The effect of implementing integrated learning system technology on teacher attitudes in rural and urban schools

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THE EFFECT OF IMPLEMENTING INTEGRATED LEARNING SYSTEM TECHNOLOGY ON TEACHER ATTITUDES IN RURAL AND URBAN SCHOOLS

Advisor: Dr. Olivia Boggs

Dissertation dated July, 1993

The purpose of this study was to assess teacher attitude toward the implementation and use of integrated learning system technology in rural and urban schools and to compare the perceptions which the two groups held with regard to its effective use in delivering daily instruction.

A review of selected literature was made to determine the appropriate tasks and responsibilities of teachers as viewed by authorities in the field of educational technology. In the review of selected literature, an effort was made to examine certain policies and procedures required as minimum expectations by the developers of the integrated learning system.

One hundred fifty teachers were selected from ten rural schools and ten urban schools in North Carolina, South
Carolina, Kentucky, Pennsylvania, and New York. One hundred percent of the teachers responded, but not to all items on the survey.

In presenting the findings of this study, the data received involved certified teachers at ten urban and ten rural elementary schools. Analysis of variance was used to test the hypotheses. The probability level of .05 was used to test each hypothesis for acceptance or rejection.

This study examined the effect of implementing an integrated learning system into the regular teaching curriculum on the basis of teacher experience, the model of delivery, teacher training, student grouping, and grade level in rural and urban schools. The survey produced quantitative data which support significant differences between urban and rural teacher attitudes about delivery model, student grouping, and grade level. Significant differences were also noticed in years of teaching experience between the two groups.
THE EFFECT OF IMPLEMENTING INTEGRATED LEARNING SYSTEM TECHNOLOGY ON TEACHER ATTITUDES IN RURAL AND URBAN SCHOOLS

A DISSERTATION
SUBMITTED TO THE FACULTY OF CLARK ATLANTA UNIVERSITY
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF EDUCATION

BY
L'TANYA WEBB SLOAN

DEPARTMENT OF EDUCATIONAL LEADERSHIP

ATLANTA, GEORGIA
JULY 1993
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CHAPTER I

INTRODUCTION

School restructuring for the twenty-first century has involved new approaches to achieve the same results. But schools must fundamentally change the way they operate if America is to produce generations of workers who can function, contribute, and even excel as society moves from the Industrial Age to the Information Age. Recognizing a need to change the way education is delivered, many states have initiated reforms which include the use of computer technology in the classroom to improve overall student achievement and to prepare students for the Information Age.

There is a belief that computer technology can do much to improve the educational process. Innovative uses of the computer in education can renew interest in all areas of the curricula, while acting as a valuable teaching tool which reaches students who are otherwise bored or simply reject the current educational system. While it has the potential to improve the current educational system, that potential cannot be realized unless schools can incorporate the technology into their regular activities (Bishop-Clark and Grant 1991).
Many kinds of technology are available to educators as they seek ways to use computers to improve the effectiveness of educational outcomes such as higher test scores and student skills. Decisions to purchase technology cannot be based on subjective measures. If it does not improve the quality of education for students, then its purchase cannot be justified. Among the various kinds of instructional technology available, Integrated Learning Systems (ILSs) have become popular.

Although millions of dollars have funded computer technology in schools across America for instructional hardware and software during the past decade, very little research regarding the effectiveness of Integrated Learning Systems can be found in the literature. In response to this void, this document addresses teacher perception of the effect of implementing an Integrated Learning System into the regular school curriculum.

Implementation is one stage of a general process of using technology effectively in any educational setting. It can be described as being all of the activities that occur between conceiving of the new data and assimilating it into regular practice. It is assumed that a system that has been properly designed, has a friendly user interface, and is efficient will be naturally accepted by its users. This is not often the case. A school's efforts during the implementation phase can determine whether teachers and students
like or dislike the new technology. The educational potential of computer technology will not be realized until schools successfully incorporate the technology into their daily activities.

This study examines teacher attitudes about the use of ILS technology throughout the eastern United States.

**Purpose**

The purpose of this study was to examine teacher attitudes in rural and urban schools in five states throughout the eastern region: North Carolina, South Carolina, Kentucky, New York, and Pennsylvania. The intent was to assess their attitudes about implementation of ILS technology on the basis of years of experience, delivery model, teacher participation in decision making, training, grade level, and the way students are grouped for the purpose of receiving instruction. Each school had purchased an Integrated Learning System and had been using the system for a minimum of one year.

Teachers in twenty schools completed a survey which indicated their responses to items which investigated their perceptions of the effectiveness of their Integrated Learning System. The study covered a twelve-month period commencing in May of 1992 and continuing through April of 1993. This study formally evaluated the implementation of the ILS and the teacher's ability to use this technology as an
integral part of the process of teaching students in the regular instructional setting.

Background

The front page of the New York Times on September 25, 1989, featured an article written by Edward B. Fiske, entitled "Impending U.S. Jobs 'Disaster': Work Force Unqualified to Work." This sounded a national alarm by the business community regarding the lack of job skills of America's youth. The article indicated that job skills, including basic computer skills, were not being developed in America's schools and that this was especially the case among minority children. As a result, "America is developing into a nation of educational haves and have-nots, who are fast becoming employment haves and have-nots" (Fiske 1989, 1). Schools across America have been increasingly purchasing computer hardware and software to address these and other concerns.

The use of the computer in education has been receiving increasing attention among educators, business people, and government officials. Some see it as the tool that will help overcome some of the problems which face America's schools, while others question its effectiveness and are still awaiting conclusive outcomes. During the past decade, many schools have invested significant resources in acquiring computer equipment and making it an important part of the child's educational experience. Schools in North
Carolina, South Carolina, Pennsylvania, Kentucky, and New York have invested millions of dollars in ILS technology.

Statement of the Problem

Most producers and consumers of educational research, especially those responsible for constructing data which contribute to the improvement of the overall quality of education, cannot escape the importance of investigating valid and reliable research and information which relate to educational technology. Research is conducted, generalizations are constructed, and theories are validated, rejected, or qualified. More and more, the life and learning in schools is being assessed by the manipulation of dependent and independent variables. One source of information, legitimation, and persuasion available to decision makers is research findings and reviews of research literature.

This study contributes to the collection of research which relates to determining the effect of the use of an Integrated Learning System (ILS) designed by Jostens Learning Corporation in schools in North Carolina, South Carolina, Pennsylvania, Kentucky, and New York. The dependent variable is rural and urban teacher attitude. Teacher attitude is defined as the way teachers feel toward the implementation of the integrated learning system as it is used for the purpose of teaching students. The independent variables are years of teaching experience, delivery model,
teacher participation in decision making, teacher training, grade level, and student groupings.

