DOCUMENT RESUME

ED 384 179 EC 304 018

AUTHOR	McInturff, Johanna R.
TITLE	Creating a Public Domain Software Library To Increase Computer Access of Elementary Students with Learning Disabilities.
PUB DATE	95
NOTE	70p.; Ed.D. Practicum, Nova University.
PUB TYPE	Dissertations/Theses - Practicum Papers (043) -- Tests/Evaluation Instruments (160)
EDRS PRICE	MF01/PC03 Plus Postage.
DESCRIPTORS	*Access to Information; *Computer Assisted Instruction; Computer Literacy; *Computer Software; Elementary Education; Information Services; *Inservice Teacher Education; *Learning Disabilities; *Library Collection Development; Program Development; Student Participation
IDENTIFIERS	*Public Domain Software

ABSTRACT

Information is provided on a practicum that addressed the lack of access to computer-aided instruction by elementary level students with learning disabilities, due to lack of diverse software, limited funding, and insufficient teacher training. The strategies to improve the amount of access time included: increasing the number of computer programs by creating a public domain software library, widening the variety of software, and providing teacher training to integrate software across the curriculum. Public domain software was obtained from online services, computer bulletin boards, and commercial vendors. Each program was previewed and classified by subject area (English, spelling, reading, social studies, science, and music) and by type (drill, application/strategy, entertainment, simulation, creativity, and utility). The service was publicized, and teachers were trained in procedural access. Students with learning disabilities reproduced the software, designed and printed labels, and maintained a dissemination policy. An increase in student self-esteem and social interactions was displayed. Computer access time increased as the number of programs increased. By supplying inexpensive, functional software to the teachers of children with learning disabilities for use in computer-aided instruction, individual student needs were addressed. Appendices include a Teacher Questionnaire for Computer Access, a list of seven vendors, and a list of the software acquired. (Contains 34 references.) (SW)

Creating a Public Domain Software Library to Increase Computer Access of Elementary Students with Learning Disabilities

by

Johanna R. McInturff

Cluster 51

A Major Practicum Report Presented to the Ed. D. Program in Child and Youth Studies in the Partial Fulfillment of the Requirements for the Degree of Doctor of Education

NOVA SOUTHEASTERN UNIVERSITY

1995

PRACTICUM APPROVAL SHEET

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April 6, 1995

Date

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure

ABSTRACT

Creating a Public Domain Software Library to Increase Computer Access in Elementary Students with Learning Disabilities. McInturff, Johanna R., 1995: Practicum Report; Nova Southeastern University, Ed.D. Program in Child and Youth Studies. Public Domain Software/Computer Aided Instruction/Access/Teacher Training/Rural/Elementary/Learning Disabilities.

This practicum was designed to address the lack of access to computer-aided instruction by elementary learning disabled students due to lack of diverse software, limited funding, and insufficient teacher training. The strategies to improve minutes of access time included increasing the number of computer programs by creating a public domain software library; widening the variety of software to include problem solving and utilities; and providing teacher training to integrate software across the curriculum.

The writer obtained public domain software from online services, computer bulletin boards, and commercial vendors; produced an order form; publicized the service; solicited requests for software; and trained teachers in procedural access. Students with identified learning disabilities reproduced the software; designed and printed labels; and maintained a dissemination policy resulting in an increase in self-esteem and social interactions.

The data revealed that computer access time increased as the number of programs increased. By supplying inexpensive, functional software to the teachers of learning disabled youngsters, individual student needs were addressed via computer-aided instruction.

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Permission Statement

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CHAPTER I

INTRODUCTION

Description of Community

In a mountainous area, where until recently the coal mining industry was responsible for placing food on the tables of most of the state's population, lies a rural county with a population of nearly 65,000. The rugged terrain and secondary road system deficiencies prevent major industries from locating within the immediate area because of problems in access by air and highway. The diminished importance of the mining industry has been partially responsible for the loss of nearly 12.3% of the county population in the past ten years. Of the families remaining, poverty is common; children who live below the poverty level comprise 29.3% of the youngsters in the county and 16.8% of families sought help through Aid to Families with Dependent Children (WV KidsCount, 1994).

Minorities constitute 7% or 4,560 members of the county population. Of the total non-white population, most are African-Americans, with Asian-Americans, Hispanics, and Eastern Indians comprising the remainder. Most of the Asians and East Indians are physicians and their families, recruited to provide medical care in this Appalachian region.

In addition to the rural, rugged aspects of the area inhibiting the recruitment and maintenance of employment opportunities, other vocations are regionally limited such as specialized doctors and other medical personnel, including obstetricians and surgeons. The entire county population is served by 136 physicians for a ratio of one doctor for every 478 patients. A deplorable consequence affecting the children in the region is the lack of prenatal care and the numbers of low birth-weight babies. Only one obstetrician and two family practitioners deliver babies, so many pregnant women seek prenatal care outside of the region or state. While one in three pregnant women does not obtain early prenatal care, the percentage of low birth-weight babies ranks this area 53rd out of 55 counties in the state (WV KidsCount, 1994). Family ties are strong with extended families providing much of the care of the youth of the county.

The school district is ranked fifty-third out of fifty-five counties in the state that ranks in the bottom five nationwide in unemployment, violent crime, and mean income (U. S. Census Bureau, 1992). Three senior high schools, four schools serving K-8 students, and twenty elementary schools supply most of the students attending the two institutions of higher learning in the county.

Nearly 12% of the district's student population participate in special education, as services are provided for gifted, deaf, visually impaired, physically handicapped, mentally impaired, learning disabled, autistic, and behaviorally disordered students. Special needs students on the elementary level are generally served in their community schools; however, gifted students are frequently bussed to centers for gifted education.

Each elementary school administers services for children with learning disabilities. The twenty classrooms offer a continuum of academic aid, from inclusive classes to full-time, special programs. The degree of learning difficulties among the 391 county LD students is varied and is reflected in the personalized educational program for each child.

Writer's Workplace and Role

The writer was a teacher of elementary students with learning disabilities in a school with a community-based, academic orientation. As one of three teachers employed for special needs students, the writer also administered the school's computer lab as systems operator for the 32-computer network. By conducting general education and Chapter I administrative training sessions at other locations, the writer indirectly facilitated computer usage throughout the district.

The 15 LD students in the writer's work setting were considered to be computer literate, and comfortable with both Apple and IBM software. These students often served as computer tutors for general education pupils within the school, collaborating with the writer to demonstrate the ease and benefits of computer-aided instruction (CAI). The resulting confidence and assuredness demonstrated by these LD students in the realm of computers encouraged a definitive path to computer awareness that could be replicated in other settings.

The general environment from which most LD students emerged offered little in opportunities for continued technological access, due to the lack of business and industry. Therefore, schools in the district must assume a responsibility to generate an awareness of computers and software to facilitate the development of a sound foundation in basic skills and lifelong learning. Such technological access would provide marketable skills to realize employment in other regions.

CHAPTER II
STUDY OF THE PROBLEM

Problem Description

During district-wide professional gatherings, many teachers of elementary LD students expressed a desire to enhance their use of technology within the classroom to address special needs of their pupils and provide exposure to computers. Informal discussions regarding the inhibitors to effective technological integration provoked a curiosity of the writer to investigate this foible.

Few participants in the educational process will argue about the necessity and benefits of technology in the classroom. Computers are tools that enhance skills in math, reading, spelling, comprehensive language arts, and problem-solving strategies (Budoff, Thormann & Gras, 1984; Murphy, 1984; Trifiletti, Frith, & Armstrong, 1984; Mokros & Russell, 1986; Vaughn, Schumm, & Gordon, 1993). In classes for students with learning disabilities, access to computers has provided opportunities to achieve commensurate with non-disabled peers (Miller & Cooke, 1989). During the last ten years, the writer's school district has furnished computers to both general education and special education programs to be integrated in daily instruction. Upon the initial purchases, standard software was provided for each school and included diskettes in the areas of math, reading, geography, and spelling. In most cases, the software was placed in a central location to be shared by the staff in each school and integrated into the curriculum.

