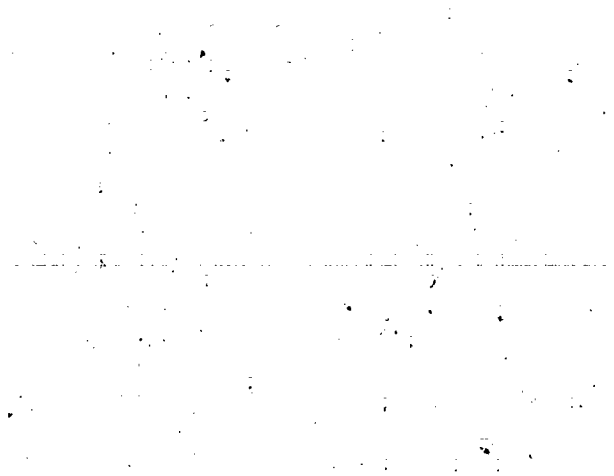

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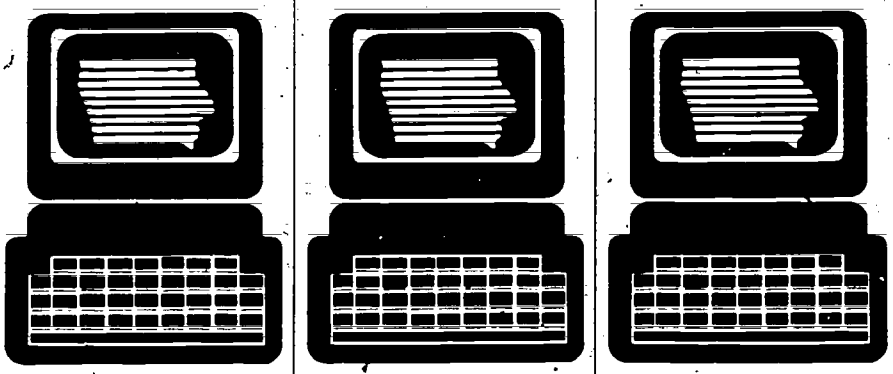
ABSTRACT

To better understand the instructional computing needs of Iowa's K-12 teachers and administrators, a needs assessment was conducted in the spring of 1983. A 48-item administrator questionnaire and a 52-item teacher questionnaire were used to gather data from all Iowa school superintendents and from random samples of both elementary and secondary teachers. Results indicate that both the teachers and the administrators felt positive and enthusiastic about all aspects of instructional computing. They perceived a need for inservice instruction as well as for using the computer in classroom instruction and management. Both teachers and administrators felt that preservice teachers should learn programming and techniques to evaluate, select, and use appropriate software. Differences emerged between administrators' and teachers' perceptions of teacher needs, and elementary and secondary teachers differed on specific items concerning the usefulness of various computer assisted instruction modes and of various computer management techniques. Significant differences also existed among five secondary teacher groups (humanities, mathematics and science, physical education, vocational education, and special education), suggesting that certain groups favor computer applications unique to their discipline. Finally, teachers and administrators warned educators against making the computer a panacea for all educational woes. The survey instrument and 77 data tables are included. (LMM)

Instructional Computing: A Needs Assessment of Iowa K-12 Teachers and Administrators

A statewide study by Iowa State University Research Institute for Studies in Education, College of Education



RISE Research Report

Research Institute for Studies in Education College of Education Iowa State University Ames, Iowa 50011

INSTRUCTIONAL COMPUTING: A NEEDS ASSESSMENT OF IOWA K-12 TEACHERS AND ADMINISTRATORS

by

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Research Institute for Studies in Education

College of Education

Iowa State University

Ames, Iowa

September, 1983

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INTRODUCTION

The impact of the computer on the public school may well reconceptualize the curriculum. Such statements as the following ones are often used to characterize the educational computing movement:

- Educators are becoming more aware of the computer and the untility of its various applications. They are exploring the uses that can be made in various instructional modes.
- Educators at all levels are seeking instruction in evaluating computer software, in programming, in choosing hardware, and in other related computer areas.
- Both computer hardware and software are being purchased in large supply by K-12 school systems.
- Philosophies of Instructional Computing are being developed by K-12 school systems.
- Various curriculum associations are advocating at least 30 minutes per day/student of computer activities by 1985.
- Educational researchers claim that a dearth of instructional computing research exists.
- Most K-12 students find the computer a highly motivating instructional tool.

To better understand the instructional computing needs of Iowa K-12 teachers and administrators, a needs assessment was conducted in the Spring of 1983.

Objectives

The objectives of the assessment were:

1. To determine the inservice needs of elementary and secondary teachers by subject area.
2. To determine the types of computer assisted instruction needed by elementary and secondary teachers by subject area.
3. To determine the specific assistance needed by elementary and secondary teachers by subject area to implement computer assisted instruction.
4. To determine the types of computer managed instruction needed by elementary and secondary teachers by subject area.
5. To determine teacher and administration perception of computer literacy characteristics for teachers.
6. To determine teacher and administrator perceptions of computer curriculum design.
7. To characterize administrator perceptions of the inservice needs of teachers, the computer assisted instruction decisions of teachers, and the computer managed instruction needs of teachers.

Survey Procedure

Two needs assessment instruments were constructed. The adminsitrator instrument contained forty-eight items, and the teacher instrument contained fifty-two items. Copies of both instruments are included in Appendix A. The Department of Public Instruction furnished a tape containing the names of all K-12 teachers and administrators. The

researchers decided to survey all Iowa school superintendents, a sample of elementary teachers, and a sample of secondary teachers. The sample of secondary teachers included samples of five subpopulations - humanities teachers, math and science teachers, physical education teachers, vocational teachers, and special education teachers. The Iowa State University Statistical Laboratory Staff drew the random sample. The procedure used to draw the random sample controlled for geographical representation by using county codes.

The following chart describes both the sample size and return rate.

SAMPLE SIZE AND RETURN RATE

Group	Sample Size	Number of Responses	Percentage of Return
Administrators	440	312	70.9
All Teachers	1750	901	51.5
•Elementary Teachers	500	248	49.6
•Secondary Humanities Teachers	250	115	46.0
•Secondary Science & Math Teachers	250	154	61.6
•Secondary Physical Education Teachers	250	90	36.0
•Secondary Vocational Education Teachers	250	130	52.0
•Secondary Special Education Teachers	250	164	51.5
TOTAL SAMPLE	2190	1213	55.4

The analysis of the 1,213 responses includes the following sections:

1. The Demographic Characteristics section describes the characteristics of the sample.
2. The General Frequencies section contains the tables and discussion of the tables which relate to the five major divisions of the survey.
    a. Teacher Inservice Needs
    b. Computer Assisted Instruction Modes
    c. Classroom Management
    d. Computer Literacy for Teachers
    e. General Concerns
3. The Content Analysis section contains tables which summarize the respondents' comments on the following items:
    a. If you were designing a preservice teacher education program, what computer work would you require?
    b. Please share with us any additional thoughts which you have on instructional computing.
4. The Significance Tests section contains tables which answer the following questions:
    a. Is there a significant difference between administrator perception of teacher needs and teacher perception of teacher needs?
    b. Is there a significant difference between perceived elementary and secondary teacher needs?
    c. Is there a significant difference in the perceived needs of secondary teachers in five disciplines?

DEMOGRAPHIC INFORMATION

Administrators

The 312 administrators surveyed held administrative positions for an average of 15 years and had an average of 8 years of teaching experience. They represented equally all of the area education agencies. 97% of them were male; 3% were female.

The districts which enroll the most students also have the most computers available. Table 1 indicates that most of the districts having less than 500 students have 1-5 computers available for instructional purposes. Only 16 districts enroll more than 3000 students, and 9 of these have more than thirty-one computers.

Table 1

K-12 District Enrollment and Number of

Computers Available for Instructional Purposes

K-12 District Enrollment \ Number of Computers Available	No Computers	1-5 Computers	6-10 Computers	11-20 Computers	21-30 Computers	31 + Computers	ROW TOTAL
0-499							
Number	1	89	23	3	0	0	116
Adjusted Percent	0.9	76.7	19.8	2.6	0.0	0.0	37.5
500-749							
Number	0	28	41	8	0	0	77
Adjusted Percent	0.0	36.4	53.2	10.4	0.0	0.0	24.9
750-999							
Number	0	9	21	5	2	0	37
Adjusted Percent	0.0	24.3	56.8	13.5	5.4	0.0	12.0
1000-1499							
Number	0	2	9	13	5	0	29
Adjusted Percent	0.0	6.9	31.0	44.8	17.2	0.0	9.4
1500-1999							
Number	0	0	3	12	3	3	21
Adjusted Percent	0.0	0.0	14.3	57.1	14.3	14.3	6.8
2000-2999							
Number	0	0	2	4	3	4	13
Adjusted Percent	0.0	0.0	15.4	30.8	23.1	30.8	4.2
3000 +							
Number	0	0	0	2	5	9	16
Adjusted Percent	0.0	0.0	0.0	12.5	31.3	56.3	5.2
Column Totals							
TOTAL NUMBER	1	128	99	47	18	16	309
TOTAL ADJUSTED PERCENT	0.3	41.4	32.0	15.2	5.8	2.8	100.0

Most of the administrators (96%) do not own a personal computer. 50% of them would attend a university sponsored workshop, and 48% wish to learn to program a computer. Of the computer languages listed on the survey, only two are known by a number of administrators - BASIC by 31%; and FORTRAN by 8%.

Most of the administrators come from science, mathematics and humanities teaching backgrounds. Table 2 summarizes the teaching backgrounds of the administrators.

Table 2

Teaching Fields of Adminsitrators

Group	Number	Adjusted Percent
Elementary	14	4.5
Humanities	97	31.2
Science and Mathematics	85	27.3
Physical Education	9	2.9
Vocational Education	41	13.2
Special Education	2	0.6
Multiple	57	18.3
Other	6	1.9
No Response	1	-
TOTAL	312	100

The administrators have a wide variety of instructional computing experiences. Of the seven descriptions of training in instructional computing, area education agency presentations have been attended by 62% of the administrators. 59% of the administrators have read books and articles about instructional computing and more than one third of them have attended general inservice session and vendor presentations. Table 3 summarizes these instructional computing experiences.

Table 3

Administrator Training in Instructional Computing

Group	Number		Adjusted Percent		No. Response	TOTAL
	Yes	No	Yes	No		
Inservice Session	144	145	49.8	50.2	23	312
AEA Presentation*	180	109	62.3	37.7	23	312
DPI Presentation	18	271	6.2	93.8	23	312
Vendor Presentation	130	159	45.0	55.0	23	312
College/University Course	89	200	30.8	69.2	23	312
Conference Session	89	200	30.8	69.2	23	312
Books/Articles	171	118	59.2	40.8	23	312
Other	35	254	12.1	87.9	23	312

* The regional Area Education Agency provides a variety of instructional services to schools.

Teachers

Of the 901 teachers who responded to the survey 57% of them are secondary teachers. The 515 secondary teachers represent the following teaching fields:

- Humanities 23%
- Mathematics and Science 27%
- Physical and Driver Education 11%
- Vocational Education 19%
- Special Education 14%
- Other 6%

29% of the teachers are elementary teachers, and 14% combine elementary and secondary teaching. 60% of the teachers are female and 40% are male. The average number of years in teaching for a respondent is 16 years.

Most of the teachers (87%) do not own a personal computer. 74% of them would like to have a computer in their classroom, and 20% of them already use computers for classroom management tasks. 81% of the teachers would attend a university sponsored workshop, and 57% of them wish to learn to program a computer. Of the ten computer languages listed in the survey, only three are known by a number of teachers (BASIC by 93%; FORTRAN by 17%; and LOGO by 5%).

Of the seven descriptions of training in instructional computing, inservice sessions have been attended by 57% of the teachers. 44% of the teachers have read books and articles about instructional computing.

34% of them have attended area education agency presentations, and 24% of them have attended a college or university course. Table 4 summarizes these training experiences.

Table 4

Teacher Training in Instructional Computing

Group	Number		Adjusted Percent		No Response	TOTAL
	Yes	No	Yes	No		
Inservice Session	383	291	56.8	43.2	227	901
AEA Presentation	229	445	34.0	66.0	227	901
DPI Presentation	14	660	2.1	97.9	227	901
Vendor Presentation	93	581	13.8	86.2	227	901
College/University Course	162	512	24.0	76.0	227	901
Conference Session	88	586	13.1	86.9	227	901
Books/Article	293	381	43.5	56.5	227	901
Other	99	575	14.7	85.3	227	901

Table 5 summarizes the amount of instructional time during a semester devoted to computer related lectures and discussions and to hands-on computing. 57% of the teachers devote no time to lectures and disucssions about computers, and 61% devote no time to hands-on-computing.

Table 5

Computer Related Instructional Time

Percent of Time (During a semester)	Computer Lectures and Discussions		Hands-On-Computing	
	Number	Adjusted Percent	Number	Adjusted Percent
None	408	56.8	541	60.9
1-10%	342	38.2	272	30.6
11-20%	27	3.0	40	4.5
21-30%	8	0.9	19	2.1
31% +	9	1.0	17	2.1
No Response	7	-	12	-
TOTAL	901	100.0	901	100.0

Most of the teachers surveyed (60.4%) said that there were no computers available in the classroom for use for instructional purposes, but 23% have one computer available, and 2.3% have 3 computers available. 66% of the teachers said that there were one to five computers available in the building for classroom purposes, but 11% said that there were no computers available. Table 6 summarizes the data concerning available computers for instructional purposes.

Table 6

Number of Computers Available for Instructional Purposes in The Classroom and in the Building

Classroom			Building		
Group	Number	Adjusted Percent	Group	Number	Adjusted Percent
None	536	60.4	None	94	10.6
1	221	24.9	1-5	599	67.5
2	53	6.0	6 +	195	22.0
3	20	2.3	No Response	13	-
4 or more	57	6.4			
No Response	14	-			
TOTAL	901	100.0	TOTAL	901	100.0

GENERAL FREQUENCIES

Introduction

Tables seven through forty summarize the administrator and teacher responses to thirty-five questionnaire items. The tables are presented in five sections. Each section consists of an introduction, the related tables, and a conclusion. The five sections include the following:

1. Teacher inservice needs
2. Computer assisted instruction modes
3. Classroom management
4. Computer literacy for teachers
5. General Concerns

Teacher Inservice Needs

The administrators and teachers were asked to respond to seven specific inservice sessions in terms of how beneficial the session would be for teachers. An eighth item allowed respondents to add additional topics. Tables 7-13 summarize the responses for each of the inservice sessions. Table 14 lists the additional suggested inservice topics.

