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ABSTRACT

The findings of a survey of selected administrative computer applications in large public school districts are presented in this report. Using a three part written questionnaire, the investigators polled 99 school districts throughout the United States and examined the responses of 55. Two major hypotheses were tested: 1) the difference in the frequency with which the benefits resulted from various applications; and 2) the various benefits which resulted from different means of development. The study reported several conclusions: 1) the most frequent computer uses were for financial accounting applications with personnel applications second; 2) contractor staffs are used less often than inhouse personnel; 3) most of the applications in use were designed for first or second generation computers; and 4) the financial applications were the most operable and successful of all the applications. The report noted that it is quite apparent that school districts are not reaping the rewards of third generation computers. (MC)

AEDS

NOVEMBER 1972

The AEDS Large School System Survey

REPORT OF FINDINGS

PREPARED FOR
THE ASSOCIATION FOR EDUCATIONAL DATA SYSTEMS

BY
DR. ROBIN C. SMITH

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FOREWORD

One of the more difficult jobs of the educational systems administrator is to keep abreast of what is going on in other school districts. As systems planners are making decisions concerning future computer applications, they need to have available to them information about what applications and methods of development have been successful in other school districts, and the benefits that resulted from these applications.

Recognizing this need, the Association for Educational Data Systems sponsored a nation-wide survey of large public school districts in the spring of 1972. The purposes of the AEDS Large School System Survey were:

1. To determine the state-of-the-art in the development of administrative computer applications in large public school districts;

2. To identify what methods of development have been most successful in developing certain administrative applications;

3. To identify the major benefits resulting from selected administrative applications in large school districts;

4. To compile data about large school district computer centers and operational administrative applications which may be disseminated as reference data to school districts, and others in need of such data.

This report presents the results and findings of the AEDS Large School System Survey. It has been prepared in the interest of disseminating important information which should prove useful to the educational systems community. We believe that the survey and this report are the first of their kind to examine the relative success of administrative computer applications in public school districts.

AEDS is indebted to Dr. Robin C. Smith who designed the survey instrument, conducted the survey, tabulated and analyzed the data, and prepared this survey report. The Montgomery County Public Schools provided keypunch and computer processing services. The George Washington University also provided computer processing services as well as procedural consultation. McDonnell Douglas Automation Company provided duplicating services. Many thanks are due to these organizations and also to the Chief Computer Systems Executives who gave of their time to complete the survey.

Russell Weitz
President, AEDS

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SECTION 1

OVERVIEW AND CONCLUSIONS

Summary

This study examined selected administrative computer applications in large public school districts, and certain factors which affect success of such applications. Success was defined in terms of the frequency with which benefits were reported to result from applications. The benefits included improved information, improved efficiency, extended service, and reduced costs.

Two major factors affecting success were studied: (1) type of application and (2) method of development. The applications selected for analysis were representative of the five functional areas of administrative activity in public school districts: personnel, pupil, financial, facilities and equipment, and instructional/non-instructional material. Methods of development included source of staffing, source of software, and generation of computer.

A written questionnaire was administered in March/April, 1972, by mail, to the Chief Computer Systems Executive of large public school districts. The population under study consisted of 99 school districts in the U.S.A. with pupil populations of 40,000 pupils or more. Sixty-one responses were received of which 55 were usable.

Respondents were asked to check a list of applications to indicate which were operational. For representative applications, they were asked to indicate whether benefits resulted to a significant or moderate degree, or whether detrimental effects resulted. For these same applications, they were asked to indicate which methods of development were used. Certain demographic data were gathered about the information systems function and the school district.

The first major hypothesis examined the differences in the frequency with which the benefits were reported to result among the various applications. The differences were tested for the five application areas and for each of the four benefit categories. Of 26 contingency tables examined, 13 were statistically significant at the .05 level or less. For selected applications, and certain benefit categories, it was concluded that application type is a factor affecting success of the administrative computer applications under study.

The second major hypothesis analyzed the various benefits which resulted using different methods of development. The differences in the frequency of benefits were tested for each of the 20 application types considering the various benefit categories. Forty-five or 25 percent of the 180 subhypotheses tested proved statistically significant at the .05 level or less. It was concluded that for selected methods of development and certain benefit categories, method of development is also a factor affecting success.

Another related conslusion of importance was that generally, regardless of application, source of software and generation of computer are factors affecting success of these selected administrative computer applications.

The Survey Instrument

The survey instrument consisted of three parts. Part I dealt with questions describing the school district's environmental characteristics. These questions pertained to the information systems staffing and budget, computer configuration, and information on how to contact the Chief Computer Systems Executive of the school district.

Part II dealt with identifying operational applications in each school district. Part III was directed toward identifying benefits resulting and methods of development for selected operational applications. The survey instrument is included as Appendix A to this report (page 43).

Operational Definitions

Certain terms require definition to clarify the scope of this study. The following paragraphs discuss these definitions.

Administrative application. -- those computer applications of a business nature which address the problems of administering the public school system. Administrative applications include such applications as financial accounting, employee data base, instructional materials inventory, pupil attendance, etc. They exclude instructional applications such as computer problem solving in mathematics, computer assisted instruction, vocational EDP courses, etc. Part II of the survey instrument (page 44) identifies the applications under study. Appendix B describes each application (page 47).

Application benefits. -- the positive results or gains that accrue to a school system as a consequence of successfully implementing an administrative computer application. These include such factors as improved information, improved efficiency, extended service and reduced costs.[1] Each of these broad benefits may be subdivided into more specific benefits. For example, improved efficiency may be subdivided into:

Improved staff performance
Improved staff utilization
Improved procedures for collecting, maintaining, or reporting information; and,
Greater flexibility to expand and modify procedures

Part III of the survey instrument (page 45) identifies the benefits considered. Appendix C (page 50) gives additional descriptions of the benefits.

Application development (systems development). -- the design and implementation of computer and manual procedures for a functional area of school system activity in order to achieve specific operational improvements (benefits).

Factors affecting success. -- those factors which influence the achievement of application benefits which are subject to administrative decision on the part of school district administrators and which may normally be varied in the short run. For this research, factors affecting success are confined to methods of development, and application type.

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[1] Adapted from Theodore Leroy Ploughman, "The Implementation, Operation, and Evaluation of Regional Data Processing Services Provided or Anticipated by Michigan's Intermediate School Districts" (unpublished Ph.D. dissertation, University of Michigan, 1968).

Large public school district. -- a public school district of 40,000 pupils or more, as of September, 1970.

Methods of development. -- alternative mixes of staff, software, and computer hardware usage which may be considered for any given application. For example, staff may be obtained via external contractors, or technical expertise may be established within the school district. Software may be developed inhouse or obtained from another organization. An application design may be implemented originally on third generation hardware, conversion from an existing first or second generation system, or run under emulation. Part III of the survey instrument **(page 46)** identifies the specific methods of development considered in this research.

Success. -- the achievement of intended benefits for a given administrative computer application to a significant or moderate degree as perceived by the Chief Computer Systems Executive for a school system.

General Findings

Environmental characteristics. -- Table 1, **page 13,** summarizes the environmental characteristics for responding information systems centers. Almost half the respondents have less than 20 staff in their information systems function, while slightly more than half have a budget of under $400 thousand. Closely paralleling figures for private industry, IBM main-frames constitute 70% of the configurations. A surprising number of the configurations, 52%, are what might be called small core users. Almost half the primary configurations are three or more years old.

Operational applications. -- Table 3, **page 19,** reflects the numbers and percent of respondents in rank-order which reported each administrative computer application as partially, or completely operational. Large school districts are evidently following the traditional pattern of computer systems usage paralleling private industry. Emphasis is placed primarily on the "bread and butter" applications in the financial and personnel areas. Pupil applications receive some emphasis perhaps because of the availability of generalized software in the pupil scheduling area, and because of the salability of computer applications when applied to popular school-based problems. The less frequently implemented applications are in the instructional/non-instructional material area, and the facilities and equipment area.

Methods of development. -- The survey asked participants to identify which of certain methods of development were associated with selected operational applications. The data **(Table 5, p. 32)** indicate that large school districts have a decided propensity toward the use of inhouse staff for development of administrative computer applications. Contractor staff are rarely used. Combined inhouse and contractor staff are used to a limited extent.

Public school systems appear to be characterized by a "do-it-yourself" syndrome. Perhaps the "inhouse only" tendency is a contributing factor to the apparent slow advancement of the educational information systems community when compared to private industry. Contractor resources provide a valuable source of technical and business skills which can complement and strengthen the capabilities of inhouse staff.

The data indicate further that large school districts generally implement administrative applications as original development. An existing application software package from another organization is used only in isolated instances. The tendency to not use software packages stems from a number of factors. There are apparently few

software packages available on the commercial market which are workable in a public school district. The traditional shortage of funds in public school districts likely discourages private industry from developing such software.

The survey data indicate that school districts have implemented many of the same applications covering a wide number of application areas. It is reasonable to believe that in some application areas, there is sufficient common-ground among school districts to allow the transfer and enhancement of application software, more than it is done today. A likely result would be lower implementation costs and time, at no real reduction in benefits.

A series of questions were asked which dealt with the generation of computer hardware used, and the nature of that use for selected applications. The data indicate that for some applications, as much as 25 percent of the school districts using third generation equipment are operating the application in first or second generation mode on that equipment. Said differently, in these instances, the advantages of third generation equipment for supporting advanced application design techniques are not being effectively used.

Roughly 25 percent of the applications are currently operating on first or second generation equipment. This and the previous finding lend support to conclusions indicated by others that public school districts are as much as half a decade behind the times in the use of the systems technology. One could attribute this to reluctance on the part of educators to commit limited funds to non-instructional areas.

It is encouraging to note that well over half of all applications are operating on third generation hardware, and as such, are hopefully using the hardware to full advantage.

Successful applications. -- Success may be defined as the achievement of pre-stated objectives. Objectives may be expressed as the benefits to result from an application. Since objectives will vary from school system to school system, the criteria for evaluating success may also vary.

The analysis of successful applications to follow assumes that all benefits considered contribute with equal weight to success. Four categories of benefits were evaluated: improved information, improved efficiency, extended service, and reduced costs. For each benefit area, applications were identified which resulted in the given benefit most frequently.

Refer to Table 7, **p. 36.** The financial applications were the most frequently reported as successful. Following in order were the instructional/non-instructional material applications, the facilities and equipment applications, the personnel applications, and the pupil applications.