As the years passed, the original software became dispersed and stored in various classrooms on each site. Through continual use and exchange between classrooms, the software became damaged or misplaced. Additions to the available software in the form of content broadening and replacement of inoperable diskettes were provided by general education appropriations when necessary. Unfortunately, special education budget considerations were prioritized to purchase expensive, specialized equipment for certain exceptionalities to implement Individualized Education Plans and did not include the replenishment of computer software. Teachers of the learning disabled discovered their classrooms with computer hardware, but limited and damaged software to operate it.

Replacing old, weathered software in the nineteen other LD classes district-wide was difficult due to the expense of purchasing diskettes with the monetary allotment provided to each teacher. Commercially produced software was expensive, and teachers needed the time and experience to preview the content to determine compatibility to student learning styles and academic and cognitive ability before any purchase was finalized. With the variation in achievement levels in each classroom, one costly piece of software could not meet the individual needs of all students.

So, while the equipment was present to encourage the adequate, creative, and appropriate use of computer-aided instruction in each classroom servicing learning disabled youngsters, teachers felt that access by students was limited due to lack of software, need for funding, and little or no teacher training in software applications. Appropriate software can foster individual learning styles and remediate individual deficiencies in academic progress. Computer-aided instruction stimulates the development of thinking skills from knowledge to evaluation. Learning disabled children can possess the tools for success when they experience the patience, sequencing, and structure of computer-aided instruction. The future mandates technological mastery. The problem addressed in this practicum was that elementary learning disabled students had limited access to computer-aided instruction.

Problem Documentation

For the purposes of uniformly collected baseline data, the elementary learning disabilities teachers at each of the district's 20 elementary schools were questioned about their classroom computer patterns (Appendix A). For comparison purposes only, a general education teacher from each school was also requested to complete the survey. Interestingly enough, the results about hardware are very similar, with the classes averaging one computer for every six students in general education and one computer for every eight LD students.

When numbers of software programs were compared, the figures show a striking difference: 285 programs in general education and 105 in the LD classes.

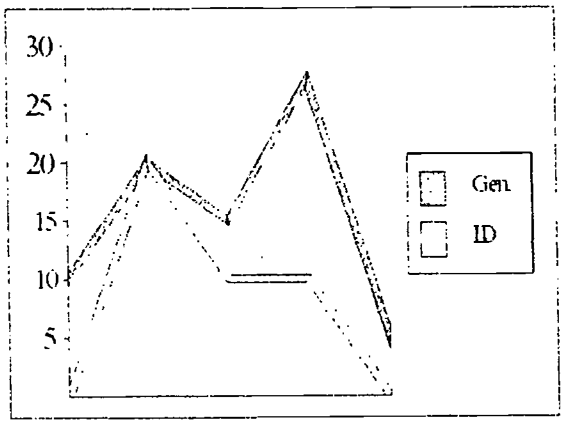

Figure i : Mean number of minutes of computer access time per day .

Similarly, the numbers of programs in each class seem to impact on the amount of time the students could access the computers. Students in general education had an average weekly computer access of 75 minutes, while LD students averaged 40 minutes, as shown in Figure I. Survey results confirmed the existence of the problem; teachers of learning disabled students needed additional software to perform to maximum efficiency in encouraging the development of their students' abilities. Corresponding to the differing totals of software programs, the types and contents of programs differed from general education to special education. In general terms, software in the general education classes stressed reading and math. The LD software stressed reading and math, but demonstrated an equivalent accent upon English and spelling.

Software emphasizing content drill and practice, logic, problem-solving, and utility software was more prevalent in general education than LD classes. Both groups possessed software for word processing and a database application.

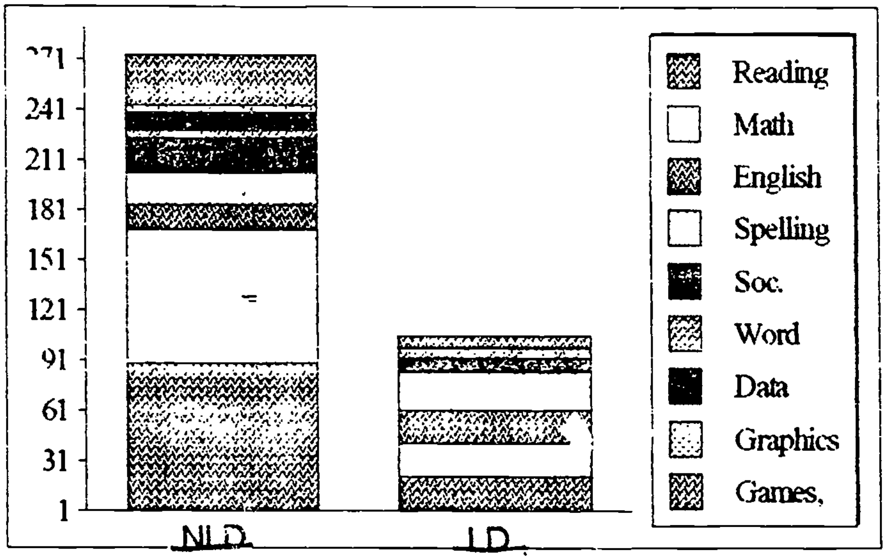

Figure 2: Classifications of computer software in general education and LD classes.

Due to the remediative/compensatory methods common in special education, and the high incidence of disabilities in language arts (Bender, 1992), it was exciting to discover that the LD classes had more software for English and spelling than the general education classes. When asked to classify the available software, both sets of respondents indicated that the primary nature of software was for drill-and-practice. The software associated with higher-order thinking skills and cognitive control generally consisted of games of reason or logic puzzles.

Another important discovery identified from the survey is that 36 of the 38 LD and general education teachers had not received computer training of any kind during the last five years. The two teachers who did receive specialized training were system operators for their schools' computer labs, and both received hardware and software orientation. The general education teachers and the teachers in LD classes unanimously acknowledged that additional training in hardware or software implementation would be sought if available in a central location.

Causative Analysis

Briefly, the causes of the problem of inadequate access to computer-aided instruction (CAI) seemed easily discernible. First, LD classes did not have enough software to successfully integrate it into the curriculum. With the existing software degenerating through use and misuse, most elementary learning disabilities classrooms could not incorporate the remaining software into every child's individualized educational plan. The students' achievement levels were too dispersed for equal access within the LD classes.

Secondly, due to budget prioritizing in the administration of special education funding, renewing software within the individual LD classes was supplanted by other essential technologies for other exceptionalities. The placement of students with multiple impairments in a school setting required an extensive expenditure for highly technical, extremely expensive equipment. Until such adjustments in fiscal outlay can be stabilized, replacement of software for elementary learning disabilities classes must be delayed. Additionally, the cost of commercially produced software seemed prohibitive when compared to the allocation for yearly supplies. When one software program absorbed the classroom budget for the entire school year, teachers had few options for obtaining different and effective software applications.

Finally, teachers were not informed about appropriate software and avenues to inexpensively obtain and favorably use it. To adequately preview and classify new software, teachers must devote an allotted amount of time for examination. The state-required 30 minute planning period for teachers falls short of temporal requirements to involve each student in constructive electronic instruction. According the Council for Exceptional Children (1991), " Teachers must establish the context, prepare students for using the technology, make links between the computer application and larger instructional context, and monitor students' performance on and off the computer." The desire to selectively integrate suitable CAI was further frustrated by the innocence of the teachers. The desire was strong; the means were absent.

Relationship of the Problem to the Literature

Combining the three aforementioned causes for the limited computer access by elementary learning disabilities students into a plausible, enactable solution required an examination of the literature to delve into previous efforts to reconcile the issues.

The foundation of the literature relied upon the effects of computer-aided instruction in influencing the learning of students. As a motivational tool, elementary children frequently rank computers as one of their favorite school activities, similar to music and physical education (Stodolsky, Salk, & Glaessner, 1991). Teachers, as well as students, find computers to be motivating for academic use (Darter & Phelps, 1990; Tierney & Simmel, 1990). The impact of such a powerful motivational method has many implications for the learner in the classroom (Cosden, 1988).