TABLE 7

TEACHER INSERVICE NEEDS

Item 1: Computer Managed Instruction is an inservice session which would be beneficial

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								3.612
Number	64	111	90	33	9	5	312	
Adjusted Percent	2.08	36.2	29.3	10.7	2.9			
B. ALL TEACHERS								3,861
Number	289	317	185	72	28	10	901	
Adjusted Percent	32.4	35.6	20.8	8.1	3.1			
• ELEMENTARY								3.675
Number	57	94	63	22	10	2	248	
Adjusted Percent	23.2	38.2	25.6	8.9	4.1			
• SECONDARY-HUMANITIES								4.044
Number	48	36	17	10	2	2	115	
Adjusted Percent	42.5	31.9	15.0	8.8	1.8			
• SECONDARY-MATH/SCIENCE								3.758
Number	45	53	33	17	5	1	154	
Adjusted Percent	29.4	34.6	21.6	11.1	3.3			
• SECONDARY-PHYSICAL EDUCATION								1.922
Number	31	31	21	4	3	0	90	
Adjusted Percent	34.4	34.4	23.3	4.4	3.3			
• SECONDARY-VOCATIONAL								4.032
Number	44	48	28	6	0	4	130	
Adjusted Percent	34.9	38.1	22.2	4.8				
• SPECIAL EDUCATION								3.945
Number	64	55	23	13	8	1	164	
Adjusted Percent	39.3	33.7	14.1	8.0	4.9			

TABLE 8

TEACHER INSERVICE NEEDS

Item 2: Choosing Appropriate Software is an inservice session which would be beneficial

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.146
Number	114	137	47	11		3	312	
Adjusted Percent	36.9	44.3	15.2	3.6				
B. ALL TEACHERS								3.863
Number	274	353	165	63	35	11	901	
Adjusted Percent	30.8	39.7	18.5	7.1	3.9			
• ELEMENTARY								3.798
Number	68	99	52	18	10	1	248	
Adjusted Percent	27.5	40.1	21.1	7.3	4.0			
• SECONDARY-HUMANITIES								3.833
Number	40	36	22	11	5	1	115	
Adjusted Percent	35.1	31.6	19.3	9.6	4.4			
• SECONDARY-MATH/SCIENCE								3.822
Number	47	55	32	12	6	2	154	
Adjusted Percent	30.9	36.2	21.1	7.9	3.9			
• SECONDARY-PHYSICAL EDUCATION								3.750
Number	18	43	18	5	4	2	90	
Adjusted Percent	20.5	48.9	20.5	5.7	4.5			
• SECONDARY-VOCATIONAL								4.000
Number	40	56	24	6	1	3	130	
Adjusted Percent	31.5	44.1	18.9	4.7	0.8			
• SPECIAL EDUCATION								3.969
Number	61	64	17	11	9	2	164	
Adjusted Percent	37.7	39.5	10.5	6.8	5.6			

TABLE 9

TEACHER INSERVICE NEEDS

Item 3: Integrating Computer Related Activites in the Curriculum is an inservice session which would be beneficial

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.294
Number	141	125	37	5	1	3	312	
Adjusted Percent	45.6	40.5	12.0	1.6	0.3			
B. ALL TEACHERS								4.141
Number	386	312	134	41	15	13	901	
Adjusted Percent	43.5	35.1	15.1	4.6	1.7			
• ELEMENTARY								4.188
Number	111	86	33	13	2	3	248	
Adjusted Percent	45.3	35.1	13.5	5.3	.8			
• SECONDARY-HUMANITIES								4.044
Number	46	37	21	10	0	1	115	
Adjusted Percent	40.4	32.5	18.4	8.8				
• SECONDARY-MATH/SCIENCE								4.118
Number	61	60	22	6	3	2	154	
Adjusted Percent	40.1	39.5	14.5	3.9	2.0			
• SECONDARY-PHYSICAL EDUCATION								3.878
Number	32	29	20	4	5	0	90	
Adjusted Percent	35.6	32.2	22.2	4.4	5.6			
• SECONDARY-VOCATIONAL								4.236
Number	56	49	19	2	1	3	130	
Adjusted Percent	44.1	38.6	15.0	1.6	0.8			
• SPECIAL EDUCATION								4.231
Number	80	51	19	6	4	4	164	
Adjusted Percent	50.0	31.9	11.9	3.7	2.5			

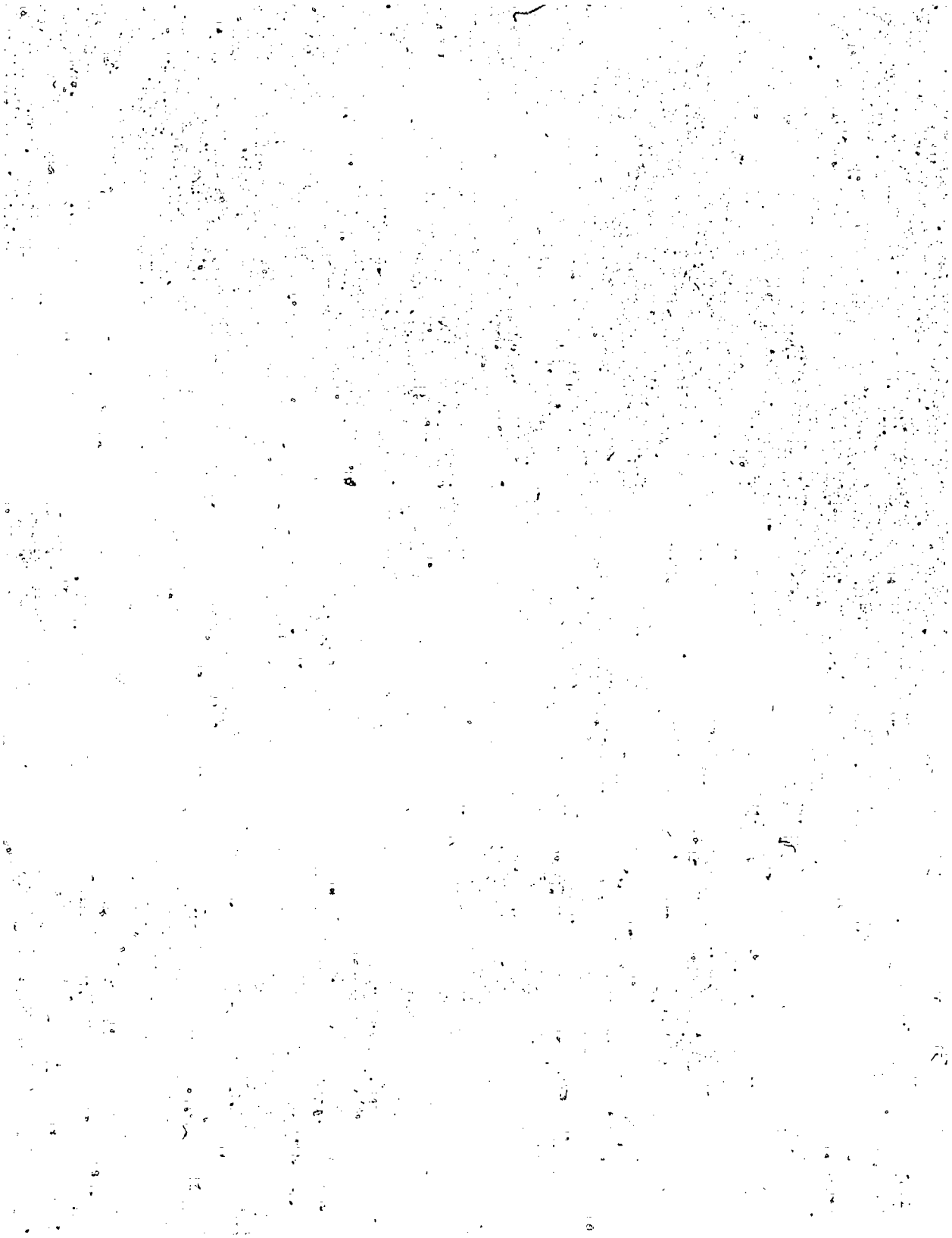

TABLE 10

TEACHER INSERVICE NEEDS

Item 4: Evaluation of Student Computing Efforts is an inservice session which would be beneficial

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								3.799
Number	70	132	82	25	0	3	312	
Adjusted Percent	22.7	42.7	26.5	8.1				
B. ALL TEACHERS								3.503
Number	162	294	302	86	43	14	901	
Adjusted Percent	18.3	33.1	34.0	9.7	4.8			
• ELEMENTARY								3.496
Number	44	80	82	29	9	4	248	
Adjusted Percent	18.0	32.8	33.6	11.9	3.7			
• SECONDARY-HUMANITIES								3.407
Number	19	34	40	14	6	2	115	
Adjusted Percent	16.8	30.1	35.4	12.4	5.3			
• SECONDARY-MATH/SCIENCE								3.704
Number	33	62	40	13	4	2	154	
Adjusted Percent	21.7	40.8	26.3	8.6	2.6			
• SECONDARY-PHYSIGAL EDUCATION								3.256
Number	15	18	41	7	9	0	90	
Adjusted Percent	16.7	20.0	45.6	7.8	10.0			
• SECONDARY-VOCATIONAL								3.722
Number	28	47	41	8	2	4	130	
Adjusted Percent	22.2	37.3	32.5	6.3	1.6			
• SPECIAL EDUCATION								3.358
Number	23	53	58	15	13	2	164	
Adjusted Percent	14.2	32.7	35.8	9.3	8.0			

TABLE 11

TEACHER INSERVICE NEEDS

Item 5: Authoring Computer Programs is an inservice session which would be beneficial

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								3.097
Number	20	79	132	67	11	3	312	
Adjusted Percent	6.5	25.6	42.7	21.7	3.6			
B. ALL TEACHERS								3.186
Number	102	258	304	151	73	13	901	
Adjusted Percent	11.5	29.1	34.2	17.0	8.2			
• ELEMENTARY								3.127
Number	20	82	74	45	23	4	248	
Adjusted Percent	8.2	33.6	30.3	18.4	9.4			
• SECONDARY-HUMANITIES								3.219
Number	12	37	37	20	8	1	115	
Adjusted Percent	10.5	32.5	32.5	17.5	7.0			
• SECONDARY-MATH/SCIENCE								3.257
Number	22	44	50	23	13	2	154	
Adjusted Percent	14.5	28.9	32.9	15.1	8.6			
• SECONDARY-PHYSICAL EDUCATION								3.191
Number	8	28	34	11	8	1	90	
Adjusted Percent	90	31.5	38.2	12.4	9.0			
• SECONDARY-VOCATIONAL								3.197
Number	14	30	58	17	8	3	130	
Adjusted Percent	11.0	23.6	45.7	13.4	6.3			
• SPECIAL EDUCATION								3.175
Number	26	37	51	35	13	2	164	
Adjusted Percent	16.0	22.8	31.5	21.6	8.0			

TABLE 12

TEACHER INSERVICE NEEDS

Item 6: Word Processing is an inservice session which would be beneficial

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								3.741
Number	53	147	86	22	1	3	312	
Adjusted Percent	17.2	47.6	27.8	7.1	0.3			
B. ALL TEACHERS								3.743
Number	228	319	242	61	30	21	901	
Adjusted Percent	25.9	36.2	27.5	6.9	3.4			
• ELEMENTARY								3.702
Number	47	103	72	13	7	6	248	
Adjusted Percent	19.4	42.6	29.8	5.4	2.9			
• SECONDARY-HUMANITIES								3.885
Number	40	39	19	11	4	2	115	
Adjusted Percent	35.4	34.5	16.8	9.7	3.5			
• SECONDARY-MATH/SCIENCE								3.557
Number	30	51	49	10	9	5	154	
Adjusted Percent	20.1	34.2	32.9	6.7	6.0			
• SECONDARY-PHYSICAL EDUCATION								3.711
Number	23	34	20	10	3	0	90	
Adjusted Percent	25.6	37.8	22.2	11.1	3.3			
• SECONDARY-VOCATIONAL								3.960
Number	46	39	33	6	2	4	130	
Adjusted Percent	36.5	31.0	26.2	4.8	1.6			
• SPECIAL EDUCATION								3.725
Number	42	53	49	11	5	4	164	
Adjusted Percent	26.2	33.1	30.6	6.9	3.1			

TABLE 13

TEACHER INSERVICE NEEDS

Item 7: Programming is an inservice session which would be beneficial

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								3.779
Number	77	124	78	17	11	5	312	
Adjusted Percent	25.1	40.4	25.4	5.5	3.6			
B. ALL TEACHERS								3.924
Number	287	343	180	51	24	16	901	
Adjusted Percent	32.4	38.8	20.3	5.8	2.7			
• ELEMENTARY								3.889
Number	70	102	54	11	7	4	248	
Adjusted Percent	28.7	41.8	22.1	4.5	2.9			
• SECONDARY-HUMANITIES								3.939
Number	35	45	26	8	0	1	115	
Adjusted Percent	30.7	39.5	22.8	7.0				
• SECONDARY-MATH/SCIENCE								3.907
Number	58	46	28	10	8	4	154	
Adjusted Percent	38.7	30.7	18.7	6.7	5.3			
• SECONDARY-PHYSICAL EDUCATION								4.056
Number	31	42	8	6	2	1	90	
Adjusted Percent	34.8	47.2	9.0	6.7	2.2			
• SECONDARY-VOCATIONAL								3.929
Number	41	48	28	8	2	3	130	
Adjusted Percent	32.3	37.8	22.0	6.3	1.6			
• SPECIAL EDUCATION								3.907
Number	52	60	36	8	5	3	164	
Adjusted Percent	32.3	37.3	22.4	5.0	3.1			

TABLE 14

TEACHER INSERVICE NEEDS

Suggested Additional Topics for Inservice Consideration

Number Responding	Suggested Additional Inservice Topics
Administrators n = 21	• A review of available software programs • An introduction to the computer • The history of computers • How to integrate software and textbooks • Authoring languages
Elementary Teachers n = 16	• Software programs appropriate for specific grade levels • How to program music • Developing and using reading instruction programs • Evaluating software • Writing simple programs • Developing networks to obtain scientific and and technical information
Secondary Teachers n = 54	• How to use computers in various subject areas • BASIC programming • Learning computer languages • Learning to use the printer • Modifying programs • Using drill and practice • How to choose a computer textbook

In general, administrators and teachers were positive about inservice sessions. Integrating Computer Related Activities into the classroom, Choosing Appropriate Software, Word Processing, and Programming would be the four most beneficial sessions for teachers as perceived by both teachers and administrators. Less than 10% of the administrators and less than 10% of the teachers concluded that inservice sessions on programming would not be beneficial. Among the suggested additional inservice topics were sessions on programs in specific subject areas and sessions on textbook selection in computer courses.

Computer Assisted Instruction Modes

In this section the administrators and teachers were asked to respond to four specific computer assisted modes of instruction in terms of how useful the modes would be and whether assistance would be needed to implement these modes into classroom instruction. Tables 15-22 summarize the responses for these items. The first four tables, 15-18, concern the perceived usefulness of the four modes of computer assisted instruction-tutorial, problem solving, simulation, and drill and practice. The remaining four tables, 19-22, concern the assistance teachers need to implement instruction in the tutorial, problem solving, simulation, and drill and practice modes.

