollment K	1-8	9-12	**Faculty K	1-8	9-12	*Machines in Use 1	2	3	4	5	6	7	8	9	10
Altamont,		187	796		9	42		x	x	x						
Ark. City,	327	2273	957	7	90	44	x									
Atchison,	240	1325	608	5	67	36			x	x						
Chanute,	196	1456	725	3	64	34				x						
Coffeyville,	290	2419	1249	6	111	53				x						
Derby,	498	3085	925	10	149	53				x						
Dodge City,	352	2179	804	6	97	25				x						
ElDorado,	303	2074	878	5	95	44		x								
Emporia,	286	1743	840	5	76	49				x						
Fort Scott,	151	1110	625	3	58	26	x									
Garden City,	288	1962	786	5	88	44				x						
Great Bend,	418	2550	997	9	119	54				x						
Hutchinson,	840	5557	1783	18	286	81				x						
Independence,	230	1117	839	4	66	33	x									
Junction City,	647	3656	922	11	157	52				x						
Ks.City (Supt.)	2542	15821	5101	43	561	218		x	x	x						
Wichita (Kechi)	99	729		2	34				x	x	Considering					
Lawrence,	593	3688	1499	12	174	97			x							
Leavenworth,	366	2724	1177	6	116	56	x									
Liberal,	396	2189	763	7	116	42		x		x						
Manhattan,	466	2607	1025	10	118	65		x		x						
McPherson,	222	1447	645	4	69	37	x									
Newton,	340	2447	908	7	113	47	x									
Ottawa,	191	1471	609	4	74	32	x									
Pittsburg,	262	2026	748	5	94	36	x									
Pratt,	192	1232	518	3	56	41	x									
Salina,	146	5967	1928	18	255	90				x						
Turner,	81	591	1028	2	31	51		x		x						
Bethel,		1122	1550		59	48				x	x	x	x			
Wichita (Campus)			969			51			x	x	x	x	x	x	x	
Wichita (Heights)			969			51				x						
Winfield	201	1504	807	4	81	35				x						
Ks.City(Ward Hi)			922			41	x									
Shawnee M.Miege			730			31	x									x
Topeka (Hayden)			780			31	x									
Wichita (Kapaun)			650			24	x									

*1. None
2. Post.Machine
3. Calculator
4. Verifax
5. Tabulator
6. Punch Card
7. Sorter
8. Reproducer
9. Collator
10. Service Bureau

** Kansas Educational Directory, Issued by A. F. Throckmorton, State Supt. of Public Instruction, Bulletin 340, 1960-61.

CHAPTER 4

ANALYSIS OF MACHINE ACCOUNTING FROM PERSONAL INTERVIEWS

As was stated in Chapter I, it is the aim of this study to gain insight into the problems of machine accounting as a possible solution towards a better method of handling the increased burden of record keeping for school districts within the State of Kansas.

Since there are so many questions that need to be answered in relation to machine accounting, and since the number of schools employing machine accounting is small, the writer deemed the best method of obtaining these answers would be through personal interviews with schools making use of punched-card accounting as well as with schools making use of the service bureau.

Just in case the inquiry form, as explained in Chapter 3, failed to reach all high schools making use of machine accounting, the writer contacted Dr. Althaus of the State Department of Public Instruction. He stated, "The State of Kansas has only two individual school systems making use of punched-card accounting procedures, namely, Campus High School of Wichita, Kansas, and Washington High School of Bethel, Kansas.[1]

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[1]Interview with Dr. Carl, B. Althaus, Director of Statistical Services, State Department of Public Instruction, Topeka, Kansas, May, 1961.

Since the number of schools involved in this investigation was so small, the personal interview was believed to be the most valid technique for gathering data.

After visiting with the administrators and the accounting departments of each school, twenty-four pilot questions were formulated in the hope that the answers would be of value to the reader of this study. Responses to these questions were recorded in shorthand by the writer and they appear in this report exactly as given. This set of questions may be found in the appendix.