Twenty years ago, the idea of an "electronic" classroom meant electrical teaching machines pioneered by Skinner (1968). Initially, the teaching machines were used in industry and perceptual conditioning to control the contingencies upon which certain behaviors were reinforced. When a subject's response was correct, the teaching machine permitted the presentation of the next item. Incorrect responses triggered the repetition of the item until the subject responded correctly.

Consequently, educators began to closely examine the paradigm of programmed electronic instruction in order to adapt it to schools and universities. With the advent of microcomputers containing memory enough to run simple drill programs, the initiation of technology into classrooms leapt from machinery to circuitry. Schools and institutions began to steadily obtain computers to facilitate learning. According to Chiang (1986, p.118), "At record rates, school districts are purchasing microcomputer hardware and software to meet the needs of all students, particularly those with learning disabilities."

Computers are extremely effective in instructing pupils in most academic areas (Murphy, 1984; Trifiletti, Frith, & Armstrong, 1984; Brevil, 1987; Jones, Torgesen, & Sexton, 1987 ; Vaughn, Schumm, & Gordon, 1993). Facilitating progress for students in general education classes, the computer can also be a valuable tool with special needs children (CEC, 1991, p. 20).

Special needs children, specifically children with learning disabilities, learn differently than children in general education classes. Some need additional learning aids to compensate for their disabilities; others need to be taught different procedures for learning. Computer technology can address the varying needs and styles of learning in a manner that blends and weaves the fibers of an appropriate education into a lifelong means to achieve. The individual requirements and nuances of each child can be managed in an efficient, effective way.

Brevil (1987) discerned that computer-aided instruction is effective in teaching arithmetic skills to children with learning disabilities. She reported that computers give immediate feedback to correct or incorrect responses, increase motivation while decreasing self-conscious behaviors, make drill-and-practice activities interesting, and improve problem-solving skills more than traditional methods of instruction. Other researchers (Trifiletti, Frith, & Armstrong, 1984) also examined the acquisition of math skills via CAI by LD students. Their study determined that children with learning disabilities learned computerized math facts twice as fast as the control group. The drill-and-practice format of software teaches LD students to develop automaticity in responding (Hasselbring, Goin, &

Bransford, 1988). Partridge (1991) reported successful mastery of addition facts when CAI was used.

Comprehensive language arts abilities can also be enhanced with specialized software. Although early research on computers and writing proved disappointing (CEC, 1991), later empirical data demonstrated that keyboarding can increase the flow of written language and aid reversals in dyslexics (Murphy, 1984). Additionally, Murphy (1984) reports that fine motor remediation through technology helps generate a neat product, an esteem booster in children with special needs.

Computerized spelling is an academic area failing to generate much empirical research. Vaughn, Schumm, and Gordon (1993) investigated the effectiveness of certain motoric methods for teaching spelling to both LD students and students with no learning disability (NLD). In comparing handwriting, tracing, and keyboarding as instructional methods for teaching spelling, the researchers discover that computer instruction is as effective as the other methods. The LD students learn fewer words than the NLD students, but have an equivalent retention rate after several weeks with all motoric conditions.

One characteristic of learning ir. LD children is the need for mastery-oriented practice that is individualized, monitored, and emphasizes speed of responding (Anderson, Hiebert, Scott, & Wilkinson, 1985). With CAI, LD students can be helped to acquire better basic reading skills due to the self-pacing, non-judgmental nature of certain computer software (Mokros &

Russell, 1986). Jones, Torgesen, and Sexton (1987) stated that one factor separating good readers from LD readers is the rapid and accurate decoding of words. The speed of decoding words inhibits the comprehension of passages. These researchers suggested that LD readers may not receive enough practice in decoding to develop speed and improve accuracy when reading. Their research demonstrated that LD students who utilized CAI for 10 weeks improved in both speed and accuracy of words presented during the training. Another finding was that the skills generalized to words that were not practiced. Chiang (1986) states the generalizibility of CAI to paper-pencil tasks as a major concern and the stimulus for additional research.

Interestingly, equity in computer access is receiving much attention in the literature. The issues are complex with equity defined in terms of gender, economics, demographics, and subject matter (McAdoo, 1994). Research is recommended to address the gradations in gender differentiation (Waugh, 1985). In examining trends in technological usage during the 1980's, certain subgroups of users did not approach amounts of CAI characterizing other subgroups (McAdoo, 1994). Minorities, females, low achievers, and poor students used computers less frequently than others. Private industry and philanthropic organizations need to lend outside support to facilitate equity in access (Haas & Boelke, 1990).

Rural school districts are reported to demonstrate technological inequity due to the greater cost when fewer children with special needs are involved (Haas

& Boelke, 1990), but McAdoo (1994) stated that inequity is not a problem of access, rather, how software is used. In further discussion, he related that poor schools use more drill-and-practice software, while richer schools use software to develop higher order thinking skills.

An educational program in conjunction with computer-aided instruction is as effective as a traditional method of teaching; sometimes the results exceed those obtained by traditional methods (Bozeman & Heirstein, 1986). Of course, the types of software can impact on the nature of the learning experience. Within the educational arena, four major subtypes of software are generally accepted : drill-and-practice, tutorial, simulations, and utility (Majsterek, 1984; Bozeman & Heirstein, 1986; Brevil, 1987; CEC, 1991)

Drill-and-practice software is comparable to memorization via the "flashcard" procedure. Facts are presented quickly; facts are presented repeatedly. Memorization of facts such as multiplication tables or the capitals of the states are examples items in drill-and-practice software. It can be used to develop automacity in mildly handicapped students (CEC, 1991) and enable learning disabled children to profit educationally (Majsterek, 1984).
Drill-and-practice is the type of software most commonly found in classrooms. In a survey of 50 school districts by Mikros and Russell (1986), the responses of 35 special needs teachers reflect that only 8 software titles in their possession were <u>not</u> drill-and-practice.

Computer software can be adapted to fulfill the role of tutor, empowering LD students to progress at their own rates. Tutorials provide a means to present new information to the student and to subsequently question for comprehension. This type of software is patterned on the early teaching machines, but has been supplanted with animation, sound, speech, and graphics (Bozeman & Hierstein, 1986; Cohen & Spenciner, 1989).

An exciting type of software being utilized with increased frequency in the educational setting is the problem-solving variety, commonly called simulation software. Reality-based scenarios require students to define a goal, hypothesize, attempt varying strategies, and learn from their errors (Mokros & Russell, 1986). These researchers relate several characteristics of this type of CAI, including the option of student choice in goal selection, encouragement of approximation or estimation, and the versatility to adapt to many subject areas. Majsterek (1984) states, "Simulations also afford real world learning involvement that enables subjects like history, science, and geography to become personally meaningful." Simulation software is encouraged to replace and supplement programs of drill-and-practice (Majsterek, 1984, Mokros & Russell, 1986, Brevil, 1987; McAdoo, 1994).

Finally, classrooms are beginning to perform many tasks with utility software, such as word processors, databases, spreadsheets, and desktop publishing programs. The productivity factor is stimulated by the use of utility software, specifically with word processing programs. Comparable to calculators as tools in math conceptualization, utility software provides a tool to facilitate the development of information-processing strategies. The subtle and multifaceted uses of utility software must be examined by teachers and others to determine the potential of this type of software (Waugh, 1985).

With the variety of choices for individual instruction available to teachers, the complexity of CAI is disappointing within the classroom. In their survey to 381 teachers, Cohen and Spenciner (1989) discovered that only 29.5% used computers. Russell (1988) discerned that 66% of the teachers he surveyed had taken computer classes in LOGO or programming. Mokros and Russell (1986) recounted that general education and special needs teachers had equal amounts of computer inservice, but 11% of the special educators had IEP software training. Not one teacher in their survey reported training on effective software integration into the curriculum.

Woodward (1992) stated that teachers are resistant to technological change. McAdoo (1994) said that isolation and inexperienced teachers inhibit technological integration. But, teachers report differing causes for the inhibited use of technology. Many professionals state that lack of appropriate software is the primary reason technology in the classroom is not maximally applied (Russell, 1988; Cosden, 1988; Cohen & Spenciner, 1989). Others call for teacher training (Majsterek, 1984; Mokros & Russell, 1986; Partridge, 1992). Woodward (1992) related the opinion that computer usage will become more prevalent when newly-graduated, computer-literate teachers join the ranks of public school teachers.