TABLE 15

COMPUTER ASSISTED INSTRUCTION MODES

Item I: Instruction in the Tutorial Mode would be useful

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.152
Number	101	163	37	7	1	3	312	
Adjusted Percent	32.7	52.8	12.0	2.3	0.3			
B. ALL TEACHERS								4.004
Number	309	362	157	41	22	10	901	
Adjusted Percent	34.7	40.6	17.6	4.6	2.5			
• ELEMENTARY								3.934
Number	95	65	59	20	4	5	248	
Adjusted Percent	39.1	26.7	24.3	8.2	1.6			
• SECONDARY-HUMANITIES								3.885
Number	30	53	19	9	2	2	115	
Adjusted Percent	26.5	46.9	16.8	8.0	1.8			
• SECONDARY-MATH/SCIENCE								3.849
Number	35	77	31	9	1	1	154	
Adjusted Percent	22.9	50.3	20.3	5.9	0.7			
• SECONDARY-PHYSICAL EDUCATION								3.567
Number	19	30	30	5	6		90	
Adjusted Percent	21.1	33.3	33.3	5.6	6.7			
• SECONDARY-VOCATIONAL								3.898
Number	36	51	33	8		2	130	
Adjusted Percent	28.1	39.8	25.8	6.3				
• SPECIAL EDUCATION								4.216
Number	87	48	12	5	10	2	164	
Adjusted Percent	53.7	29.6	7.4	3.1	6.2			

TABLE 16

COMPUTER ASSISTED INSTRUCTION MODES

Item 2: Instruction in the Problem Solving Mode would be useful

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.304
Number	124	162	18	3	2	3	312	
Adjusted Percent	40.1	52.4	5.8	1.0	0.6			
B. ALL TEACHERS								3.687
Number	244	299	218	82	47	11	901	
Adjusted Percent	27.4	33.6	24.5	9.2	5.3			
• ELEMENTARY								4.088
Number	95	86	45	10	3	9	248	
Adjusted Percent	39.7	36.0	18.8	4.2	1.3			
• SECONDARY-HUMANITIES								3.071
Number	16	27	33	23	14	2	115	
Adjusted Percent	14.2	23.9	29.2	20.4	12.4			
• SECONDARY-MATH/SCIENCE								4.098
Number	59	60	25	8	1	1	154	
Adjusted Percent	38.6	39.2	16.3	5.2	0.7			
• SECONDARY-PHYSICAL EDUCATION								3.278
Number	14	27	30	8	11		90	
Adjusted Percent	15.6	30.0	33.3	8.9	12.2			
• SECONDARY-VOCATIONAL								3.853
Number	36	51	32	7	3	1	130	
Adjusted Percent	27.9	39.5	24.8	5.4	2.3			
• SPECIAL EDUCATION								3.556
Number	45	46	39	18	14	2	164	
Adjusted Percent	27.8	28.4	24.1	11.1	8.6			

TABLE 17

COMPUTER ASSISTED INSTRUCTION MODES

Item 3: Instruction in the Simulation Mode would be useful

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.106
Number	97	161	43	6	3	2	312	
Adjusted Percent	31.3	51.9	13.9	1.9	1.0			
B. ALL TEACHERS								3.821
Number	251	340	206	61	27	16	901	
Adjusted Percent	28.4	38.4	23.3	6.9	3.1			
• ELEMENTARY								3.890
Number	84	73	59	12	9	11	248	
Adjusted Percent	35.4	30.8	24.9	5.1	3.8			
• SECONDARY-HUMANITIES								3.545
Number	25	30	40	15	2	3	115	
Adjusted Percent	22.3	26.8	35.7	13.4	1.8			
• SECONDARY-MATH/SCIENCE								3.893
Number	43	66	26	12	3	4	154	
Adjusted Percent	28.7	44.0	17.3	8.0	2.0			
• SECONDARY-PHYSICAL EDUCATION								3.744
Number	19	44	18	3	6		90	
Adjusted Percent	21.1	48.9	20.0	3.3	6.7			
• SECONDARY-VOCATIONAL								4.078
Number	43	58	22	4	1	2	130	
Adjusted Percent	33.6	45.3	17.2	3.1	0.8			
• SPECIAL EDUCATION								3.883
Number	56	55	36	6	9	2	164	
Adjusted Percent	34.6	34.0	22.2	3.7	5.6			

TABLE 18

COMPUTER ASSISTED INSTRUCTION MODES

Item 4: Instruction in the Drill and Practice Mode would be useful

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.210
Number	120	141	43	6	0	2	312	
Adjusted Percent	38.7	45.5	13.9	1.9				
B. ALL TEACHERS								4.117
Number	364	341	125	19	19	13	901	
Adjusted Percent	41.0	38.4	14.1	4.4	2.1			
• ELEMENTARY								3.708
Number	89	56	54	26	18	5	248	
Adjusted Percent	36.6	23.0	22.2	10.7	7.4			
• SECONDARY-HUMANITIES								3.991
Number	38	47	15	12	0	3	115	
Adjusted Percent	33.9	42.0	13.4	10.7				
• SECONDARY-MATH/SCIENCE								3.921
Number	39	70	35	8	0	2		
Adjusted Percent	25.7	46.1	23.0	5.3				
• SECONDARY-PHYSICAL EDUCATION								3.674
Number	18	39	23	3	6	1	90	
Adjusted Percent	20.2	43.8	25.8	25.8	3.4	6.7		
• SECONDARY-VOCATIONAL								3.961
Number	35	60	24	8	0	3	103	
Adjusted Percent	27.6	47.2	18.9	6.3				
• SPECIAL EDUCATION								4.309
Number	101	38	7	4	12	2	164	
Adjusted Percent	62.3	23.5	4.3	2.5	7.4			

TABLE 19

COMPUTER ASSISTED INSTRUCTION MODES

Item 1: Assistance is needed to implement the Tutorial Mode of instruction

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								3.974
Number	103	115	69	18	2	5	312	
Adjusted Percent	33.6	37.5	22.5	5.9	0.7			
B. ALL TEACHERS								3.813
Number	324	217	211	75	36	18	901	
Adjusted Percent	36.7	24.6	26.2	8.5	4.1			
• ELEMENTARY								3.934
Number	95	65	59	20	4	5	248	
Adjusted Percent	39.1	26.7	24.3	8.2	1.6			
• SECONDARY-HUMANITIES								4.124
Number	56	26	22	7	2	2	115	
Adjusted Percent	49.6	23.0	19.5	6.2	1.8			
• SECONDARY-MATH/SCIENCE								3.458
Number	35	38	52	18	10	1	154	
Adjusted Percent	22.9	24.8	34.0	11.8	6.5			
• SECONDARY-PHYSICAL EDUCATION								3.921
Number	37	22	21	4	5	1	90	
Adjusted Percent	41.6	24.7	23.6	4.5	5.6			
• SECONDARY-VOCATIONAL								3.824
Number	44	29	40	10	2	5	130	
Adjusted Percent	35.2	23.2	32.0	8.0	1.6			
• SPECIAL EDUCATION								3.681
Number	57	37	37	16	13	4	164	
Adjusted Percent	35.6	23.1	23.1	10.0	8.1			

TABLE 20

COMPUTER ASSISTED INSTRUCTION NEEDS

Item 2: Assistance is needed to implement the Problem Solving Mode of instruction

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.219
Number	122	136	42	5	1	6	312	
Adjusted Percent	39.9	44.4	13.7	1.6	0.3			
B. ALL TEACHERS								3.889
Number	323	273	182	56	42	25	901	
Adjusted Percent	36.9	31.2	20.8	6.4	4.8			
• ELEMENTARY								4.088
Number	95	86	45	10	3	9	248	
Adjusted Percent	39.7	36.0	18.8	4.2	1.3			
• SECONDARY-HUMANITIES								3.714
Number	45	26	19	8	14	3	115	
Adjusted Percent	40.2	23.2	17.0	7.1	12.5			
• SECONDARY-MATH/SCIENCE								3.684
Number	39	50	44	14	5	2	154	
Adjusted Percent	25.7	32.9	28.9	9.2	3.3			
• SECONDARY-PHYSICAL EDUCATION								3.809
Number	36	25	12	7	9	1	90	
Adjusted Percent	40.4	28.1	13.5	7.9	10.1			
• SECONDARY-VOCATIONAL								3.952
Number	47	39	27	7	4	6	130	
Adjusted Percent	37.9	31.5	21.8	5.6	3.2			
• SPECIAL EDUCATION								3.906
Number	61	47	35	10	7	4	164	
Adjusted Percent	38.1	29.4	21.9	6.3	4.4			

TABLE 21

COMPUTER ASSISTED INSTRUCTION MODES

Item 3: Assistance in needed to implement the Simulation mode of instruction

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.039
Number	108	120	63	12	3	6	312	
Adjusted Percent	35.3	39.2	20.6	3.9	1.0			
B. ALL TEACHERS								3.854
Number	313	256	209	59	38	26	901	
Adjusted Percent	35.8	29.3	23.9	6.7	4.3			
• ELEMENTARY								3.890
Number	84	73	59	12	9	11	248	
Adjusted Percent	35.4	30.8	24.9	5.1	3.8			
• SECONDARY-HUMANITIES								3.864
Number	44	28	21	13	4	5	115	
Adjusted Percent	40.0	25.5	19.1	11.8	3.6			
• SECONDARY-MATH/SCIENCE								3.575
Number	42	37	50	15	9	1	154	
Adjusted Percent	27.5	24.2	32.7	9.8	5.9			
• SECONDARY-PHYSICAL EDUCATION								4.022
Number	27	31	12	4	5	1	90	
Adjusted Percent	41.6	34.8	13.5	4.5	5.6			
• SECONDARY-VOCATIONAL								4.008
Number	49	38	32	5	2	4	130	
Adjusted Percent	38.9	30.2	25.4	4.0	1.6			
• SPECIAL EDUCATION								3.844
Number	57	49	35	10	9	4	164	
Adjusted Percent	35.6	30.6	21.9	6.3	5.6			

TABLE 22

COMPUTER-ASSISTED INSTRUCTION MODES

Item 4: Assistance is needed to implement the Drill and Practice Mode of instruction

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								3.765
Number	82	105	85	33	1	6	312	
Adjusted Percent	26.5	34.3	27.8	10.8	0.3			
B. ALL TEACHERS								3.647
Number	295	209	208	106	62	21	901	
Adjusted Percent	33.5	23.7	23.6	12.0	7.0			
• ELEMENTARY								3.708
Number	89	56	54	26	18	5	248	
Adjusted Percent	36.6	23.0	22.2	10.7	7.4			
• SECONDARY-HUMANITIES								3.982
Number	52	25	17	14	3	4	115	
Adjusted Percent	46.8	22.5	15.3	12.6	2.7			
• SECONDARY-MATH/SCIENCE								3.190
Number	26	33	53	26	15	1	154	
Adjusted Percent	17.0	21.6	34.6	17.0	9.8			
• SECONDARY-PHYSICAL EDUCATION								3.876
Number	36	23	19	5	6	1	90	
Adjusted Percent	40.4	25.8	21.3	5.6	6.7			
• SECONDARY-VOCATIONAL								3.800
Number	41	35	34	13	2	5	130	
Adjusted Percent	32.8	28.0	27.2	10.4	1.6			
• SPECIAL EDUCATION								3.509
Number	51	37	31	22	18	5	164	
Adjusted Percent	32.1	23.3	19.5	13.8	11.3			

In general, the administrators and teachers felt that computer assisted modes of instruction would be useful. Drill and practice and problem solving were the two modes of instruction perceived to be the most useful by both administrators and teachers. Less than 10% of the administrators and less than 10% of the teachers concluded that computer assisted modes of instruction would not be useful.

More than 70% of the administrators and more than 60% of the teachers felt that assistance was needed in implementing the various modes of instruction into classroom instruction. Among the various modes of instruction, problem-solving and simulation were perceived as needing the most assistance with implementation. Less than 10% of the administrators and less than 10% of the teachers contended that assistance would not be needed in implementing the various modes of instruction in the classroom.

Classroom Management

The administrators and teachers were asked to consider the usefulness of five types of computer assistance for classroom management. The five types of assistance included: sequencing instruction, assessing student achievement, generating tests, maintaining instructional objectives, and providing career counseling. The responses for these five items are summarized in Tables 23 - 27.

TABLE 23

CLASSROOM MANAGEMENT

Item 1: Assistance in sequencing instruction would be useful

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.045
Number	96	149	57	2	7	1	312	
Adjusted Percent	30.9	47.9	18.3	0.6	2.3			
B. ALL TEACHERS								3.870
Number	255	359	203	54	20	10	901	
Adjusted Percent	28.6	40.3	22.8	6.1	2.2			
• ELEMENTARY								4.016
Number	69	124	40	8	3	4	248	
Adjusted Percent	28.3	50.8	16.4	3.3	1.2			
• SECONDARY-HUMANITIES								3.796
Number	30	43	27	13		2	115	
Adjusted Percent	26.5	38.1	23.9	11.5				
• SECONDARY-MATH/SCIENCE								3.549
Number	26	55	55	11	6	1	154	
Adjusted Percent	17.0	35.9	35.9	7.2	3.9			
• SECONDARY-PHYSICAL EDUCATION								3.500
Number	18	30	27	9	6	0	90	
Adjusted Percent	20.0	33.3	30.0	10.0	6.7			
• SECONDARY-VOCATIONAL								3.760
Number	23	59	40	7		1	130	
Adjusted Percent	17.8	45.7	31.0	5.4				
• SPECIAL EDUCATION								4.296
Number	89	48	14	6	5	2	164	
Adjusted Percent	54.9	29.6	8.6	3.7	3.1			

TABLE 24

CLASSROOM MANAGEMENT

Item 2: Assistance in Assessing Student Achievement would be useful

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								3.817
Number	49	170	79	12	1	1	312	
Adjusted Percent	15.8	54.7	25.4	3.9	0.3			
B. ALL TEACHERS								3.904
Number	234	412	183	47	14	11	901	
Adjusted Percent	26.3	46.3	20.6	5.3	1.6			
• ELEMENTARY								3.967
Number	63	126	61	9	4	5	248	
Adjusted Percent	25.9	51.9	16.9	3.7	1.6			
• SECONDARY-HUMANITIES								3.876
Number	30	55	13	14	1	2	115	
Adjusted Percent	26.5	48.7	11.5	12.4	0.9			
• SECONDARY-MATH/SCIENCE								3.791
Number	32	70	39	11	1	1	154	
Adjusted Percent	20.9	45.8	25.5	7.2	0.7			
• SECONDARY-PHYSICAL EDUCATION								3.800
Number	20	40	25	2	3		90	
Adjusted Percent	22.2	44.4	27.8	2.2	3.3			
• SECONDARY-VOCATIONAL								3.860
Number	26	64	34	5		1	130	
Adjusted Percent	20.2	49.6	26.4	3.9				
• SPECIAL EDUCATION								4.031
Number	63	57	31	6	5	2	164	
Adjusted Percent	38.9	35.2	19.1	3.7	3.1			

TABLE 25

CLASSROOM MANAGEMENT

Item 3: Assistance in Generating Tests would be useful

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								3.641
Number	53	129	98	29	3		312	
Adjusted Percent	17.0	41.3	31.4	9.3	1.0			
B. ALL TEACHERS								3.703
Number	245	297	227	78	42	12	901	
Adjusted Percent	27.6	33.4	25.5	8.8	4.7			
• ELEMENTARY								3.558
Number	54	77	76	20	15	6	248	
Adjusted Percent	22.3	31.8	31.4	8.3	6.2			
• SECONDARY-HUMANITIES								3.850
Number	39	37	21	13	3	2	115	
Adjusted Percent	34.5	32.7	18.6	11.5	2.7			
• SECONDARY-MATH/SCIENCE								3.928
Number	54	47	40	11	1	1	154	
Adjusted Percent	35.3	30.7	26.1	7.2	0.7			
• SECONDARY-PHYSICAL EDUCATION								3.967
Number	28	42	13	3	4		90	
Adjusted Percent	31.1	46.7	14.4	3.3	4.4			
• SECONDARY-VOCATIONAL								3.868
Number	36	51	33	7	2	1	130	
Adjusted Percent	27.9	39.5	25.6	5.4	1.6			
• SPECIAL EDUCATION								3.327
Number	34	43	44	24	17	2	164	
Adjusted Percent	21.0	26.5	27.2	14.8	10.5			