To give greater clarity and unity to the answers received from the two personal interviews held with Mr. Winters of the Washington High School, Bethel, Kansas and Mr. Ferguson of the Campus High School, Wichita, Kansas, the following procedures will be used: Following each of the stated questions, all answers received from Mr. Winters will be identified by the name "Washington," and all answers received from Mr. Ferguson will be identified by the name "Campus." Table II on page 24 has been prepared for all questions receiving short answers.

I. INTERVIEWS WITH WASHINGTON HIGH SCHOOL, BETHEL, KANSAS AND CAMPUS HIGH SCHOOL, WICHITA, KANSAS

The following questions were asked and answers received:

General Information.

4. When you were originally thinking of converting

to tabulation, what factors induced you and your school board to make your change in accounting procedures?

Washington

(1) The length of time it took us to make student schedules and the lack of information we were able to give our teachers.

(2) To justify the cost of three machines, we figured they would take the place of one or two secretaries, and

(3) We went from a one-school system to a three-school system. We did not have to add any secretaries.

Campus

We had a board member that had worked with punched-card equipment and installation in industry and with my visiting with the Stanford University in California. They had information available to their classes regarding the Series 100 equipment. They had said that a 2000 high school enrollment was a break point for this type of automation. This was in the year of 1958. The installation of the three basic machines, namely, the key punch, the sorter, and the tabulator would be sufficient to take care of pupil accounting. However, if the institution wished to add business accounting along with pupil accounting, you would need the five machines given in answer to question number two.

In 1959, the International Business Corporation came out with the Series 50 equipment that was identical to the Series 100 equipment except that their operating speed was reduced about one-half and their rental costs about five-eights. Thusly, the Stanford formula pointed out that a 1200 student school could economically justify a Series 50 installation.

TABLE II

SHORT QUESTIONS AND ANSWERS RECEIVED
FROM TWO PERSONAL INTERVIEWS

Questions	Answers from Washington High School	Answers from Campus High School
*1. How long has your school had tabulating equipment?	Two years.	One year.
2. What machines does your school use now?	Tabulator, Keypunch, and Sorter.	Tabulator, Keypunch, Sorter, Collator, and Reproducer.
3. What machines were originally installed?	Same.	Same.
5. Approximately, what was the total enrollment of your school system at the time tabulation was installed?	1400 students.	969 students.
15. Combining rental machines and personnel, what is the approximate total costs of operating a punched card installation?	$625.00 per month.	$1300.00 per month.
21. Did you encounter any difficulties with your staff and office workers in making the change over in accounting procedures?	No.	No.

*Numbers correspond with list of questions found in the appendix.

6. Should a school insist on a complete installation of equipment or should they start out small and add to as their needs grow?

Washington

You need to start out with the machines that it takes to do the job. It is easier to fit your needs to one accounting system, then add later if necessary. For the school term 1961-62, we would like to add the "mark-sensing" system. The "mark-sensing" card system would help us on grade reporting. As it is now, we have to key-punch the information given to us by the teachers.

This year we print the class lists and give to the teachers and then we key-punch the information they return.

Campus

There is no complete installation of equipment. We feel you have to install the necessary equipment to do the job. It takes a certain minimum amount of installation which we think any school would need to begin with, namely, the key punch, the sorter, and the tabulator.

7. After the installation of equipment has been made, should a school begin with a single job?

Washington

With our new installation last year, we used the machines for registration, printing of student schedules, teacher class rolls, grade reports, and permanent records.

Campus

A person should start out one step at a time. The job of programming, working with schedules, and other forms should be started before the equipment is ordered or installed because each piece of equipment has custom attachments that need to fit the particular projects you are going to carry out.