The literature over the preceding ten years was crowded with examples of the effectiveness, benefits, and obstacles to precise adoption of computer technology and software for educational purposes. A viable combination of the research and opinions of learned experts changed the situation of inadequate computer access for elementary learning disabled students in the writer's district.

CHAPTER III

OUTCOMES AND EVALUATION INSTRUMENTS

Specialized software and electronic learning through computers benefits children with learning disabilities. Increased academic achievement combined with a technologically literate future can result from a patient, efficient computer learning experience. Each child can progress individually with a program driven specifically for drill-and-practice or develop lifelong reasoning skills through problem-solving simulations. Children identified as specific learning disabled should have equity in software and optimum access to computer-aided instruction to maximize the efficacy of their intermediate and lifelong learning.

Goal

The goal projected for this practicum was to increase the access to computer-aided instruction by elementary learning disabled students. As reported by the teachers of the LD students, deficits such as limited funds, few software programs, and inability of teachers to adequately and comfortably use CAI must be overcome in any strategy for goal attainment. Increasing the amount of time that students are permitted to seek computer-aided instruction must reflect a combination of approaches to overcome obstacles preventing access.

Children with learning disabilities can benefit f. .me engaged in technological instruction as individual needs are met through curriculum and method of instruction. The function of software can range from simulation, strategy, and drill-and-practice in both basic subject and enrichment curriculum areas. The diversity of software can provide patient, uniform instruction for reluctant and divergent learners (Mokros & Russell, 1986). The differing functions of certain applications can stimulate thought or provide an untiring, supportive tutor. Computers can become an aid to the accumulation of knowledge by becoming tools for research. Simultaneously, an increase in time spent with computers serves to familiarize students to a computer literate society. Ours is a technological future; our students must be prepared for it.

Outcomes

In assimilating obstacles that prevent adequate access to computers into a viable solution strategy, increasing access meant 1) increasing the amount of software available for use within the classroom, and 2) increasing the amount of time each child spent learning important skills via computer. Classrooms were adequately equipped with IBM and Apple IIe computers, but software had become overused or nonfunctional. Additionally, the available software was primarily used for memorization drills. The same programs were used for every child, regardless of individual need. Teachers reported that they were reluctant to use computers in the classroom due to inexperience in selecting and integrating software, so the amount of time each student spent in CAI was minimized.

One obvious solution to the problem of limited access appeared to be increasing the number of computer programs in each classroom, providing variety and stimulation for disabled learners. In more operational elements, the first outcome was that the total number of software programs in LD classes be increased from 105 to over 200 as determined by teacher requests.

A second outcome that demonstrated attainment of the goal of increased access was to increase the amount of time students were interacting with computers during school. Whether resulting from hesitant teachers or software unavailability, the amount of minutes the LD students spent using the computer needed to be aggrandized for maximum benefits. Operationally stated, the second outcome was that the average access time for CAI would increase from 40 minutes to 75 minutes per week for the LD students as reported by the participating LD teachers.

Measurement of Outcomes

To ascertain the effectiveness of the interventions, the initial survey data regarding the numbers of computer programs were compared to a weekly summary of additional software programs received by each classroom. Increases in the number of programs were charted per classroom to determine the amount of change. Simultaneously, the total number of minutes of computer access for students in each class per day was reported by the ten participating LD teachers (Appendix B). An average number of minutes of computer access was then calculated for a typical student in each class, generating data to be compared with baseline information to ascertain the degree of change in computer access time.

CHAPTER IV

SOLUTION STRATEGY

Discussion and Evaluation of Possible Solutions

In preparation for employment within the next century, educational progress must advance tandomly with industry to arrange a positive, productive future for our charges. Similar to past modifications, the focus of schools must transition from an agricultural society to an industrial society to a technological society, paralleling the tenets of industry. Manual labor is being replaced by technology, with its stress upon higher-order thinking and analytical skills (Woodward, 1992). Not only our nation, but the world will place more emphasis upon students' abilities to think and communicate (Hill, 1992).

Access to computer-aided instruction can maximize individual learning with efficacy, in a responsible manner, for every child. Unfortunately, not every child has well-managed access to CAI. Some authors (Haas & Boelke, 1990) have called for the intervention of private industry in the form of money, equipment, or management. Others (McKeen, Guckes, Lovell, Templeton, & Cline, 1986) report that underwriting by a microcomputer corporation is meritous for empowering teachers to embrace computer technology. Relevant to the lack of industry in the district, private intervention seems a distant resource to resolve the practicum problem.

Upon reviewing multifarious articles and studies regarding limited computer access by the educational community, two primary features for rectification were apparent. Initially, teachers need to be furnished with appropriate software to use in student programming on computers which sit unplugged within the classrooms (Russell, 1988; Cosden, 1988). Cohen & Spenciner (1989) surveyed teachers who rank lack of software as a primary inhibitor in technological infusion in the classroom.

Software must be appropriate to student needs in concept, readability, curriculum, and goals. The type of learning the teacher deems appropriate for each student regulates the nature of the software; the short term goal dictates whether the learning is passive or active (Majsterek, 1984). The goal for the student may dictate drill-and-practice software or simulation software; therefore, a range of software choices should be available for teacher use.

Secondly, teachers need to receive timely, merited exposure to information sessions that impart examples of software and practical integration strategies. Rural schools especially deserve training since the teachers are inexperienced or isolated (Siegel, 1994a). The previously recounted survey about limited access (Cohen & Spenciner, 1989) ranks in-service training as the most helpful strategy to foster integration. The informational strategy has shown striking results in the

New Orleans School District where classes for teachers are conducted to bond curriculum, pedagogy, and technology (Siegel, 1994b).

Description and Justification of Solution Selected

The most advantageous plan to increase CAI in the district's elementary learning disabilities classes was a combination of the two strategies referenced in the literature with adaptations for the relevant qualities of the writer's district. The increased availability of software in combination with a program to teach teachers how to integrate it into their classes seemed to be the most viable solution.

Teachers often feel that they do not have a decision-making role in the selection of software to implement the learning program of their students (Cosden, 1988). The empowerment to select software and the knowledge to implement it was the combination that insured teachers would strive to increase CAI in LD classes.

In the ideal strategy to raise electronic access supplied to students, hardware would be available for every student at anytime during instructional periods, including in the home. The computer could be used as a tool to initiate creative problem-solving with NASA , calculate the average temperature in Brazil, or communicate globally across continents. Students could develop their knowledge, skills, and logic through sophisticated, expensive software. Hardware would be state of the art, comparable to high-tech industry. Unfortunately, as the appropriation for education from the tax base in the region diminishes, compromise is indicated within the drive to seek the ideal scenario. In reaching, however, for the highest standards, a truly workable solution within the confines of the resources was discovered. Creativity and assets were maximized for the benefit of the students.

Report of Action Taken

Since one barrier to replacing software or adding software of a broader nature was monetary, a compromise was generated to avoid the purchase of thousands of dollars in corporately-produced and commercially-marketed programming. As with most commercially successful products, much of the cost of the product filters to packaging and advertising. If software could be purchased without the high cost of development and packaging, many programs could be purchased with an amount of money equivalent to the price of one retail software diskette. Public domain software seemed to remedy the cost issue.

Consideration of cost-effective software in college curriculum was reported by Scholastech (1986) whereas colleges were encouraged to adopt public domain software. Public domain software is generally considered to be software that is not copyrighted by the author and is available for copying, modifying, and distribution. The developer, if known, places no restrictions on the use of the software and receives no monetary reimbursement (Heiman, McGrath, & Case, 1988).

Another type of software commonly available for no cost to the public is termed "freeware". Certain programs have been copyrighted and credited, with documentation or directions for the use of the program (Scholastech, 1986). Both public domain and freeware are available for little or no cost to the purchaser. In most cases, the only charge is for the actual cost of the blank diskette to which the program is copied. Some programs are experimental, with defects in quality, but, the quality of other public domain and freeware can be equal to or surpass programs costing in excess of hundreds of dollars (Scholastech, 1986).

