

A LONGITUDINAL STUDY OF ELEMENTARY KEYBOARDING COMPUTER SKILLS

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ABSTRACT

In the 1980's numerous national studies were conducted regarding the teaching of the "touch" method of keyboarding at the elementary level. Since then not much has been written to measure the growth of keyboarding instruction in grades kindergarten through sixth grade. The recommendations from the National Commission on Excellence in Education include computer literacy as a basic knowledge for all students. As states mandate computer literacy, are they also requiring keyboarding instruction that develops efficient input skills?

The problem of this study was to determine if the number of school districts that included keyboarding instruction at the elementary level has increased as more elementary children use the computer as a writing tool. The purpose of the study was to determine the status of elementary keyboarding in the State of Wisconsin and to compare data from 1993 and 1996 as to the following questions: 1) At what grade was the "touch" method of keyboarding taught? 2) Who taught keyboarding? 3) How much time was allocated? 4) When was keyboarding reinforced? 5) What software was used? 6) What textbook was preferred? 7) What computer environment was used? 8) Was keyboarding/word processing integrated into other classes?

A questionnaire was developed based on previous studies (Sormunen, 1989; Prigge, 1988) and mailed in 1993 to all 428 school districts in Wisconsin. A response rate of 67% (285) was realized. Following minor revisions, a similar questionnaire was mailed in April 1996 to the same school districts and a 57% (242) response was received. A follow-up request was concluded to those school districts that responded in 1993 but not in 1996. Forty-two additional responses were received, increasing the response rate for both 1996 surveys to 66% (284). The school districts that responded in 1993 and in 1996 were used for the statistical analysis. The null hypothesis was tested on the matched responses using a chi square analysis.

A significant difference was found in the number of school districts that introduced the "touch" method of keyboarding at the elementary level in 1996 (73%) as compared to 1993 (54%). Likewise, a dramatic increase was indicated regarding reinforcement of keyboarding once the "touch" method was introduced. Combining all responses in 1993 for grades 1-6, 68.6% of the school districts reported keyboarding reinforcement compared to 99% in 1996. Other 1996 findings included: Keyboarding was taught more by Business Education-licensed teachers than elementary-licensed teachers and most often at the fourth grade, with third grade receiving the second highest number of responses. The most common instructional time was 25-45 minutes everyday for six weeks. Macintosh computers were used most often and the predominant software package was Micro-Type: The Wonderful World of Paws.

Based on the results of this study, teachers are realizing the importance of keyboarding as a basic skill as indicated by the rate of increase in the number of school districts implementing keyboarding instruction at the elementary level. However, this increase is still deficient if indeed the mandate is for all students to be computer literate. School districts should include keyboarding instruction in the elementary curriculum that includes the development of efficient inputting skills to use technological tools more effectively.

INTRODUCTION

Since the invention of the first “practical” typewriter in 1867 by Christopher Lathan Sholes of Milwaukee, Wisconsin, numerous studies have been conducted evaluating the typewriter as a writing tool. Kreiter (1981) stated, “no other device was comparable to the typewriter to teach children spelling and punctuation.” Published research studies identifying who should teach typewriting, at what grades, for how long appeared in many journals. These questions continue to be asked as a result of elementary children having frequent access to microcomputers. According to a study completed by Sormunen (1989) almost every elementary school in the nation had computers available in the classroom. With the increased opportunity for children to use the computer as a writing tool, how efficient are children inputting data? One concern is



Traditionally, typewriting skills—now referred to as keyboarding skills—were taught in high schools by Business Education- licensed teachers who have been trained to teach the psychomotor manipulations of keyboarding. With the present trend toward the introduction of keyboarding at the elementary level, are elementary-licensed teachers now teaching these skills? As Koenke (1987) stated “the business education teacher is usually the local consultant and inservice leader in keyboarding with the elementary teacher being assigned a major role in keyboarding instruction.”

How much time is needed to teach the “touch” method of keyboarding? The “touch” method (positioning the hands on home row using each finger to key specific keys according to the slant of the keyboard) is referred to as the most efficient method of inputting. In 1985 the Alaskan Department of Education suggested:

In the best of all possible worlds, in the ideal school district with the ideal, appropriately sequenced computer curriculum, all fifth or sixth graders would receive several weeks of keyboarding training to prepare them for middle and high school word processing and general computer use (p.60).