The implications of the ranking are important. Those applications most often implemented are not ranked as the most beneficial. The personnel and pupil applications are second and third most frequently implemented, respectively. However, they are the last two application areas in the success ranking.

The instructional/non-instructional applications are the last two application areas in terms of frequency implemented. In the success ranking, they are second and third. This suggests that generally, school districts are not implementing those applications which tend to most often produce benefits. The financial applications are excepted, since they are first in both the success ranking and in frequency implemented.

Benefits Achieved. -- An analysis of those applications considered to be more successful provides a basis for determining which benefit categories appear to result most frequently.

Refer to Table 8, **page 36.** Considering all benefits equally weighted, improved information results most frequently. Following in order are improved efficiency, extended service, and reduced costs.

The findings confirm the experience of this researcher--that the benefits of computer applications are not necessarily cost savings, but rather are more frequently in the area of improved information. The lower ranking of the extended service benefit also suggests that public school districts have yet to fully tap the capabilities of the computer to address problems in the management decision-making area.

Factors Affecting Success. -- Twenty-six statistical tests were performed to determine if benefits were dependent upon the type of application. The tests showed statistically significant findings in half the instances, identifying which applications showed an unusual tendency to produce positive or negative benefits. Refer to Tables 9 and 10, **pages 37 and 38.**

One hundred and eighty statistical tests were performed to determine if benefits were dependent upon the method of development used for a given application. This analysis was carried out for each of 20 applications. Twenty-five percent of the tests proved statistically significant. The analysis generally identified those applications for which certain methods of development show a tendency to produce positive or negative benefits for each application. Refer to Table 11, **page 39.**

Conclusions

Analysis of the data presented in the remaining sections of this report leads to the following general conclusions. The statistical procedures upon which these conclusions are based may be obtained from the author through AEDS.

Conclusion 1. -- Of those applications selected for study, financial applications are the most frequently implemented administrative computer applications in large public school districts. Pupil applications and personnel applications are the next most frequently implemented. The instructional/non-instructional material applications are the next to least frequent, and the facilities and equipment applications are the least frequently implemented. See Table 3, **page 19.**

Conclusion 2. -- Large school districts generally use inhouse staff for the development of the administrative computer applications under study. Contractor staff are rarely used. Combined inhouse and contractor staff are used to a limited extent. See Table 5, **page 32.**

Conclusion 3. -- Large school districts generally implement those administrative computer applications under study as original development. An existing application software package from another organization is used only in isolated instances. See Table 5, **page 32.**

Conclusion 4. -- A majority of administrative computer applications studied in large public school districts are operating either as converted and enhanced applications or as applications originally designed and developed for operation on a third

generation computer. However, a major proportion of the applications were designed for first or second generation equipment and are still operating in that mode either on first or second generation hardware or under emulation. See Table 5, page 32.

Conclusion 5. -- Considering all benefits equally weighted, the financial applications, of those studied, are the most frequently reported as successful. The second most frequently reported as successful are the instructional/non-instructional material applications. Next, are the facilities and equipment applications. Next to least frequently reported as successful are the personnel applications and the least frequently reported as successful are the pupil applications. See Table 6, page 35, and Table 7, page 36.

Conclusion 6. -- Considering all benefits equally weighted, improved information results most frequently from the successful applications under study. Improved efficiency results second most frequently. Extended service results next to least frequently, and reduced costs result least often. See Table 6, page 35, and Table 8, page 36.

Conclusion 7. -- For selected applications and certain benefit categories, application type is a factor affecting success of the administrative computer applications under study in large public school districts. See Table 9, page 37, and Table 10, page 38.

Conclusion 8. -- For selected methods of development and certain benefit categories, method of development is a factor affecting success of the administrative computer applications under study in large public school districts. See Table 11, page 39.

Suggested Areas for Further Research

The survey analysis points to a number of needs which exist in the educational information systems community. A need exists to provide a greater level of precision in the identification and measurement of benefits resulting from applications. Further research should examine workable means of affecting software exchange among public school districts. Coupled with that area of research is the need to examine ways for standardizing terminology and documentation, and for disseminating information about the developmental activities of public school districts.

It is apparent from this study that a number of school districts are not reaping the rewards of the advanced third generation technology. It is important to examine ways in which the computer installation of school districts can be upgraded. Such research would contribute substantially to the advancement of the educational systems community.[1]

Robin C. Smith

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[1]AEDS wishes to acknowledge the use and adaptation of material from Robin C. Smith, "An Examination of Major Factors Affecting Success in the Development of Administrative Computer Applications in Large Public School Districts" (unpublished D.B.A. dissertation, George Washington University, 1972).

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SECTION 3

ORGANIZATIONAL CHARACTERISTICS

Pages 13-14: Table 1.--Organizational characteristics, summary, March/April, 1972.

- in summary, shows the number of school districts at various levels of staffing for different types of positions in the information systems function
- in summary, shows the number of school districts at various levels of school system staffing, pupil population, school system budget, and information systems budget
- in summary, shows the number of school districts possessing computer hardware for each manufacturer and model; core size; own, lease, rent information; and the number of years the CPU has been installed

NOTE TO TABLE 1: Responses for interval "0" indicate that the category was left blank on the school district response.

Pages 15-17: Table 2.--Organizational characteristics by school district, March/April, 1972

- provides the detail organizational characteristics of each school district including:

  Information Systems Staffing
  District Staffing
  FY72 Budget
  Pupil Population
  Computer Configuration

TABLE 1.--Organizational characteristics, summary, March/April, 1972

Management/ Supervision Information Systems

Interval	1-2	3-4	5-6	7+
Frequency	21	23	7	4
%	38	42	13	7

Clerical Support Information Systems

Interval	0	1-2	3-4	5-6	7+
Frequency	5	31	11	3	5
%	9	56	20	5	9

Systems Information Systems

Interval	0	1-2	3-4	5-6	7+
Frequency	14	23	7	3	6
%	25	42	13	5	10

Analyst-programmers Information Systems

Interval	0	1-2	3-4	5-6	7+
Frequency	12	21	9	6	7
%	22	38	16	11	13

Programmers Information Systems

Interval	0	1-2	3-4	5-6	7-8	9+
Frequency	11	11	15	9	3	6
%	20	20	27	16	5	11

Computer Operations & Support Information Systems

Interval	0	2-4	5-7	8-10	11-13	14-16	17-19	20+
Frequency	1	7	13	11	5	1	5	13
%	2	13	24	20	9	2	9	24

Total DP Staff

Interval	6-19	20-39	40-59	60-79	80+
Frequency	23	19	6	2	5
%	42	35	11	4	9

School System Staff

Interval*	0	3-5	6-8	9-11	12-14	15+
Frequency	4	22	14	2	6	7
%	7	40	25	4	11	13

*in thousands

FY 72 School System Budget

Interval*	0	20-39	40-69	70-99	100-129	130-159	160+
Frequency	2	8	22	8	3	4	8
%	4	15	40	15	5	7	15

*in millions

FY 72 Information Systems Budget

Interval*	0	1-2	3-4	5-6	7-8	9-10	11-12	13+
Frequency	1	16	15	9	4	3	2	5
%	2	29	27	16	7	5	4	9

*in 100 thousands

TABLE 1.--continued

Hardware

Manufacturer	IBM										Honeywell			
Model	1401	20	25	30	40	50	135	145	155	115	200	430	1250	1251
Frequency	7	1	4	7	13	2	1	4	1	1	1	1	1	1
%	12	2	7	12	23	4	2	7	2	2	2	2	2	2

Manufacturer	Burroughs		NCR		UNIVAC		RCA	
Model	2500	3500	C200	315	1106	9400	2	70/45
Frequency	1	2	3	1	1	1	1	1
%	2	4	5	2	2	2	2	2

Core

Core (k)	8-16	32	64-70	96	120-131	150	192	256	292	384-393	512	1024
Frequency	9	6	14	2	6	1	6	7	1	2	1	1
%	16	11	25	4	11	2	11	12	2	4	2	2

Own, Lease, Rent

O/L/R	O	L	R	Comb.
Frequency	10	23	15	9
%	17	40	26	16

Number of Years Installed (As of 6/72)

Interval*	< 1	1-1.9	2-2.9	3-3.9	4-4.9	5-5.9	6+
Frequency	12	12	7	5	9	3	7
%	22	22	13	9	16	5	13

*years

Pupil Population

Interval*	40-50	60-70	80-90	100-110	120-130	140+
Frequency	13	15	9	2	6	10
%	24	27	16	4	11	18

*in thousands

TABLE 2.--Organizational characteristics by school district, March/April, 1972.

	Item	Birmingham City	Mobile	Fresno	Garden Grove	Los Angeles	Mt. Diablo	Oakland	Sacramento	San Diego	San Juan	Denver	Jefferson County	Brevard County	Broward County	Dade County	Hillsborough County	Palm Beach County	Pinellas County	Chicago
		ALA.		CALIFORNIA								COLO.		FLORIDA						IL.
INFORMATION SYSTEMS STAFF	Mgmt/Supervision	2	1	3	2	11	1	3	4	6	1	3	2	3	4	4	4	1	5	6
	Clerical Support			1	3	4	1	2	2	3	2	2	2	2	5	3	4	1	7	34
	Systems			1	2	9		1	1	4		4	4	1	6	8	3	2	1	16
	Analyst-Prog.	1	1	3	2	35		2	5	15	1	1		3	2			1	1	2
	Programmers	1	1	3			3	3			3	7	4	4	9	17	9	6	3	16
	Computer Ops & Support	3	7	7	6	95	6	10	9	27	7	13	12	8	18	25	11	6	2	61
	TOTAL	7	10	18	15	154	11	21	21	55	14	30	24	21	44	57	31	17	20	135
DISTR. STAFF	TOTAL (in thousands)	4	5	5	3	60	3	6	4	10	4	12	5	5	11	23	10	6	8	47
FY 72 BUDGET	School System (in millions)	28	32	52	40	800	46	80	47	150	46	124	60	44	98	270	78	64	66	769
	Computer Based Info. Systems (in 100 thousands)	1	1	3	3	22	2	6	3	11	2	5	4	5	8	12	6	2	3	30
PUP. POP.	TOTAL (in thousands)	60	70	60	50	700	50	70	50	160	50	100	60	60	110	240	100	70	80	560
COMPUTER CONFIGURATION	Manufacturer	IBM	HW	IBM	BU	IBM*	IBM	HW*	IBM	IBM	IBM	UN*	IBM*	IBM	IBM*	IBM	IBM	IBM	HW	IBM*
	Model	360	115	40	3500	50	1401	430	30	40	1401	1106	30	40	145	155	30	25	1251	145
	Total Core (in K)	64	32	128	150	384	16	192	64	192	16	292	64	192	256	393	96		65	1024
	Own, Lease, Rent	O	R	L	L	L/O	R	R	O	R	L	O	L/O	R/O	R	L	[illegible]	L	L	O
	M/Y Installed	6/68	11/70	11/70	7/70	10/68	65	12/71	2/68	65	11/63	9/70	1/71	10/68	1/72	3/72	5/70	12/7[illegible]	11/68	10/71