**Significance of the Study**

Within the context of school district decision making, most policy makers and administrators are held accountable for predicting and demonstrating positive, measurable, short-term outcomes. This decision-making accountability relates especially to costly innovations such as the purchase of computers. One source of information, legitimation, and persuasion available to decision makers is research findings and reviews of literature. Because of the new presence of computer technology in the educational environment, much of the offerings appear value neutral and applicable. Much of it centers around many different types of computer software available; therefore, the evidence which supports the benefits from expensive and costly investments in technology in classrooms is relatively nonspecific. Much of it relates to Computer Assisted Instruction (CAI), Integrated Learning Systems (ILSs), and computer-managed instruction. This study focuses on the most expensive type of technology: the use of Integrated Learning Systems.

While an ILS curriculum has the capability of improving the delivery of instruction by the teacher to
students, this is not always the case. This study contributes to the body of research which examines the effect of the ILS in schools, in a relatively consistent manner, in twenty schools in the eastern region of the United States. All schools purchased the same ILS provided by the Jostens Learning Corporation. Implementation of the ILS differs from school to school on the basis of delivery model, grade level assignment, student groupings, teacher participation in decisions for selecting and implementing the technology, and the quality of training teachers received at the building level.

Research Questions

This study was guided by the following research questions:

1. Is there a significant difference in the attitudes of rural teachers when years of experience is considered a crucial factor?

2. Is there a significant difference in the attitudes of rural teachers when the delivery model is considered a crucial factor?

3. Is there a significant difference in the attitudes of rural teachers when teacher decision making is considered a crucial factor?

4. Is there a significant difference in the attitudes of rural teachers when training is considered a crucial factor?
5. Is there a significant difference in the attitudes of rural teachers when grade level is considered a crucial factor?

6. Is there a significant difference in the attitudes of rural teachers when student grouping for instruction is considered a crucial factor?

7. Is there a significant difference in the attitudes of urban teachers when years of experience is considered a crucial factor?

8. Is there a significant difference in the attitudes of urban teachers when the delivery model is considered a crucial factor?

9. Is there a significant difference in the attitudes of urban teachers when teacher decision making is considered a crucial factor?

10. Is there a significant difference in the attitudes of urban teachers when training is considered a crucial factor?

11. Is there a significant difference in the attitudes of urban teachers when grade level is considered a crucial factor?

12. Is there a significant difference in the attitudes of urban teachers when student grouping for instruction is considered a crucial factor?
Summary

The purpose of this study was to examine the effects of the use of ILS technology on one dependent variable, teacher attitude, as it relates to five independent variables: years of teaching experience, delivery model, teacher decision making, teacher training, grade level, and student grouping.
CHAPTER II
REVIEW OF THE LITERATURE

Advances in educational technology have created the opportunity for fundamental structural change in the entire educational system. When the crisis of confidence in American schools was precipitated by Sputnik, educational technology emerged as a part of the solution. Millions of dollars were spent. The conceptualization of using technology in education is as varied as the schools and school districts which use computer equipment and software. The analysis of research was undertaken to clarify existing knowledge of the use of integrated learning system technology and to provide information concerning implementation factors that would be helpful to educators. Since the study examined teacher attitude in rural and urban school settings, the literature review also covers these three areas. Since many forms of technology are available for use in the classroom, this review represents an overview of only integrated learning system technology, with reference to how this technology relates to the implementation of the ILS.
What Is an ILS?

Integrated learning systems (ILSs) are networked systems of multiple computers which deliver comprehensive educational courseware at the direction of a central management system. Because they are networked, the use of floppy disks is eliminated. Typically, the ILS courseware covers language arts, reading, and mathematics. These subjects are matched to current standards for curriculum content (Bailey and Lumley 1991). Most ILSs are configured as computer labs but distributed network systems, which put computers directly within the classroom, are an increasingly popular mode of ILS delivery (Shore and Johnson 1992). From kindergarten through twelfth grade, a pattern of instructional computer use which has come to be known as "ILS" is being offered to a large market of school districts by about eight major companies.

ILS companies provide a wide range of courses, with each company covering most of the basic subjects at each grade level. Lessons feature a mixture of tutorials, drill and practice, and games running on an IBM low-end PC, Macintosh, Tandy, or a clone thereof. There is often a correlation of the integrated learning system curriculum to the basal being used in the classroom.

ILS systems allow self-pacing and individualized progress. Management of education and the assessment of student progress are gaining increasing attention in the
elementary school setting. As a result, most ILS packages, in addition to the instruction itself, include management and reporting systems, as well as several types of tests of student achievement (Cook 1992).

These elements—instruction, testing, reporting—are closely linked. In ILS systems, the computer is used to present instruction (with some degree of interactivity), to record student progress, to measure achievement, and to produce reports for teachers and class managers at requested intervals. These data summarize the achievement of all students.

Some of the ILS computer-based tests are versatile: they can be used to place students at individualized starting points and also to calculate equivalent scores on nationally recognized standardized tests and the statistical norms that accompany them.

These packages require work to develop and in some cases have been the result of corporate mergers and acquisitions among players in the educational field. For example, Computer Systems Research of Avon, Connecticut, which sells computer-based instruction to both schools and industry, was recently acquired by Macmillan/McGraw-Hill School Publishing. This move brings the acquired company into the same family as McGraw-Hill's California Test Bureau, a long-established vendor of standardized achievement tests. The current plan is to integrate these elements, employing the
national sales force to market both the tests and the computer-based instruction (Cook 1992).

The benefits of an ILS for teaching are numerous. The system can analyze student progress and automatically "branch" or send a student to a different lesson based on his or her performance on the system. Teachers receive numerous reports which allow them to modify student placement at any time.

The sophistication of an ILS allows students to proceed at their own pace. As classes proceed through the curriculum, each student receives lessons at his or her own individualized instructional level. Students are attentive to the software because it often contains graphics, motion on screen, and sound (Wiberg 1993).

The school-based administrator can monitor school progress through reports from the ILS management system. The management system also provides reports that can be shared with parents describing their children's progress.

When Is a Non-ILS Almost an ILS?

While the producers of integrated learning systems improve and perfect their approach, others in the educational computing arena are working to align themselves with the ILS approach. Phrases such as "ILS-like" or "an alternative to ILSs" are beginning to appear more frequently in
the literature from companies in the "stand-alone software" camp (Sherry 1992).

Perhaps both groups are looking for a middle ground. Responding to a demand for more teacher control and more freedom to pick and choose from the best software around, many of the ILS companies are moving quickly to incorporate third-party software and flexible management systems. At the same time, many hardware and software producers who have until now encouraged educators to piece together their own software collections are recognizing the need to show school districts a more "total solution"—a package of preselected letters accompanied by documentation, management tools, training, and support (Sherry 1992). The following are a few examples.

Apple

Apple's Early Language Connections package features third-party software (including portfolio assessment tools), Macintosh computers, and state-of-the-art peripherals. This third-party software package is sold to supplement the regular language arts curriculum rather than replace it. This software collection is designed to be a comprehensive learning program around which a significant portion of primary-grade language arts curriculum can center.
IBM

IBM has produced networked solutions for the business sector for many years. This company has also produced comprehensive educational software. It has only been in the past year, with IBM's new Teaching and Learning with Computers (TLC) program, that EduQuest has come close to offering its own ILS.