With the financial allocation for software frozen for an indeterminate period, public domain software beckoned to provide a variety of options for classroom integration for the fiscally responsible. Thus, the initial stage of the solution to the practicum problem consisted of the creation of a public domain software library entitled "WE CARE SOFTWARE" that not only advanced technological use of computers in the classroom with suitable programming for each child, but provided the impetus for broadening the varieties of software.

However, public domain software, free and cost efficient for individual needs, is difficult to obtain with any variety (Salvadore, Froschuar, & van Burgh, 1994). Interested persons must be creative in their quest as the seekers of appropriate software. To address the need for inexpensive software, commercial companies were formed to provide public domain or freeware at a nominal cost. Public domain software catalogs available through computer journals were amassed. Initially, these catalogs carried few programs, very general, with no guarantee of quality or purity. Few companies provided directions, or documentation, for using the software. Salvador, Froschauer and van Burgh (1994) reported that mistakes or glitches in the programs in combination with lack of documentation were the major problems with public domain software. With the blossoming popularity and market for diverse, inexpensive software, companies have become more specialized with entire catalogs now dedicated for educational purposes. A startup fund of fifty dollars purchased twelve diskettes from the software catalogs, each containing about five programs. These programs launched "WE CARE SOFTWARE".

Through a gateway to the electronic highway, the knowledge obtainable with a modem resolved the public domain dilemma. With access to an online subscriber service, many options were available through subscriber forums for selecting and downloading utility, simulation, and other types of educational software using a modem for emulation. Characteristic of public domain software, no charge was made to copy and download the programs apart from the cost of the diskettes. Forty-five programs were obtained via electronic transfer.

Another option to obtain public domain software was to post a message requesting free educational software on many of the educational electronic bulletin boards of computer user groups. Messages were posted on Apple forums, DOS forums, and other learning forums. Memos were issued throughout the district requesting copies of public domain software already utilized in computer-aided instruction. The remaining thirteen programs were obtained in this manner. In the most limited vein, additional contacts were initiated throughout the community to request public domain and to share available resources or ideas.

To implement the initial phases of the solution strategy, an assorted collection of noncopyrighted programs was amassed from the identified sources. Programs classified for use in word processing, databases, and other utilities were downloaded from a commercial service. Multiples of educational drill-and-practice software were supplemented with disks of simulation and problem-solving. As the online libraries of available software can be quite massive, only the most divergent offerings of suitable educational diskettes were obtained via modem.

Online services posed several problems in supplanting the inventory. Technical intricacies of downloading were unexpected. Condensed files of data needed to be decompressed, transferred from a hard disk drive to a portable diskette, and zipped files deleted. The service was inaccessible at times due to the local telephone service provider. While the process seemed initially arduous, downloading educational programs eventually proved to be a key source for public domain software.

To complete the collection and fill any void in curriculum areas, several diskettes of public domain software were ordered from carefully-selected vendors and purchased with limited funding obtained from the district (Appendix C). A virus-protection program installed on the master-receiving computer certified that the public domain software obtained from online services was virus-free and safe to operate on the hardware in each classroom. Additional supplies such as blank diskettes, labels, and diskette mailers were solicited from the local school improvement council, parent-teacher organization, and participating teachers.

As each software title arrived, the identifying information was entered by a student team comprised of elementary students with learning disabilities into a computerized database designed for ease of use. A number was assigned to each program to assist in locating the requested software for future orders. When a teacher within the district ordered a legion of programs, titles were located in the database and the master diskettes were legally copied by students. Concurrently, other LD students designed and printed labels for the diskettes, decorated the mailing folders, and returned the software via the interdepartmental mailing system.

Technologically sophisticated LD students in the writer's setting also assisted in a rating and review system to simplify the time necessary for preview by the participating teachers. The students served as subjects who examined and tested each program for ease of use and readability of the programs. The students reviewed the software from child- designed forms.

As the software was collected, each program was previewed and classified. The programs were classified by subject areas as well as type of software. Categories for academic areas included English, spelling, reading, social studies, science, and music. Games and entertainment programs were classified as such. Programs designed for multiple uses was classified as integrated software.

For purposes of classification, software types were defined by the writer as:

a. Drill - software in content areas that prompts memorization and automatic learning, e.g.. multiplication facts.

b. Application/strategy - software requiring that the student use prior knowledge and higher order thinking skills to address new material in an interactive forum, e.g.. historical adventure scenarios.

c. Entertainment - software in game format with no academic connection, e.g.. eye-hand coordination games.

d. Simulation - software that demonstrates a model, e.g.. planetary orbits.

e. Creativity - software emphasizing design, art, production, or originality, e.g.. drawing programs.

f. Utility - software that serves as a tool to further learning, e.g.. word processors, databases, teachers' aides.

Obviously defective or material-inappropriate programs were deleted from the collection. Approximate grade levels were assigned to each program based solely upon readability,and the identifying information was entered into a database. The database printout was sorted with varying specifications so that teachers could request a listing of any category of software they desired to address the individual needs of their students. Teachers could select software based upon title, subject, platform, grade level, and type as depicted in Figure 3.

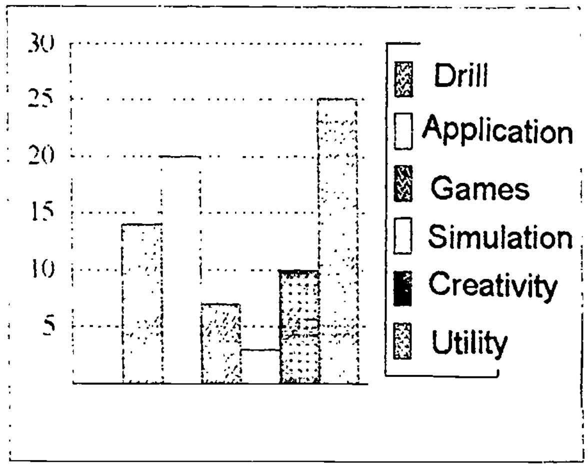

Figure 3: Distribution of available software by classification.

Order forms were printed according to curriculum areas and were designated according to system compatibility. As new software was obtained through new funding sources, updated forms were distributed (Appendix D).

After the software was obtained, the second major component of the solution strategy acquainted the elementary learning disabilities teachers with "WE CARE SOFTWARE" - its purpose and its potential. Advertisements were designed and publicity disseminated by students in the writer's class (Appendix E). A teacher training session was scheduled for inservice credit to encourage attendance. The district special education office which routinely sought to facilitate innovative presentations, approved the workshop and credited attending teachers. A centrally-located site with adequate hardware to demonstrate and display the new software was selected. Several programs were previewed during the session, and nineteen teachers examined the order form and procedures to obtain desired diskettes. Technical questions regarding the integration of hardware and software were answered to stimulate proper use. Sample schedules for student assignments were distributed to illustrate successful synthesis within the regular instructional day. The reporting form for student access was examined, a commitment for participation from ten teachers was exacted, and the solution strategy was in place. Although all nineteen teachers were permitted to request the free software, the totals from the nonparticipating nine classrooms were omitted from the data. Follow-up consultations with participating teachers were conducted via telephone when questions arose or technical difficulties were encountered. Teachers needed encouragement to continue the project and to integrate software into their daily plans.

An ongoing component of "WE CARE SOFTWARE" was the library maintenance system. During the couple of weekly hours of class time devoted to the library by the writer's students, methods of problem-solving and cooperative learning were integrated into the curriculum through activities in math, art, written language, and computer literacy. Student graphs were maintained from tallies of ordered programs, imaginative software descriptions were composed, and designs were reproduced on ads, labels, and mailers. The assigned roles of the student teams were to rotated before students discovered a comfortable role in administering the practicum. A specific time demarcation ensured that the students experienced no loss of instructional time for basic skills; the project enriched and incorporated additional curriculum components into practical life skills products. In operating and assisting a small non-profit business, the students developed assessment, thinking, and communication patterns, reflecting proposed literacy skills for the 21st century (Hill, 1992). The resulting rise in self-esteem in the students was not operationally measured; however, comments were collected and the indirect benefit to students was noted.