8. Would you say the first job converted to punched cards is the most difficult?

Washington

It is more difficult. The primary difficulty was getting the staff used to the machine procedures and getting them to see the need for it. Without full cooperation of everyone concerned, the administrator is in for a difficult time.

Justification is to reduce the teacher's load. Some of the teachers felt this was a gadget that the administration dreamed up to relieve the office work. In fact, it added to the office work. However, we feel this has relieved the teachers of added work beyond their teaching duties. The machines give the teachers more information that might not be possible had it been done manually.

Campus

The answer to this question would hinge on what was meant by "first job." I would say the months spent making a complete study of the objectives, volume, time development of detailed procedures, and coding were possibly the most difficult.

9. Would it be advisable to continue with the old system of accounting as the new system is being started?

Washington

No. Any school system that is planning a change in its accounting procedures to the type of machines we are now using should start its study and planning early enough to go all one way or the other. It would be almost too late now for a school to start planning on an installation for the 1961-62 school term unless it has done a considerable amount of planning and studying needs previous to this time. (This interview was conducted on April 25, 1961.) You have to determine HOW you want to do it,

WHEN you are going to do it, and WHAT information you want on your cards and forms. A school should be working on it a year before the actual installation.

Campus

My answer to this question would be "yes" based on visitations that were made to Endicott, New York at the school I attended.

10. What advice would you give for school districts contemplating machine accounting?

Washington

(1) Determine what are their needs.

(2) Are they meeting their needs adequately now?

(3) Investigate the machine procedures to see if it would be of a benefit to him.

Topeka, Shawnee Mission, and other high school administrators have not gone into machine accounting because the administrators have not been entirely sold on the idea. If they do go into the change over, they do not want one large IBM installation for all schools. The reason being the administrators do not want to lose touch of their records. Also, the conversion would mean centralized record keeping and they do not want this.

Campus

Planning and more planning. Their investigation may show automation would not do a thing for them. School men are always conscious of their needs. I would suggest that they make a visitation to some institution that has punched card installation in operation.

The interviewer asked, "Would you copy someone else's installation?"

This would depend upon whether they are using a "System Man." A system man is the one who

designs the system. If they are going to use an operator only, they are going to have to use a system that has been worked out with possibly a few modifications. However, if they have a system man to set up the program, then in all probability they will not copy another installation but tailor their system to meet their own needs. I would say "yes" you need to copy a certain amount.

Costs.

11. Is there any way to determine the costs before determining the needs?

Washington

You can not adequately determine the costs before you determine your needs. However, you may have to alter your needs somewhat. Once you determine your needs and what you want the machines to do, you can very definitely determine your costs for any one year.

Campus

No. You can only arrive at round figures. You know the rental costs of machines but nothing accurate.

12. What factors should be taken into consideration before determining the cost of installation?

Washington

I think we have discussed the answer to this question from previous discussions.

Campus

Several factors should be taken into consideration, such as, (1) physical location of equipment, (2) how close is the nearest service repair man, (3) procedures, (4) personnel, and (5) do you have the necessary office space?

13. How many personnel are employed to handle the tabulating equipment?

Washington

We have two girls. One girl works full time and the other girl only works part time. At the time we made the IBM installation, we did not add any personnel. We took our district bookkeeper and sent her to an I.B.M. school for two weeks on the key-punch. Another two weeks was devoted to learning the functional wiring. Ninety per cent of the work is done by this one girl who is a district bookkeeper.

Campus

One full time system man, and one part-time key punch employee.

14. After installation of equipment, were you able to reduce your office personnel?

Washington

We didn't eliminate any jobs. When we went from a one-school system of 1400 students to a three-school system of 2700 students, our clerical staff remained the same.

Campus

Of course, our school is a new school. You will not necessarily reduce office personnel in a small system, but you will be able to have many more services and much more data immediately available for a more efficient operation.