TLC delivers EduQuest software for reading, language arts, writing, typing, and math for first- through seventh-grade classrooms over a distributed network. Four or five student networks are placed in each classroom, forming one of several learning centers in that classroom. The teacher can control assignments and oversee student activities using IBM's ICLAS network management system.

Educational Resources

Educational Resources, a leading distributor in the educational software industry, offers a set of curriculum packages that can be freely customized by the teacher, called Open Architecture Solutions, or simply Solutions. Often considered "an affordable alternative to the ILS," each Solutions package begins with a core set of third-party offerings in math, science, social studies, language arts, or ESL at a special bundle price. CD-ROM drive hardware costs are sometimes included as well.
Edunetics Corporation

Edunetics is a networked middle school and high school program. Rediscover Science resembles an ILS in many ways. If the company offered equally comprehensive course-ware in the other subjects, it would be classified as an ILS. This program provides on-line lessons (including tutorials, simulated labs, and problem-solving explorations) with a variety of off-line tasks and a management system that evaluates student performance, generates reports, and allows teachers to customize learning paths.

MECC

MECC, well known for its stand-alone software and district membership programs, also has a networked solution. MECC Management Master (MMM) is a "managed system" for networked Apple II computers. MECC software for elementary mathematics and language arts instruction runs on the system, along with management tools that deliver appropriate lessons to students based on their abilities and needs, correlate the software to the textbooks being used in the district, and report on student progress.

MECC's literature on MMM attempts to differentiate the system from the traditional ILS, pointing out that MMM is a supplement to rather than a replacement for standard instruction, that it offers teachers a great deal of control
over lesson sequences and curriculum objectives, and that it permits the addition of nonmanaged software to the system.

**Instructional Approaches (ILS)**

ILSs are in the process of trying to shed the image of "ILS = Drill and Practice + Tutorials." Although some ILS systems still fit this description, a number of companies offer open-ended educational experiences as well. Some of the newest activities incorporate simulations and exploratory activities that combine basic skills development with an emphasis on problem solving and higher-order thinking skills (Sherry 1992).

Even more common is the move to incorporate tools for research and exploration. Most ILS companies have added word processors to their systems. Reference tools such as on-line electronic encyclopedias, atlases, and dictionaries are supported by some ILS systems. Additional tools include desktop publishers, graphing tools, drawing programs, "story makers," data bases, spreadsheets, grading programs, notepads, and calculators. Sometimes these tools are offered as independent units to students and teachers. At other times they are integrated into the ILS courses, playing a key role in instruction.

The trend toward more open-ended instruction presents ILS companies with a challenge. It becomes more difficult to provide detailed reports on student progress.
(strengths and weaknesses) when the ILS is open-ended. Each
time a teacher customizes a lesson, it becomes more diffi-
cult to manage the data.

On the other hand, some ILS leaders are taking this
opportunity to counter traditional criticisms that rely
too heavily on superficial, multiple-choice assessment by
beginning to experiment with alternative assessment features
(for example, tools that encourage teachers to view student
work holistically and enter personalized comments).

The tutorial portions of ILS lessons are recently
more sophisticated than their predecessors. Some companies
have started building into their lessons help aids that are
content- and context-sensitive media options that allow
students to access hints, explanations, and tutorials
relevant to the task at hand. One example is the Jostens
Learning Corporation Algebra I Program. As students move
from page to page through this on-line supplemental text-
book, they have options to complete tutorials and lessons
with the assistance of an on-line plotter and calculator
which are available throughout all lessons.

Most of the ILSs have also added courses that inte-
grate reading and writing, often employing a whole-language
approach. Many of these and other new courses are thematic
lessons which function to teach several curriculum areas
under one theme.
Interactive Media

The ultimate weapon in ILS technology is the merging of television with computers. John Kernan, president of Jostens Learning Corporation, recently unveiled a new technology that turns classroom computers into color television sets with on-screen actors that even speak to and work directly with students. As students interact with this on-screen action, they are fed healthy doses of math, science, reading, language arts, and other subjects.

The computer system allows teachers to work with up to forty students in a variety of different ways simultaneously. For example, teachers can give one student a math lesson involving complex animation, while another student interacts with a Yellowstone Park ranger using a motion video segment. At the same time, a group of students can be involved with a lifelike science simulation with three-dimensional characters.

Teachers can customize or create courseware using material for videocassette recorders, projectors, printed matter, and cable and satellite television, according to Kernan. Kernan indicated that the Jostens Learning InterActive Media system is the first of its kind to unite all elements of educational technology, which experts considered a technological impossibility. This product has been in development for two years.
Presently, the Jostens InterActive Media system is being tested in kindergarten through third-grade curriculum programs in schools that have Apple, IBM, Jostens Learning, or Tandy microcomputers. Schools will be selected in Florida, Houston, San Diego, Shawnee Mission (Kansas), central New Jersey, and Atlanta.

The San Diego based Jostens has placed ILSs in over six thousand schools nationwide. The schools are located in a variety of places, ranging from Eskimo villages in Alaska to rural areas of the Midwest and metropolitan areas like the District of Columbia. With a staff of approximately five hundred teacher-staff development employees among the company's eighteen hundred workers, the products are updated every four to six months. Changes are based on problems found by teachers, technological advances, Congressional action, or other federal rules (APF).

**ILS Leaders**

**Computer Curriculum Corporation (CCC)**

CCC, the oldest and one of the largest companies in the field, became part of Paramount Communications' publishing group in 1990. Since its beginnings in 1967, CCC has evolved from a proprietary minicomputer-based drill and practice system to a multiplatform system that incorporates software which is more varied in its approaches to learning. During the fall of 1992, the CCC ILS line was renamed
SuccessMaker to represent the company's educational goals more accurately.

**Computer Networking Specialists (CNS)**

CNS is unique among ILS competitors because it specializes in reprogrammed versions of third-party software distributed through its Classworks management system. Customers select from a list of programs (some from other companies), and the CNS management system makes it easy for teachers to build their own lesson sequences.

**Ideal Learning**

Once the only ILS designed specifically for the Apple II line, Ideal has now expanded to support the Macintosh line and will soon move to the Windows environment as well. Ideal features an open management system that facilitates the use of third-party courseware with its ILS.

**Jostens Learning Corporation**

Since Jostens Learning Corporation's 1989 purchase of the four-year-old Education Systems Corporation (ESC), Jostens Learning has grown to be the giant in the ILS industry. Originally created by combining ESC and Prescription Learning ILS lines, the company is now continuing its expansion by merging with WICAT Systems. Jostens Learning has been a leader in introducing new technologies to the ILS.
industry, as evidenced by its early use of CD-ROM and its announcement of full-motion video for 1993.