TABLE 26

CLASSROOM MANAGEMENT

Item 4: Assistance in Maintaining Instructional Objectives would be useful

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								3.833
Number	62	156	74	20			312	
Adjusted Percent	19.9	50.0	23.7	6.4				
B. ALL TEACHERS								3.704
Number	210	333	247	71	28	12	901	
Adjusted Percent	23.6	37.5	27.8	8.0	3.1			
• ELEMENTARY								3.587
Number	42	98	72	20	10	6	248	
Adjusted Percent	17.4	40.5	29.8	8.3	4.1			
• SECONDARY-HUMANITIES								3.602
Number	23	42	30	16	2	2	115	
Adjusted Percent	20.4	37.2	26.5	14.2	1.8			
• SECONDARY-MATH/SCIENCE								3.497
Number	29	48	53	16	7	1	154	
Adjusted Percent	19.0	31.4	34.6	10.5	4.6			
• SECONDARY-PHYSICAL EDUCATION								3.678
Number	20	34	27	5	4		90	
Adjusted Percent	22.2	37.8	30.0	5.6	4.4			
• SECONDARY-VOCATIONAL								3.760
Number	25	57	39	7	1	1	130	
Adjusted Percent	19.4	44.2	30.2	5.4	0.8			
• SPECIAL EDUCATION								4.117
Number	71	54	26	7	4	2	164	
Adjusted Percent	43.8	33.3	16.0	4.3	2.5			

TABLE 27

CLASSROOM MANAGEMENT

Item 5: Assistance in Student Career Counseling would be useful

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								3.826
Number	52	166	78	14		2	312	
Adjusted Percent	168	53.5	25.2	4.5				
B. ALL TEACHERS								3.321
Number	128	278	307	106	71	11	901	
Adjusted Percent	14.4	31.2	34.5	11.9	8.0			
• ELEMENTARY								3.058
Number	27	55	92	43	26	5	248	
Adjusted Percent	11.1	22.6	37.9	17.7	10.7			
• SECONDARY-HUMANITIES								3.292
Number	16	34	40	13	10	2	115	
Adjusted Percent	14.2	30.1	35.4	11.5	8.8			
• SECONDARY-MATH/SCIENCE								3.497
Number	20	59	56	13	5	1	154	
Adjusted Percent	13.1	38.6	36.6	8.5	3.3			
• SECONDARY-PHYSICAL EDUCATION								3.456
Number	15	31	33	2	9		90	
Adjusted Percent	16.7	34.4	36.7	2.2	10.0			
• SECONDARY-VOCATIONAL								3.783
Number	28	53	41	6	1	1	130	
Adjusted Percent	21.7	41.1	31.8	4.7	0.8			
• SPECIAL EDUCATION								3.130
Number	22	46	45	29	20	2	164	
Adjusted Percent	13.6	28.4	27.8	17.9	12.3			

On the whole, the administrators and teachers responded that using computers for classroom management by teachers would be beneficial. Specifically, the teachers and administrators felt that computer assistance in sequencing instruction, assessing student achievement and in maintaining instructional objectives would be particularly useful. 70% of the administrators and 46% of the teachers felt that computer assistance in student career counseling would be useful. 58% of the administrators and 61% of the teachers felt that computer assistance in generating tests would be useful. Less than 10% of the teachers and less then 10% of the administrators concluded that computer assistance in classroom management would not be useful.

Computer Literacy for Teachers

The administrators and teachers were asked if they believed that teachers should possess certain characteristics of computer literacy.

The eight characteristics in this section were the following:

1. Teachers should be able to describe the use of computers.
2. Teachers should be able to recognize computer hardware components.
3. Teachers should be able to identify the major functions of a computer system.
4. Teachers should be able to recognize the application of computers in society.
5. Teachers should be able to recognize the role that information codes play in computing.
6. Teachers should be able to correct logic errors in an improperly functioning algorithm.
7. Teachers should be able to interpret and use a software package.
8. Teachers should be able to value the potential role of computers in society.

Tables 28 - 35 summarize the responses for each of the eight items.

TABLE 28

COMPUTER LITERACY FOR TEACHERS

Item 1: Teachers should be able to describe the uses of computers

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.510
Number	179	115	17	0	1		312	
Adjusted Percent	57.4	36.9	5.4	0.3				
B. ALL TEACHERS								4.479
Number	480	358	46	3	1	13	901	
Adjusted Percent	54.1	40.3	5.2	0.3	0.1			
• ELEMENTARY								4.434
Number	126	100	17	0	1	4	248	
Adjusted Percent	51.6	41.0	7.0		0.4			
• SECONDARY-HUMANITIES								4.465
Number	62	43	9			1	115	
Adjusted Percent	54.4	37.7	7.9					
• SECONDARY-MATH/SCIENCE								4.573
Number	95	47	7	1	0	4	154	
Adjusted Percent	63.3	31.3	4.7	0.7				
• SECONDARY-PHYSICAL EDUCATION								4.438
Number	44	40	5			1	90	
Adjusted Percent	49.4	44.9	5.6					
• SECONDARY-VOCATIONAL								4.434
Number	63	60	5	1		1	130	
Adjusted Percent	48.8	46.5	3.9	0.8				
• SPECIAL EDUCATION								4.525
Number	90	68	3	1		2	164	
Adjusted Percent	55.6	42.0	1.9	0.6				

TABLE 29

COMPUTER LITERACY FOR TEACHERS

Item 2: Teachers should be able to recognize computer hardware components

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.381
Number	159	120	27	5	1		312	
Adjusted Percent	51.0	38.5	8.7	1.6	0.3			
B. ALL TEACHERS								4.346
Number	414	383	75	13	2	14	901	
Adjusted Percent	46.7	43.2	8.5	1.5	0.2			
• ELEMENTARY								4.347
Number	112	107	19	3	1	6	248	
Adjusted Percent	46.3	44.2	7.9	1.2	0.4			
• SECONDARY-HUMANITIES								4.228
Number	49	48	12	4	1	1	115	
Adjusted Percent	43.0	42.1	10.5	3.5	0.9			
• SECONDARY-MATH/SCIENCE								4.457
Number	83	55	12	1		3	154	
Adjusted Percent	55.0	36.5	7.9	0.7				
• SECONDARY-PHYSICAL EDUCATION								4.267
Number	35	45	9	1			90	
Adjusted Percent	38.9	50.0	10.0	1.1				
• SECONDARY-VOCATIONAL								4.328
Number	55	62	9	2	0	2	130	
Adjusted Percent	43.0	48.4	7.0	1.6				
• SPECIAL EDUCATION								4.383
Number	80	66	14	2	0	2	164	
Adjusted Percent	49.4	40.7	8.6	1.2				

TABLE 30

COMPUTER LITERACY FOR TEACHERS

Item 3: Teachers should be able to indentify the major functions of a computer system

ROUP/NUMBER OF RESPONSES ND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
SUPERINTENDENTS								
Number	140	138	28	4	1	1	312	4.325
Adjusted Percent	45.0	44.4	9.0	1.3	0.3			
ALL TEACHERS								
Number	381	381	99	25	4	11	901	4.247
Adjusted Percent	42.8	42.8	11.1	2.8	0.4			
ELEMENTARY								
Number	111	98	27	7	1	4	248	4.275
Adjusted Percent	45.5	40.2	11.1	2.9	0.4			
SECONDARY-HUMANITIES								
Number	45	43	22	3	1	1	115	4.123
Adjusted Percent	39.5	37.7	19.3	2.6	0.9			
SECONDARY-MATH/SCIENCE								
Number	67	57	17	8	1	4	154	4.207
Adjusted Percent	44.7	38.0	11.3	5.3	0.7			
SECONDARY-PHYSICAL EDUCATION								
Number	37	45	8				90	4.322
Adjusted Percent	41.1	50.0	8.9					
SECONDARY-VOCATIONAL								
Number	49	62	14	4		1	130	4.209
Adjusted Percent	38.0	48.1	10.9	3.1				
SPECIAL EDUCATION								
Number	72	76	11	3	1	1	164	4.319
Adjusted Percent	44.2	46.6	6.7	1.8	0.6			

TABLE 31

COMPUTER LITERACY FOR TEACHERS

Item 4: Teachers should be able to recognize the applications of computers in society

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.498
Number	177	116	14	4		1	312	
Adjusted Percent	56.9	37.3	4.5	1.3				
B. ALL TEACHERS								4.350
Number	429	358	90	8	4	12	901	
Adjusted Percent	48.3	40.3	10.1	0.9	0.4			
• ELEMENTARY								4.318
Number	112	103	22	2	3	6	248	
Adjusted Percent	46.3	42.6	9.1	0.8	1.2			
• SECONDARY-HUMANITIES								4.307
Number	56	39	18		1	1	115	
Adjusted Percent	49.1	34.2	15.8	0.9				
• SECONDARY-MATH/SCIENCE								4.457
Number	86	50	13	2		3	154	
Adjusted Percent	57.0	33.1	8.6	1.3				
• SECONDARY-PHYSICAL EDUCATION								4.244
Number	35	43	11	1			90	
Adjusted Percent	38.9	47.8	12.2	1.1				
• SECONDARY-VOCATIONAL								4.310
Number	55	60	13	1		1	130	
Adjusted Percent	42.6	46.5	10.1	0.8				
• SPECIAL EDUCATION								4.417
Number	85	63	13	2		1	164	
Adjusted Percent	52.1	38.7	8.0	1.2				

TABLE 32

COMPUTER LITERACY FOR TEACHERS

Item 5: Teachers should be able to recognize the role that information codes play in computing

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.035
Number	87	159	55	9	1	1	312	
Adjusted Percent	28.0	51.1	17.7	2.9	0.3			
B. ALL TEACHERS								4.012
Number	262	400	191	27	2	19	901	
Adjusted Percent	29.7	45.4	21.7	3.1	0.2			
• ELEMENTARY								3.963
Number	66	111	56	8	1	6	248	
Adjusted Percent	27.3	45.9	23.1	3.3	0.4			
• SECONDARY-HUMANITIES								3.965
Number	32	49	30	3		1	115	
Adjusted Percent	28.1	43.0	26.3	2.6				
• SECONDARY-MATH/SCIENCE								3.893
Number	42	60	37	9	1	5	154	
Adjusted Percent	28.2	40.3	24.8	6.0	0.7			
• SECONDARY-PHYSICAL EDUCATION								4.102
Number	31	36	20	1		2	90	
Adjusted Percent	35.2	40.9	22.7	1.1				
• SECONDARY-VOCATIONAL								4.000
Number	32	67	24	4		3	130	
Adjusted Percent	25.2	52.8	18.9	3.1				
• SPECIAL EDUCATION								4.191
Number	59	77	24	2		2	164	
Adjusted Percent	36.4	47.5	14.8	1.2				

TABLE 33

COMPUTER LITERACY FOR TEACHERS

Item 6: Teachers should be able to correct logic errors in an improperly functioning algorithm.

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								3.453
Number	41	106	119	38	5	3	312	
Adjusted Percent	13.3	34.3	38.5	12.3	1.6			
B. ALL TEACHERS								3.568
Number	166	308	284	91	26	26	901	
Adjusted Percent	19.0	35.2	32.5	10.4	3.0			
• ELEMENTARY								3.581
Number	44	91	72	16	13	12	248	
Adjusted Percent	18.6	38.6	30.5	6.8	5.5			
• SECONDARY-HUMANITIES								3.553
Number	26	35	34	18	2	1	115	
Adjusted Percent	21.9	30.7	29.8	15.8	1.8			
• SECONDARY-MATH/SCIENCE								3.563
Number	26	56	49	17	3	3	154	
Adjusted Percent	17.2	37.1	32.5	11.3	2.0			
• SECONDARY-PHYSICAL EDUCATION								3.629
Number	16	33	32	7	1	1	90	
Adjusted Percent	18.0	37.1	36.0	7.9	1.1			
• SECONDARY-VOCATIONAL								3.456
Number	19	38	52	13	3	5	130	
Adjusted Percent	15.2	30.4	41.6	10.4	2.4			
• SPECIAL EDUCATION								3.619
Number	36	55	45	20	4	4	164	
Adjusted Percent	22.5	34.4	28.1	12.5	2.5			

TABLE 34

COMPUTER LITERACY FOR TEACHERS

Item 7: Teachers should be able to interpret and use a software package

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.479
Number	163	136	10	2		1	312	
Adjusted Percent	52.6	43.7	3.2	0.6				
B. ALL TEACHERS								4.298
Number	402	372	94	17	3	13	901	
Adjusted Percent	45.3	41.9	10.6	1.9	0.3			
• ELEMENTARY								4.313
Number	112	102	23	5	1	5	248	
Adjusted Percent	46.1	42.0	9.5	2.1	0.4			
• SECONDARY-HUMANITIES								4.211
Number	51	41	17	5		1	115	
Adjusted Percent	44.7	36.0	14.9	4.4				
• SECONDARY-MATH/SCIENCE								4.351
Number	71	64	14	2		3	154	
Adjusted Percent	47.0	42.4	9.3	1.3				
• SECONDARY-PHYSICAL EDUCATION								4.169
Number	34	38	15	2		1	90	
Adjusted Percent	38.2	42.7	16.9	2.2				
• SECONDARY-VOCATIONAL								4.271
Number	49	68	10	2		1	130	
Adjusted Percent	38.0	52.7	7.8	1.6				
• SPECIAL EDUCATION								4.383
Number	85	59	15	1	2	2	164	
Adjusted Percent	52.5	36.4	9.3	0.6	1.2			

TABLE 35

COMPUTER LITERACY FOR TEACHERS

Item 8: Teachers should be able to value the potential role of computers in society.

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	STRONGLY AGREE (5)	AGREE (4)	UNDECIDED (3)	DISAGREE (2)	STRONGLY DISAGREE (1)	NO ANSWER	TOTAL (n)	MEAN
A. SUPERINTENDENTS								4.348
Number	142	141	20	7		2	312	
Adjusted Percent	45.8	45.5	6.5	2.3				
B. ALL TEACHERS								4.235
Number	364	392	108	18	4	15	901	
Adjusted Percent	41.1	44.2	12.2	2.0	0.5			
• ELEMENTARY								4.227
Number	99	105	33	4	1	6	248	
Adjusted Percent	40.9	43.4	13.6	1.7	0.4			
• SECONDARY-HUMANITIES								4.186
Number	50	42	15	4	2	2	115	
Adjusted Percent	44.2	37.2	13.3	3.5	1.8			
• SECONDARY-MATH/SCIENCE								4.265
Number	66	63	19	2	1	3	154	
Adjusted Percent	43.7	41.7	12.6	1.3	0.7			
• SECONDARY-PHYSICAL EDUCATION								4.216
Number	36	37	13	2	0	2	90	
Adjusted Percent	40.9	42.0	14.8	2.3				
• SECONDARY-VOCATIONAL								4.186
Number	43	70	13	3		1	130	
Adjusted Percent	33.3	54.3	10.1	2.3				
• SPECIAL EDUCATION								4.301
Number	70	75	15	3		1	164	
Adjusted Percent	42.9	46.0	9.2	1.8				

The administrators and teachers responded very positively to six of the eight characteristics of computer literacy. Over 90% of the administrators and 85% of the teachers responded that teachers should have a knowledge of the following computer literacy characteristics: computer uses, hardware components, software uses, major functions of computers, and role of computers in society. 79% of the administrators and 75% of the teachers agreed that teachers should be able to recognize the role that information codes play in computing (Item 5). Only 48% of the administrators and 54% of the teachers believed that the teachers should be able to correct an improperly functioning program. 14% of the administrators and 13% of the teachers disagreed that teachers should possess this programming skill.

General Concerns

The administrators and teachers were asked to respond to several questions of general concern regarding computers. These questions asked:

1) How should the curriculum be organized to insure computer literacy?

2) Who should teach introductory computer skills?

3) How aware are teachers and administrators of student computing expertise?

4) At what grade level should students begin using computers?

5) At what grade level should students begin to learn computer programming?