16. Do you consider supplies (ribbons, cards, forms, etc.) as one of the minor or major costs of operation?

Washington

Your supplies and costs are a factor when you first start out. After installation, your

by-products was used by the administration not long ago. The school is putting on a play production called "Brigadoon." Play practice is requiring alot of the student's time toward final production. Through automation, we were able to determine, in a very short time, by comparison before and during this time of practice, the effect play practice was having upon the student's grades. The board of education requested this information from the last board meeting and through the by-products of automation, the answer was easily determined.

Reports and Administration.

19. How many uses (reports, payrolls, inventories, etc.) are being handled by your punched-card installation?

Washington

(1) Printing student's daily attendances.
(2) Teacher class rolls.
(3) Printing grade reports every nine weeks.
(4) Payroll. This includes printing of checks and the register becomes a part of our ledger which will cut down the work of hand posting. We pay the teachers twice a month instead of the usual monthly pay roll. Teachers like being paid twice a month and we can do this very nicely with our machines.
(5) Expense checks. The expense register is posted and totaled on the accounting machine which again becomes a part of the ledger.
(6) Quarterly Social Security Reports.
(7) W-2 forms.
(8) All reports are duplicated for the counselors so they won't have to bother the administration for information.
(9) School directory. Also any class listings can be easily obtainable by the use of the sorter.

Campus

We use our tabulating equipment for the following: census, attendance and drop-outs, class lists,

registration, grade reporting, posting permanent records, testing analysis for the counselors, payroll, purchase orders which includes encumbrance and unencumbrance balances, accounts payable ledger, permanent records, budget accounting, social security reports, W-2 forms, reconciliation of income tax withheld from wages, and the employer's quarterly federal tax return.

20. How important to the user is the added speed that machine accounting can provide?

Washington

In the beginning of the year, the student daily schedules for our 2700 students can be printed in a day where it would take a secretary a much longer time to complete.

The principal would have to spend the greater part of a summer term writing out schedules for the following term.

At grade reporting time, the reports can now be made out immediately. By the manual methods, it used to take a week or ten days to complete.

Your permanent records are always up to date.

There is considerable saving of time in making out the pay roll. We are now able to pay our employees twice a month.

In regard to expense checks, we are thinking of doing this twice a month in order to take advantage of discounts.

Campus

Added speed in school accounting is just like it is with any other institution or place of business. The continuous addition of more reports in less time makes some form of automation a must.

22. Does punch-card installation force a review of office functions?

Washington

Only in so far as the bookkeeper now verifies totals rather than add and re-add columns and totals.

Campus

Yes it will. Budget forms from the State used to be six pages long. The annual report is now four pages. When you go to punched card accounting, information can be reproduced in various forms to be distributed to the various department heads. It is unnecessary to fill out many report forms of duplicated information. Since converting to automation, schools have found that many reports duplicate items of information.

23. What would you say would be some of the most difficult tasks for a school that has decided to make an installation of a punch-card system?

Washington

(1) Physical limitations. This includes filing space, storage space, and machine space.
(2) Service representatives. How near is your nearest service man? This is no problem with us.
(3) Card and forms set up. Know what information you want, where to get it, and the printing of such.
(4) Noise. The installation should not be placed near any class room. The problem is knowing where you are going to locate it.
(5) Changing of schedules and movement of students. Kansas City has a movement of 500 students a day.
(6) Branch schools are against centralization of machine accounting because of the loss of cards and delay in receiving reports.
(7) Work becomes magnified when you are doing work for someone else.

Campus

Review of their manual operations, eliminate duplicate information, and try to set up a system that will get information in proper sequence and subject order so as to be usable. Have the various forms and reports for immediate use and projected into possible future reports. I know of a system in Texas that has revised its system three times. Why? They had not thought through and projected their thinking far enough into the future.