**Macmillan/McGraw-Hill**

In the summer of 1991, Computer Systems Research was acquired by Macmillan/McGraw-Hill's School Publishing Company's CTB division and became Macmillan/McGraw-Hill Open Integrated Learning System. Designed in response to the Florida Education Department, the system is planned to be integrated with Macmillan/McGraw-Hill's other school products, such as basal texts and CTB administrative/testing products.

**PLATO 2000**

The PLATO 2000 System is the newest version of the PLATO System used in the 1960s and 1970s for computer-assisted instruction. PLATO Education Services (originally a division of Control Data Corporation) has been a part of The Roach Organization (TRO) for the last two years. PLATO features courseware for all grades, with a large concentration of materials for secondary and adult populations.

**New Century**

The New Century system began twenty years ago as a print-based system. The system presently features digitized human speech and VGA color graphics, plus a management
system with exclusive testing and reporting features. Lessons include both computer- and print-based activities.

**Wasatch Educational Systems**

This company had the first ILS to integrate its reading and writing activities and was the first to produce a science curriculum using high resolution color graphics. Traditionally MS-DOS based, Wasatch is moving toward the Windows arena.

**WICAT Systems**

WICAT has evolved from a strictly proprietary hardware/software system to one of the industry's more open systems. This transformation is evidenced by the company's AIMS Instructional Management System, which gives educators a great deal of flexibility and control over how the ILS will be used. Jostens and WICAT merged in 1992 to combine companies.

**How the Nine ILS Companies Measure Up**

A thorough comparison of the nine ILS companies was done in the October, 1992, issue of *Technology and Learning*. Table 1 shows a comparison chart from that article (8-9).

ILS sales for 1990 for the top six ILS companies were as follows: (1) Jostens Learning, $115 million; (2) Computer Curriculum, $47 million; (3) WICAT Systems, $26 million; (4) Wasatch Education, $9 million; (5) Computer
## Table 1

### How the Top Nine Producers of Integrated Learning Systems Measure Up

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<td>Sunnyvale, CA 94089</td>
<td>Wea Walla, WA 99362</td>
<td></td>
<td>Phoenix, AZ 85020-1402</td>
</tr>
<tr>
<td></td>
<td>(800) 227-6324</td>
<td>(800) 372-2277</td>
<td></td>
<td>(800) 222-4339</td>
</tr>
</tbody>
</table>

### Hardware Platforms

<table>
<thead>
<tr>
<th></th>
<th>Macintosh and Windows, (MS-DOS for some of the older offerings)</th>
<th>Apple II, MS-DOS, and Macintosh</th>
<th>Apple II and Macintosh</th>
<th>Apple II, MS-DOS, and Macintosh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>K-12 (DOS and Apple) K-6 (Mac)</td>
<td>K-12 (Apple)</td>
<td>K-12 (DOS)</td>
<td>K-12 (Mac, DOS, Windows)</td>
</tr>
<tr>
<td>Reading</td>
<td>K-12 adult</td>
<td>K-12 adult (Apple)</td>
<td>K-12 adult (Apple)</td>
<td>K-12 adult (DOS)</td>
</tr>
<tr>
<td>Language Arts/Writing</td>
<td>K-12 (Mac and Apple) K-6 (DOS)</td>
<td>3-12 (Apple)</td>
<td>3-12 (Apple)</td>
<td>K-12 (DOS, Mac, Windows)</td>
</tr>
<tr>
<td>Science</td>
<td>5-8 (Windows and Mac) 5-12 (DOS)</td>
<td>4-9 (Apple)</td>
<td>4-9</td>
<td>6-9</td>
</tr>
<tr>
<td>ESL</td>
<td>K-12 (Windows and Mac) K-6 (Apple)</td>
<td>no</td>
<td>no</td>
<td>K-3 (Mac)</td>
</tr>
<tr>
<td>Life Skills</td>
<td>yes (Windows and Mac)</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Other Subject Areas</td>
<td>computer literacy (Windows and Mac)</td>
<td>Spanish reading</td>
<td>Home learning system (DOS and Apple II)</td>
<td></td>
</tr>
<tr>
<td>Word Processor</td>
<td>yes, third party (DOS) notebook only for Macintosh</td>
<td>yes (Mac)</td>
<td>yes, third party (Apple, Mac)</td>
<td>yes</td>
</tr>
<tr>
<td>Encyclopedias/Reference Tools</td>
<td>yes, several third party (DOS)</td>
<td>no</td>
<td>no</td>
<td>yes (Mac, DOS, Windows)</td>
</tr>
<tr>
<td>Other</td>
<td>Second encyclopedia for Mac (Golden Book)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Third-party offerings

<table>
<thead>
<tr>
<th></th>
<th>Watchline science and communication arts</th>
<th>All courseware is from third parties including AEC, Davidson, Gamon, Great Wave, Hartley, Humanities, Miller, and many more</th>
<th>+ Apple II software from 16 companies + Macintosh software from Bytes of Learning, Great Wave, Ips Publishing, Mindplay, Scholaric</th>
<th>+ Microsoft Works + Davidson's English Express + Children's Writing &amp; Pub. Ctr. and The Writing Ctr. from The Learning Co.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration of above</td>
<td>Ranges from simply launching to integrating into course sequence</td>
<td>Modified for management by system (e.g., results included in student reports)</td>
<td>Ranges from simply launching to managing (e.g., results included in student reports)</td>
<td>Ranges from simply launching to managing (e.g., results included in student reports)</td>
</tr>
<tr>
<td>Approach to other third-party programs added by school district</td>
<td>Can be launched from system and included in course sequence. System records time on task.</td>
<td>For Apple II version, must exit ILS to access + For Mac and MS-DOS versions, can be launched from system and included in course sequence</td>
<td>Can be launched from system and included in course sequence. System records time on task.</td>
<td>With Renaissance Management system, they can be launched and included in course sequence.</td>
</tr>
</tbody>
</table>