Tables 36 - 40 summarize the responses to these questions.

TABLE 36

GENERAL CONCERNS

Item 1: Organizing the curriculum to insure computer literacy

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	REQUIRED COURSES	ELECTIVE COURSES	CONCEPT INTEGRATION	OTHER	REQUIRED AND ELECTIVE COURSES	REQUIRED COURSE AND CONCEPT INTEGRATION	ELECTIVE COURSES AND CONCEPT INTEGRATION	NO ANSWER	TOTAL
A. SUPERINTENDENTS									
Number	99	98	71	12	6	7	13	6	312
Adjusted Percent	32.4	32.0	23.2	3.2	2.0	2.2	4.2		
B. ALL TEACHERS									
Number	277	376	175	23	7	5	18	20	901
Adjusted Percent	31.4	42.7	19.9	2.6	0.8	0.6	2.0		
• ELEMENTARY									
Number	84	101	43	8		2	2	8	248
Adjusted Percent	35.0	42.1	17.9	3.4		0.8	0.8		
• SECONDARY-HUMANITIES									
Number	35	42	27	2	3	1	3	2	115
Adjusted Percent	31.0	37.2	23.9	1.6	2.7	0.9	2.7		
• SECONDARY-MATH/SCIENCE									
Number	51	57	30	6	2		5	3	154
Adjusted Percent	33.8	37.7	19.9	4.0	1.3		3.3		
• SECONDARY-PHYSICAL EDUCATION									
Number	26	51	6	3			2	2	90
Adjusted Percent	29.5	58.0	6.8	3.4			2.3		
• SECONDARY-VOCATIONAL									
Number	40	56	29	2	1		2		130
Adjusted Percent	30.8	43.1	22.3	1.5	0.8		1.5		
• SPECIAL EDUCATION									
Number	41	69	40	2	1	2	4	5	164
Adjusted Percent	25.8	43.4	25.2	1.2	0.6	1.3	2.5		

TABLE 37

GENERAL CONCERNS

Item 2. Who should teach introductory and advanced computer skills?

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	INTRODUCTORY SKILLS				ADVANCED SKILLS			
	ALL TEACHERS SHOULD TEACH	SELECTED TEACHERS SHOULD TEACH	NO RESPONSE	TOTAL	ALL TEACHERS SHOULD TEACH	SELECTED TEACHERS SHOULD TEACH	NO RESPONSE	TOTAL
A. SUPERINTENDENTS								
Number	183	128	1	312	15	296	1	312
Adjusted Percent	58.8	41.2			4.8	95.2		
B. ALL TEACHERS								
Number	426	458	17	901	55	832	14	901
Adjusted Percent	48.2	51.8			6.2	93.8		
• ELEMENTARY								
Number	145	96	7	248	11	229	8	248
Adjusted Percent	60.2	39.8			4.6	95.4		
• SECONDARY-HUMANITIES								
Number	30	82	3	115	7	107	1	115
Adjusted Percent	26.8	73.2			6.1	93.9		
• SECONDARY-MATH/SCIENCE								
Number	66	85	3	154	9	143	2	154
Adjusted Percent	43.7	56.3			5.9	94.1		
• SECONDARY-PHYSICAL EDUCATION								
Number	34	56		90	5	84	1	90
Adjusted Percent	37.8	62.2			5.6	94.4		
• SECONDARY-VOCATIONAL								
Number	61	69		130	14	116		130
Adjusted Percent	46.9	53.1			10.8	89.2		
• SPECIAL EDUCATION								
Number	90	70	4	164	9	153	2	164
Adjusted Percent	56.3	43.8			5.6	94.4		

TABLE 38

GENERAL CONCERNS

Item 3: Administrator/Teacher knowledge of student expertise

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	VERY AWARE (5)	SOMEWHAT AWARE (4)	UNDECIDED (3)	SOMEWHAT UNAWARE (2)	VERY UNAWARE (1)	NO RESPONSE	TOTAL	MEAN
A. SUPERINTENDENTS								4.232
Number	107	185	7	5	6	2	312	
Adjusted Percent	34.5	59.7	2.3	1.6	1.9			
B. ALL TEACHERS								3.430
Number	151	433	77	84	136	20	901	
Adjusted Percent	17.1	49.1	8.7	9.5	15.4			
• ELEMENTARY								3.342
Number	38	110	27	39	8	8	248	
Adjusted Percent	15.8	45.8	11.2	10.8	16.2			
• SECONDARY-HUMANITIES								3.132
Number	7	61	11	10	25	1	115	
Adjusted Percent	6.1	53.5	9.6	8.8	21.9			
• SECONDARY-MATH/SCIENCE								3.775
Number	35	87	4	10	15	3	154	
Adjusted Percent	23.2	57.6	2.6	6.6	9.9			
• SECONDARY-PHYSICAL EDUCATION								3.000
Number	6	42	8	12	21	1	90	
Adjusted Percent	6.7	47.2	9.0	13.5	23.6			
• SECONDARY-VOCATIONAL								3.372
Number	15	68	15	12	19	1	130	
Adjusted Percent	11.6	52.7	11.6	9.3	14.7			
• SPECIAL EDUCATION								3.741
Number	50	65	12	14	17	6	164	
Adjusted Percent	31.6	41.1	7.6	8.9	10.8			

TABLE 39

GENERAL CONCERNS

Item 4: At what grade level should students begin using computers?

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	PRIMARY K - 3	INTERMEDIATE 4 - 6	JUNIOR HIGH SCHOOL 7 - 9	SENIOR HIGH SCHOOL 10 - 12	NO RESPONSE	TOTAL
A. SUPERINTENDENTS						
Number	171	121	14	3	3	312
Adjusted Percent	55.3	39.2	4.5	1.0		
B. ALL TEACHERS						
Number	463	307	93	18	20	901
Adjusted Percent	52.5	34.8	10.5	2.0		
• ELEMENTARY						
Number	168	66	7	1	6	248
Adjusted Percent	69.4	27.3	2.9	0.4		
• SECONDARY-HUMANITIES						
Number	47	47	11	6	4	115
Adjusted Percent	42.3	42.3	9.9	5.4		
• SECONDARY-MATH/SCIENCE						
Number	69	57	21	4	3	154
Adjusted Percent	45.7	37.7	13.9	2.6		
• SECONDARY-PHYSICAL EDUCATION						
Number	27	41	20	2		90
Adjusted Percent	30.0	45.6	22.2	2.2		
• SECONDARY-VOCATIONAL						
Number	36	65	24	4	1	130
Adjusted Percent	27.9	50.4	18.6	3.1		
• SPECIAL EDUCATION						
Number	116	31	10	1	6	164
Adjusted Percent	73.0	19.5	6.3	0.6		

TABLE 40

GENERAL CONCERNS

Item 5: At what grade level should students begin to learn computer programming?

GROUP/NUMBER OF RESPONSES AND PERCENTAGES	PRIMARY K - 3	INTERMEDIATE 4 - 6	JUNIOR HIGH SCHOOL 7 - 9	SENIOR HIGH SCHOOL 10 - 12	NO RESPONSE	TOTAL
A. SUPERINTENDENTS						
Number	14	75	137	84	2	312
Adjusted Percent	4.5	24.2	44.2	27.1		
B. ALL TEACHERS						
Number	70	311	363	139	18	901
Adjusted Percent	7.8	34.5	40.3	15.4		
• ELEMENTARY						
Number	26	124	75	15	8	248
Adjusted Percent	10.8	51.7	31.3	6.3		
• SECONDARY-HUMANITIES						
Number	8	34	49	22	2	115
Adjusted Percent	7.1	30.1	43.4	19.5		
• SECONDARY-MATH/SCIENCE						
Number	8	39	79	26	2	154
Adjusted Percent	5.3	25.7	52.0	17.1		
• SECONDARY-PHYSICAL EDUCATION						
Number	6	24	43	15	2	90
Adjusted Percent	6.8	27.3	48.9	17.0		
• SECONDARY-VOCATIONAL						
Number	2	22	63	42	1	130
Adjusted Percent	1.6	17.1	48.8	32.6		
• SPECIAL EDUCATION						
Number	20	68	54	19	3	164
Adjusted Percent	12.4	42.2	33.5	11.8		

The first question (Table 36) concerned curriculum organization. 43% of the administrators and 42% of the teachers responded that elective courses should be developed for interested students. 32% of the administrators and 31% of the teachers felt that a required course should be developed for all students. 23% of the administrators and 20% of the teachers responded that computer concepts should be integrated into the existing curriculum. Less than 5% of the administrators and less than 5% of the teachers felt that there should be some combination of required and elective courses or of courses and concept integration.

Table 37 describes the responses to the question of who should be responsible for teaching introductory and advanced level computer related skills. 95% of the administrators and 94% of the teachers felt that only selected teachers should teach advanced computer related skills. 59% of the administrators thought that all teachers should teach introductory skills and 41% thought only selected teachers should teach introductory computer skills. 48% of the teachers thought that all teachers should teach the introductory skills, and 52% thought that only selected teachers should teach introductory computer skills.

Table 38 describes respondent awareness of student expertise in instructional computing. 60% of the administrators and 49% of the teachers answered that they were "somewhat aware" of student expertise; 35% of the administrators and 17% of the teachers responded that they were "very aware" of their students expertise; 4% of the administrators and 25% of the teachers felt that they were unaware of their students expertise in instructional computing.

The final questions concerned the grade levels at which students should begin using computers (Table 39) and begin learning computer programming (Table 40). 55% of the administrators and 53% of the teachers thought that students should begin using computers at the primary (K-3) level while 39% of the administrators and 35% of the teachers thought that students should begin using computers at the intermediate (4-6) level (Table 39). 44% of the administrators and 40% of the teachers responded that students should begin to learn computer programming in junior high (7-9) (Table 40). 24% of the administrators and 35% of the teachers felt that students should begin to learn computer programming at the intermediate (4-6) level. 27% of the administrators and 15% of the teachers felt that learning computer programming should begin at senior high (10-12) level.

CONTENT ANALYSIS OF OPEN ENDED RESPONSES

Introduction

Tables 41-43 summarize the administrator and teacher responses to two open-ended items of general concern.

The items are:

1. If you were designing a preservice teacher education program, what computer work would you require?
2. Please share with us any additional thoughts which you have on instructional computing.

The three content analysis tables which summarize the responses include:

1. Preservice Teacher Education Program Recommendations
2. Thoughts on Instructional Computing
3. Concerns About Computers in the Schools

Preservice Teacher Education Program Recommendations

All of the administrators and teachers were asked to suggest topics which should be included in preservice teacher education programs. 53% of the administrators, 50% of the elementary teachers, and 44% of the secondary teachers responded. Table 41 lists the suggested topics (only two administrators and one secondary teacher advised that programming not be included in teacher education programs.)

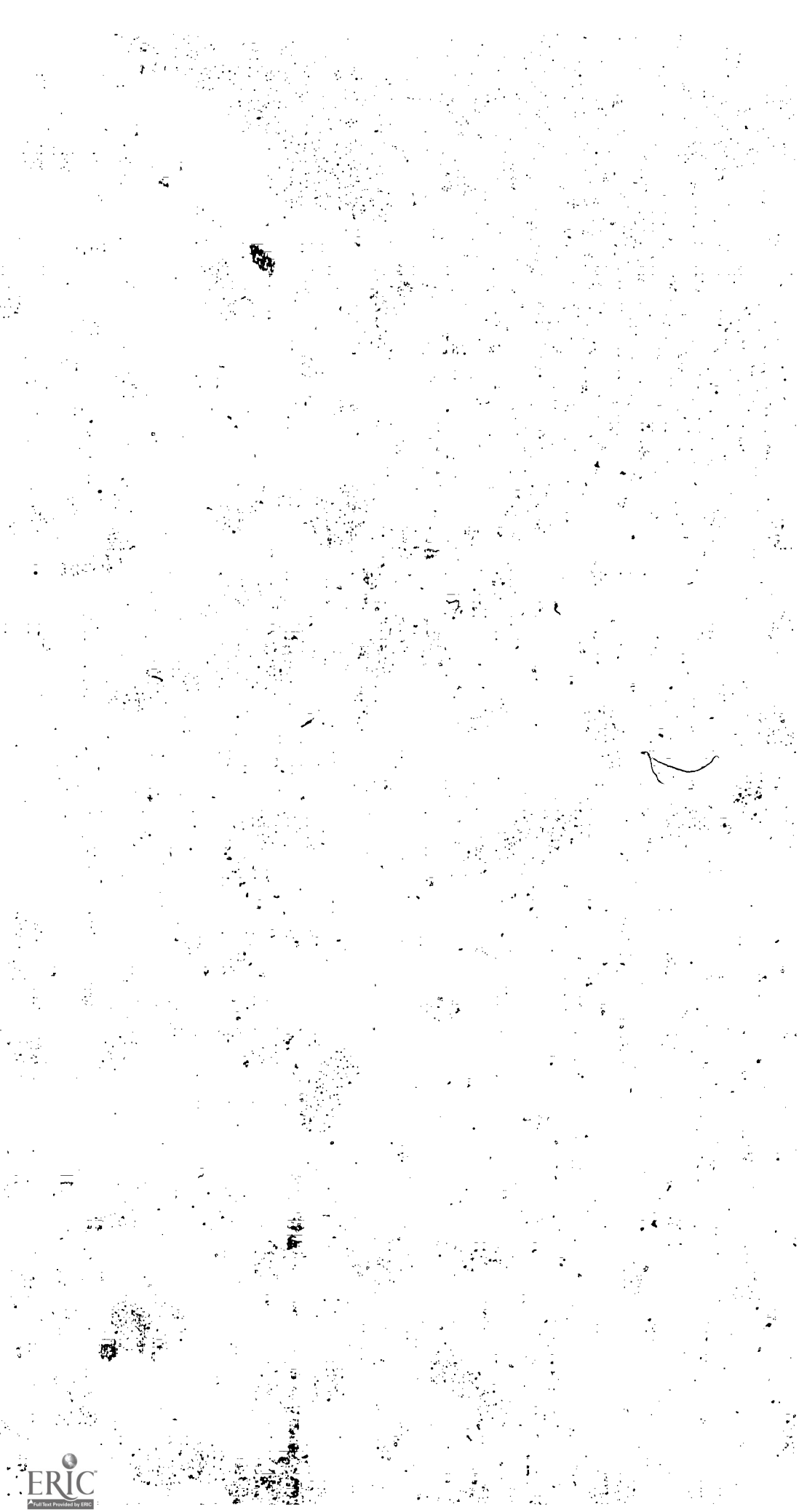

Table 41

CONTENT ANALYSIS

Preservice Teacher Education Program Recommendations

Number Responding	Preservice Teacher Education Program Topics
Administrators n = 165	• Discussions about available software • Lessons on authoring programs • Introduction to BASIC • Information on computer hardware • Computer programming skills • Computer languages • Curriculum assistance in integrating computer assisted instruction • Techniques to evaluate, select, and use available software • Information on Apple II or Apple III • Computer managed instruction techniques • The history of computing • How to reduce computer anxiety
Elementary Teachers n = 120	• BASIC • Computer programming • Selection and evaluation of software • Hands-on-experience • Design and implementation of programs in a specific area • Instruction on computer literacy • Instruction on hardware • Instruction on integrating programs into the K-12 curriculum (Scope and sequence) • Work on computer managed instruction • Instruction in various languages • Work on computer assisted instruction • Instruction on word processing • How to use area education agency materials

Table 41 (continued)

CONTENT ANALYSIS

Preservice Teacher Education Program Recommendations

Number Responding	Preservice Teacher Education Program Topics
Secondary Teachers n = 286	• Instruction in basic computer terminology • Programming • Selection and evaluation of software • Hands-on-experience • Computer literacy • How to use canned programs • Classroom uses of computers • Designing and implementing programs in a specific area • BASIC • Hardware selection (Apple II or Apple III?) • Computer managed instruction • How to learn various languages • Word processing

The administrators, elementary teachers and secondary teachers suggested introduction to BASIC, hands-on-experiences, instruction on hardware and software and computer-curriculum integration as program topics. Two other interesting topics suggested for preservice teacher education programs were the reduction of computer anxiety and the history of computing.