* Also have one or more additional computers

TABLE 2.--continued

	Item	Fort Wayne	Gary	Shawnee Mission	Jefferson County	Caddo Parish	East Baton Rouge	New Orleans	Anne Arundel	Baltimore City	Baltimore County	Montgomery County	Prince George's County	Boston	Detroit	Flint	St. Louis	Clark County	Albuquerque	Winston-Salem/ Forsyth
		IND.		KS.	KY.	LA.			MARYLAND					MASS.	MICH.		MO.	NV.	NM.	NC.
INFORMATION SYSTEMS STAFF	Mgmt/Supervision	2	2	4	2	3	2	4	3	3	2	8	4	4	3	2	2	2	3	1
	Clerical Support	1	1	2	1	90	4	2	1	1	4	23		2	3	3	2	3	5	1
	Systems	1	1	2			1		4	5	2	21		1	5	1	3	2		
	Analyst-Prog.	1		5	3	2	2	4			3	8	18	2	4	1	4		2	1
	Programmers	5	3	2			2		6	7	4	19		2	4	1	7	4	3	2
	Computer Ops & Support	5	7	12	10	4	3	8	15	25	10	38	23	10	17	2	51	8	21	1
	TOTAL	15	14	27	16	99	14	18	29	41	25	117	45	21	36	10	69	19	34	6
DISTR. STAFF	TOTAL (in thousands)	4	4	4	6	5	6	8	5	16	14	10	14	7	20	5	13	6	7	2
FY 72 BUDGET	School System (in millions)	38	37	32	70	47	48	64	70	197	139	159	151	100	240	56	85	67	52	27
	Computer Based Info. Systems (in 100 thousands)	3	2	7	3	1	2	3	4	10	5	20	9	3	6	2	7	5	4	1
PUP. POP.	TOTAL (in thousands)	40	40	40	90	60	70	110	70	200	130	130	160	90	270	40	120	70	80	50
COMPUTER CONFIGURATION	Manufacturer	IBM	NCR	IBM	HW	IBM	BU	NCR	IBM	IBM*	IBM	IBM*	IBM	IBM	IBM*	UN	IBM*	RCA	HW	BU
	Model	25	C200	40	200	1401	3500	C200	30	40	40	145	40	1401	30	9400	145	2	1250	2500
	Total Core (in K)	32	32	256	65	16	120	64	64	196	196	256	256	16K	64	64	256	131	65	70
	Own, Lease, Rent	L	R	R	L	L	O	L	L	R		L	L/R	L	O	L	R/L	L	O	R
	M/Y Installed	10/71	11/70	12/68	11/66	8/69	7/71	11/70	1/72	2/69	68	12/71	11/69	10/64	4/66	9/71	12/71	2/71	7/69	3/71

* Also have one or more additional computers

TABLE 2.--continued

	Item	Newark	Cincinnati	Toledo	Tulsa	Portland	Philadelphia	Pittsburgh	Greenville County	Memphis City	Nashville Davidson	Austin	Ft. Worth	Houston	Fairfax County	Norfolk City	Richmond	Seattle	Kanawha County	Milwaukee
		NJ.	OHIO		OK.	OR.	PA.		SC.	TENN.		TEXAS			VIRGINIA			WA.	W.V.	WI.
INFORMATION SYSTEMS STAFF	Mgmt/Supervision	40	2	4	3	5	7	4	1	5	4	1	4	5	3	2	5	6	2	4
	Clerical Support	2	4	1	2	10	4	5	1	2	1	1	2	2	2		2	6	1	
	Systems	4	1	2	1		10	2	1	5				1	3	1	3	3		4
	Analyst-Prog.		1	1			9	5		5	4		5	5	3	2		13	2	
	Programmers	6		3	5	9	11	6	1	5		1		6	3	2	6	5	2	9
	Computer Ops & Support	14	12	9	8	6	26	4	4	18	8	5	7	19	12	6	17	26	7	19
	TOTAL	66	20	20	19	30	67	26	8	40	17	8	18	38	26	13	33	59	14	36
DISTR. STAFF	TOTAL (in thousands)	5	5	4	6			7	4	13	7	6	6	18	13	5	5		5	
FY 72 BUDGET	School System (in millions)	107	75	55	44			115	32	90	70	45	67	183		34	40	97	48	133
	Computer Based Info. Systems (in 100 thousands)	6	2	3	2		15	5	1	5	3	1	4	7		5	4	10	2	7
PUP. POP.	TOTAL (in thousands)	80	80	620	80		300	70	60	130	90	50	80	230	130	60	40	80	50	130
COMPUTER CONFIGURATION	Manufacturer	IBM	IBM	IBM	IBM		IBM*	NCR*		IBM*	IBM	IBM*	RCA	IBM	IBM	IBM	IBM	IBM	NCR	IBM
	Model	40	1401	25	1401		40	C200		40	25	20-1	70/45	40	1401	30	30	40	315	40
	Total Core (in K)	256	8	32	16		192	64		128	32	12	131	192	16	64	64	256	10	128
	Own, Lease, Rent	O/L	O	L	L		L	R		O	L	R	L	R/O	L	O	R	R	L	R
	M/Y Installed	1/71	12/62	2/70	6/64			9/70		3/67	7/70	7/67	5/68	7/69	9/67	6/69	4/70	10/66	11/67	1/68

* Also have one or more additional computers

SECTION 4

OPERATIONAL APPLICATIONS

Page 19: Table 3.--Administrative Computer applications partially or completely operational, reported as of March/April, 1972

- reflects a summary of the number of school districts reporting the various administrative computer applications as partially or completely operational

Pages 20-31: Table 4.--Administrative computer applications partially or completely operational, reported as of March/April, 1972, by school district

- provides the detail list of operational applications for each responding school district

NOTE TO TABLE 4: This table indicates for certain applications, the method of development used to implement an application. Part III of the survey instrument (page 46) asked the school districts to identify which of certain methods of development were used to implement the application. The numbers indicated in the body of the table specify which methods were indicated for the application by the responding school district.

For example, the notation "314" indicates that the particular school district checked question 3 under source of staffing, question 1 under source of software, and question 4 under computer generation. 314 thus indicates that the school district used combined inhouse and contractor staff (3), software development was original (1), and the design was originally developed for a third generation computer.

Page 32: Table 5.--Methods of development for selected administrative computer applications reported as of March/April, 1972, summary

- summarizes the responses concerning methods of development for certain applications under study

TABLE 3.--Administrative computer applications partially or completely operational, reported as of March/April, 1972.

Application[a]	Number	Percentage[b]
First Quarter		
02 Pupil scheduling	52	95
11 General expenditure accounting	51	93
14 Payroll	50	91
05 Test scoring & analysis	49	89
20 Employee data base	49	89
15 Accounts payable	45	82
04 Report cards	40	73
13 Budget development	38	69
17 Salary cost projections	38	69
03 Pupil attendance	36	66
39 Warehouse inventory	36	66
Second Quarter		
06 Pupil registration	33	60
16 School lunch inc. & exp. acct.	33	60
25 Employee retirement	33	60
01 Pupil data base	30	55
07 Pupil census	29	53
23 Certification	27	49
40 Purchasing	27	49
38 Library & textbook ordering	26	47
19 Job cost accounting	25	46
21 Position control	24	44
26 Substitute teachers	24	44
Third Quarter		
41 Instr. mat. catalogues	22	40
12 Accounts receivable	21	38
44 Sch. lunch plan., ord., & inv.	20	36
31 Equipment inventory	18	33
36 Instructional materials inv.	14	26
27 Facilities inventory	13	24
08 Enrollment forecasting	12	22
42 Library ops. support	11	20
10 Guidance & counseling	10	18
18 PPBS program cost analysis	9	16
24 Inservice training	9	16
Fourth Quarter		
22 Recruitment & hiring	8	15
37 Inst. mat. booking & scheduling	8	15
28 Facil. constr. proj. control	6	11
09 Health & immunization	5	9
30 Bus sched. & routing	5	9
43 Bibliographic data base	5	9
34 Equip. utilization & evaluation	4	7
32 Preventive maint. scheduling	3	6
29 Work order requests scheduling	2	4
35 Future facilities planning	2	4
33 Facilities util. & evaluation	0	0

[a]Grouped by quarter.

[b]Number divided by fifty-five responding school systems, times 100. This tabulation includes only the 55 out of 61 responses, which were received prior to the cutoff date.