Erickson (1993) recommended “the ideal age group for keyboarding instruction is the upper elementary school level (ages 10-12).” The National Business Education Association (1992) stated “while research studies support the benefits of introducing keyboarding in the upper elementary level, it is imperative that youngsters be provided keyboarding instruction prior to consistent use of computers, at any grade level.”

The National Commission of Excellence in Education included computer literacy as a basic knowledge for all students. Since this recommendation was made, what has happened in subsequent years? As states and school districts mandate computer literacy, are they providing reinforcement of keyboarding that leads to the development of usable skills?

In order to determine the status of keyboarding instruction, a questionnaire was developed and mailed in 1993 and in 1996 to all 428 school districts in Wisconsin. As shown in the following table, the response rate in 1993 was 67%, representing 285 school districts and the response rate in 1996 was 66%, representing 284 (242 + 42) school districts. The school districts that responded in 1993 and in 1996 (224) were used to test the hypothesis that there will be no significant difference in the number of school districts introducing keyboarding at the elementary level in 1996 compared to 1993. When comparing the matched responses, the hypothesis was rejected. A chi square test indicated a significant difference below the 0.001 level.

SUMMARY OF RESPONSES				
	<u>Mailed</u>	<u>Not Usable*</u>	<u>Districts Represented</u>	<u>Percentage</u>
Surveys mailed in 1993	439	8	285	67%
Surveys mailed in 1996	433	-	242	66%
Follow-up surveys in 1996	82	2	42	
Matches-Both in 1993 and 1996	-	-	224	52%

* Surveys were returned or eliminated because of duplication or no name identified. Surveys were mailed to the Business Education Department of each high school. Some school districts had more than one high school, resulting in more than the 428 surveys being mailed.

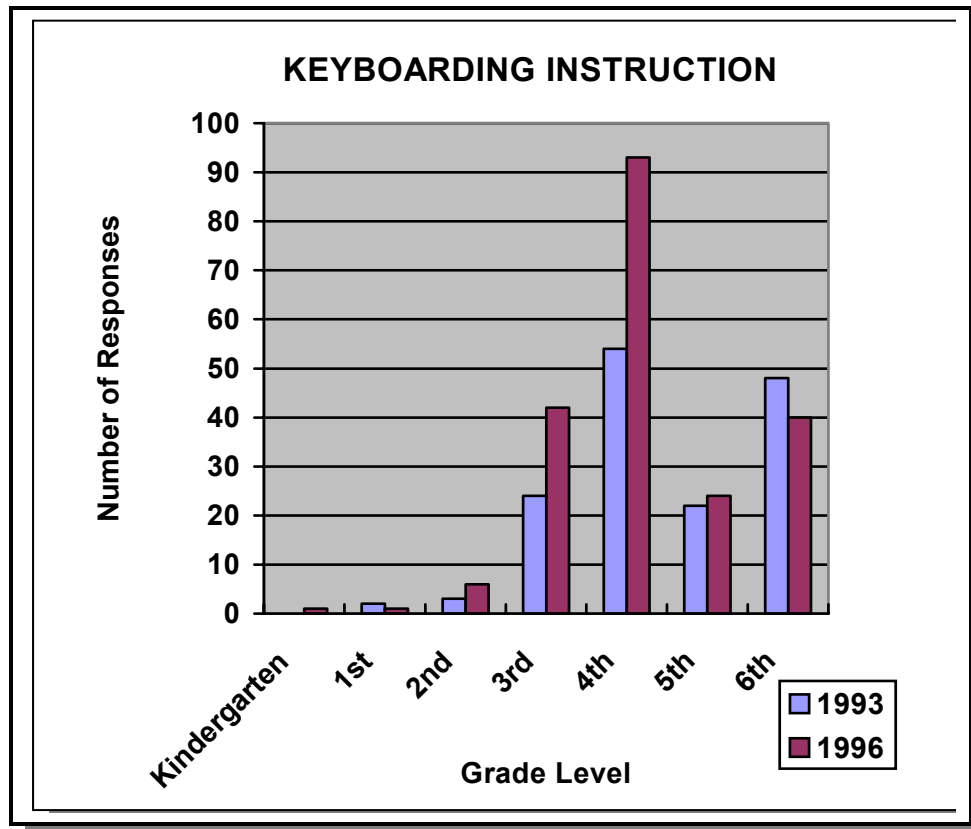
The findings of this study indicated that there was a significant increase in the number of school districts introducing keyboarding at the elementary level from 1993 to 1996. However, 275 of the school districts responding to this survey did not include keyboarding instruction at the elementary level. All of the following percentages calculated in this study are based on the 153 responses (54%) of the total responses in 1993 and 207 responses (73%) of the total responses in 1996, which indicated the inclusion of keyboarding.