24. What values would machine accounting give towards better education and supervision?

Washington

An administrator is a teacher too, and it will help him get around to do a better job of supervision.[2]

Campus

Control, accuracy, and the ability to have a summary of accounting upon a very short notice. We do not have a single person on the payroll without his social security, teacher, retirement, Blue Cross insurance, and attendance on the punched card. This includes the cafeteria, activity accounts, transportation, bus drivers, and all other areas. Our annual and quarterly reports are made by merely running our cards through our accounting machines and printing on continuous form paper for the various State and Federal agencies.[3]

Without going into other surrounding States, this completes the personal interviews with all individual schools known to the writer to have punched-card installations in their

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[2]Interview with Mr. Winters, Assistant Superintendent of Washington High School, Bethel, Kansas, April, 1961.

[3]Interview with Mr. Ferguson, Superintendent of Campus High School, Wichita, Kansas, April, 1961.

school systems. However, the writer made two more visitations with institutions using the services of the Service Bureau. This was mainly done to approach both types of automation service and to gather data for interested readers that may be thinking of contract services with the Bureau. No set of questions was formulated for the following two interviews.

II. INTERVIEW WITH THE BISHOP MIEGE HIGH SCHOOL SHAWNEE MISSION, KANSAS

The writer's third interview was with Rev. Sullivan, Principal of the Bishop Miege High School, Shawnee Mission, Kansas. The main purpose of this interview was to determine what disadvantages the school has encountered in making use of contract services with the Service Bureau located in Kansas City, Missouri. The following information was given:

> One of the greatest disadvantages of handling your records through the service bureau is scheduling. Beginning with the 1961 and 1962 school term, the service bureau is adding the service of scheduling classes for the next year. This scheduling, the service bureau says, is going to be handled on their computer. We have also been advised that the costs will nearly double next year due to this added service. The only disadvantage I can see from this is that you will not know until school starts whether you will have 50 or 150 students enrolled in one class.
>
> Our costs for handling student records for the year of 1960-61 has cost the school around $2.50 per student.
>
> Another disadvantage equal to scheduling is the lack of communication, guidance, and counseling between the school and the service bureau. The

service bureau prints only what you tell them to print and so many times if they (the service bureau and the schools) could have a council meeting together with the representatives of the service bureau, everyone would benefit more and there would be less chance of mistakes which are costly.

Another disadvantage is that we have to submit in hand written or typewritten copy, two copies of our courses that will be offered, and two copies of student listings giving all the information we want to be printed. Along with this there is also the problem of not having enough space on the cards where the service bureau can spell out the full name. Consequently, the name has to be abbreviated.

Other than the above mentioned disadvantages, the service bureau has aided us in reducing our work in the office. We can, providing there is enough money in the budget, secure a greater amount of information than heretofore has been available.

In summary, this is our first year of making use of the service bureau. Next year, after having experienced the costs of mistakes not anticipated before use, the services and results of reports should be more satisfactory and less expensive.[4]

III. INTERVIEW WITH DR. WROTH A. FLETCHER, REGISTRAR, WICHITA UNIVERSITY, WICHITA, KANSAS

It was the writer's wish to interview a Wichita school system making use of the services provided by the Service Bureau. The only institution making use of this service was the Wichita University. Since so much has been written and published listing the advantages of the Service

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[4]Interview with Rev. Sullivan, Principal of the Bishop Miege High School, Shawnee Mission, Kansas, April, 1961.

Bureau, it was the writer's intention to determine what disadvantages were connected with the Bureau.

The writer's fourth interview was with Dr. Wroth A. Fletcher, Registrar of the Wichita University, Wichita, Kansas.

The following disadvantages given to the interviewer are:

(1) Personnel changes. When you have a procedure well established between two organizations and new personnel are continuously being employed, especially employees that know very little about the established procedures, many times reports have to be run over and over again in order to get the desired results. These reruns are all costly mistakes. Otherwise, the Service Bureau is only as good as the quality of the personnel that are responsible for the operational functions.

(2) Lack of competition. Wichita has only one Service Bureau. When you have only one place to take your business, the customer has to comply with all their regulation and prices or not at all.