As the popularity of "WE CARE SOFTWARE" burgeoned, student participation could not be maintained at required levels. Commitment by the students was unquestioned; amounts of copying outdistanced available time. As the novelty decreased, software requests from teachers diminished and students again became full participants for the remaining few months.

Concluding the twenty-three week ordering period, cumulative data concerning minutes and amounts of software were examined to establish the degree of impact the establishment of a public domain library and teacher training had upon student access to CAI. Results were appraised to determine if the solution strategy was successful in scope.

CHAPTER V

RESULTS, DISCUSSION, AND RECOMMENDATIONS

The lack of innovative, operational, or novel software within elementary learning disabled classes in this rural school district limited the amount of time special needs students were engaged in computer-aided instruction. Combined with the lack of teacher training in software gleaning and integration, the lack of software prohibited the LD children in the district from attaining the maximum technological benefit from the available hardware. To alleviate the lack of computer access, teachers were encouraged through a training session to procure software from "WE CARE SOFTWARE", a school-based, public domain software service.

The practicum outcomes to achieve the goal of increased computer access were: 1) average access time for CAI would increase from 40 minutes to 75 minutes per week, and; 2) total number of software programs in LD classes would increase from 105 to over 200 as determined by teacher requests. Each class would acquire at least one utility program, one strategy program, and three additional diskettes.

Results

Initially, weekly data concerning programs ordered from individual classes were accumulated and tallied. Types and numbers of requisitioned software plus minutes of computer access, based upon teacher reporting, were documented. Data were examined with respect to the overall goal and individual outcomes.

Outcome 1. The mean weekly computer time for each class was obtained by dividing the total number of minutes students spent in CAI by the total number of students in each class. This mean time counterbalanced any change in student population with the classes. Increases in amounts of computer access of each class during the intervention time are presented in Table 1.

TABLE 1

Average minutes in computer-aided instruction based upon total minutes and number of students in each class.

	Minutes per week of CAI for LD students																						
Group	*Weeks*																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
A	59	62	52	70	82	104	105	88	98	151	210	210	210	140	200	216	230	215	220	225	250	250	293
B	43	48	43	85	128	113	115	141	156	195	214	198	126	148	190	200	200	216	215	220	225	230	245
C	40	56	53	56	79	83	64	75	81	83	105	231	196	216	230	230	230	210	200	215	215	215	195
D	24	30	30	30	63	75	77	77	86	113	180	180	192	189	200	180	200	205	100	200	240	245	232
E	68	90	60	54	63	66	111	114	183	232	270	342	304	245	240	245	300	300	315	290	332	295	300
F	34	41	43	62	82	88	111	114	154	158	236	203	227	190	205	205	200	230	245	240	245	250	300
[illegible]	70	[illegible]	70	70	110	143	150	160	190	180	200	232	213	216	210	240	237	240	204	300	351	342	364
H	7	20	20	22	112	145	167	155	137	155	260	192	346	387	350	345	295	245	290	340	345	340	345
I	60	84	52	51	80	113	87	80	96	122	118	102	141	157	150	162	183	180	100	75	140	210	224
J	33	46	44	48	66	82	83	87	67	104	272	261	361	261	294	250	300	310	390	342	350	210	368

A total group mean for number of minutes in computer instruction of participating elementary learning disabled students was calculated to evaluate the total increase in CAI. As reported earlier, the mean number of minutes before the practicum intervention was 40. To achieve the outcome, mean minutes in CAI must approach 75 minutes per week per student. Results in mean computer access time for the total group from baseline are presented in Figure 4.

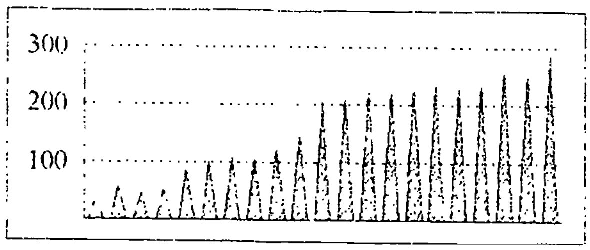

Figure 4: Mean group increase in minutes of CAI.

Outcome 2: A total of 155 computer programs was ordered by ten teachers during the 23 weeks the library was operational. Five weeks after the first requisitions, the number of requests peaked at 50. The remaining 18 weeks found that the requested programs remained below 20. The rate of ordering fluctuated from classroom to classroom. Individual class requests were totaled and results appear in Figure 5.

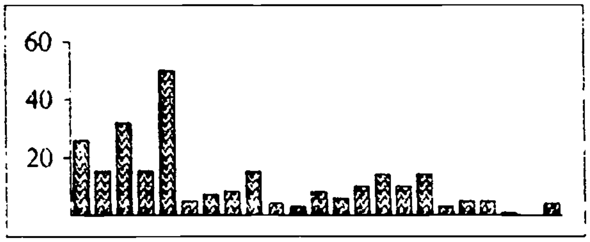

Figure 5 No. of software programs ordered weekly.

To achieve the expected outcome, available software in district elementary classrooms for the learning disabled must total over 200 programs, measured by an increase of 95 programs. At the conclusion of the practicum implementation phase, elementary teachers had ordered 60 programs above targeted amounts. Cumulative totals were obtained by adding the number ordered to the baseline of 105. Consecutive weekly totals were added to the total from the previous week to obtain an aggregate of software programs. Increases in district-wide totals are displayed in Figure 6.

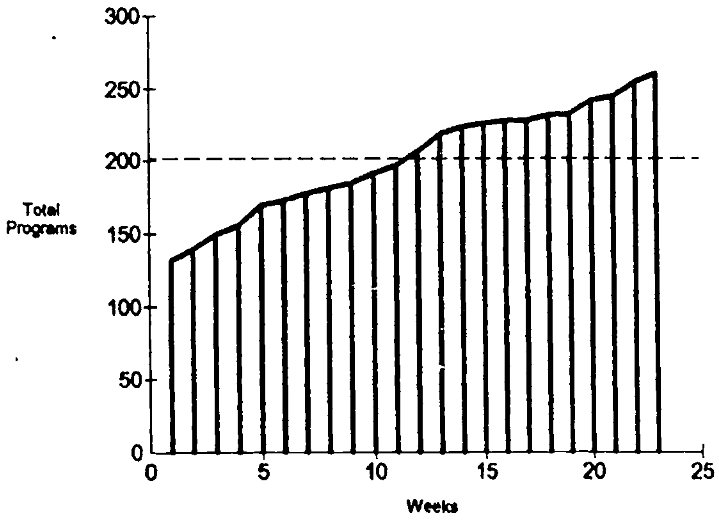

Figure 6. Cumulative programs ordered by elementary teachers of the learning disabled.

A further component to the software acquisition solution was that teachers order programs of a disparate nature. Teacher respondents to the initial practicum survey reported that their primary software was of a drill-and-practice format. In distributing software in additional formats, teachers added to the diversity in programming and function. In addition to the increase in the total number of computer programs, the nature of the orders was classified for each classroom in Table 2. All nineteen targeted classes increased problem-solving software by one program; each class acquired one utility program; and, each targeted class obtained three diskettes of additional multi-subject software.

TABLE 2

Classifying software by nature as ordered by elementary teachers of elementary learning disabled children.

	Nature of Software						
Group	Drill	Application	Utility	Games	Creativity	Simulation	Totals
A	7	4	1	0	1	0	13
B	5	4	2	1	1	0	13
C	5	2	2	0	1	3	13
D	4	5	5	2	1	1	18
F	10	5	6	0	1	3	25
E	5	2	11	1	2	0	21
G	2	2	7	0	1	0	12
H	16	1	2	1	1	1	22
I	2	3	1	2	1	2	11
J	4	1	1	0	1	0	7
Totals	60	29	38	7	11	10	155

Discussion

In the writer's rural setting where opportunities for employment are limited by the lack of industry, students rely upon schools to offer them the opportunities to acquire technological equality with neighboring states. More specifically, the children enrolled in elementary learning disabilities programs seemed to have even less access than their nondisabled peers. Hardware availability within the schools was adequate, but a lack of software denied LD students a bridge to technological awareness and individually designed CAI.