Thoughts on Instructional Computing

The teachers and administrators were asked to share any thoughts or ideas that they had on instructional computing. 25% of the administrators, 30% of the elementary teachers, and 31% of the secondary teachers responded. Table 42 summarizes their thoughts. The thoughts reflect positive suggestions for utilizing educational technology in the schools and several concerns. Because the concerns emerged throughout the open-ended responses, Table 43 lists only the concerns.

Table 42

CONTENT ANALYSIS

Thoughts on Instructional Computing

Number Responding	Thoughts on Instructional Computing
Administrators n = 79	• Scope and sequence is needed for the K-12 curriculum • A computer literacy course for K-9 is needed • A semester course should be required at the 7th grade level • Planning is needed • Student needs must be assessed • Objectives must be determined • Elementary school concerns are different from secondary • Computers should become a part of the learning process but not the learning process itself • Inservice work is needed • Area education agencies should establish classes at the district level • University consultants are needed • A regional clearing house is needed

Table 42 (continued)

CONTENT ANALYSIS

Thoughts on Instructional Computing

Number Responding	Thoughts on Instructional Computing
Administrators n = 79	• There must be a way to meet student needs without making large financial commitments on equipment that will soon become obsolete • Computing is a must for public education • The greatest challenge is to get teachers to overcome computer anxiety • Teachers and administrators should visit schools with computer courses and programs • BASIC language should be taught
Elementary Teachers n = 74	• Teachers find it difficult to find time to use computers • Teaching the 3 Rs traditionally takes much time • Computers are not needed in the formative years • The teaching load is already heavy • Elementary students may only play with computers not learn • Computers are a motivating experience and should be used in all grades • Parents should participate in computer education • Computer courses should be local • Teachers are afraid of the computers • Teachers and students need hands-on-experience • This is a world of computers • The universities should keep the students informed of the latest technology and its capabilities • We must keep up with the latest changes

Table 42 (continued)

CONTENT ANALYSIS

Thoughts on Instructional Computing

Number Responding	Thoughts on Instructional Computing
Secondary Teachers n = 204	• Teachers desire more inservice programs - at convenient times and places - with speakers other than college professors - inservice should be held before school starts • Introductory courses are needed with hands-on approaches - trained person is needed in each department - humanistic approaches are needed • Textbooks for teachers are needed • Computers would be beneficial to our educational system • Computer programs must be designed for specific grades and subjects • Teachers are afraid of computers; they are not interested in them • Work is needed on designing, using, obtaining and evaluating software • Teachers need help integrating computers into the curriculum • Computers are just a teaching tool • Teachers need support from administrators • Administrators should know the importance of computers • Teachers need released time to learn about computers • Instructors should be computer literate • Programs are needed for talented and gifted • Computer use in physical education is limited • Computers will not work in music • Software is not designed for art classes • Remedial programs are needed • Computers are not important for language arts classes • Computers are good for visual learnings

In general, the administrators thought that planning is needed to make computers a part of the learning process. Student needs must be assessed and computer objectives determined. The planners should remember that elementary and secondary school children's needs are different. The elementary teachers thought that the teaching of the 3 Rs already puts a heavy load on the teachers. Therefore they found it difficult to find time to teach about computers. They also thought that parents should participate in computer education.

The secondary teachers thought computer programs should be designed for specific grades and subjects. They shared the thought with the administrators that computer needs should be integrated into the curriculum. The secondary teachers also felt that they needed support from the administrators, released time to learn about computers, and help in integrating computers into the curriculum.

Concerns about Computers in the School

The administrators and teachers suggested a number of concerns and cautions regarding instructional computing, and these are summarized in Table 43. These concerns emerged from a content analysis of both of the open ended questions, and reflected the views of the 165 administrators, 120 elementary teachers, and 286 secondary teachers who responded to the preservice teacher education question and the 79 administrators, 74 elementary teachers, and 204 secondary teachers who responded to the thoughts on computers question.

Table 43

Teachers and Administrators Concerns about Computers in the Schools

Group	Concerns About Computers in the Schools
Administrators	• Computers are not the panacea and won't automatically solve educational problems • Let's not get on a bandwagon • Go slow and plan well • Computers may become a substitute for drill and practice like calculators
Elementary Teachers	• Computers are not for all students • Do not force computers on teachers and students • Teachers are already overburdened and would find it difficult to integrate computers into their subject areas and classrooms • Computers are only another teaching tool. They will come and go • Computers may make the learning process impersonal • Computers will be considered another panacea
Secondary Teachers	• Too much emphasis is placed on computers • Computers are just a teaching tool • Computers should be used for instructional purposes and not just for playing games • Do not use computers for mathematics • Students need human beings to introduce and clarify concepts • Computers can't replace books or homework • Machines should not replace teachers • Computers are a gimmick to get students to learn • We may be jumping in too soon with too much emphasis on computer use • Computers should be kept in perspective • Computers are not a cure-all • Computers will result in inability to think

Table 43 (continued)

Teachers and Administrators Concerns about Computers in the Schools

Group	Concerns About Computers in the Schools
Secondary Teachers	• Computers will make students too dependent • Computers should not be used in the lower grades • Computers should not be used for autistic children and children with low abilities

The administrators were concerned that computers not become a panacea to solve educational problems. They cautioned that planners should go slow and plan well to ensure that computers not become a substitute for drill and practice. The elementary teachers felt that computers should not be forced on teachers and students. They also expressed the concern that they are already overloaded and find it difficult to integrate computers into their subject areas and classroom. The secondary teachers believed that computers are just another teaching tool and should not replace teachers, books or homework. The computers should be kept in perspective, they warned.

SIGNIFICANCE TESTS

Three research questions regarding instructional computing were asked:

1. Is there a significant difference between administrator perception of teacher needs and teacher perception of teacher needs?
2. Is there a significant difference between perceived elementary and secondary teacher needs?
3. Is there a significant difference in the perceived needs of secondary teachers in five disciplines?

From these questions the following hypotheses were formulated:

1. There is no significant difference between administrator perception of teacher needs and teacher perception of teacher needs. ($M_1 = M_2$)
2. There is no significant difference between perceived elementary and secondary teacher needs. ($M_1 = M_2$)
3. There are no significant differences among the perceived needs of teachers in the five diciplines. ($M_1 = M_2 = M_3 = M_4 = M_5$)

Hypothesis #1. There is no significant difference between administrator perception of teacher needs and teacher perception of teacher needs. ($M_1 = M_2$)

Thirty variables were tested using the T-test. The hypothesis that there was no significant difference between administrator perception of teacher needs and teacher perception of teacher needs was rejected for eleven of these. The results of this analysis are shown in Table 11-34.

Of the seven suggested topics for inservice sessions, one was perceived to be significantly more beneficial for teachers by teachers than by administrators. This inservice session concerned computer

managed instruction. Two of the sessions were perceived to be significantly more beneficial for teachers by administrators than by teachers. These sessions concerned integrating computer related activities into the curriculum and evaluating student computing efforts.

Of the four modes of computer assisted instruction, three of them were perceived to be significantly more useful by administrators than by teachers. These included the tutorial mode, the problem solving mode, and the simulation mode.

Of the same four modes of computer assisted instruction, both problem solving and simulations were perceived by administrators to be significantly more troublesome for teachers to integrate into the curriculum than by the teachers themselves.

Of the five classroom management tasks listed for computer assistance, only one, assisting students in career decision making, was found to be significant. Administrators perceived that this task would be more useful for teachers than did teachers.

Of the eight computer literacy characteristics for teachers, two were found by administrators to be significantly more desirable for teachers to possess than by the teachers themselves. These two were concerned with the ability to describe computer applications and to interpret and use a software package.

Table 44

Teacher Inservice Needs

Item 1: Computer Managed Instruction is an inservice session which would be beneficial

Group	N	Mean	SD	t	2-Tailed Probability
Administrators	307	3.61	1.02	-3.58	0.00**
Teachers	891	3.86	1.06		

** Significant at .01 level

Table 45

Teacher Inservice Needs

Item 3: Integrating Computer Related activities into the curriculum is an inservice session which would be beneficial

Group	N	Mean	SD	t	2-Tailed Probability
Administrators	309	4.29	0.77	2.57	0.01**
Teachers	888	4.14	0.95		

** Significant at .01 level

Table 46

Teacher Inservice Needs

Item 4: Evaluation of student computing efforts is an inservice session which would be beneficial

Group	N	Mean	SD	t	2-Tailed Probability
Administrators	309	3.80	0.88	4.84	0.00**
Teachers	888	3.50	1.05		

** Significant at .01 level

Table 47

Computer Assisted Instruction Modes

Item 1: Instruction in the tutorial mode would be useful

Group	N	Mean	SD	t	2-Tailed Probability
Administrators	309	4.15	0.74	2.45	0.01**
Teachers	891	4.00	0.97		

** Significant at .01 level

Table 48

Computer Assisted Instruction Modes

Item 2: Instruction in the problem-solving mode would be useful

Group	N	Mean	SD	t	2-Tailed Probability
Administrators	309	4.30	0.68	11.41	0.00**
Teachers	890	3.69	1.13		

** Significant at .01 level

Table 49

Computer Assisted Instruction Modes

Item 3: Instruction in the simulation mode would be useful

Group	N	Mean	SD	t	2-Tailed Probability
Administrators	310	4.11	0.78	4.49	0.00**
Teachers	885	3.82	1.02		

** Significant at .01 level

Table 50

Computer Assisted Instruction Modes

Item 2: Assistance is needed to implement the problem-solving mode of instruction

Group	N	Mean	SD	t	2-tailed Probability
Administrators	306	4.22	0.77	5.70	0.00**
Teachers	876	3.89	1.12		

** Significant at .01 level

Table 51

Computer Assisted Instruction Modes

Item 3: Assistance is needed to implement the simulation mode of instruction

Group	N	Mean	SD	t	2-tailed Probability
Administrators	306	4.04	0.90	2.92	0.004**
Teachers	875	3.85	1.11		

** Significant at .01 level

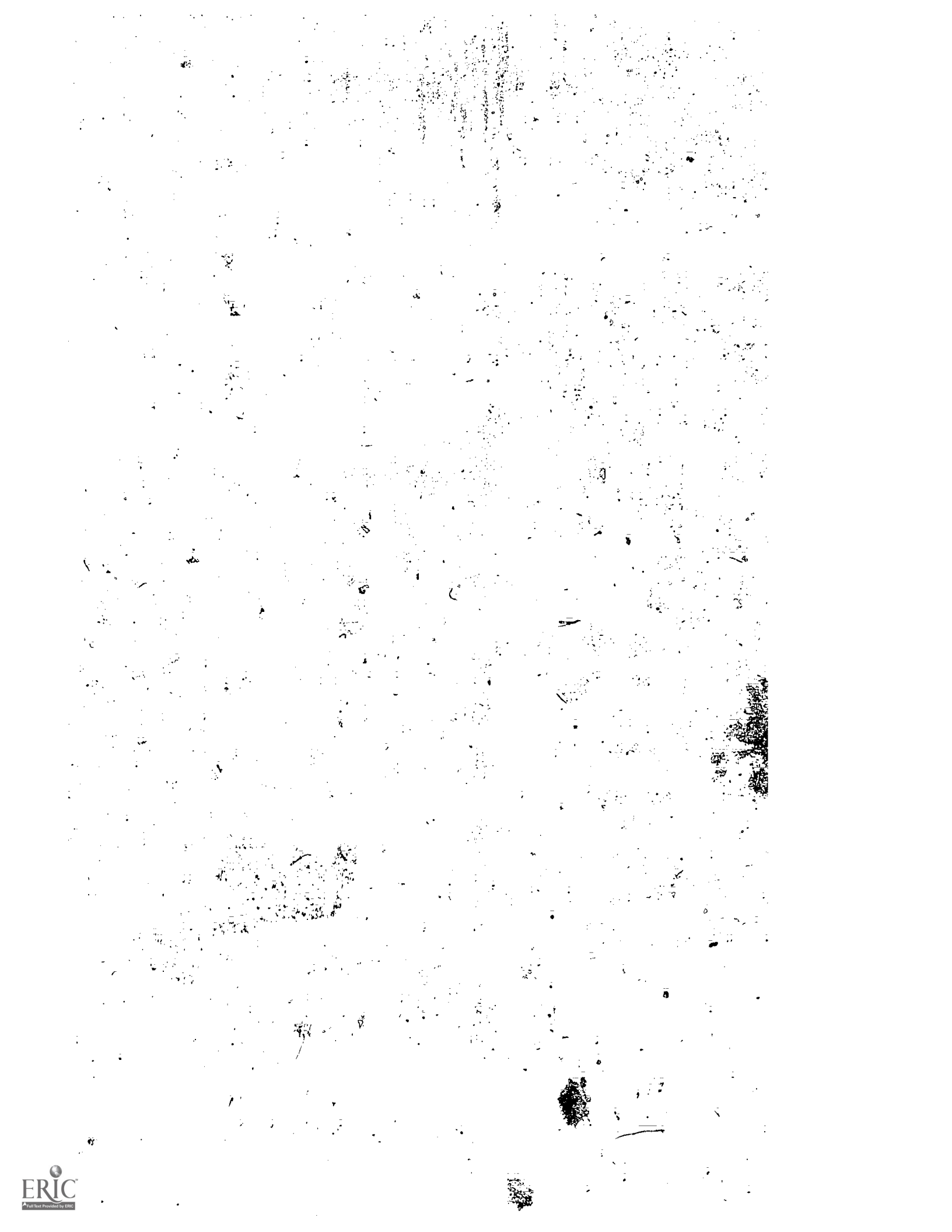

Table 52

Classroom Management

Item 5: Assistance in student career counseling would be useful

Group	N	Mean	SD	t	2-Tailed Probability
Administrators	310	3.83	0.76	8.89	0.000**
Teachers	890	3.32	1.11		

** Significant at .01 level

Table 53

Computers Literacy for Teachers

Item 4: Teachers should be able to recognize the application of computer in society

Group	N	Mean	SD	t	2-Tailed Probability
Administrators	311	4.50	0.65	3.17	0.002**
Teachers	889	4.35	0.73		

** Significant at .01 level

Table 54

Computer Literacy for Teachers

Item 7: Teachers should be able to interpret and use a software package

Group	N	Mean	SD	t	2-Tailed Probability
Administrators	311	4.48	0.60	3.81	0.000**
Teachers	888	4.30	0.76		

** Significant at .01 level

Hypothesis #2. There is no significant difference between perceived elementary and secondary teacher needs ($M_1 = M_2$)

Thirty variables were tested using the T-test. The hypothesis that there was no significant difference between perceived elementary and secondary teacher needs was rejected for eight of these. The results of this analysis are shown in Tables 52 - 62.

Of the seven suggested topics for inservice sessions, only one was perceived to be significantly more beneficial to secondary than to elementary teachers. This one pertained to an inservice session on computer managed instruction.

Of the four descriptions of computer assisted instruction, two were perceived to be significantly more useful in elementary instruction than in secondary instruction. These included tutorial and drill and practice programs.