(3) Distance between the Service Bureau and the plant making use of their services. This is certainly no fault of anyone's. The Wichita University is only 3 or 4 miles from the Service Bureau. However, there are many times when we only have a few cards that need tabulating and we need the information as soon as possible. There is no delivery between communications. The Service Bureau has a stated time of the day they run the cards through the tabulator and it is up to us to get the cards to them at the stated time.

(4) Lack of procedures, new ways of doing things, and improvement of the whole operation. You do not get nor receive that intimate touch with the Service Bureau. They could do a better job of helping you. They do just what they are contracted to do. Instead of the

Service Bureau studying and mapping out better procedures and ways of doing things, it is left up to me. We do not get too much help from them on new procedures.

In summary, I believe there is a definite place in our school systems for automation. Every year there are more and more reports needed and we want them in less time. You have to mechanize in order to get the work done.[5]

IV. INTERVIEW WITH MR. W. T. WEIDLE, MANAGER THE SERVICE BUREAU CORPORATION WICHITA, KANSAS

The writer's last interview was held with Mr. Weidle, Manager of The Service Bureau Corporation, Wichita, Kansas. The purpose of this last interview was to determine any of the basic charges that could be given to the writer as well as a summary of their operations relating to contractual services with schools.

Mr. Weidle gave the following charges based upon the following school and enrollment:

Enrollment: 1500 students broken down as follows: 450 freshmen, 400 sophomores, 350 juniors, and 300 seniors.

Number of courses offered: 120 individual courses.

Length of term: 2 semesters with two grading periods.

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[5] Interview with Dr. Wroth A. Fletcher, Registrar of the Wichita University, Wichita, Kansas, April, 1961.

(6) Periods: A maximum of 8 periods a day.

Charges: The following charges would be for the first year only that the school would go into operation.

Fixed Charge: 15¢ per student based on Sophomores, Juniors, and Seniors of the following year plus a fixed charge of $250.00.

Price of pre-registration & scheduling: 80¢ per student.

Grade Reports: Four grade periods. 25¢ per student for each grading period or $1.00 per year per student.

Permanent record: An additional 5¢ per student.

Changes: 5¢ per change. "Change" is defined as a request by the school to alter data in a student's record.

Total costs: Mr. Weidle estimated the total costs for the year would be approximately $3.00 per student or less.

The following information is a summary relating to services offered by the Bureau:

(1) There are over 70 Service Bureau Corporations in the United States, Kansas has only one.
(2) Scheduling students and classes is done in the spring.
(3) Grade reporting takes approximately 3 days to complete or less. Transportation time to and from the school would be added.
(4) Two student listings and course listings must be made up by the school and presented to the Service Bureau.
(5) Forms to be used by the school are to be ordered from I.B.M.

(6) There are several advantages. The system has been designed to eliminate guess work in scheduling students in their classes. Utilization is made of the very latest techniques and accounting procedures. Possibly the most important single advantage would be the reduction of clerical work in your school.[6]

V. COSTS OF A MINIMUM AMOUNT OF EQUIPMENT

The data with regard to basic installation costs of the Series 50 machines has been presented in Table III. This table may be found on page 42. The cost of $505.00 does not include the many special devices, which can alter the cost and procedural picture for any given institution.

The printing card punch machine operates at a speed of 3000 strokes per hour, the sorter operates at a speed of 450 cards per minute, the accounting machine will list and tabulate 50 columns per minute, the collator operates at a speed of 125 cards per minute, and the reproducing summary punch machine operates at a speed of 50 cards per minute.

As was stated earlier, the three basic machines are the printing card punch, the sorter, and the accounting machine. The added auxiliary equipment, which includes the collator and reproducing summary punch, increases the speed

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[6]Interview with Mr. W. T. Weidle, Manager of the Service Bureau Corporation, Wichita, Kansas, April, 1961.