TABLE 4.--Administrative computer applications partially or completely operational, reported as of Mar/Apr, 1972 by school district

	Application	Birmingham City	Mobile	Fresno	Garden Grove	Los Angeles	Mt. Diablo	Oakland	Sacramento	San Diego	San Juan	Denver	Jefferson County	Brevard County	Broward County	Dade County	Hillsborough County	Palm Beach County	Pinellas County	Chicago	Ft. Wayne	Gary	Shawnee Mission	Jefferson County
		ALA		CALIFORNIA								COLO.		FLORIDA						ILL.	IND.		KA.	KY.
PUPIL APPLICATIONS	Pupil Data Base				123			314	123	124	121	124	114	124	123	323				123	124	123	123	
	Pupil Scheduling	112		314	314		311	314	114	114	311	314	124	313	123	113	114	122	314	313	113	314	112	314
	Pupil Attendance			124	123		121	314	122		121	124	124	124	123		122		124			123	124	124
	Report Cards			124	124		121	314	122	124	121	124	124	124	123	123	122	122	124		122	123	124	124
	Test Scoring & Analysis	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Pupil Registration			X	X		X		X	X	X	X	X		X		X	X	X		X	X	X	
	Pupil Census			X	X		X	X	X	X	X		X				X	X	X					X
	Enrollment Forecasting				X			X	X	X	X		X		X		X	X						
	Health & Immunization							X	X	X									X					
	Guidance & Counselling							X	X	X	X			X	X			X						

TABLE 4.--
Continued

	Application	Caddo Parish (LA.)	E. Baton Rouge (LA.)	New Orleans (LA.)	Anne Arundel (MARYLAND)	Baltimore City (MARYLAND)	Baltimore County (MARYLAND)	Montgomery County (MARYLAND)	Prince George's County (MARYLAND)	Boston (MASS.)	Detroit (MICH.)	Flint (MICH.)	St. Louis (MO.)	Clark County (NEV.)	Albuquerque (NM.)	Winston-Salem Forsyth (NC.)	Newark (NJ.)	Cincinnati (OHIO)	Toledo (OHIO)	Tulsa (OK.)	Portland (OR.)	Philadelphia (PA.)	Pittsburgh (PA.)	Greenville County (SC.)
PUPIL APPLICATIONS	Pupil Data Base				122	322	324		123	121		123	124	124	113						311	314	122	
	Pupil Scheduling	111	114	114	312	314	314	314	113	121	123	123	114	214	114	124	124		112	121	311	122	312	114
	Pupil Attendance	111	124		122	322	324	123	123				123	123		124				121	321	213		
	Report Cards	121	124		122				124	121		123	123	123	113	124	124	121	124		311	322		
	Test Scoring & Analysis		X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X			X	X
	Pupil Registration		X	X			X		X	X		X	X	X	X					X			X	X
	Pupil Census		X			X			X				X		X	X		X		X			X	X
	Enrollment Forecasting											X	X			X		X						
	Health & Immunization														X									
	Guidance & Counselling												X							X		X		

TABLE 4.--
Continued

	Application	Memphis City (TENN.)	Nashville Davidson (TENN.)	Austin (TEXAS)	Ft. Worth (TEXAS)	Houston (TEXAS)	Fairfax County (VIRGINIA)	Norfolk City (VIRGINIA)	Richmond (VIRGINIA)	Seattle (WA.)	Kanawha County (WV.)	Milwaukee (WIS.)
PUPIL APPLICATIONS	Pupil Data Base			124		124			123	124		124
	Pupil Scheduling	314	312	114	114	114	114	314	114	314	111	313
	Pupil Attendance	323	123	124	124		121	122	123	124		123
	Report Cards	123		124	124	124		122	123	124	121	323
	Test Scoring & Analysis	X	X	X	X	X	X	X	X	X	X	X
	Pupil Registration	X		X		X			X	X		X
	Pupil Census	X	X	X			X	X		X		X
	Enrollment Forecasting											X
	Health & Immunization	X										
	Guidance & Counselling											

TABLE 4.--
Continued

	Application	Birmingham City	Mobile	Fresno	Garden Grove	Los Angeles	Mt. Diablo	Oakland	Sacramento	San Diego	San Juan	Denver	Jefferson County	Brevard County	Broward County	Dade County	Hillsborough County	Palm Beach County	Pinellas County	Chicago	Ft. Wayne	Gary
		ALA.		CALIFORNIA								COLO.		FLORIDA						ILL.	IND.	
FINANCIAL APPLICATIONS	General Expenditure Acctg		121	124	114	124	121	314	123	124	121	123	122	124	124				124	123	314	122
	Accts Receivable		121	124				314	123				122	124	124				124			122
	Budget Development		121	124	114	124	121	314	123	124	121	323		124	124	324		122	124	123		122
	Payroll	314	121	124		123	121	314	123	124	121	124	322	124	124	323	122	122	124	123	122	322
	Accts Payable	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X	X
	School Lunch Income & Exp. Acctg		X	X	X	X	X	X	X	X	X		X		X		X	X	X	X		X
	Salary Cost Projections		X	X	X	X	X		X	X	X	X	X	X	X		X	X	X	X		
	PPBS Program Cost Analysis				X					X		X	X		X	X	X	X				
	Job Cost Acctg					X		X	X	X		X		X	X							X
PERSONNEL APPLICATIONS	Employee Data Base	124	121		123	123	121	314	123	124	121	124	122	124	123	124	122	122	124	123		322
	Position Control				124	124			123	124	121		122		123		124	222	124	123		
	Recruitment & Hiring				124																	
	Certification		121		123	123	121	314	123		121	123	122		123		122	112	124			
	Inservice Training						X				X	X		X	X			X	X			
	Employee Retirement			X		X	X	X	X	X	X	X	X	X	X	X	X	X	X			
	Substitute Teachers		X				X	X	X	X	X	X		X	X		X		X			

TABLE 4.--
Continued

	Application	Shawnee Mission	Jefferson County	Caddo Parish	E. Baton Rouge	New Orleans	Anne Arundel	Baltimore City	Baltimore County	Montgomery County	Prince George's County	Boston	Detroit	Flint	St. Louis	Clark County	Albuquerque	Winston-Salem Forsyth	Newark	Cincinnati	Toledo	Tulsa
		KA.	KY.	LA.			MARYLAND					MASS.	MICH.		MO.	NEV.	NM.	NC.	NJ.	OHIO		OK.
FINANCIAL APPLICATIONS	General Expenditure Acctg	124	124		124	122	312	124	324	122	314	121	322	123	322	123	124	124	124	121	124	121
	Accts Receivable	124					322				314			123	322		123	124			124	121
	Budget Development		124		124		322		324	124			124	123	123	123			124		124	121
	Payroll	123	124	121	123	122	322		324	122	123		122	123	123	123	123	124	123	121	124	121
	Accts Payable	X	X		X		X		X	X	X			X	X	X		X		X	X	X
	School Lunch Income & Exp. Acctg			X			X		X	X	X		X	X	X			X		X	X	X
	Salary Cost Projections		X		X	X			X	X	X			X	X	X	X				X	
	PPBS Program Cost Analysis										X		X									
	Job Cost Acctg				X		X	X			X	X	X	X	X	X	X			X		
PERSONNEL APPLICATIONS	Employee Data Base	123	124	121	123	122	122	124		124	123	121		123	124	123	113	124	124	121	124	121
	Position Control				124				324		124			123	124	123			124			
	Recruitment & Hiring	124							324				124			123						
	Certification		124	121	124								122	123		123		124			124	
	Inservice Training			X																		
	Employee Retirement	X		X	X				X		X		X	X	X			X		X	X	
	Substitute Teachers	X		X	X		X				X		X	X	X		X					

TABLE 4.--
Continued

	Application	Portland	Philadelphia	Pittsburgh	Greenville County	Memphis City	Nashville Davidson	Austin	Ft. Worth	Houston	Fairfax County	Norfolk City	Richmond	Seattle	Kanawha County	Milwaukee
		OR.	PA.		SC.	TENN.		TEXAS			VIRGINIA			WA.	WV.	WIS.
FINANCIAL APPLICATIONS	General Expenditure Acctg	124	122	122		123	122	124	114	124	121	122	322	124	111	323
	Accts Receivable						122						122	124		
	Budget Development	124	324	122			122	124			121	122	123	124	121	124
	Payroll	124	324	122		123	122	124	114	122		122	122			322
	Accts Payable	X	X	X	X	X	X		X	X		X	X	X	X	X
	School Lunch Income & Exp. Acctg	X		X		X	X			X		X	X	X		
	Salary Cost Projections	X	X	X	X	X	X	X		X	X		X			X
	PPBS Program Cost Analysis	X						X		X	X					
	Job Cost Acctg	X		X		X		X					X	X		X
PERSONNEL APPLICATIONS	Employee Data Base	124	122	122	124	123	122	124	114	122	121	122	122	324		123
	Position Control		124	122				124			121		122	324		
	Recruitment & Hiring			122			122				121					
	Certification		122			123	122				121			324		
	Inservice Training					X									X	
	Employee Retirement			X		X	X	X	X		X		X	X	X	
	Substitute Teachers		X			X	X				X		X	X		

TABLE 4.--continued

	Application	Birmingham City	Mobile	Fresno	Garden Grove	Los Angeles	Mt. Diablo	Oakland	Sacramento	San Diego	San Juan	Denver	Jefferson County	Brevard County	Broward County	Dade County	Hillsborough County	Palm Beach County	Pinellas County	Chicago
		ALA.		CALIFORNIA								COLO.		FLORIDA						IL.
INSTRUCTIONAL/NON-INSTRUCTIONAL MATERIAL APPLICATIONS	Instructional Materials Inv.			124		224			122	124	121				123					124
	Instr. Mat. Booking & Sched.					121				124					123					
	Library & Textbook Ordering			124		224	121			124	121		122	124						123
	Warehouse Inv. & Requisitioning			124	114	123	121	324	123	124	121	123	122	124	123					123
	Purchasing	X			X	X		X	X		X			X	X					X
	Instr. Mat. Catalogues			X			X		X		X		X	X	X					X
	Library Operations Support					X				X	X									
	Bibliographic Data Base					X				X	X									
	School Lunch Planning, Ordering, & Inventory					X	X	X	X			X	X		X	X		X		

TABLE 4.--continued

	Application	Fort Wayne	Gary	Shawnee Mission	Jefferson County	Caddo Parish	East Baton Rouge	New Orleans	Anne Arundel	Baltimore City	Baltimore County	Montgomery County	Prince George's County	Boston	Detroit	Flint	St. Louis	Clark County	Albuquerque	Winston-Salem/ Forsyth
		IND.		KA.	KN.	LA.			MARYLAND					MASS.	MICH.		MO.	NEV.	NM.	NC.
INSTRUCTIONAL/NON-INSTRUCTIONAL MATERIAL APPLICATIONS	Instructional Materials Inv.			124							324		124				124		124	
	Instr. Mat. Booking & Sched.													121			124	123		
	Library & Textbook Ordering			124					222	121	324			121	123	123	124		121	
	Warehouse Inv. & Requisitioning			124			124			121		122		121	322	123	122		124	
	Purchasing			X	X		X				X		X		X	X	X	X	X	
	Instr. Mat. Catalogues			X				X			X	X					X	X	X	
	Library Operations Support			X												X	X		X	
	Bibliographic Data Base			X													X			
	School Lunch Planning, Ordering, & Inventory			X									X		X		X			