Of the same four modes of computer assisted instruction, only problem solving programs were perceived to be significantly more troublesome for elementary teachers to integrate into the curriculum than for secondary teachers to do so.

Of the five classroom management tasks listed for computer assistance, four of these were found to contain significant differences. Elementary teachers would find using the computer to prescribe sequenced instruction to be significantly more useful than would secondary teachers. Secondary teachers would find using the computer to generate tests, to maintain objectives, and to provide career counseling to be significantly more useful than would elementary teachers.

Of the eight computer literacy characteristics for teachers, no significant differences were found.

Table 55

Computer Inservice Needs of Teachers

Item 1: Computer managed instruction is an inservice session which would be beneficial.

Group	N	Mean	SD	t	2-Tailed Probability
Elementary Teachers	246	3.67	1.05	-3.76	0.001**
Secondary Teachers	645	3.93	1.05		

**Significant at .01 level

Table 56

Computer Assisted Instruction Modes

Item 1: Instruction in the tutorial mode would be useful

Group	N	Mean	SD	t	2-Tailed Probability
Elementary Teachers	245	4.21	0.84	4.24	0.000**
Secondary Teachers	646	3.93	1.00		

** Significant at .01 level

Table 57

Computer Assisted Instruction Modes

Item 4: Instruction in the drill and practice mode would be useful

Group	N	Mean	SD	t	2-Tailed Probability
Elementary Teachers	246	4.41	0.75	6.56	0.000**
Secondary Teachers	642	4.00	1.00		

**Significant at .01 level

Table 58

Computer Assisted Instruction Modes

Item 2: Assistance is needed to implement the problem-solving mode of instruction

Group	N	Mean	SD	t	2-Tailed Probability
Elementary Teachers	239	4.09	1.03	3.59	0.000**
Secondary Teachers	637	3.81	1.18		

** Significant at .01 level

Table 59

Classroom Management

Item 1: Assistance in sequencing instruction would be useful

Group	N	Mean	SD	t	2-Tailed Probability
Elementary Teachers	244	4.02	0.	.04	0.003**
Secondary Teachers	647	3.81	1.0		

** Significant at .01 level

Table 60

Classroom Management

Item 3: Assistance in generating tests would be useful

Group	N	Mean	SD	t	2-Tailed Probability
Elementary Teachers	242	3.56	1.11	2.40	0.016**
Secondary Teachers	647	3.76	1.10		

**Significant at .01 level

Table 61

Classroom Management

Item : Assistance in maintaining instructional objectives would be useful

Group	N	Mean	SD	t	Tailed obability
Elementary Teachers	242	3.59	1.00	-2.15	0.035**
Secondary Teachers	647	3.75	.02		

** Significant at .01 level

Table 62

Classroom Management

Item 5: Assistance in student counseling would be useful

Groups	N	Mean	SD	t	2-Tailed Probability
Elementary Teachers	248	3.06	1.13	-4.40	0.000**
Secondary Teachers	647	3.42	1.08		

** Significant at .01 level

Hypothesis #3. There are no significant differences among the perceived needs of teachers in the five disciplines.

Thirty variables were tested using a one-way analysis of variance. The hypothesis that there were no significant differences among the perceived needs of teachers in the five disciplines was rejected for fifteen of these.

A Scheffe' test provided information as to which groups of teachers differed significantly from the other groups. Each of the following fifteen tables is analyzed separately to describe the results of the Scheffe' test.

Table 63

Teacher Inservice Needs

Item 4: Evaluation of student computer efforts is an inservice session which would be beneficial

Group	N	Mean	S.D.
Secondary Teachers			
Humanities	113	3.41	1.07
Math & Science	152	3.70	0.99
Physical Education	90	3.26	1.14
Vocational	126	3.72	0.94
S[illegible]cation	162	3.36	1.09

F (6,637) = 5.10, p < .01

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe' test showed that physical education teachers were significantly different from vocational and math and science teachers, thus indicating that physical education teachers have less need to learn computer techniques to evaluate student efforts than do vocational, math, and science teachers.

Table 64

Teacher Inservice Needs

Item 6: Word processing is an inservice session which would be beneficial

Group	N	Mean	S.D.
Secondary Teachers			
Humanities	113	3.89	1.11
Math & Science	149	3.56	1.07
Physical Education	90	3.71	1.07
Vocational	126	3.96	0.98
Special Education	160	3.72	1.03

$F_{(4,633)} = 3.02$, $p \geq .01$

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe' test showed that math and science teachers were significantly different from vocational teachers, thus indicating that math and science teachers have less need to learn word processing than do vocational teachers.

Table 65

Computer Assisted Instruction Modes

Item 1: Instruction in the tutorial mode would be useful

Group	N	Mean	S.D.
Secondary Teachers			
Humanities	113	3.89	0.95
Math & Science	153	3.89	0.85
Physical Education	90	3.57	1.09
Vocational	128	3.90	0.89
Special Education	162	4.22	1.12

$F(4,641) = 6.68$, $p \geq .01$

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe' test showed that physical education teachers were significantly different from special education teachers, thus indicating that physical education teachers have less need to use the tutorial mode than do special education teachers.

Table 66

Computer Assisted Instruction Modes

Item 2: Instruction in the problem-solving mode would be useful.

Group	N	Mean	S.D.
Secondary Teachers			
Humanities	113	3.07	1.23
Math & Science	153	4.10	0.90
Physical Education	90	3.28	1.20
Vocational	129	3.86	0.97
Special Education	162	3.56	1.25

$F(4,642) = 17.70$, $p \leq .01$

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe' test showed that humanities teachers were significantly different from math, science, vocational, and special education teachers, thus indicating that humanities teachers have less need to use the problem-solving mode than do the other groups. Physical education teachers were significantly different from math, science, and vocational teachers, thus indicating that physical education teachers have less need to use the problem-solving mode than do the other groups. Special edutation teachers were significantly different from other math and science teachers, thus indicating that special education teachers have less need to use the problem-solving mode than do math and science teachers.

Table 67

Computer Assisted Instruction Modes

Item 3: Instruction in the simulation mode would be useful

Group	N	Mean	S.D.
Secondary Teachers			
Humanities	112	3.54	1.04
Math & Science	150	3.89	0.98
Physical Education	90	3.74	1.04
Vocational	128	4.08	0.84
Special Education	162	3.88	1.10

F (4.637) = 4.59, $p \geq .01$

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe' test showed that humanities teachers were significantly different from vocational teachers, this indicating that humanities teachers have less need to use the simulation mode than do vocational teachers.

Table 68

Computer Assisted Instruction Modes

Item 4: Instruction in the drill and practice mode would be useful

Group	N	Mean	S.D.
Secondary Teachers			
Humanities	112	3.99	0.95
Math & Science	152	3.92	0.83
Physical Education	89	3.67	1.05
Vocational	127	3.96	0.85
Special Education	162	4.31	1.16

F (4,637) = 6.78, $p \geq .01$

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe' test showed that physical education and math and science teachers were significantly different from special education teachers, thus indicating that physical education and math and science teachers have less need to use the drill and practice mode than do special education teachers.

Table 69

Computer Assisted Instruction Modes

Item 1: Assistance is needed to implement the tutorial mode of instruction

Group	N	Mean	S.D.
Secondary Teachers			
Humanities	113	4.12	1.04
Math & Science	153	3.46	1.16
Physical Education	89	3.92	1.16
Vocational	125	3.82	1.06
Special Education	160	3.68	1.28

F (4,635) = 6.18, $p \geq .01$

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe' test showed that math and science and special education teachers were significantly different from humanities teachers, thus indicating that math, science and special education teachers need less assistance in learning tutorial mode implementation than do humanities teachers.

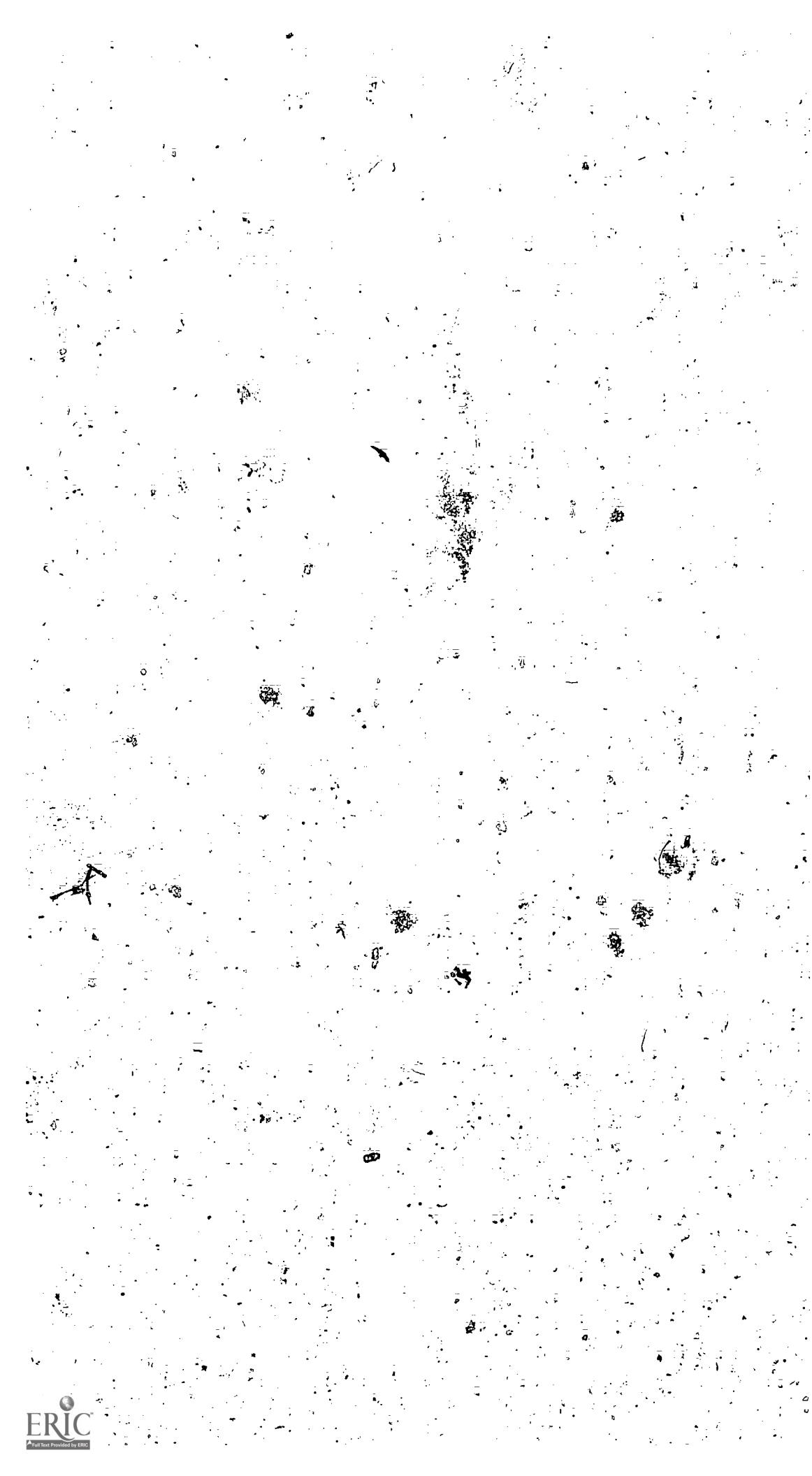

Table 70

Computer Assisted Instruction Modes

Item 3: Assistance is needed to implement the simulation mode of instruction

Group	N	Mean	S.D.
Secondary Teachers			
Humanities	110	3.86	1.18
Math & Science	153	3.58	1.16
Physical Education	89	4.02	1.12
Vocational	126	4.01	0.98
Special Education	160	3.84	1.15

F (4,633) = 3.54, $p \geq .01$

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe' test showed that math and science teachers were significantly different from vocational teachers, thus indicating that math and science teachers need less assistance in learning simulation mode implementation than do vocational teachers. (Although the mean for physical education teachers is higher than the mean for vocational teachers, the standard deviation for physical education is 1.12.)

Table 71

Computer Assisted Instruction Modes

Item 4: Assistance is needed to implement the drill and practice mode of instruction

Group	N	Mean	S.D.
Secondary Teachers			
Humanities	111	3.98	1.18
Math & Science	153	3.19	1.20
Physical Education	89	3.88	1.20
Vocational	125	3.80	1.06
Special Education	159	3.51	1.36

F (4,632) = 9.29, $p \leq .01$

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe' test showed that math and science teachers were significantly different from humanities, physical education, and vocational teachers, thus indicating that math and science teachers need less assistance in drill and practice mode implementation than do the other three groups. Special education teachers were significantly different from humanities teachers, thus indicating that special education teachers need less assistance in drill and practice mode implementation than do humanities teachers.

Table 72

Classroom Management

Item 1: Assistance in sequencing instruction would be useful

Group	N	Mean	S.D.
Secondary Teachers			
Humanities	113	3.80	0.97
Math & Science	153	3.55	0.99
Physical Education	90	3.50	1.12
Vocational	129	3.76	0.81
Special Education	162	4.30	0.99

F (4,642) = 15.29, $p \leq .01$

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe' test showed that humanities teachers, math and science teachers, physical education teachers and vocational teachers were significantly different from special education teachers, thus indicating that special education teachers would find assistance in sequencing instruction more useful than would the other four groups of secondary teachers.

Table 73

Classroom Management

Item 3: Assistance in generating tests would be useful

Group	N	Mean	S.D.
Secondary Teachers			
Humanities	113	3.85	1.10
Math & Science	153	3.93	0.98
Physical Education	90	3.97	1.00
Vocational	129	3.87	0.94
Special Education	162	3.33	1.26

F (4,642) = 8.90, $p \leq .01$

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe test showed that special education teachers were significantly different from humanities teachers, math and science teachers, physical education teachers, and vocational teachers, thus indicating that special education teachers would find assistance in generating tests less useful than would the other four groups of secondary teachers.

Table 74

Computer Management

Item 47 Assistance in maintaining instructional objectives would be useful

Group	N	Mean	S.D.
Secondary Teachers			
Humanities	113	3.60	1.02
Math & Science	153	3.50	1.06
Physical Education	90	3.68	1.03
Vocational	129	3.76	0.85
Special Education	162	4.12	0.99

F (4,642) = 8.78, $p \leq .01$

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe' test showed that humanities teachers, math and science teachers and physical education teachers were significantly different from special education teachers, thus indicating that special education teachers would find assistance in maintaining instructional objectives more useful than would the other three groups of secondary teachers.

Table 75

Computer Management

Item 5: Assistance in student career counseling would be useful

Group	N	Mean	S.D.
Secondary Education			
Humanities	113	3.29	1.12
Math & Science	153	3.50	0.94
Physical Education	90	3.46	1.11
Vocational	129	3.78	0.87
Special Education	162	3.13	1.22

F (4,642) = 7.45, $p \leq .01$

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe' test showed that special education teachers and humanities teachers were significantly different from vocational teachers, thus indicating that vocational teachers would find assistance in student career counseling more useful than would special education and humanities teachers.

Table 76

Computer Literacy for Teacher

Item 5: Teachers should be able to recognize the role that information codes play in computing

Group	N	Mean	S.D.
Secondary Teachers			
Humanities	114	3.96	0.81
Math & Science	149	3.89	0.91
Physical Education	88	4.10	0.79
Vocational	127	4.00	0.76
Special Education	162	4.19	0.73

F (4,635) = 3.15, $p \leq .01$

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe' test showed that math and science teachers were significantly different from special education teachers, thus indicating that math and science teachers hold stronger beliefs concerning whether teachers should be able to recognize the role that information codes play in computing than do special education teachers.