TABLE III

MINIMUM COST OF THE SERIES 50
PUNCH CARD RENTAL MACHINES *

Type	Description	Cost
26	Printing Card Punch.....	$ 60.00
82	Series 50 Sorter.....	40.00
402	Series 50 Accounting Machine.....	255.00
77	Collator.....	80.00
514	Reproducing Summary Punch.....	70.00
	Total Monthly Rental.....	$505.00

* This table shows the rental costs obtained from I.B.M. Wichita, Kansas as of May, 1961.

of the basic installation considerably.

Installations vary greatly in volume of work, complexity of jobs, and nature of jobs. Administrators may have different notions of the use of punched cards; their installations may have different applications and quite different costs.

Installation costs can be estimated only after detailed study of proposed jobs. To anticipate costs, the user should consider the following:

(1) Make a list of all jobs contemplated.

(2) Develop procedures for all jobs.

(3) Schedule the work. Work volume and machine speeds are known. The speed of operations which would continue to be manual are known or can be estimated. The length of the work week is known. The rental costs of machines are known.

(4) Determine machine, personnel, and supply requirements.

(5) Convert all needs to dollar terms.

CHAPTER V

SUMMARY AND CONCLUSIONS

This study was conducted in order to investigate the application and development of machine accounting practices for use in Kansas school districts. Although some applications of the accounting system developed can be made to various type of machines, this study was limited to a machine classified as a "Series 50" machine manufactured by the International Business Machine Corporation. The "Series 50" is a complete punched-card system designed and priced to meet the particular needs of smaller school systems; it has the same function and capacity as equipment used by larger schools, colleges, and universities; and it is readily expandable to meet the growth requirements of schools.

This investigation covers (1) published and unpublished reports of professional associations, and materials in school administration, (2) an inquiry of thirty-seven Kansas high schools with an enrollment of 800 or more students to determine what machines were now being used for financial record keeping, and (3) case studies of four schools known to this writer to be using punched card systems of accounting. The information gathered from the four schools using the punched card systems of accounting was obtained through personal interviews.

Uppermost in the mind is the value it would have for

school superintendents, administrators, and others concerned with the financial management of schools.

On the basis of this particular study, the following conclusions appear warranted:

(1) Prevalence of accounting machines in Kansas is almost insignificant.

(2) The responses to the inquiry form indicated 37 per cent of all high schools studied lack any type of an accounting machine.

(3) Inadequacies of school accounting have been recognized.

(4) Punch card methods can be effectively used to perform existing office tasks.

(5) Because of its flexibility, the accounting machine can perform many varied accounting activities and make new facts available in the process.

(6) Installation of the three basic accounting machines can be economically justified for schools having an enrollment of 1,000 students or more.

(7) Installations must be tailored to the needs of the user.

(8) The user should determine his needs before attempting to determine the costs.

(9) Because machine, personnel, and other needs can be anticipated, installation expenses and operating costs can be estimated in advance.

(10) Punched card methods may save money. However, installation will not necessarily reduce office personnel.

(11) Supplies are considered minor costs of operation.

(12) Very little, if any difficulty is encountered with staff and office workers in making the change over in accounting procedures.

(13) The change to card methods requires a revaluation of clerical work, redesigning of present office forms and documents, and orientation of the mind to a new concept of how the work will be done.

(14) The school districts making use of punched cards concluded that machine accounting was desirable because of the increasing volume of financial transactions, better control, accuracy, the ability to have a summary of accounting upon a very short notice, better services that by-products provide through automation, and the better supervision that can be provided by the administrator.

(15) In regard to the service bureau, there is a definite lack of communication, guidance, and counseling between the school and service bureau. The schools receive very little help from the service bureau towards improving communications. Since Kansas has only one service bureau, there is a definite lack of competition.