This practicum was designed to increase the access of elementary learning disabled students to computer-aided instruction through the creation of a public domain software library combined with teacher training. Steps to attain the goal consisted of increasing the numbers of available and diverse software programs in participating classrooms, and increasing the resulting minutes of CAI for the students.

Results confirm the attainment of the outcomes proposed in the solution strategy. It appears that making public domain software available to teachers increased both the number of programs in the classrooms and increased the amount of minutes learning disabled students spent in computer access. Public domain software is a viable solution to lack of software with limited output of financial resources. Not only did software acquisitions surpass expectations, but the projected outcome was reached within 12 weeks after creation of the software ordering service. Upon completion of the 23 weeks of formal data gathering procedures, teachers had ordered 60 programs above the anticipated amount. The writer discovered that teachers were interested in obtaining most new software as it was added to the database. New order forms precipitated new orders.

Undocumented comments support the strategy of supplying teacher training about selection and use of relevant software. Teachers reported that they felt comfortable because the software had been previewed, and their questions about specific uses were valued. Innovative integration of word processing, database, and research tools provided teachers with instructional options apart from drill-and-practice. The procurement of only 60 drill titles from the 155 total programs indicated that teachers were inventively broadening the higher order thinking skills of their students.

The practicum can be deemed successful in increasing the amount of time students spent in computer-aided instruction. The results of data collection demonstrate that the outcome was reached only 5 weeks after additional software became available. The amount of minutes increased dramatically and consistently during the data collection period. Average time spent in computer instruction was approaching an hour per day for each student, an amount surpassing access in general education classes.

A secondary result that had a primary impact upon the success of the practicum has no empirical data; the outcomes were on the faces and in the comments of the students involved in "WE CARE SOFTWARE". In the writer's setting, the LD student teams who carried the weight of the reproduction and distribution of software benefited in two major avenues, self esteem and social interaction. In student interviews and feedback from schools throughout the district, the children felt that the practicum experience made them more popular than before the intervention. Other students felt that it was "fun" or they "got out of real work" during the prescribed computer time. The confidence of these children empowered them to assist other teachers in general education classes through software demonstrations. Notes of appreciation from schools across the district became trophies to display and acknowledge. The smiles and boosted egos that resulted from decision-making activities, such as initially previewing and rating the software, were an immeasurable consequence of raised self-esteem.

The team approach to student involvement in the software library fostered an increase in social interaction within the special education setting. Social strengths in leadership, patience, cooperation, and verbal skills emerged as necessary to complete an order. The students became "team players" whose motivation involved the design and completion of a designated product. They seemed to respect one another as positive links in the production chain.

The bifold solution strategy of teacher training and a public domain software library resulted in an increase of computer programs and an increase in time spent in computer access. Student assistants increased their self-esteem and social interactions. The important conclusion to the practicum intervention is that elementary learning disabled students in the district have more access to computers than they had prior to the solution strategy . . . the problem was rectified.

Recommendations

Many factors interacted to contribute to the success of the practicum. Conscientious record-keeping by the participating teachers figured prominently in the data collection. The project had the full support of both the building supervisor and district coordinator of special education. Student participation in administering the library insured promptness in disseminating the software. Any replication of the solution strategies would rely upon similar commitment.

As an extension of this practicum experience, the following recommendations could further the evolution of the concept into a permanent solution to increase the access to computer-aided instruction for LD students:

1. Obtain grants or other monies to update the inventory, replenish consumable supplies and broaden the impact of the project to general education.
2. Broaden the number of teacher training sessions to include online access and downloading techniques.
3. Convert student goals and objectives into learning modules for dissemination across curriculum areas.
4. Introduce "WE CARE SOFTWARE" via diskette that includes a brief history of the software service, an order form, current software inventory, and common trouble-shooting solutions (Scholastech, 1986).

Dissemination Plans

The free computer software has been distributed to elementary classrooms for autistic, mentally impaired and behaviorally disordered children throughout the district. Similarly, secondary classes for special needs students have requested titles on the intermediate level. Several general education classes have requested order forms. The widest dissemination of the software has been to classes in the Washington, D. C. area. The procedures for downloading, replicating, and packaging were demonstrated by the elementary LD students to students attending education classes at the local college.

Practicum results and recommendations have been disseminated to the participating LD classes and undergraduate classes in special education methods. Additionally, the strategies to increase access were presented to the faculty of two elementary schools and the coordinator of special education for the district. The director of Chapter I for the district has expressed a desire to implement a similar program during the subsequent school year and has discussed sessions for teacher training.

Two additional days of training and feedback have been scheduled by the computer coordinator involving one representative from each school in the county. At that time, additional help will be enlisted to accommodate the huge success of the practicum.

The responses to the software library have been overwhelming, as participating teachers continue to obtain diskettes to meet the individual, specialized needs of their students. Teachers have also requested programs to address specific deficiencies in the software inventory and contributed public domain programs to the database. As the requests multiply, the access to CAI improves. Our children are the beneficiaries.

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APPENDIX A

INITIAL SURVEY OF TEACHERS

TEACHER QUESTIONNAIRE FOR COMPUTER ACCESS

HARDWARE:

1. How many computers do you have in your classroom? ________ Apple

   ________ IBM

   ________ Other

2. How many computers are in your school? ________

3. How many printers are available in your classroom? ________

4. Are any of your computers networked? _______

5. Do any of your computers have a hard disk drive? _______

6. Do you have a modem or access to one? _______

7. Do you have a computer with CD-ROM? _______

SOFTWARE:

1. How many working diskettes (3.5" and 5.25") do you have in your classroom? _______

2. How many programs are utilized by your students in the areas of:

   reading _______

   spelling _______

   math _______

   word processing_______

   social studies _______

   English _______

   other (specify) _______

3. How long since you have received new software? _______

4. Would you classify most of your software as drill-and-practice OR logic/problem solving.

CLASSROOM USAGE:

1. How often do your students use the classroom computers?

daily _____

weekly _____

monthly _____

never _____

2. How long does each student remain on the computer per session? _______

M_____ T_____ W_____ TH_____ F_____

3. Do they work alone or in pairs? _________

4. How do you use software in your classroom? Please rank the following from greatest to least.

drill and practice _____

enrichment and problem solving _____

word processing _____

research _____

reward _____

5. What is the biggest disappointment with computer software in general?

6. What would increase the students' access to computers in your setting?

7. Have you received training in hardware within the last five years?

8. Have you received training in software within the last five years?

7. What type of training would help you integrate computers more fully in your classroom?

8. Would you attend a training session if available and centralized to your school?

9. How many students do you teach? _______ Males? _______ Females? ______

Thank you very much for your participation in this survey.

APPENDIX B

TEACHER CAI RECORD SHEET

Teacher's Computer Time Record Sheet

Name______________________School________________________

Week of ____________________________

Each block is equal to 15 minutes of computer time. Fill in one block for each 15 minutes a child is using the computer. For example, if two children are partners on a computer for 15 minutes, color in two boxes. For times less than 15 minutes, color in a proportion of the box. Thanks for your help.