ELEMENTARY KEYBOARDING FINDINGS					
	<u>Total Responses</u>	<u>YES</u>	<u>%</u>	<u>NO</u>	<u>%</u>
1993 Introduction of Keyboarding K-6	285	153	54%	132	46%
1996 Introduction of Keyboarding K-6	284	207	73%	77	27%

KEYBOARDING INSTRUCTION

Survey responses were categorized according to the number of school districts with one to three elementary schools referred to as *smaller school districts* and school districts with four or more elementary schools referred to as *larger school districts*. In 1993 responses from the smaller school districts indicated that keyboarding was taught primarily by Business Education-licensed teachers (61.7%) rather than by elementary classroom teachers (27.2%). However in 1996, the number of elementary –licensed teachers teaching keyboarding increased to 37%, while the number of business Education-licensed teachers decreased to 50%. In 1996 the number of Business Education-licensed teacher teaching keyboarding in larger school districts (29%) remained the same as 1993, while the number of elementary-licensed teachers, as well as the number of both Business Education-licensed and elementary-licensed teachers increased to 53%. This data indicates that as elementary-licensed teachers become more familiar with computers, more keyboarding instruction is included in their elementary curriculum.

As indicated in the following charts, the “touch” method of keyboarding (positioning the hands on homerow using each finger to key specific keys according to the slant of the keyboard) was not introduced at the kindergarten level in 1993 and only one school district in 1996 reported including instruction at the kindergarten level. In 1993 at the first grade level, two school districts introduced keyboarding compared with only one in 1996. During the 1993 school year, only three school districts introduced keyboarding in the second grade, compared with six school districts in 1996. A large increase was seen at the third grade level, where in 1993, 15.7% (24) school districts introduced keyboarding, compared with 20.3% (42) in 1996. Likewise, an impressive increase was seen at the fourth grade level in which 35.5% (54) introduced keyboarding in 1993 with 44.9% (93) in 1996. At the fifth grade, 14.3% (22) of the 153 total positive responses in 1993 indicated teaching keyboarding; whereas, in 1996, 11.6%, (24) of the 207 total positive responses taught keyboarding.



In 1993 keyboarding at the sixth grade received the second highest number of responses with 31.4% (48); whereas in 1996, it was the third highest with 19.3% (40). This data indicates that keyboarding instruction is being introduced in lower levels, specifically at the third and fourth grades.

Respondents were asked to specify the amount of time designated for keyboarding instruction. Categories were: 1) 3 weeks, 25-45 minutes per day; 2) 4 weeks, 25-45 minutes per day; 3) 6 weeks, 25-45 minutes per day; 4) 9 weeks, 25-45 minutes per day; 5) 6-9 weeks, 30-45 minutes every other day; and 6) other time periods. The amount of time for keyboarding instruction varied with each grade level and especially with each classroom teacher at the lower grade levels. The most common instructional time indicated in 1993 and in 1996 was 25-45 minutes everyday for six weeks. At the first and second grade levels, instructional time for keyboarding generally varied with each classroom teacher. Instruction was not structured the same every day or every week. At the third grade, keyboarding was taught primarily for 30 minutes every day for four to six weeks, although many schools reported teaching the skill once, twice, or three times a week for 30 minutes.