As a result of this study the writer recommends the following:

(1) Kansas school systems with enrollments over 1000 should seriously study the advisability of acquiring accounting machines.

(2) A greater amount of study should be made towards evaluating and up-dating our present procedures.

(3) The cost of some machines varies with the number of extras. Unless they will be used effectively and economically, the extras should not be ordered.

(4) Due to the prohibitive costs of purchasing equipment, schools would be financially better off to rent their machines.

(5) Due to the recent introduction of the series 50 machines, further research and study on the cost analysis might prove valuable for potential users.

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April 7, 1961

Dear Sir:

In writing a Thesis for my Master's degree titled, "The Application and Development of Machine Accounting Practices for Kansas School Districts," I am in need of further information regarding what kind of machines are presently being used in our Kansas School systems.

Would you be kind enough to answer the following questions and return as soon as possible?

QUESTIONS

Do you use machines in your financial accounting and completing of pupil records? (Machines other than typewriters and adding machines)
Please check one: YES_____ NO_____

If yes, please state which of the following machines you use:

____Ledger Posting Machine.

____Printing Calculator.

____Verifix Coyter.

____Punch Card Accounting Machine.
Other related machines if any:

_____

_____

____Other Machines: (Please State)

_____

_____

A stamped self-addressed envelope is enclosed for your reply. Thank you.

Sincerely,

E. D. Crum, Jr.

APPENDIX

April 7, 1961

Dear Sir:

In writing a thesis for my master's degree titled, "The Application and Development of Machine Accounting Practices for Kansas School Districts," I am in need of further information regarding what kind of machines are presently being used in our Kansas School systems.

Would you be kind enough to answer the following questions and return as soon as possible?

QUESTIONS

Do you use machines in your financial accounting and completing of pupil records? (Machines other than typewriters and adding machines)
Please check one: YES_____ NO_____

If yes, please state which of the following machines you use:

____Ledger Posting Machine.

____Printing Calculator.

____Verifax Copier.

____Punch Card Accounting Machine.

Other related machines if any:

_____

_____

____Other Machines: (Please State)

_____

_____

A stamped self-addressed envelope is enclosed for your reply. Thank you.

Sincerely,

C. D. Crum, Jr.

QUESTIONS USED IN PERSONAL INTERVIEWS

General Information.

1. How long has your school had tabulating equipment?
2. What machines does your school use now?
3. What machines were originally installed?
4. When you were originally thinking of converting to tabulation, what factors induced you and your school board to make your change in accounting procedures?
5. Approximately, what was the total enrollment of your school system at the time tabulation was installed?
6. Should a school insist on a complete installation of equipment or should they start out small and add to as their needs grow?
7. After the installation of equipment has been made, should a school begin with a single job?
8. Would you say the first job converted to punched cards is the most difficult?
9. Would it be advisable to continue with the old system of accounting as the new system is being started?
10. What advice would you give for school districts contemplating machine accounting?

Costs.

11. Is there any way to determine the costs before determining the needs?
12. What factors should be taken into consideration before determining the cost of installation?
13. How many personnel are employed to handle the tabulating equipment?
14. After installation of equipment, were you able to reduce your office personnel?
15. Combining rental machines and personnel, what is the approximate total costs of operating a punched card installation?

16. Do you consider supplies (ribbons, cards, forms, etc.) as one of the minor or major costs of operation?

17. What is your opinion of using the Service Bureau rather than owning or renting your own equipment?

18. How much money would you say your installation has saved your school district?

Reports and Administration.

19. How many uses (reports, payrolls, inventories, etc.) are being handled by your punch-card installation?

20. How important to the user is the added speed that machine accounting can provide?

21. Did you encounter any difficulties with your staff and office workers in making the change over in accounting procedures?

22. Does punch-card installation force a review of office functions?

23. What would you say would be some of the most difficult tasks for a school that has decided to make an installation of a punch-card system?

24. What values would machine accounting give towards better education and supervision?