Table 77

General Concerns

Item 3: Teacher knowledge of student computing expertise

Group	N	Mean	S.D.
Secondary Teachers			
Humanities	114	3.13	1.32
Math & Science	151	3.77	1.17
Physical Education	89	3.00	1.36
Vocational	129	3.37	1.2[illegible]
Special Education	158	3.74	1.29

F (4,636) = 9.24, $p \leq .01$

The analysis of variance indicated that there was at least one significant difference among the groups. The follow-up Scheffe' test showed that humanities and physical education teachers were significantly different from math and science and special education teachers, thus indicating that humanities and physical education teachers believe that they have less knowledge of the computing expertise of their students than do math and science and special education teachers.

SUMMARY AND CONCLUSIONS

An instructional computing needs assessment of Iowa K-12 Teachers and Administrators was mailed to all 440 superintendents, 500 elementary teachers, and 1250 secondary teachers. The analysis was based on 1,213 responses (an overall return rate of 55.4%).

The school administrators held administrative positions for an average of fifteen years; 97% of them were male. Most of the administrators (96%) do not own a personal computer, but 31% of them are familiar with BASIC. More than half of the administrators come from science, mathematics and humanities teaching backgrounds, and more than half of them have attended area education agency presentations on instructional computing.

60% of the teacher respondents were male and 57% of them were secondary teachers. Most of the teachers (87 %) do not own a personal computer, but 74% of them would like to have a computer in their classroom. 20% of the teachers do use the computer for classroom management tasks. One-third of the teachers have attended an area education agency presentation on computers, but nearly two-thirds of them reported that there were no computers in their classrooms for instructional purposes. Two-thirds of the teachers teach in buildings with one to five computers available for instructional purposes.

The districts which enroll the most students also have the most computers available. Most of the districts enrolling less than 500 students have 1-5 computers available for instructional purposes. Nine of the sixteen districts enrolling more than 3000 students have more than thirty-one computers.

The respondents were asked questions concerning teacher inservice needs, computer assisted instruction modes, classroom management, computer literacy for teachers, and general concerns. The analysis of the responses included a consideration of general frequency tables for all of the survey items, and a content analysis of open-ended responses. Analysis of variance, t-tests, and Scheffe' tests were used to determine significance.

The following conclusions emerged from the instructional computing needs assessment of Iowa K-12 Teachers and Administrators.

1. Both the teachers and the administrators are positive and enthusiastic concerning all aspects of instructional computing.
2. Teachers perceive inservice topics to be beneficial and would even appreciate sessions on the history of computing and the selection of computer textbooks.
3. Teachers and administrators believe that preservice teachers should learn programming, and techniques to evaluate, select and use appropriate software. Many other computer related topics should also be included in a teacher education program.
4. Teachers wish to use varied modes of computer assisted instruction and would appreciate curricular assistance in implementing these modes. They would also find the computer valuable in classroom management tasks.
5. Both teachers and administrators believe that teachers should possess computer literacy characteristics.

6. Both teachers and administrators caution that careful planning of computer assisted curricula is needed and some warn that educators should not make the computer a panacea for all educational woes. Some teachers suggest that overburdened teachers may have some difficulty finding the time to prepare themselves for electronic teaching.

7. Most teachers and administrators believe that children in the primary grades should be exposed to computers, but that programming should be saved for junior high school.

8. Many teachers would play a role in teaching about computers but most believe that only selected teachers should teach computer programming.

9. Nearly one-third of the teachers and administrators favor requiring computer literacy courses of all students, and 32% of the administrators and 43% of the teachers favor an elective course approach to achieving computer literacy.

10. Teachers perceive inservice sessions on computer managed instruction to be more beneficial for themselves than do administrators perceive the session to be beneficial for teachers. Administrators perceive several computer related topics to be more beneficial for teacher than do the teachers themselves.

11. Elementary and secondary teachers differ on specific items concerning the usefulness of various computer assisted instruction modes and of various computer management techniques.

12. A number of significant differences exist among the five secondary teachers groups - humanities, math and science, physical education, vocational, and special education. These differences suggest that certain groups favor computer applications unique to these disciplines.

The overall conclusion that can be drawn from this report is that Iowa teachers and administrators have enthusiastically joined the electronic revolution; have a need for inservice instruction; and have use for the computer in classroom instruction and management.

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Appendix A

Survey Instrument

Question Asked

of

Administrators

SECTION I. Demographic Information. Circle the letter which best answers the question.

1. How many years administrative experience do you have?

   a) 0-3 b) 4-6 c) 7-10 d) 11-15 e) 16 +

2. How many years teaching experience do you have?

   a) 0-3 b) 4-6 c) 7-10 d) 11-15 e) 16 +

3. With which of the following teaching fields were you most closely associated? Circle only one.

   a) K-6
   b) Language Arts
   c) Agriculture
   d) Art
   e) Business
   f) Mathematics
   g) Music
   h) Science
   i) Distributive Ed.
   j) Foreign Language
   k) Health/Phy. Ed.
   l) Home Economics
   m) Industrial Arts
   n) Trade & Ind.
   o) Drivers Ed.
   p) Multi Occupations
   q) Special Ed.
   r) Social Studies
   s) Other: _____

4. What is the K-12 enrollment of your district?

   a) 0-499 c) 750-999 e) 1500-1999 f) 2000-2999 g) 3000 +
   b) 500-749 d) 1000-1499

5. In which Area Education Agency district is your school district?

   a) 1 d) 4 g) 7 j) 11 m) 14
   b) 2 e) 5 h) 9 k) 12 n) 15
   c) 3 f) 6 i) 10 l) 13

6. What is your gender?

   a) Male
   b) Female

SECTION II. Instructional Computing Background. Circle the letter which best answers the question.

1. Do you or a person in your immediate family own a computer?

   a) Yes
   b) No

2. Have you had any training in instructional computing? If you have, circle all of those training descriptions which apply.

   a) Attended an inservice session in this district
   b) Attended an AEA presentation
   c) Attended a DPI presentation
   d) Attended a vendor presentation
   e) Completed (or are completing) a college or university course
   f) Attended a conference session
   g) Read books and/or articles
   h) Other: _____

3. Are you able to program in any of the following languages? If yes, circle those languages in which you can program.

a) BASIC	e) LOGO	i) COBOL
b) APL	f) SIMSCRIPT	j) ADA
c) ALGOL	g) PASCAL	k) OTHER: _____
d) FORTRAN	h) LISP	

If no, do you wish to learn to program a computer?

a) Yes
b) No

4. Would you attend a university sponsored computer workshop for administrators?

a) Yes
b) No

5. How many computers are available for teachers to use for instructional purposes in your school district?

a) None c) 6-10 d) 11-20 e) 21-30 f) 31 +
b) 1-5

Questions Asked of Teachers

SECTION I. Demographic Information. Circle the letter which best answers the question.

What grade levels best describe your primary teaching responsibility?

a) K-6 b) 7-12 c) Other _____

2. If your primary teaching responsibility is 7-12, which of the following subject areas best describes your primary teaching responsibility? Circle only one.

a) Social Studies
b) Language Arts
c) Agriculture
d) Art
e) Business
f) Mathematics
g) Music
h) Science
i) Distributive Ed.
j) Foreign Language
k) Health/Phy. Ed.
l) Home Economics
m) Industrial Arts
n) Trade & Ind.
o) Driver Ed.
p) Multi Occupations
q) Special Ed
r) Other: _____

3. How many years teaching experience do you have?

a) 0-3 b) 4-6 c) 7-10 d) 11-15 e) 16 +

4. In which Area Education Agency district is your school?

a) 1
b) 2
c) 3
d) 4
e) 5
f) 6
g) 7
h) 9
i) 10
j) 11
k) 12
l) 13
m) 14
n) 15

5. What is your gender?

a) ~~Male~~
b) Female

SECTION II. Instructional Computing Background. Circle the letter which best answers the question.

1. Do you or a person in your immediate family own a computer?

a) Yes
b) No

2. Have you had any training in instructional computing? If you have, circle all of those training descriptions which apply.

a) Attended an inservice session in this district
b) Attended an AEA presentation
c) Attended a DPI presentation
d) Attended a vendor presentation
e) Completed (or are completing) a college or university course
f) Attended a conference session
g) Read books and/or articles
h) Other:

3. Are you able to program in any of the following languages? If yes, circle those languages in which you can program.

a) BASIC	e) LOGO	i) COBOL
b) APL	f) SIMSCRIPT	j) ADA
c) ALGOL	g) PASCAL	k) OTHER _____
d) FORTRAN	h) LISP	

If no, do you wish to learn to program a computer?

a) Yes
b) No

4. How many computers are available for you to use for instructional purposes in your classroom?

a) None b) 1 c) 2 d) 3 e) 4 or more

5. If you do not have a computer in your classroom, would you like to have one?

a) Yes
b) No

6. How many computers are available for you to use for instructional purposes in your school building?

a) None b) 1-5 c) 6 +

7. During a semester, what percentage of instructional time in your classroom is devoted to discussions and lectures about computers?

a) None b) 1-10% c) 11%-20% d) 21%-30% e) 31% or more

8. During a semester, what percentage of instructional time in your classroom is devoted to hands-on computing by students?

a) None b) 1-10% c) 11-20% d) 21-30% e) 31% or more

9. Do you use the computer for any classroom management tasks? (i.e. recording grades, word processing, testing, instructional diagnosis)

a) Yes
b) No

10. Would you attend a university sponsored computer workshop for teachers?

a) Yes
b) No

Questions Asked

of

All Respondents

SECTION III. The Teacher and the Computer.

A. The following are descriptions of possible inservice sessions. For each of these circle the most appropriate response:

5 . . . . . Strongly Agree that
4 . . . . . Agree that
3 . . . . . Undecided as to whether } the session would be beneficial for me
2 . . . . . Disagree that
1 . . . . . Strongly Disagree that

Please circle your response!

1. Computer Managed Instruction - A session designed to help teachers learn record keeping and classroom management computer techniques.	5	4	3	2	1
2. Choosing Appropriate Software - A session designed to help teachers evaluate available software and make purchasing decisions.	5	4	3	2	1
3. Integrating Computer Related Activities into the Curriculum - A session designed to help teachers design instructional activities using computers	5	4	3	2	1
4. Evaluation of Student Computing Efforts - A session designed to help teachers determine effective evaluation techniques for students involved in computer activities.	5	4	3	2	1
5. Authoring Computer Programs - A session designed to help teachers learn the extent of involvement required in authoring computer programs.	5	4	3	2	1
6. Word Processing - A session designed to help teachers learn the techniques of word processing.	5	4	3	2	1
7. Programming - A session designed to help teachers learn a language such as LOGO or BASIC.	5	4	3	2	1

8. List additional topics for inservice consideration:

B. Below are modes of computer assisted instruction. For each of these modes, circle the item which best describes how useful programs in this mode would be in your classroom instruction.

5 . . . . . Strongly Agree that
4 . . . . . Agree that
3 . . . . . Undecided as to whether > this mode would be useful
2 . . . . . Disagree that
1 . . . . . Strongly Disagree that

		Please circle your response				
9.	Tutorial - The tutorial mode is similar to programmed instruction text materials. The student interacts directly with the computer as the computer presents information and asks questions in a programmed instruction format.	5	4	3	2	1
10.	Problem Solving - In this mode the student uses the computer to assist in problem solving, particularly problems that involve mathematical manipulation of data. In some cases students will use prewritten programs, while in other cases it is appropriate for students to write their own problem solving programs.	5	4	3	2	1
11.	Simulation - Through this mode the computer simulates real-life situations and the student learns principles and concepts through interaction with the computer simulation	5	4	3	2	1
12.	Drill and Practice - In this mode the student has already learned basic facts and/or concepts and receives drill and practice in those facts or concepts through interaction with the computer.	5	4	3	2	1

C. Consider each of the modes again in terms of the assistance you need to learn to integrate these modes into your classroom instruction. Circle the appropriate response. Amount of assistance needed:

5 . . . . . A great deal
4 . . . . . Much
3 . . . . . Some
2 . . . . . Little
1 . . . . . None

		Please circle your response				
13.	Tutorial	5	4	3	2	1
14.	Problem Solving	5	4	3	2	1
15.	Simulation	5	4	3	2	1
16.	Drill and Practice	5	4	3	2	1

D. The computer can be used to help teachers in a variety of ways. For each of the following descriptions of these forms of assistance, consider how useful you would find this assistance. Circle the appropriate response.

5 . . . . . Strongly agree that
4 . . . . . Agree that
3 . . . . . Undecided as to whether > this assistance would be useful
2 . . . . . Disagree that
1 . . . . . Strongly Disagree that

Please circle your response

Task					
17. To prescribe sequenced instruction based on continuing evaluation that allows students to proceed at their own level of achievement.	5	4	3	2	1
18. To assess student achievement on a periodic basis.	5	4	3	2	1
19. To maintain test pool items, generate and score tests.	5	4	3	2	1
20. To maintain and retrieve instructional objectives.	5	4	3	2	1
21. To assist students in career decision making.	5	4	3	2	1

SECTION IV. Computer Literacy for Teachers. Teachers will probably be required to have some level of computer literacy. For each of the following items, decide whether you believe that teachers should possess the ability. Circle the appropriate response.

5 . . . . . Strongly Agree
4 . . . . . Agree
3 . . . . . Undecided
2 . . . . . Disagree
1 . . . . . Strongly Disagree

Please circle your response

I believe that teachers should be able to . . .					
1. Recognize that computers are generally useful for information processing tasks which require rapid handling of information	5	4	3	2	1
2. Recognize that computer hardware refers to the physical components of computer systems.	5	4	3	2	1
3. Identify the major functions of a general purpose computer system; namely input, output, storage or memory, control, and arithmetic.	5	4	3	2	1
4. Recognize that computers and computer-supported applications have a major impact on the way ordinary citizens live, work, and play.	5	4	3	2	1
5. Recognize that information codes (numbers) or passwords are a primary means for restricting use of computer systems, of computer programs, and of data files.	5	4	3	2	1
6. Correct syntax and logic errors in an improperly functioning algorithm or program.	5	4	3	2	1
7. Interpret and use a software package.	5	4	3	2	1
8. Value the potential role of computers in meeting societal and institutional needs.	5	4	3	2	1

SECTION V. General Questions. Circle the response which best describes your answer to the question.

1. What is the best curricular response to take in assisting students to attain computer literacy?

   a) A required course should be developed for all students.
   b) Elective courses should be developed for interested students.
   c) No new courses should be added. Computer related objectives should be spread throughout the curriculum.
   d) Other: _____

2. Who should be responsible for teaching introductory computer related skills/topics?

   a) All teachers should play a role.
   b) Only selected teachers should play a role.

3. Who should be responsible for teaching advanced computer related skills/topics?

   a) All teachers should play a role.
   b) Only selected teachers should play a role.

4. To what extent are you aware of the instructional computing expertise of your own students?

   a) Very aware c) Undecided e) Very unaware
   b) Somewhat aware e) Somewhat unaware

5. At what grade level do you believe students should begin using computers?

   a) Primary K-3 c) Junior High School 7-9
   b) Intermediate 4-6 d) Senior High School 10-12

6. At what grade level do you believe students should be given an opportunity to learn computer programming?

   a) Primary K-3 c) Junior High School 7-9
   b) Intermediate 4-6 d) Senior High School 10-12

7. If you were designing a preservice teacher education program, what computer work would you require?

8. Please share with us any additional thoughts which you have on instructional computing.