A variety of instructional time allotments were reported at the fourth grade level. In 1993 more than half (55%) of the school districts responding offered keyboarding instruction for 25-45 minutes per day for six to nine weeks. Ten percent of the schools offered keyboarding on an every-other day basis from 30-45 minutes for 12 to 18 weeks. Likewise in 1996, more than half (53%) of the schools teaching keyboarding at this grade level offered every day instruction for three to nine weeks, 25-45 minutes a day. Another 13% introduced keyboarding in six to nine weeks, 30-45 minutes every-other day.

At the fifth grade level in both years 1993 and 1996, instruction was most often completed in six to nine weeks, 25-45 minutes every day. Other reported time periods varied from 20 minutes, three times a week for the entire year to twelve weeks, 40 minutes a day.

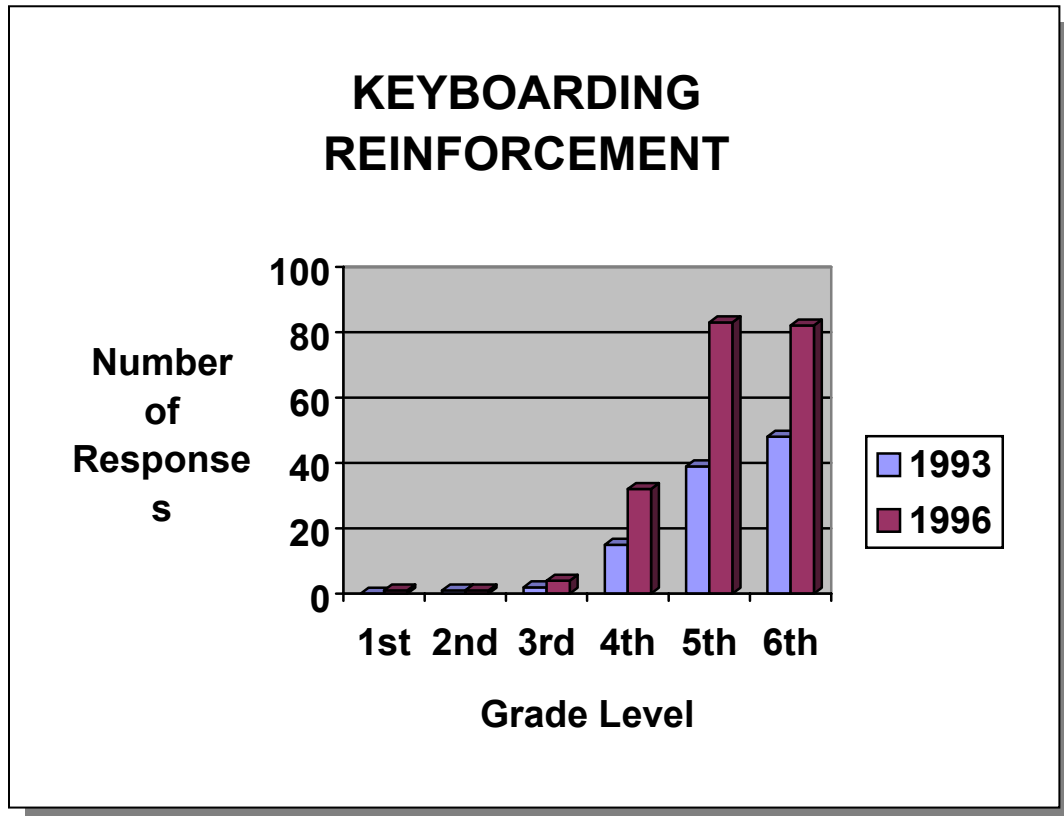
The sixth grade instructional time coincided with the structured class periods of each school. In 1996, more schools reported teaching keyboarding at the middle school level, whereas, in 1993 many schools had sixth grade in the elementary K-6 building. In both years 1993 and 1996 more than half (62%, 60% respectively) required keyboarding 30-45 minutes every day for a period of six to nine weeks.