TABLE 4.--continued

	Application	Newark	Cincinnati	Toledo	Tulsa	Portland	Philadelphia	Pittsburgh	Greenville County	Memphis City	Nashville Davidson	Austin	Ft. Worth	Houston	Fairfax County	Norfolk City	Richmond	Seattle	Kanawha County	Milwaukee
		NJ.	OHIO		OK.	OR.	PA.		SC.	TENN.		TEXAS			VIRGINIA			WA.	W.V.	WI.
INSTRUCTIONAL/NON-INSTRUCTIONAL MATERIAL APPLICATIONS	Instructional Materials Inv.						122			123										123
	Instr. Mat. Booking & Sched.						322												121	324
	Library & Textbook Ordering	124			121		122							122	121	122	122	124		124
	Warehouse Inv. & Requisitioning		121	124	121		322			123	114	124		122	121	122	122	124		124
	Purchasing					X	X	X			X	X				X	X	X		X
	Instr. Mat. Catalogues			X	X		X							X	X	X		X		X
	Library Operations Support							X			X						X			X
	Bibliographic Data Base																			
	School Lunch Planning, Ordering, & Inventory				X	X				X	X	X		X		X	X	X		X

TABLE 4.--continued

	Application	Birmingham City	Mobile	Fresno	Garden Grove	Los Angeles	Mt. Diablo	Oakland	Sacramento	San Diego	San Juan	Denver	Jefferson County	Brevard County	Broward County	Dade County	Hillsborough County	Palm Beach County	Pinellas County	Chicago
		ALA.		CALIFORNIA								COLO.		FLORIDA						IL.
FACILITIES & EQUIPMENT APPLICATIONS	Facilities Inventory	124	121	124		324					121									123
	Facilities Construction Project Control										121			213						
	Work Order Request Scheduling							121							123					
	Bus Scheduling & Routing																114			
	Equipment Inventory	X	X			X			X	X	X		X	X	X		X		X	
	Preventive Maintenance Scheduling					X				X										
	Facilities Utilization & Evaluation														X					
	Equipment Utilization & Evaluation										X		X	X	X					
	Future Facilities Planning														X		X	X		

TABLE 4.--continued

	Application	Fort Wayne	Gary	Shawnee Mission	Jefferson County	Caddo Parish	East Baton Rouge	New Orleans	Anne Arundel	Baltimore City	Baltimore County	Montgomery County	Prince George's County	Boston	Detroit	Flint	St. Louis	Clark County	Albuquerque	Winston-Salem/ Forsyth
		IND.		KA.	KN.	LA.			MARYLAND					MASS.	MICH.		MO.	NEV.	NM.	NC.	
FACILITIES & EQUIPMENT APPLICATIONS	Facilities Inventory									121			124							
	Facilities Construction Project Control												124					123		
	Work Order Request Scheduling																			
	Bus Scheduling & Routing			X																124
	Equipment Inventory											X	X	X	X				X	
	Preventive Maintenance Scheduling	X																		
	Facilities Utilization & Evaluation																			
	Equipment Utilization & Evaluation																			
	Future Facilities Planning												X							

TABLE 4.--continued

	Application	Newark	Cincinnati	Toledo	Tulsa	Portland	Philadelphia	Pittsburgh	Greenville County	Memphis City	Nashville Davidson	Austin	Ft. Worth	Houston	Fairfax County	Norfolk City	Richmond	Seattle	Kanawha County	Milwaukee
		NJ.	OHIO		OK.	OR.	PA.		SC.	TENN.		TEXAS			VIRGINIA			WA.	W.V.	WI.
FACILITIES & EQUIPMENT APPLICATIONS	Facilities Inventory		121				122	122		113		124					123			
	Facilities Construction Project Control																	123		324
	Work Order Request Scheduling																	123		
	Bus Scheduling & Routing								114		314									
	Equipment Inventory		X							X							X	X		
	Preventive Maintenance Scheduling																			
	Facilities Utilization & Evaluation																			
	Equipment Utilization & Evaluation											X								
	Future Facilities Planning																			

TABLE 5.--Methods of development[a] for selected administrative computer applications, reported as of March/April, 1972. (Percent[b])

Application[c]	N[d]	Group I Source of Staffing			Group II Source of Software		Group III Generation of Computer			
		Inhouse	Contractor	Combined	Package	Original	1st/2nd gen.	Emulation	Converted	Orig. 3rd. gen.
Pupil										
1. Pupil data base	29	83	0	17	14	86	7	10	35	48
2. Pupil scheduling	52	58	4	39	85	15	12	17	15	56
3. Pupil attendance	36	83	3	14	8	92	14	11	33	42
4. Report cards	39	92	0	8	5	95	15	15	23	46
Financial										
11. General expenditure acct.	50	80	0	20	14	86	16	24	16	44
12. Accounts receivable	21	81	0	19	10	91	10	29	19	43
13. Budget development	38	84	0	16	5	95	16	16	18	50
14. Payroll	48	79	0	21	6	94	13	31	25	31
Personnel										
20. Employee data base	49	94	0	6	6	94	16	22	27	35
21. Position control	23	87	4	9	0	100	9	17	17	57
23. Certification	24	92	0	8	8	92	21	21	29	29
Facilities & equipment										
27. Facilities inventory	14	93	0	7	7	93	29	14	21	36
Instr./non-instr. material										
36. Instr. material inventory	14	86	7	7	0	100	7	14	14	64
38. Library & textbook ord.	26	85	8	8	0	100	23	23	15	39
39. Warehouse inv. & requis.	35	89	0	11	6	94	20	23	17	40

[a]Column headings refer to methods of development. See Part III of the survey instrument, page

[b]Percent of N indicating that the method of development was used for that application. One method was indicated by the respondent within each of the three groups.

[c]Applications with N < 14 are omitted.

[d]N=Number of school districts providing usable answers to the questions about methods of development.

SECTION 5

BENEFIT SUMMARY

Page 35: Table 6.--Benefits reported to have resulted to a significant or moderate degree as of March/April, 1972, summary

- summarizes the per cent of responding school districts reporting significant or moderate results for selected applications, and the benefits

Page 36: Table 7.--Rank-order of applications according to frequency of success

- ranks certain applications according to the frequency with which benefits were indicated to result

Page 36: Table 8.--Rank-order of benefits for successful applications, according to frequency reported

- ranks the benefits according to the frequency with which they were reported for those applications in the upper half of the success ranking

Page 37: Table 9.--Applications reported as showing positive or negative benefits more frequently than might be expected when compared to the general responses for the application area

- indicates which applications showed positive or negative benefits considering the application area only

Page 38: Table 10.--Applications reported as showing positive or negative benefits more frequently than might be expected when compared to the general responses for all application areas

- indicates which applications showed positive or negative benefits considering all application areas

NOTE TO TABLES 9 & 10: A contingency table analysis was used to determine the applications for which the number of school districts reporting significant or moderate results exceeded the expected frequency at a statistically significant level (.05).

For Table 9, a "+" for an application indicates that the benefit resulted more frequently than would be expected considering all responses for that application area only. A "-" for an application indicates that the benefit resulted less frequently than would be expected considering the responses for all applications in that application area only.

For Table 10, a "+" or "-" considers the responses for all applications in all application areas.

Pages 39-41: Table 11.--Applications reported as showing positive or negative benefits more frequently than might be expected when compared to the general responses, for certain methods of development

- indicates which methods of development showed positive or negative results for certain benefit categories for each application

NOTE TO TABLE 11: A contingency table analysis was used to determine the methods of development for each application for which the number of school districts reporting significant or moderate results exceeded the expected frequency at a statistically significant level (.05).

A "+" for a method of development, for a given application, indicates that the benefit resulted more frequently than would be expected considering all responses for that method of development category and application. A "-" has the opposite meaning.

For example, the responses indicate that, for the Pupil Scheduling application, use of a software package yields improved information and extended service, and all benefits, more frequently than would be expected, considering the responses for source of software.

TABLE 6. — Benefits[a] reported to have resulted to a significant or moderate degree as of March/April, 1972. (Percent)[b]

Application	N[d]	Improved Information					Improved Efficiency			Extended Service			Reduced Costs		
		Access-ible	Widely Dissem.	Current Timely	Accurate Reliable	Compre-hensive	Staff Perform.	Proce-dures	Flexi-bility	New Info.	Extnd. Capabil.	Better Info.	Reduced Dupli.	Staff Reduced	Better Util.
Pupil															
01. Pupil data base	29	93	93	100	100	90	64	90	90	79	86	90	59	03	62
02. Pupil scheduling	52	96	83	86	98	88	85	94	79	92	96	69	52	35	90
03. Pupil attendance	36	92	89	86	89	83	69	100	75	86	92	83	67	33	78
04. Report cards	39	90	87	90	92	90	82	92	87	90	97	92	72	36	90
Financial															
11. General expenditure acct.	50	98	96	98	94	92	88	92	82	90	92	92	72	70	94
12. Accounts receivable	21	100	100	100	100	86	95	95	90	90	90	86	71	62	95
13. Budget development	38	100	89	95	95	92	89	97	89	95	95	79	63	55	89
14. Payroll	48	98	92	94	98	92	87	94	83	87	94	83	85	73	94
Personnel															
20. Employee data base	49	98	94	96	96	86	80	96	82	88	98	88	75	57	80
21. Position control	23	100	100	91	96	87	83	91	74	100	87	78	65	65	78
23. Certification	24	92	79	79	71	67	67	87	58	79	92	75	62	50	75
Facilities & equipment															
27. Facilities inventory	14	79	71	79	79	86	50	64	50	79	71	86	64	14	50
Instr./non-instr. material															
36. Instru. material inventory	14	100	93	100	100	93	86	100	93	100	93	71	79	42	93
38. Library & textbook ord.	26	85	88	96	100	88	85	96	85	88	81	58	85	77	100
39. Warehouse inv. & requis.	35	97	89	97	97	97	89	83	80	91	83	74	86	69	83

[a]Column headings refer to benefits resulting. See Part III of the survey instrument, page
[b]Percent of N indicating that the benefit resulted to a significant or moderate degree.
[c]Applications with n <14 are omitted.
[d]N = Number of school districts providing usable answers to the questions about benefits.

Table 7. -- Rank-order of applications according to frequency of success.