*Unless otherwise noted, offerings are for all platforms supported*
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2500 Garden Rd.</td>
<td>220 Old New Brunswick Rd.</td>
<td>4660 West 77th St.</td>
<td>5250 S. 300 West, Ste. 250</td>
<td>1875 South State St.</td>
<td></td>
</tr>
<tr>
<td>Monterey, CA 93940</td>
<td>Piscataway, NJ 08854</td>
<td>Edina, MN 55435</td>
<td>Salt Lake City, UT 84107</td>
<td>Orem, UT 84058</td>
<td></td>
</tr>
<tr>
<td>(800) 538-9547</td>
<td>(800) 833-4232</td>
<td>(800) 899-3000</td>
<td>(800) 877-2545</td>
<td>(800) 759-4239</td>
<td></td>
</tr>
<tr>
<td>MS-DOS</td>
<td>MS-DOS</td>
<td>MS-DOS</td>
<td>MS-DOS</td>
<td>MS-DOS</td>
<td></td>
</tr>
<tr>
<td>K-12</td>
<td>K-8, adult</td>
<td>1-adult</td>
<td>K-adult</td>
<td>K-adult</td>
<td>K-adult</td>
</tr>
<tr>
<td>K-12</td>
<td>K-10, adult</td>
<td>K-adult</td>
<td>Prek-adult</td>
<td>K-adult</td>
<td></td>
</tr>
<tr>
<td>K-12</td>
<td>2-10 (lang. arts)</td>
<td>9-12 writing</td>
<td>8-12 other lang. arts</td>
<td>K-adult</td>
<td>K-adult</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>9-adult</td>
<td>3-adult</td>
<td>S-12</td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>9-adult</td>
<td>no</td>
<td>K-6</td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>no</td>
<td>yes</td>
<td>yes</td>
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<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes, third party</td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes, third party</td>
<td></td>
</tr>
<tr>
<td>none</td>
<td>none</td>
<td>technical and business skills</td>
<td>keyboarding</td>
<td>staff development assessment/achievement testing</td>
<td></td>
</tr>
<tr>
<td>none</td>
<td>none</td>
<td>computer literacy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>yes, third party</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>test generator, third party</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ Elementary science software from ExcelT</td>
<td>+ EDL and reading from International</td>
<td>+ Math software from SRA and IBM</td>
<td>+ Tools from World Book, Addison-Wesley and Ipsos</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ A wide variety of language arts and math courses from IBM</td>
<td>+ Substance abuse series from SAC</td>
<td>+ Early childhood program from Moby</td>
<td>+ Edusoft science, Waterford math, and NESS literacy programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ Phonics and drill from HEC</td>
<td>+ &quot;Explore-A&quot; titles from William K. Bradford</td>
<td>+ Ranges from inclusion in basic sequence to more complete management by system</td>
<td>+ Ranges from inclusion in basic sequence to more complete management by system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modified for management by system (e.g., results included in student reports)</td>
<td>Modified for management by system (e.g., results included in student reports)</td>
<td>Modified for management by system (e.g., results included in student reports)</td>
<td>Modified for management by system (e.g., results included in student reports)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ra</td>
<td>ra</td>
<td>ra</td>
<td>ra</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can be launched from system and included in course sequence.</td>
<td>Can be launched from system and included in course sequence.</td>
<td>Can be launched from system and included in course sequence.</td>
<td>Can be launched from system and included in course sequence.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under current management system, must set ILS to access but teachers can build in messages directing students to specific programs.</td>
<td>Can simply be launched from ILS.</td>
<td>Can simply be launched from ILS.</td>
<td>Can simply be launched from ILS.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Networking Specialists, $6 million; and (6) Computer Systems Research, $4 million (Cook 1992).

**Implementation of an ILS**

Implementing an ILS in a school requires a great deal of organization and research. The process involves three basic stages: planning, installation, and institutionalization.

The first stage, planning, starts with gathering political, financial, and emotional support and open lines of communication. Educators and community members who fund the school budget must understand the link between technology and implementation: technology is both a catalyst that propels change and a tool that, when implemented properly, can make change occur. Also during the planning stage, school leaders identify problems in the current system, define what change are necessary, and determine how they want the ILS to help them make those changes.

In the second stage, installation, equipment is installed and teacher/guides are trained in the skills they need to use the technology to its fullest potential. The staff development component is the most important part of the implementation process. Without people who are skilled at integrating the ILS curriculum with the regular classroom curricula, the technology investment is useless. In addition to formal training sessions, teachers or lab attendants
need technical support on an ongoing basis, not just as the ILS is introduced but as the ILS grows in sophistication and as new technological developments are integrated into the school plan.

The third stage is institutionalization, in which change is confirmed through feedback from the individuals using it. Careful monitoring at this point indicates whether the ILS and its applications are necessary (Reigeluth, Annelli, and Otto 1992).

The Role of the Teacher in an ILS Environment

Much of the literature suggests that in an ILS environment the role of the teacher changes. Instead of performing as presenters of information, teachers in restructured institutions function as guides who expedite, manage, and motivate student learning (Reigeluth, Annelli, and Otto 1992). In addition to advising and assisting students, teachers guide the integration and use of technology and design learning materials. When teachers receive specialized training they better assume their new role as true facilitators of learning. If an ILS is introduced to teachers and they are expected to implement this new technology without the necessary training, successful implementation will be sustained only to the degree that it fits the prevailing institutional structure.
The approach undermines the lecture and recitation methods of teaching and promotes the student as self-directed learner. A lack of adequate teacher training will cause the new technology not to match the organizational structure. It will therefore be squeezed out (Collins 1991).

At least two major trends have been identified from the literature and from observations in schools using integrated learning systems:

1. **A shift from whole class to small group instruction.** When teachers use an ILS, one to four students are using the system within the classroom setting (distributed), or all students are seated at separate computer stations in one room (laboratory). In a study of Apple Classroom of Tomorrow (ACOT) classrooms, Maryle Gearhart and her associates reported a dramatic decrease in teacher-led activities (from constituting over 70 percent of class time when computers are not in use to constituting less than 10 percent when computers are in use) and a corresponding increase in independent or cooperative activities (Collins 1991). This shift means that teachers begin to talk to individual students and to develop an idea of how much students understand and what their confusions are. Usually teachers have an inflated idea of how much their students understand, so actually watching teachers as they observe their students struggle with problems may give teachers a more realistic picture of their students.
2. A shift from lecture and recitation to coaching.

As a part of the shift from whole-class to individualized instruction, there is a shift from didactic approaches to a constructivist approach. Janet Schofield and David Verban documented this shift in terms of language: teachers shift from second-person constructions ("You should do this") to first-person constructions ("Let's try this"). Gearhart and her colleagues found that, in ACOT classrooms, activities facilitated—as opposed to directed—by teachers increased from about 20 percent of class time to 50 percent. The introduction of the computer encouraged the teacher to play the role of a coach. Since much of the learning is meant to take place between the student and the computer, the teacher becomes an observer and a guide who ensures that those interactions are beneficial to the student's learning.

One argument in the literature suggests that computers make the teacher's job more difficult, just as television and filmstrips or the new science curricula of the 1960s did. The latter required teachers to devote extra time to gathering materials and saddled them with the difficult task of coordinating a class or a group of students working independently on experiments or discussing the meaning of what they had done. If students have ready access to a computer for the purpose of receiving instruction, students are likely to become more engaged than they would using worksheets and textbooks (Collins 1992).
It is believed that teachers may influence the cognitive effects of educational computer experiences through the mediation they provide (Clements, Nastasi, and Swaminathan 1993). Such scaffolding should ideally effect high levels of structuring and modeling initially, with a gradual decline in the level of guidance as children's cognitive and social skills develop. Preschoolers working in pairs showed greater enjoyment and task involvement, but not better achievement, than those working alone. Such findings suggest that teachers need to continually monitor the interplay of curriculum demands, instructional strategies, and children's competencies (Clements, Nastasi, and Swaminathan 1993).