REINFORCEMENT

Once the “touch” method of keyboarding was introduced, reinforcement of correct keystroking was measured. In comparing the amount of reinforcement reported in 1993 with the total number of responses in 1996, a dramatic increase occurred. Combining all responses in 1993 for grades 1-6, 68.6% (105) school districts reported reinforcement; whereas in 1996, 99% (205) responded that keyboarding was reinforced at least once at another grade level. Many responses indicated that the skill was reinforced at every grade level following introduction.

Since the introduction of keyboarding primarily occurred in the fourth grade, reinforcement was reported most frequently at the fifth and sixth grade. Reinforcement at the fifth grade more than doubled (84 responses in 1996 compared with 39 responses in

1993). At the sixth grade, a substantial increase was indicated (82 responses in 1996 compared with 48 responses in 1993). Many schools reported reinforcement at both grade levels.



The survey asked respondents to indicate the type of instructional software used in teaching keyboarding. Instructional software graphically shows which finger should be used to key the letters of the alphabet and computer operational keys. The various editions of *MicroType – The Wonderful World of Paws* (South-Western/ITP Publishing Company) were the predominant software packages used by school districts in both 1993 (34%) and in 1996 (23.7%). *Ainsworth Keyboard Trainer* gained in popularity from 1993 (2.6%) to 1996 (5.3%). Another popular software was *Type to Learn* with responses in 1993 (5.2%) compared to 1996 (5.3%). The following software packages had comparable responses in 1993 and 1996, *Ultra Keys*, *Touch Typing for Beginners*, *All the right Type*, *CompuKeys*, and *Alphabetic Keyboarding*. Another 9.8% of respondents used various software packages, such as *Stickey Bears*, *KeyWords*, and *CommuniKeys*. In 1996 software packages as *Mario Teaches Typing* and *Herzog* were mentioned. The remaining school districts (27.5% in 1993 and 32.3% in 1996) reported using an “open screen” with a word processing software packages such as *AppleWorks*, *Microsoft Works*, *ClarisWorks*, etc. or did not specify using a software package.

INSTRUCTIONAL SOFTWARE MATERIALS				
<u>Software</u>	1993		1996	
	<u>Responses</u>	<u>%</u>	<u>Responses</u>	<u>%</u>
MicroType: The Wonderful World of Paws	54	35.3	49	23.7
Ainsworth Keyboard Trainer	4	2.6	11	5.3
Type to Learn	8	5.2	11	5.3
Mavis Bacon Teaches Typing	4	2.6	8	3.9
Ultra Keys	2	1.3	8	3.9
Touch Typing for Beginners	5	3.3	7	3.4
All the Right Type	6	3.9	7	3.4
CompuKeys	10	6.5	7	3.4
Alphabetic Keyboarding	3	2.0	7	3.4
Various other software packages	15	9.8	25	12.0
Did not use instructional software*	42	27.5	67	32.3
Note: Not all schools responded to this question.			1993 N =153; 1996 N = 207	

Respondents were asked to identify the textbook, if one was used in teaching keyboarding. In school districts using a textbook to augment instruction, again – “Paws” textbooks (*Paws Presents Computer Keyboarding or Computer Keyboarding, An Elementary Course*) were used most in both surveys of 1993 and 1996 (22.9% compared with 32.4%, respectively). Another very popular textbook was *I Can Keyboard* (Glencoe/SRA Publishing company) which received comparable responses in 1993 and in 1996 (16.3% compared with 15.9%).

The questionnaire asked respondents to identify what word processing software was used in Keyboarding. *AppleWorks* continued to lead in both surveys—18.3% (28) in 1993 compared with 21.3% (44) in 1996. *Microsoft Works* software gained in 1996 from 8.5% (13) in 1993 to 21.3% (44) in 1996. *ClarisWorks* software gained impressively, comparing 1993’s 22.6% with 1996’s 12.1% of respondents. Other word processing software that was reported in 1993 included *Bank Street Writer*, *MacWrite*, *Children’s Writing and Publishing Center*, and *Magic Slate*. Additional word processing software such as *PerfectWorks* and *Microsoft Office Professional* were reported being used in 1996.