Application	Rank	No. of benefits in upper 50 percent
11. General expenditure accounting	1	12
12. Accounts receivable	1	12
14. Payroll	1	12
36. Instructional materials inv.	1	12
13. Budget development	2	11
20. Employee data base	3	10
38. Library & textbook ordering	4	9
39. Warehouse inventory	4	9
02. Pupil scheduling	5	7
01. Pupil data base	6	6
04. Report cards	6	6
21. Position control	7	5
03. Pupil attendance	8	4
23. Certification	9	1
27. Facilities inventory	9	1

Table 8. -- Rank-order of benefits for successful applications, according to frequency reported.

Benefit	Rank	No. of applications in upper 50 percent
03. Current, timely	1	8
04. Accurate, reliable	1	8
01. Accessible	2	7
02. Widely disseminated	2	7
07. Improved procedures	2	7
05. More comprehensive	3	6
09. New information	4	5
10. Extended capabilities	4	5
14. Better utilization	4	5
06. Staff performance	5	2
08. Flexibility	5	2
11. Better information	5	2
12. Reduced duplication	6	0
13. Staff reduced	6	0

TABLE 9.--Applications reported as showing positive or negative benefits more frequently than might be expected when compared to the general responses for the application area

Application	+ or -	Benefit Category
Pupil		
1. Pupil data base	+	Improved information
	-	Reduced costs
	-	All benefits
2. Pupil scheduling	+	Improved information
3. Pupil attendance	-	Improved information
Personnel		
20. Employee data base	+	Improved information
	+	All benefits
21. Position control	+	All benefits
23. Certification	-	Improved information
	-	Improved efficiency
	-	All benefits
Facilities & equipment		
27. Facilities inventory	-	Improved efficiency & reduced costs
29. Work order requests	+	Improved efficiency & reduced costs
30. Bus scheduling	+	Improved efficiency & reduced costs
Instr./non-instr. material		
36. Instru. mat. inventory	+	Improved information & extended service
37. Instru. mat. bking. & sch.	-	Improved information & extended service
	-	All benefits

TABLE 10.--Applications reported as showing positive or negative benefits more frequently than might be expected when compared to the general responses for all application areas

Application	+ or -	Benefit Category
1. Pupil data base	-	Reduced costs
13. Budget development	-	Reduced costs
23. Certification	-	Improved information
	-	Improved efficiency
	-	All benefits
27. Facilities inventory	-	Improved information
	-	Improved efficiency
	-	Reduced costs
	-	All benefits
38. Library & textbook ord.	+	Reduced costs

TABLE 11.--Applications reported as showing positive or negative benefits more frequently than might be expected when compared to the general responses, for certain methods of development.

	Application	I.Staff II.Software III.Computer	Method of Development[a]	+ or -	Benefit Category[a]
Pupil Applications	Pupil data base				No significant finding
	Pupil scheduling				No significant finding
	Pupil attendance	Soft	Package	+	Improved information & extended service
				+	All benefits
		Comp	Orig. 3rd gen.	-	Improved information & extended service
				-	All benefits
	Report cards	Comp	Orig. 3rd gen.	+	Improved efficiency & reduced costs
			1st/2d gen.	-	All benefits
Financial Applications	General exp. acctg.	Soft	Package	+	Improved information & extended service
		Comp	1st/2d gen.	-	Improved efficiency & reduced costs
				-	All benefits
			Orig. 3rd gen.	+	Improved efficiency & reduced costs
	Accounts receivable	Comp	Orig. 3rd gen.	+	All benefits
	Budget development	Staff	Combined	-	Improved information & extended service
				-	All benefits
		Comp	Orig. 3rd gen.	+	Improved information & extended service
			Other	-	Improved information & extended service
			1st/2d gen.	-	All benefits
			Emulation	+	All benefits
	Payroll				No significant finding

[a]See Part III of the survey instrument, page 43.

TABLE 11.--continued

	Application	I.Staff II.Software III.Computer	Method of Development[a]	+ or −	Benefit Category[a]
Personnel Applications	Employee data base	Soft	Package	−	Improved efficiency & reduced costs
				−	All benefits
	Position control	Staff	Contractor or combined	+	All benefits
		Comp	1st/2d gen. or emulation or conversion	−	Improved efficiency & reduced costs
			Conversion	−	All benefits
	Recruitment & hiring	Comp	Orig. 3rd gen.	+	Improved efficiency & extended service
			Other	−	Improved efficiency & extended service
			Orig. 3rd gen.	+	All benefits
	Certification	Staff	Combined	+	Improved information & extended service
		Soft	Package	+	Improved information & extended service
		Comp	Conversion	−	Improved information & extended service
			Orig. 3rd gen.	+	Improved information & extended service
			Conversion	−	All benefits
			Emulation	+	All benefits
Facilities & Equipment Applications	Facilities inventory	Staff	Combined	+	Improved efficiency & reduced costs
		Soft	Original	−	Improved efficiency & reduced costs
				−	All benefits
		Comp	Conversion	−	All benefits
	Facilities construction project control	Comp	Orig. 3rd gen.	+	All benefits
	Work order requests scheduling	Comp	1st/2d gen.	−	Improved information & extended service
			Conversion	+	Improved information & extended service
			1st/2d gen.	−	All benefits
			Conversion	+	All benefits

[a]See Part III of the survey instrument, page 43.

TABLE 11.--continued

	Application	I.Staff II.Software III.Computer	Method of Development[a]	+ or -	Benefit Category[a]
Facilities & Equipment Applications	Bus scheduling & routing	Staff	Combined	+	All benefits
Instructional/Non-Instructional Material Applications	Instructional mat. inv.	Staff	Combined or contractor	-	All benefits
	Instr. mat. booking & scheduling	Staff	Combined	-	Improved efficiency & reduced costs
		Comp	Orig. 3rd gen.	+	Improved information & extended service
				+	Improved efficiency & reduced costs
				+	All benefits
	Library & textbook ord.	Staff	Contractor or combined	-	Improved information & extended service
				-	All benefits
		Comp	1st/2d gen.	-	All benefits
	Warehouse inv. & req.	Staff	Combined	-	Improved information & extended service
				-	Improved efficiency & reduced costs
				-	All benefits
		Soft	Package	+	All benefits

[a]See Part III of the survey instrument, page 43.

APPENDICES

PART I

TO BE COMPLETED BY THE CHIEF COMPUTER SYSTEMS EXECUTIVE

AEDS LARGE SCHOOL SYSTEM SURVEY

ABOUT YOUR PARTICIPATION

1. DO YOU WANT TO RECEIVE AT COST A DIRECTORY CONTAINING THE DETAILS RESULTING FROM THIS SURVEY? . . . . . _____

2. MAY THE SURVEY ANSWERS FOR YOUR SCHOOL DISTRICT BE INCLUDED IN A DETAILED DIRECTORY? IF YOU WISH CERTAIN ANSWERS EXCLUDED, WRITE NO NEXT TO THOSE ANSWERS AS YOU COMPLETE THE SURVEY. YOUR ANSWERS WILL BE HELD IN COMPLETE & STRICT CONFIDENCE AS YOU SO INDICATE. (PLEASE COMPLETE THE SURVEY REGARDLESS OF YOUR ANSWER TO THIS QUESTION). . _____

ABOUT YOUR ORGANIZATION

(cc 1) 01 (cc 3) _____

3. APPROXIMATELY HOW MANY STAFF DOES THE SCHOOL SYSTEM EMPLOY WITH DIRECT OR INDIRECT ASSIGNMENTS IN THE AREA OF COMPUTER BASED INFORMATION SYSTEMS?

(cc 6)

MANAGEMENT/SUPERVISION. . . . . _____
CLERICAL SUPPORT. . . . . _____
SYSTEMS . . . . . _____
ANALYST-PROGRAMMERS . . . . . _____
PROGRAMMERS . . . . . _____
COMPUTER OPERATIONS & SUPPORT . . . . . _____
TOTAL . . . . . _____

4. APPROXIMATELY HOW MANY TOTAL STAFF DOES THE SCHOOL SYSTEM EMPLOY?. . . . . (cc 21) _____

5. APPROXIMATELY WHAT IS THE TOTAL FY 72 OPERATING BUDGET FOR: (cc 23)

THE ENTIRE SCHOOL SYSTEM. . . . . $ _____
COMPUTER BASED INFORMATION SYSTEMS. . . . . $ _____

(cc 1) 02 (cc 3) _____

6. PLEASE PRINT THE FOLLOWING INFORMATION ABOUT EACH COMPUTER CONFIGURATION:

	(A) (cc 6)	(B) (cc 15)	(C) (cc 24)
MANUFACTURER	_____	_____	_____
MODEL.	_____	_____	_____
TOTAL CORE	_____	_____	_____
OWN, LEASE, OR RENT. . .	_____	_____	_____
MONTH, YEAR INSTALLED. .	_____	_____	_____

7. PLEASE PRINT THE FOLLOWING INFORMATION ABOUT THE CHIEF COMPUTER SYSTEMS EXECUTIVE FOR YOUR SCHOOL SYSTEM:

(cc 1) 03 (cc 3) _____

NAME . . . . . (cc 6) _____
TITLE. . . . . (cc 30) _____
TELEPHONE. . . . . (cc 64) AC: /NUMBER: - EXT: X _____

(cc 1) 04 (cc 3) _____

NAME OF SCHOOL SYSTEM. . (cc 6) _____
BUSINESS ADDRESS . . . . (cc 40) STREET: _____
(cc 60) CITY: _____
(cc 74) STATE: (cc 76) ZIP _____

PLEASE TURN TO THE BACK OF THIS PAGE & ANSWER PART II - - - - - - ►

PART II

ABOUT APPLICATIONS

8. INSTRUCTIONS: PLEASE CHECK EACH OF THE FOLLOWING APPLICATIONS WHICH ARE PARTIALLY (INCLUDING PILOT) OR COMPLETELY OPERATIONAL. OMIT THOSE WHICH ARE IN THE DEVELOPMENT STAGE BUT ARE NOT OPERATIONAL.