The Role of the Student Using an ILS

The guidelines of the National Association for the Education of Young Children (NAEYC) and the National Association of Early Childhood Specialists in State Departments of Education (1991) for early childhood curriculum accept the Piagetian notion that children construct knowledge through interaction with materials and people. One study indicated that the computer environment offered equal and sometimes greater control and flexibility to young children. Other studies show that computers enrich experience with regular manipulatives. Third-grade children who used both manipulatives and ILS software demonstrated a greater
sophistication in classification and logical thinking and showed more foresight and deliberation in classification than did children who used only manipulatives (Clements, Nastasi, and Swaminathan 1993).

Student time on an integrated learning system can raise mathematics achievement for preschoolers and primary grade children. In addition, several studies have found that drill-and-practice software increases preschool and primary grade children's prereading or reading skills. Amount of practice is important. A small amount of time on the ILS will have little effect (Clements, Nastasi, and Swaminathan 1993). In contrast, placing computers in kindergarten classrooms for several months significantly increases reading readiness skills; placing them in the home as well yields even greater gains (Hess and McGarvey 1987).

Problem-solving ILS activities motivate children as young as kindergarten age to make choices and decisions, alter their strategies, persist, and score higher on tests of critical thinking (Gelinas 1986). Preschool and primary grade children develop the ability to understand the nature of problems and use representations such as drawings to solve them. When given opportunities to debug or find and fix errors in Logo programs, children also increase their ability to monitor their thinking and readjust when they become confused (Clements, Nastasi, and Swaminathan 1993).
Researchers have consistently observed high levels of spoken communication and cooperation as young children entered at the computer. Compared to more traditional activities such as puzzle assembly or block building, the computer elicits more social interaction and different types of interaction; for example, young children initiate interactions more frequently and engage in more turn-taking and less tutoring when working with computers. Only in the computer environment do simultaneously high levels of language and cooperative play activity occur. Primary grade students collaborate more when working with the computer than with paper and pencil.

The types of interactions range from working in parallel or taking turns to more sophisticated forms of collaborative work such as helping or instructing and discussion and building upon each other's ideas. Children's styles of interaction change as they gain experience, progressing from turn taking, to peer teaching, to peer collaboration. This occurs even among preschoolers, although the pattern also follows a developmental trend; preschoolers typically engage in turn taking and peer teaching, whereas primary grade children engage in more collaborative interactions (Clements, Nastasi, and Swaminathan 1993).

The teacher and the software may also make a difference. For example, the teacher might encourage cooperation
by placing two chairs in front of the computer, suggesting that students work in pairs, and encouraging them to set cooperative goals or to confer as they work on individual projects. Increasing the level of teacher direction and increasing student responsibility for their own behavior minimizes behaviors such as aggression and competition (Clements, Nastasi, and Swaminathan 1993).

ILS Technology in Schools Across America

Baltimore, Maryland

An evaluation of the ILS program in Baltimore city was conducted by Henry Jay Becker (1991), project director for the Johns Hopkins University Center for Social Organization of Schools during 1989-90. The Integrated Learning Systems Project studied the effectiveness of two different ILS systems which featured basic skills software in reading and mathematics in computer labs.

One system was from Computer Networking Specialists (CNS), a small firm based in the state of Washington. This software incorporated drill-and-practice and tutorial software licensed from ten different publishers placed onto the system for management. Lessons were customized for individual students. The CNS system was evaluated in its second year of implementation at the Mt. Royal Elementary School, a relatively unique inner-city school which, although having an enrollment that was more than 90 percent
black and over 50 percent free-lunch eligible, nevertheless has enrolled well-educated families as well. This school has higher than average test scores.

The second system studied the Jostens Basic Learning System. This software program featured highly colorful and comprehensive elementary reading and mathematics curriculum that is less skills-based than CNS's. The Jostens program is intellectually grounded in a theory of instruction that specifies the ordering of several strands of instructional content and which focuses on higher order thinking skills. The math curriculum features over 50 percent applications and problem solving. The Jostens system had been implemented the previous spring at the study site, Lovely Lexington Terrace Elementary School. Lexington Terrace is a school-wide Chapter I school whose students mainly reside in one of the city's high-rise public housing projects, but which nevertheless has averaged close to the median percentile on norm-referenced tests, particularly in mathematics.

In both schools, the software management system placed each child at his or her instructional level and provided lessons while tracking their performance during the year and recording which lesson they were to do the next time they logged onto the system.

Neither system produced positive results for the school's total enrollment across both mathematics and reading. Some teachers did profit from using the management
system. Overall, the use of CNS software resulted in modestly positive effects on traditional mathematics content but negligible effects on reading and language arts scores. Effects on mathematics learning were improved for "gifted and talented" students in the fourth and fifth grades. In addition, the math results were also positive for regular fourth-grade students. Effects were also notable for two subgroups of students: those with the lowest 30 percent of pretest scores and on mathematics concepts and applications as measured in the traditional norm-referenced test. No outstanding overall or subgroup effects were noticed on the reading test except that student attitudes toward reading as a subject may have been positively affected by the students' use of the CNS software.

At Lovely Lexington Terrace Elementary, where students used the Jostens ILS, the implementation produced some favorable attitudes from students about mathematics but only negligible achievement results overall for both math and reading. These findings were the result of positive achievement effects for some subgroups of students and negative effects for others. In particular, reading and language arts results were better for students who scored lower. Students having the highest pretest scores in reading also improved. There were negative results for students in the middle group (Becker 1991).
Detroit, Michigan

Students at Jefferson Elementary School in Sterling Heights use an integrated learning system called OZ. This computer drives a $13 million multimedia teaching tool recently installed by Warren Consolidated Schools. The goal is to hype the learning experience for Nintendo generation kids raised on playing video games while providing instant access to an amazing amount of information (McCann 1992).

There are sixteen elementary schools in the Warren Consolidated District which covers parts of Warren which use the Jostens ILS system. A product of San Diego based Jostens Learning Corporation, OZ is designed to snag kids' interest and keep them packed with real-life and animated programming, full-motion video, and professional quality sound, routed to all classrooms.

OZ's nerve center is about the size of three four-drawer file cabinets. If the wiring installed in Jefferson Elementary to make the system work were put end to end, it would stretch from Flint, Michigan, to Toledo, Ohio. It allows students to become acclimated quickly to high-tech learning technology, while providing teachers with a standardized way of tracking students' progress.

Jostens network links Jefferson Elementary with fifteen other elementary schools, plus the Macomb Math/Science Technology Center at Butcher Community Center. Warren officials boast that theirs is the first school
district in the U.S. to link so many buildings in such a sophisticated network (McCann 1992).

**Decatur, Georgia**

DeKalb County's elementary school students are spending less time at the blackboard these days and are focusing their time on the keyboard. Almost twelve hundred computers are in operation across the school system, and eighteen hundred more are due to be plugged in and running early in the school year. Every third-grade class now has several computers, and the fourth grade will get them this year. The DeKalb County School System eventually plans to include the fifth and sixth grades as they expand the system's integrated learning system.