WORD PROCESSING SOFTWARE CAMPARISON					
Software	1993		1996		
	Responses	%	Responses	%	
AppleWorks	28	18.3	44	21.3	
Microsoft Works	13	8.5	44	21.3	
Claris Works	4	2.6	25	12.1	
Micro Typewriter	12	7.8	10	4.8	
WordPerfect	6	3.9	15	7.2	
FredWriter	8	5.2	7	3.4	
Other word processing software	10	6.5	26	12.5	
Did not specify	72	47.2	36	17.4	
Note: Not all schools responded to this question			1993 N = 153; 1996 N = 207		

In 1993 two school districts taught keyboarding on typewriters with the remaining school districts using computers for keyboarding instruction. In 1996, no school district reported using typewriters. However, the kind of computer used changed over the past three years from Apple IIe to Macintosh computers at the K-6 level. Statistically in 1993, almost half (49%) of the schools that introduced keyboarding used Apple IIe computers compared with 38.2% in 1996. The largest increase reported was with the Macintosh computers at the K-6 level. In 1993, 31% (48) of the schools reported using Macintosh computers, while in 1996, 55.1% (114) of the schools reported using Macintosh computers. Another large increase was reported with the IBM/PC computers. In 1993, 27% (4) schools reported using IBM or PC environment computers compared with 48.3% (100) in 1996. Apple GS computers decreased from 1993 (32%) to 1996(29.5%).

Over the three-year period, many schools adopted the middle school concept whereby sixth grade was joined with seventh and eight grades. Separating the K-5 level and the sixth grade in 1996, more K-5 schools reported using Macintosh computers, (72) followed by Apple IIe (59), IBM/PC (49), and Apple GS (45); whereas at the sixth grade level, more schools reported IBM/PC (51) followed by Macintosh (42), Apple IIe (20), and Apple GS (16). Many school districts indicated using several different types of computers with one kind in a lab setup and another kind in the classroom. In 1996, a few surveys reported using DreamWriters or Alpha Smart word processors to teach the introduction of the keys to elementary children.

COMPUTERS						
Computer	1993			1996		
	K-6	%	K-5	6 th Grade	Total	%
Apple IIe	75	49.0	59	20	79	38.2
Apple IIGS	49	32.0	45	16	61	29.5
Macintosh	48	31.0	72	42	114	55.1
IBM/PC	41	27.0	49	51	100	48.3
Note: Many schools reported using more than one kind of computer.					1993 N = 153; 1996 N = 207	

The respondents were asked to indicate if keyboarding was integrated in other elementary subject areas. Most responses in 1993 and 1996 indicated that keyboarding was integrated predominantly with language arts. As children filled the computer screens inputting sentences, they were asked to make decisions pertaining to spelling, capitalization, grammar, punctuation, clarity of thought, and sentence structure. Other classes where keyboarding was used were in Social Studies, Science, Reading, Math, F/CE, and Health. In 1996 respondents indicated that keyboarding was an integral part of computer literacy units. Keyboarding was reported being used in producing newsletters, science fair reports, folk fair projects, cookbooks, etc. Several respondents indicated that keyboarding was used in any class that required reports, letters, term papers, or research papers. Once keyboarding was introduced, it was integrated throughout the elementary curriculum.

SUMMARY AND CONCLUSIONS

Based on the result of this study, the occurrence of keyboarding instruction is rapidly increasing in the lower elementary grades. A significant increase was found in the number of school districts that included keyboarding instruction in the elementary K-6 curriculum. The largest number of responses indicated that the “touch” method (a more efficient method of inputting instead of the “hunt and peck” method) of keyboarding was taught at the third and fourth grades.

Survey responses indicated that elementary keyboarding skills were taught most often by Business Education-licensed teachers, although the number of elementary-licensed teachers introducing the keys increased substantially over the three-year period. The responses indicated that elementary-licensed teachers are becoming more comfortable in using computers and are realizing the value of children possessing efficient keyboarding skills.

Although the amount of time designated for keyboarding instruction varied considerably with each grade level, the most common instructional time was 25-45 minutes every day for six weeks. Teachers realized the importance of every-day instruction in developing a skill, which follows recommended published guidelines on keyboarding instruction. Schools reporting every-other day instruction indicated a longer period of time to teach keyboarding skills—usually nine weeks or more.