PUPIL APPLICATIONS (cc 37)

1. PUPIL DATA BASE (CUMULATIVE RECORDS). . . . . ☐
2. PUPIL SCHEDULING. . . . . ☐
3. PUPIL ATTENDANCE. . . . . ☐
4. REPORT CARDS. . . . . ☐
5. TEST SCORING AND ANALYSIS . . . . . —
6. PUPIL REGISTRATION. . . . . —
7. PUPIL CENSUS. . . . . —
8. ENROLLMENT FORECASTING. . . . . —
9. HEALTH AND IMMUNIZATION . . . . . —
10. GUIDANCE AND COUNSELLING. . . . . —
xx. _____ . . . . —
xx. _____ . . . . —

FINANCIAL APPLICATIONS (cc 47)

11. GENERAL EXPENDITURE ACCOUNTING. . . . . ☐
12. ACCOUNTS RECEIVABLE . . . . . ☐
13. BUDGET DEVELOPMENT. . . . . ☐
14. PAYROLL . . . . . ☐
15. ACCOUNTS PAYABLE. . . . . —
16. SCHOOL LUNCH INCOME & EXPENSE ACCOUNTING. . . . . —
17. SALARY COST PROJECTIONS . . . . . —
18. PPBS PROGRAM COST ANALYSIS. . . . . —
19. JOB COST ACCOUNTING (MAINT., & OPERATIONS). . . . . —
xx. _____ . . . . —
xx. _____ . . . . —

PERSONNEL APPLICATIONS (cc 56)

20. EMPLOYEE DATA BASE. . . . . ☐
21. POSITION CONTROL. . . . . ☐
22. RECRUITMENT AND HIRING. . . . . ☐
23. CERTIFICATION . . . . . ☐
24. INSERVICE TRAINING. . . . . —
25. EMPLOYEE RETIREMENT . . . . . —
26. SUBSTITUTE TEACHERS . . . . . —
xx. _____ . . . . —
xx. _____ . . . . —

FACILITIES AND EQUIPMENT APPLICATIONS (cc 63)

27. FACILITIES INVENTORY. . . . . ☐
28. FACILITIES CONSTRUCTION PROJECT CONTROL . . . . . ☐
29. WORK ORDER REQUESTS SCHEDULING. . . . . ☐
30. BUS SCHEDULING AND ROUTING. . . . . ☐
31. EQUIPMENT INVENTORY . . . . . —
32. PREVENTIVE MAINTENANCE SCHEDULING . . . . . —
33. FACILITIES UTILIZATION & EVALUATION . . . . . —
34. EQUIPMENT UTILIZATION & EVALUATION. . . . . —
35. FUTURE FACILITIES PLANNING. . . . . —
xx. _____ . . . . —
xx. _____ . . . . —

INSTRUCTIONAL/NON-INSTRUCTIONAL MATERIAL APPLICATIONS (cc 72)

36. INSTRUCTIONAL MATERIALS INVENTORY . . . . . ☐
37. INSTRUCTIONAL MATERIALS BOOKING & SCHEDULING. . . . ☐
38. LIBRARY & TEXTBOOK ORDERING . . . . . ☐
39. WAREHOUSE INVENTORY & REQUISITIONING. . . . . ☐
40. PURCHASING (PURCH. ORDER PREPARATION, STATUS, ETC). —
41. INSTRUCTIONAL MATERIALS CATELOGUES. . . . . —
42. LIBRARY OPERATIONS SUPPORT. . . . . —
43. BIBLIOGRAPHIC DATA BASE (BOOK TITLES, ABSTRACTS). . —
44. SCHOOL LUNCH PLANNING, ORDERING, & INVENTORY. . . . —
xx. _____ . . . . —
xx. _____ . . . . —

PLEASE TURN TO THE NEXT PAGE & ANSWER PART III - - - - ►

PART III

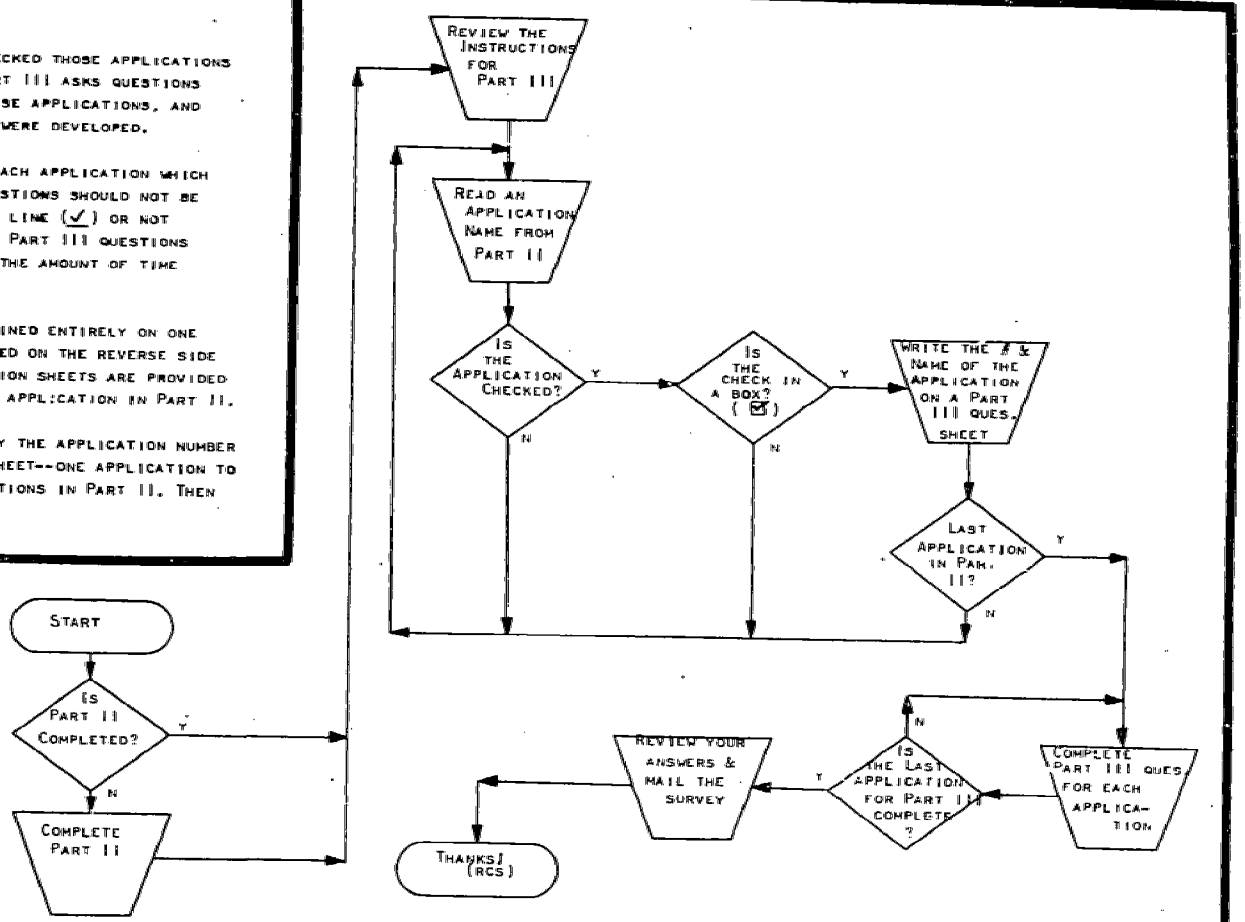
GENERAL INSTRUCTIONS:

YOU HAVE JUST COMPLETED PART II IN WHICH YOU CHECKED THOSE APPLICATIONS WHICH ARE OPERATIONAL IN YOUR SCHOOL SYSTEM. PART III ASKS QUESTIONS ABOUT THE BENEFITS RESULTING FROM CERTAIN OF THESE APPLICATIONS, AND THE METHODS BY WHICH THESE CERTAIN APPLICATIONS WERE DEVELOPED.

PART III QUESTIONS SHOULD BE ANSWERED ONLY FOR EACH APPLICATION WHICH YOU CHECKED IN A BOX (☑) IN PART II. PART III QUESTIONS SHOULD NOT BE ANSWERED FOR APPLICATIONS WHICH ARE CHECKED ON A LINE (✓) OR NOT CHECKED AT ALL (__) IN PART II. WE ARE CONFINING PART III QUESTIONS TO ONLY CERTAIN APPLICATIONS PRIMARILY TO LIMIT THE AMOUNT OF TIME REQUIRED FOR YOU TO COMPLETE THE SURVEY.

THE COMPLETE SET OF PART III QUESTIONS ARE CONTAINED ENTIRELY ON ONE SIDE OF A SHEET. THE SAME QUESTIONS ARE DUPLICATED ON THE REVERSE SIDE OF THE SHEET. SUFFICIENT SETS OF DUPLICATE QUESTION SHEETS ARE PROVIDED FOR YOU TO ANSWER PART III QUESTIONS FOR EACH ☑ APPLICATION IN PART II.

REFERRING TO THE ☑ APPLICATIONS IN PART II, COPY THE APPLICATION NUMBER AND APPLICATION NAME ON ONE SIDE OF A PART III SHEET--ONE APPLICATION TO EACH SIDE OF A SHEET. DO THIS FOR ALL ☑ APPLICATIONS IN PART II. THEN ANSWER PART III QUESTIONS FOR EACH APPLICATION.