Demonstrated at the system's Rehoboth Instructional Center, ILS is accessed through a network of desktop computers linked to a single storage device. From that storage, a teacher can retrieve a wide variety of teaching packages that focus on reading, mathematics, and language arts. A speech connection and brilliant color graphics mean the system is likely to hold the attention of younger students.

One simple computer exercise takes a student through a test of adding skills. A more sophisticated lesson prepares a student for a writing assignment. Other features in the system allow more advanced students to choose a
"template" from another file that will guide them through the writing of a business letter, a personal letter, or some other assignment. In one program, a student can follow the antics of "WiseGuy" choosing answers to questions about subjects such as metrics.

A main objective of the ILS is teaching students to read and write. Since 50 percent of the reading material is science and social studies content, students get it all in one dose. As early as third grade, students begin keyboarding skills. IBM and WICAT are the suppliers of the ILS materials ("DeKalb's Classes Increasingly 'On-Line'" 1992).

**Ft. Pierce, Florida**

Garden City Elementary School, with its 256 computers and instructional software from Computer Curriculum Corporation (CCC), will be a showcase for the state of Florida. CCC, a Simon and Schuster company, is installing the instructional programs and conducting training for a cost of about $170,000, which represents a savings to the district of nearly $86,000.

This is the largest integrated learning system in the state of Florida as measured by the total number of terminals in a single school, according to the superintendent. The instructional materials were designed specifically for Garden City and match the school's instructional goals (Burgess 1992).
Osceola, Indiana

Administrators in Osceola, Indiana, decided their number one priority was to keep their educational goals intact. They wanted their technology to support their curricula rather than forcing the curricula to match the technology. As a result, the high school is equipped with Apple, DOS, and Unix systems, each used in a particular area.

IBM was the school's technology of choice in its business and industrial arts classes. Teachers wanted their business students to use the kinds of software they are likely to encounter in the business world. The school selected software such as Lotus 1-2-3 and WordPerfect and, hence, IBM hardware. To teach drafting, the school uses Autoclad (Computer Graphics World 1992).

Romulus, Michigan

This urban school system teaches students basic reading, writing, and arithmetic skills through the use of ILS technology supplied by Jostens Learning Corporation. After finishing at the bottom of the barrel on state exams and having a 40 percent failure rate in mathematics among ninth graders, the system had an acute sense of failure. System officials believed part of the solution was in ILS technology.
The superintendent decided that what the students needed was individualized instruction through artificial intelligence, or computers. After researching the idea, the superintendent discovered that the Jostens system delivered programmed sets of instructions that allow students to complete course work with a computer at their own pace.

The administrators of the Romulus School District began meeting with the major software developers in the education market early last year. They looked for a company that could provide the most comprehensive package as well as top-notch support.

Each classroom is equipped with five computers, some Macintosh and others IBM PCs. There are approximately two hundred computers in each location. Every room also has a big-screen television and a telephone by which a teacher can reach a parent if necessary.

Together, Jostens and Romulus built additional facilities in each school where the students work for an hour and a half every day on computers. The rooms are called the Computer-Aided Instruction Classrooms (CAIC). There are three CAIC rooms in each elementary school, one for kindergarten through second grade, one for the third and fourth grades, and a third room for students in the fifth and sixth grades. Each CAIC room is equipped with thirty-five computers.
Currently, three of the five elementary schools have the new systems in place. In the upcoming school year, the remaining elementary schools will be automated, and the junior and senior high schools will begin selecting the necessary equipment. So far, it is too early to see any changes in grade-point averages or statewide test scores (Parrish 1992).

New Haven, Connecticut

On February 3, 1992, residents of New Haven, Connecticut, opened their daily newspapers and found an encouraging announcement: "Fourth Graders Shine for New Haven." The city's fourth-grade mastery test results for 1991 indicated that student performance had improved as more than half the children met state reading standards.

The computer program chosen by the district was Jostens three years ago. Four IBM computers and a printer were placed in every second- through fifth-grade public school classroom in the city. Each computer was programmed with software and networked to a central file server in the main office of each school.

The district chose Jostens because administrators wanted a software package that would help teachers provide individualized instruction to children with a broad range of abilities. Although New Haven is the home of Yale University, the socioeconomic status of its school-age students
is low. In a typical elementary school classroom, some students read above grade level, while others are still struggling to master basic skills. The test results of the latter were greatly improved because of their participation on the Jostens ILS system (St. Onge 1992).

**Waycross, Georgia**

Emerson Park, Center Junior, McDonald Street, Memorial Drive, Wacoma, Waresboro, and Waycross High Schools all report positive learning going on because of the integrated learning systems placed in laboratories in each school. Students received individualized instruction at their instructional level in the areas of reading and mathematics on the Jostens Basic Learning System.

McDonald Street incorporates the Jostens Chapter I Computer Lab in skills training in a variety of ways. The lab was set up with a backup system of follow-up instructional activities. This addition provided continuous progress in the skills being emphasized. Wacoma's Chapter I Jostens Computer Lab students spent a great deal of time on the writing processor. They recorded great improvements in the area of writing. Five boys and girls have advanced in their grades to the point that they are registered on the A/B honor rolls. Regular classroom teachers confirm that they see improved work from the students who have spent time on the computers.
At Waycross High School, eleven student work stations and one teacher management station provide individualized computer-based instruction in reading, writing, and math. Additional learning experiences in collateral areas such as study skills, keyboarding, survival skills, and life skills are also presented. These components provide sequential learning experiences from the prereading level through the twelfth grade (Hurst 1992).

Jacksonville, Florida

Teachers in the new Andrew A. Robinson Elementary School in Jacksonville, Florida, using Apple HyperCard multimedia software, are developing curriculum units and commanding lab and classroom technology systems. Technology is used to address multiple learning styles, encourage teacher and student creativity, develop lifelong learning skills, and facilitate cooperation in the large institution. Robinson, part of the NSBA Technology Leadership Network's Duval County School System, is a 1,120-student magnet school where most students come from a poor, inner-city neighborhood but where children from other areas also are attracted by the technology. It inherited much of its computer equipment when three other elementary schools closed as it was built. Additional equipment was purchased through construction, magnet, and Chapter I funds.
Two thirty-two-station IBM computer labs run Jostens Basic Learning System software, featuring individualized lessons in reading and math and reports on student progress, all available during the school day and after school, or enrichment activities for members of the school computer lab. One thirty-two-station Apple Macintosh lab, networked with Ethernet software, is used for instruction in word processing, desktop publishing, and HyperCard use, as well as for lessons using Jostens Dragon Tales, an integrated language arts program.

The media center has a twelve-station Jostens Research and Literature based writing lab where students use computers to access Compton's electronic encyclopedia and other research and writing software. Students also peruse the media center's circulation catalog through this technology system. Each classroom is equipped with at least one IBM computer, one Macintosh computer, a printer, teacher productivity software, and Jostens Tapestry program for language arts and mathematics (National School Board Association 1992).