APPENDIX C

VENDORS

Directory of Vendors

America Online Software Libraries, Vienna, VA

Balloons Software, 5201 Chevy Chase Parkway, NW, Washington, D. C. 20015, (202) 244-2223

Big Byte Software, P. O. Box 14008, Arlington, TX 76094-1008, 800-879-2983

Lab Software, 650 North Larkin Avenue, Joliet, IL 60435-5763, 800-644-3475

Mr. Disk, 5915 Casey Drive, Knoxville, TN 37909-1808, 800-833-8674

PC Shareware, 1763 Garnet Ave., San Diego, CA 92109, 800-447-2181

Public Brand Software, P.O. Box 51315, Indianapolis, IN 46251, 800-426-3475

APPENDIX D

ORDER FORM

We Care Software - Jan. 1995

Title	Subject	Platform	Type	Level
IQ Builder	All	IBM	Application	Int.
Let's Bake Cookies	All	IBM	Creativity	Pri. Int.
Amy (Kids' Games)	All	IBM	Entertainment	Pri.
Answer Sheet Generator	All	IIe	Utility	Teacher
Build a Test	All	IIe	Utility	Teacher
C. I. T. E. Learning Styles	All	IIe	Utility	Teacher
Computer Tutorial	All	IBM	Utility	Teacher
Designing Portfolios	All	IBM	Utility	Teacher
DOS Instruction	All	IIe	Utility	Teacher
Educational Templates	All	IIe	Utility	Teacher
File Express	All	IBM	Utility	Teacher
FrEd Writer	All	IIe	Utility	All
Puzzle Generator	All	IIe	Utility	Teacher
Rightwriter	All	IBM	Utility	All
Teachers' Database	All	IBM	Utility	Teacher
Teachers' Gradebook	All	IBM	Utility	Teacher
Teachers' Gradebook	All	IIe	Utility	Teacher
Time Saver & Organizer	All	IBM	Utility	Int.
Word Processing for Kids	All	IBM	Utility	All
Word Processing for Kids	All	IBM	Utility	Pri., Int.
EGA Coloring Book	Art	IBM	Entertainment	Pri.
Mad Libs	English	IIe	Application	Int.
A/AN	English	IIe	Drill	Int.
ABC Order	English	IIe	Drill	Int.
Antonyms	English	IIe	Drill	Int.
Apostrophes	English	IIe	Drill	Int.
Synonyms	English	IIe	Drill	Int.
Funny Face Drawer	Games	IBM	Creativity	Pri.
Sports Savvy	Integrated	IIe	Drill	Int/Mid.
Oregon Trail	Integrated	IIe	Stategy	Int.
Battleship	Integrated	IIe	Strategy	Int./Mid.
Bouncing Kamungas	Integrated	IIe	Strategy	All
Crisis Mountain	Integrated	IIe	Strategy	Int/Mid.
Estimation	Math	IIe	Application	Int.
Estimation Soccer	Math	IIe	Application	Int.
Making Change	Math	IIe	Application	Pri/Int.
Math and Logic	Math	IBM	Application	Pri./Int.
Math Story Problems	Math	IBM	Application	Int.
Math Strategies	Math	IBM	Application	Int.
Mom's Math	Math	IBM	Application	All
Smart Cash Register	Math	IIe	Application	Int.

Title	Subject	Platform	Type	Level
Fun with Designs	Math	IBM	Creativity	Pri./Int.
Tangrams Templates	Math	IIe	Creativity	Pri./Int.
Addition and Graphics	Math	IIe	Drill	Pri.
Addition and Sound	Math	IIe	Drill	Pri.
Addition Drill	Math	IIe	Drill	Pri.
Coin Toss	Math	IIe	Drill	Pri.
East Math Drill	Math	IIe	Drill	Int./Mid.
Fast Prime Numbers	Math	IIe	Drill	Int.
Flash Cards	Math	IIe	Drill	All
Fraction Calculator	Math	IBM	Drill	Int.
Fraction Practice	Math	IIe	Drill	Int./Mid.
Hard Math Drill	Math	IIe	Drill	Int./Mid.
Math Bingo	Math	IBM	Drill	Pri.
Math Dice	Math	IIe	Drill	Pri.
Math in Color	Math	IIe	Drill	Pri.
Math Willie Worm	Math	IIe	Drill	Pri.
Metrics	Math	IIe	Drill	Int./Mid.
Perimeter/Area	Math	IIe	Drill	Int./Mid.
Place Value	Math	IIe	Drill	Pri.
Roman Numerals	Math	IIe	Drill	Int.
Supermath	Math	IIe	Drill	All
Time Teacher	Math	IIe	Drill	Pri.
Times Table Practice	Math	IIe	Drill	Int.
Tom's Math Drill	Math	IIe	Drill	Pri/Int.
Wizquiz	Math	IBM	Drill	Pri./Int.
Big Math Attack	Math	IBM	Drill/Entertainment	All
Factor Game	Math	IIe	Drill/Entertainment	Int./Mid.
Math and Music	Math	IIe	Drill/Entertainment	Pri.
Math Ladder	Math	IIe	Drill/Entertainment	All
Blackjack	Math	IIe	Entertainment	Int./Mid.
Blackjack	Math	IIe	Strategy	Int/Mid
Basketball Stats	Math	IBM	Utility	Int.
Calculator	Math	IIe	Utility	All
Christmas Duets	Music	IIe	Entertainment	All
Electric Duets Christmas	Music	IIe	Entertainment	All
Shape Recognition	Readiness	IIe	Drill	Pri.
Vocabulary Builder	Reading	IIe	Application	Mid.
A Christmas Story	Reading	IIe	Creativity	All
Creative Writing Rebus	Reading	IIe	Creativity	Pri./Int.
Crisis Mountain	Reading	IIe	Creativity	Int./Mid.
Haiku	Reading	IIe	Creativity	All
Story Time	Reading	IIe	Creativity	All
Amy's First Primer	Reading	IBM	Drill	Pri.

Title	Subject	Platform	Type	Level
Animal Alphabet	Reading	IBM	Drill	Pri.
Lunchbox	Reading	IBM	Drill	Pri.
Plurals	Reading	IIe	Drill	Mid.
Sequencing Skills	Reading	IIe	Drill	Int.
Syllables	Reading	IIe	Drill	Int./Mid.
ABC Funkeys	Reading	IBM	Drill/Entertainment	Pri.
Word Gallery	Reading	IBM	Drill/Entertainment	Int.
Sports Savvy	Reading	IIe	Entertainment	Mid.
Wheel of Fortune	Reading	IIe	Game	All
Dolch List	Reading	IIe	Utility	Teacher
Readability Test	Reading	IIe	Utility	Teacher
Oregon Trail	S. Studies	IIe	Creativity	Int./Mid.
Africa	S. Studies	IIe	Drill	Int./Mid.
Asia	S. Studies	IIe	Drill	Int./Mid.
Black History Quizzes	S. Studies	IBM	Drill	Int.
Geography	S. Studies	IIe	Drill	Int./Mid.
Name the States	S. Studies	IIe	Drill	Int.
Presidents	S. Studies	IIe	Drill	Int./Mid.
State Capitals	S. Studies	IIe	Drill	Int./Mid.
US Abbreviations	S. Studies	IIe	Drill	Int.
US Map	S. Studies	IIe	Simulation	All
700 Flags	S. Studies	IBM	Utility	Pri./Int.
Malcolm X Quiz Game	S.Studies	IBM	Drill	Int.
U. S. Presidents	S.Studies	IIe	Utility	Int.
Greenhouse	Science	IIe	Application	Mid.
Weather Forecast	Science	IIe	Application	Mid.
Wind Chill Factor	Science	IIe	Application	Int.
Orbit	Science	IIe	Simulation	Mid.
Planets	Science	IIe	Simulation	Mid.
Lost in the Universe	Science	IIe	Strategy	Int.
Dino's Database	Science	IBM	Utility	Int./Mid.
Billy Bear Learns to Sign	Spelling	IBM	Drill	Pri./Int.
Spelling	Spelling	IIe	Drill	Pri.
Spelling Tutor	Spelling	IIe	Drill	Pri./Int.
Hangman	Spelling	IIe	Drill/Entertainment	Int.
Spelling Test	Spelling	IIe	Utility	Teacher

Name ____________________

School ____________________

IN ______

Date ____________________

OUT ______

Total ______

APPENDIX E

PUBLICITY FOR WE CARE SOFTWARE

COMING SOON

WE CARE SOFTWARE

FREE !

Dear LD teachers,

In an attempt to broaden the availability of software for your Apple IIe and IBM computers, the students at ____________ School have initiated a software library entitled, "WE CARE SOFTWARE". The purpose of the project is three-fold: 1) We hope to provide free, public domain software on the elementary level to other classes; 2) We want to apply real world concepts to our academic areas; 3) We want to promote software usage in LD classes on the scale of regular education classes.

We have attached an order form to preview the kinds of programs that will be available. Until the scheduled inservice to explain how the library will work, just circle the programs you want and send it to:

____

____

We will copy the programs for you at no cost and return them to you via PEDS.

Thanks,