PLEASE TURN THE PAGE TO COMPLETE PART III - - - -

(cc 1) 05 (cc 3)

PART III

INSERT THE NUMBER & NAME OF AN APPLICATION CHECKED WITHIN A BOX ☑ FROM PART II ----------►

(cc 6)

NUMBER	APPLICATION NAME FROM PART II

ABOUT BENEFITS RESULTING 9. INSTRUCTIONS: CIRCLE THE ANSWER LETTER (S M N O A) WHICH APPLIES BEST TO THIS APPLICATION, FOR EACH OF THE BENEFITS BELOW

BENEFITS	(cc 8)	SIGNIFICANT RESULT S	MODERATE RESULT M	NO RESULT N	THE OPPOSITE RESULTED O	DOES NOT APPLY TO THIS APPLICATION A
IMPROVED INFORMATION						
MORE ACCESSIBLE INFORMATION.		S	M	N	O	A
MORE WIDELY DISSEMINATED INFORMATION		S	M	N	O	A
MORE CURRENT, TIMELY INFORMATION		S	M	N	O	A
MORE ACCURATE, RELIABLE INFORMATION.		S	M	N	O	A
MORE COMPREHENSIVE, MEANINGFUL, RELEVANT INFORMATION . .		S	M	N	O	A
IMPROVED EFFICIENCY						
IMPROVED STAFF PERFORMANCE		S	M	N	O	A
IMPROVED PROCEDURES FOR COLLECTING, MAINTAINING, OR REPORTING INFORMATION		S	M	N	O	A
GREATER FLEXIBILITY TO EXPAND & MODIFY PROCEDURES. . . .		S	M	N	O	A
EXTENDED SERVICE						
NEW INFORMATION FOR BETTER MANAGEMENT DECISIONS.		S	M	N	O	A
EXTENDED CAPABILITY TO ANALYZE, COMPARE, INTERRELATE, & INTERPRET INFORMATION		S	M	N	O	A
BETTER INFORMATION FOR RESEARCH--GREATER VOLUME OF INFORMATION, MORE COMPREHENSIVE INFORMATION		S	M	N	O	A
REDUCED COSTS						
REDUCED DUPLICATION IN STORAGE, MAINTENANCE OR REPORTING OF INFORMATION.		S	M	N	O	A
STAFF INCREASES PREVENTED, OR NUMBER OF STAFF REQUIRED REDUCED		S	M	N	O	A
BETTER UTILIZATION OF EQUIPMENT, FACILITIES, OR STAFF. .		S	M	N	O	A

ABOUT METHODS OF DEVELOPMENT 10. INSTRUCTIONS: CHECK THE ONE ITEM IN EACH OF GROUPS I, II, & III BELOW WHICH BEST DESCRIBES THE METHODS USED TO DEVELOP THIS APPLICATION. BE SURE TO CHECK ONE IN EACH GROUP.

(cc 22)

GROUP I: CHECK ONE

DEVELOPED USING ENTIRELY INHOUSE STAFF. . . . . _____
DEVELOPED USING ENTIRELY EXTERNAL CONTRACTOR STAFF. . . . . _____
DEVELOPED USING COMBINED INHOUSE STAFF & CONTRACTOR STAFF . . . . . _____

GROUP II: CHECK ONE

ADAPTED AN EXISTING APPLICATION SOFTWARE PACKAGE (I.E., SCHEDULING PACKAGE, PAYROLL PACKAGE, ETC.) FROM ANOTHER ORGANIZATION & ADAPTED IT TO YOUR REQUIREMENTS. . . . . _____
ORIGINAL DEVELOPMENT TAILORED TO REQUIREMENTS OF YOUR SCHOOL SYSTEM. . . . . _____

GROUP III: CHECK ONE

OPERATING ON A 1ST OR 2ND GENERATION COMPUTER . . . . . _____
OPERATING ON A 3RD GENERATION COMPUTER UNDER EMULATION (COMPATIBILITY MODE) . . . . . _____
CONVERTED TO A 3RD GENERATION COMPUTER & ENHANCED A DESIGN ORIGINALLY DEVELOPED FOR OPERATION ON A 1ST OR 2ND GENERATION COMPUTER. . . . . _____
ORIGINALLY DESIGNED & DEVELOPED FOR OPERATION ON A 3RD GENERATION COMPUTER . . . . . _____

(cc 31) _____

IS THIS THE LAST APPLICATION? IF SO, PLEASE COMPLETE THE FOLLOWING:

NUMBER OF APPLICATIONS CHECKED WITHIN A BOX ☑ IN PART II: _____
NUMBER OF APPLICATIONS FOR WHICH PART III WAS COMPLETED: _____

THESE NUMBERS SHOULD BE EQUAL - - - - - - -

THANK YOU FOR YOUR COOPERATION

PLEASE ANSWER PART III QUESTIONS FOR ANOTHER APPLICATION ON THE REVERSE SIDE OR ON ANOTHER SHEET - - - - - - - ►

APPENDIX B

DESCRIPTIONS OF INDIVIDUAL APPLICATIONS

Pupil applications

Pupil census deals with the maintenance of resident data used to estimate future direct enrollment.

Enrollment forecasting deals with the projection of pupil enrollment based upon historic trends and pupil census data.

Pupil registration involves the collection and maintenance of basic pupil enrollment data, course requests, and personal identification data.

Pupil scheduling deals with the use of the computer to schedule classes considering such restraints as maximum class size, facility limitations, and elimination of conflicts.

Pupil attendance involves the collection of student attendance records and reasons for absence.

Test scoring and analysis includes the scoring and analysis of standardized tests and/or teacher made tests usually using a mark-sense device.

Report cards involves the collection of student grade information and the printing of report cards often including attendance and test information.

Health and immunization includes the collection of pupil health inventories and maintenance of immunization records on the computer.

Guidance and counseling involves the use of the pupil data base to analyze pupil performance and relate capabilities to interests.

The pupil data base involves the maintenance and printing of complete pupil profiles, transcripts, etc., using data provided from many other applications.

Financial applications

Salary cost projections deal with a projection of salary expenditures for future years based upon projected teacher requirements (derived from pupil enrollments).

Budget development uses the computer to analyze previous years' financial activity and to maintain planning data about future receipts and expenditures during the budget development process.

Accounts receivable deals with the maintenance and reporting of income or receivable financial accounts, and the generation of invoices.

School lunch income and expenditure accounting involves the maintenance and reporting of financial data reflecting the status of the school lunch activity. This is normally a separate application since school lunch is a self-sustaining function in public schools.

Payroll involves the collection of employee attendance, and the generation of payroll checks and related reports.

General expenditure accounting involves the maintenance of expense accounts for salary and non-salary expenditures.

Accounts payable involves the maintenance of payable accounts and the generation of payment checks.

Job cost accounting includes the maintenance of cost data by job in the maintenance and building operations area.

PPBS program cost analysis involves the analysis of financial accounts by educational programs which are defined in terms of instructional objectives.

Personnel applications

The recruitment and hiring application deals with the maintenance of an applicant data base used in support of the recruiting activities.

The position control application involves the maintenance and reporting of data about the filled and vacancy status of position authorizations.

The employee data base maintains cumulative data on each employee from the time they are hired to retirement or termination.

The certification application deals with the maintenance and reporting of data about the certification status of each teacher.

The inservice training application involves a skills inventory used to determine and keep track of the training needs for employees.

The employee retirement application deals with the maintenance of data on retired employees pertaining to retirement benefits.

Substitute teachers includes the maintenance of data about teacher substitutes and procedures for contacting these substitutes.

Facilities and equipment applications

Facilities inventory deals with the maintenance and reporting of data about the type, characteristics and location of school system facilities.

Equipment inventory deals with the maintenance and reporting of data about the type, characteristics and location of school system equipment.

Facilities construction project control involves the use of the computer to monitor new building construction projects. For the larger school systems, these may involve five to ten new buildings a year.

Work order requests scheduling involves the scheduling of requests for repair of facilities or equipment.

Preventive maintenance scheduling involves the use of the computer to schedule repair of facilities or equipment based upon predefined deterioration factors.

Bus scheduling and routing deals with the scheduling of buses to deliver students to schools on time and the routing of these buses to optimize their use.

Equipment utilization and evaluation involves the use of the computer to analyze the utilization and adequacy of existing equipment.

Facilities utilization and evaluation involves the use of the computer to analyze the utilization and adequacy of existing facilities.

Future facilities planning involves the use of the computer to project facilities requirements based upon projected facilities deterioration and pupil enrollment.

Instructional/non-instructional material applications

Instructional materials inventory deals with the maintenance of inventory status of instructionally oriented material items.

Instructional materials booking and scheduling involves the use of the computer to reserve a central inventory item and schedule centrally located instructional materials for use in the schools.

Library and textbook ordering involves the ordering of library books and textbooks to maintain an inventory level necessary for the instructional program.

Instructional materials catalogues include the computer generation of catalogues identifying the instructional materials available to teachers.

Bibliographic data base involves the maintenance of descriptive information about instructional materials, particularly books, and the generation of selective bibliographic summaries based upon a file search using predefined selection criteria.

Library operations support involves the use of the computer in support of school based libraries by generation of card catalogues, book labels, etc., and the maintenance of school based library inventories.

Warehouse inventory and requisitioning includes the maintenance on the computer of an inventory of expendable and non-expendable supplies and the filling of inventory requisitions from the schools.

Purchasing includes the preparation of purchase orders to satisfy inventory deficiencies and the maintenance of purchase order and vendor status.

School lunch planning, ordering, and inventory involves what the name implies. This is usually developed as a separate application because the school lunch operation is maintained on a self-sufficient basis.

APPENDIX C

DEFINITION OF BENEFITS

Improved information.--These benefits describe the characteristics of the information resulting from the implementation of an administrative computer application:

1. More accessible information: information more readily available to those who require access.

2. More widely disseminated information: more people have access to the information.

3. More current, timely information: recent information is available at the time it is needed.

4. More accurate, reliable information: the information has consistently less error.

5. More comprehensive, meaningful, relevant information: the information covers a greater range of subject areas, is presented in a more meaningful way, and pertains more directly to the needs of the user.

Improved efficiency.--These benefits describe the effect of the application on day-to-day operations.

1. Improved staff performance: as a result of improved information, the product of the educational staff is consistently of higher quality.

2. Improved procedures for collecting, maintaining, or reporting information: staff efficiency is increased because of less redundancy of information, fewer duplicated procedures, and a more streamlined way of doing business.

3. Greater flexibility to expand and modify procedures: because of a more systematic way of conducting business, and because of a higher level of documentation of procedures, a greater capability to modify procedures results.

Extended service.--These benefits describe the extention of capabilities to use the human mind to greater advantage because of the improved nature of the information provided.

1. New information for better management decisions: additional information not previously provided is available which leads to improved decision making.

2. Extended capability to analyze, compare, interrelate, and interpret information: the computer is used to relate existing information in a way not possible by hand resulting in improved decision making.

3. Better information for research--greater volume of information, more comprehensive information: the computer stores a wide range of information which may be accessed for research purposes without the need to conduct expensive surveys.

Reduced costs.--These benefits describe the more effective use of the dollars available to the school system as a result of data processing.

1. Reduced duplication in storage, maintenance or reporting of information: by elimination of duplication, the previous costs of performing the duplicate effort are eliminated.

2. Staff increases prevented, or number of staff required reduced: the application results in fewer staff to produce the same or an improved product, or has prevented increases in staff by absorbing many of the tasks previously performed by hand.

3. Better utilization of equipment, facilities or staff: the application has resulted in a more efficient use of existing resources.