The importance of reinforcement of keyboarding skills was evidenced by the dramatic increase in the number of school districts reporting the occurrence of reinforcement at subsequent grade levels. Since the introduction of the keys primarily occurred in the fourth grade, reinforcement was reported most frequently at the fifth and sixth grades. Most schools reinforced keyboarding at each grade level once the “touch” method was introduced.

Although numerous self-instructional keyboarding software materials are available in teaching the keyboarding skills, *MicroType: The Wonderful World of Paws* was most often used. Keyboarding success was based on the teaching methodology not necessarily the software package used in instruction. Similarly, in the selection of a textbook used for instruction, *Paws Presents Computer Keyboarding* was used most frequently as school districts adopted the complete “Paws” program.

School districts reported using Apple computers in the keyboarding instruction with Macintosh computers used most frequently at the kindergarten through sixth grade level. Over the three-year period of this study, many schools adopted the middle school concept, which moved the sixth grade in 1996, more K-5 schools reported using Macintosh computers, whereas in the sixth grade, more schools reported using IBM/PC computers. Many schools reported using several different types of computers with one kind in a computer lab setup and another kind in the elementary classroom. In 1996 a few surveys reported using small portable Alpha Smart word processors to teach the introduction of keys, which allowed instruction to take place in the elementary classroom instead of the computer lab.

Once the keys were introduced, keyboarding was integrated primarily with language arts. Other subjects where keyboarding was used were Social Studies, Science, Reading, Math, F/AC, and Health classes. Respondents also indicated that keyboarding was an integral part of computer literacy units. As elementary children became proficient using the computer, opportunity to integrate keyboarding skills increased throughout the elementary curriculum.

RECOMMENDATIONS

Keyboarding instruction is in a transition period as elementary-licensed teachers have the opportunity to use the computer in teaching children language arts skills. In order for children to use the computer for word processing, efficient inputting skills are needed. The “touch” method of keyboarding allows children to input words faster than they can write in longhand and allows corrections to be made easily. However, traditionally, the “touch” method of keyboarding was taught by business Education-licensed teachers who have been prepared to teach the psychomotor manipulations and the psychology of keyboarding skill development. As computers are being used more frequently for word processing by elementary children, an efficient system of inputting needs to be taught before children develop their own “hunt-and-peck” system. Elementary-licensed teachers, therefore, need to become knowledgeable regarding the appropriate instruction of keyboarding. The Business Education-licensed teacher should be consulted within each school district to develop an elementary Keyboarding Instructional Program that includes in-servicing elementary-licensed teachers on (1) the importance of teaching the “touch” method, (2) the appropriate methods of teaching keyboarding, and (3) the psychology of keyboarding skill development (reinforcement).

The Business Education-licensed teachers in the school district can serve as mentors to the elementary-licensed teachers, thereby providing a smooth transition from the introduction of the “touch” method and reinforcement in using the computer for more advanced computer applications that are offered at the middle and secondary grades. One of the goals of keyboarding instruction is for the students to develop a “usable” keyboarding skill of 30 words or greater.

As technology advances at a rapid pace, computer keyboarding skills are essential for every child. Although there has been a significant increase in the number of school districts including elementary keyboarding instruction, every school district should

require keyboarding instruction within the elementary curriculum as part of a computer literacy standard.

All children should have the opportunity to learn and develop efficient inputting skills to be able to communicate effectively on the computer. Efficient inputting allows children to key in more sentences in a given period of time, providing more time to concentrate on decisions pertaining to spelling, grammar, punctuation, clarity of thought, and sentence structure. With Internet access, children will be more productive in communicating with e-mail and exploring the World Wide Web.

Once the keys are introduced, keyboarding skills should be reinforced and integrated in other subjects within the elementary curriculum. Language Art is a common thread across curriculum. With efficient keyboarding skills, reports, letters, term papers, and research projects can be completed in less time than previous handwritten assignments. Keyboarding, now considered as a “basic” skill, and be included in all elementary subject areas.

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