Oakland, California

Hundreds of Oakland school children are taking Apple computers home. Under a pilot program, fourteen Oakland schools with students performing below the national average each received thirty Apple IIe computers and educational
software. Starting in the summer of 1992, students were allowed to check out the computers for four- to six-week periods on a rotating basis.

The goal was to get parents to spend more time working with their children to develop basic reading, writing, and math skills. Parents attended a two-hour training session with their children before they were allowed to check out the computers (Smith 1992).

**Utica, Michigan**

Warren Consolidated Schools completed the first phase of an integrated learning system installed by Jostens Learning Corporation during the month of April, 1992. The Board of Education spent $2.1 million for software and instructional computer systems that were installed in each of the district's elementary schools during the 1992-93 school year.

All of the buildings were connected through the technology, an expansion of a pilot program started at one of their elementary schools in April. The system in each building has a central control center to oversee equipment in the classrooms. Each classroom has a computer workstation, a 27-inch television monitor, a speaker system, and a telephone.

School officials indicated that the system will provide a wider range of subjects to cover and make technology
easier to use and understand. It will make technology the focus for the delivery of primary instruction. Teachers will no longer have to take students to a library media center or wait for video cassette recorders and monitors to become available.

The integrated learning system consists of curriculum software run over networked microcomputers, either IBM or Apple compatible, and includes a management system that tracks student progress. The ILS can deliver developmentally appropriate, well-coordinated, individualized instruction to each student. Instruction is designed to match the content of major textbooks, as well as district and state objectives.

The system also allows for classroom broadcast of six television channels, including Discovery, Public Broadcasting, Cable News Network, the Weather Channel, the Learning Channel, and network television. Closed-circuit television and communication with other teachers or administrators is also available. Some of the software packages also include the "virtual reality" programming. Phase II of the program includes adapting similar programs at the middle school and high school levels (Gardner 1992).

Houston, Texas

By the year 2000, students at Ft. Bend Independent School District will have become proficient users of
computers. Trustees recently approved a five-year $2 million lease agreement for software and computer equipment. The move set in motion a technology pilot program schools throughout the state could one day be copying, according to school officials. The pilot program will begin at five elementary schools. In the future, the technology will expand to other schools.

The computers will be distributed in the classrooms at a 3:1 ratio for elementary students, 4:1 for middle school students, and 5:1 for high school students. The $2 million lease agreement will be paid back through the Texas Technology Allotment at $27 per student. The district estimated a minimum of $1 million income through the grant each year.

Teachers received training on the new computers in the areas of math, reading, science, and student records. Through computers, students will have access to the Library of Congress or talk to students in Moscow. Changes in the workplace have dictated the need for technological advances in the classroom (Dorsett 1992).

Morton, Washington

Jostens Learning Corporation provided the Onalaska School District access to twenty-eight computer stations for students in kindergarten through fourth grade. This lab will assist students to improve their skills in writing,
reading, language arts, mathematics, and science. Special training sessions for kindergarten through sixth grade staff members were conducted in the lab (Jones 1992).

**Clifton, Texas**

Students in second through fifth grades at Clifton Elementary School received Macintosh LC computers installed in a computer lab during the spring of 1991. The lab uses Jostens Integrated Learning System's reading and math curricula combined with a word processor, keyboarding, and TAAS program.

Students attend the lab for thirty minutes three times a week, with resource students also attending the lab on a regular schedule. The twenty-four computer stations make it possible for each student to work individually at the computer.

Students take the Jostens Basic Skills Inventory (BSI) test which places them in Jostens reading and math curricula. The students then do reading and math lessons at their own pace and ability. Teachers also give students individualized lessons or assign a computer lesson to the entire class that correlates with classroom work. Teachers and students view the computer lab as a valuable tool that enhances the learning process (Williams 1992).
Teacher Attitude

One basic premise of organizational theory suggests that organizations employing professionals can be effective only when the following three requirements are met: (1) quality people must be recruited, (2) the organizational structure and the work activity must be organized so that professional employees can achieve their goals, and (3) professionals must be rewarded for their accomplishments. Only when all of these requirements are met can we expect positive attitudes from any teaching staff (Bacharach and Conley 1989). If schools recruit talented people but fail to provide a work environment in which they can become successful, teachers will become disillusioned with their careers, no matter how well qualified they are. Teacher attitude rests on this premise. Teachers enter the profession expecting a work environment in which they can fulfill their intrinsic goals in the workplace and, in turn, improve their overall attitude (Conley, Bacharach, and Bauer 1989).

If we are to genuinely improve teacher attitude in schools, we must first ensure that the work environment enhances teachers' sense of professionalism and, in turn, decreases their career dissatisfaction. By examining the organizational work characteristics of schools associated with teacher career dissatisfaction, a basis for changing the work environment can be formulated to ensure more
continuous career satisfaction for teachers (Bacharach and Conley 1989).

Hall's (1976) model of career development defines organizational work conditions as the critical factors in promoting a cycle of career success. Organizations that provide a high level of support for employee goal-directed activities and provide an atmosphere in the workplace that supports autonomy are more likely to enhance the overall attitudes of their employees (Hall 1976). This view is consistent with the work of such school researchers as Goodlad (1984, 530), who stated that "when teachers find themselves restrained and inhibited by problems of the workplace, it is reasonable to expect frustration and dissatisfaction to set in."

Researchers suggest that educators should be able to differentiate between schools that enhance teacher attitude and schools that do not. The unit of analysis suggested here is the school organization, not simply the individual teacher (Bishop and George 1972).

One important characteristic that contributes greatly to improved teacher attitude is a teacher's ability to be viewed as a professional. Teachers expect to have a high level of autonomy, to serve as their own judges, and to be highly involved in decision making. The rights that teachers expect are often in conflict with their roles as members of bureaucratic organizations (Conley 1989).
In a bureaucracy, the leaders of an organization attempt to create certainty and enhance predictability through such mechanisms as specifying rules, often through written procedures (Hall 1982). In schools, bureaucracy may clarify expectations for teachers and provide direction for their work activities. These specifications can facilitate teachers' work since, in their absence, teachers may believe that their roles are somewhat ambiguous and such feelings may lead to attitudes of displeasure. In contrast, if school bureaucracy results in too much direction and control of teachers' activities, teachers may perceive the creation of rules as infringement on the autonomy they expect as professionals. Bureaucratization may also result in the increased routinization and mundaneness of work activities, and teachers' feelings may include lack of challenge, alienation, and dissatisfaction (Conley 1989).

Like other professionals, teachers derive their sense of professionalism largely from their own expertise. One way in which school administrators recognize teachers' expertise is to provide them with opportunities to participate in decision making. Authority connotes whether an organizational member has the final say in the decision-making process (Hall 1976). Influence is broader in scope than authority because it connotes informal power (Bacharach and Lawler 1980). When teachers feel they lack authority over decisions or have less influence over decisions than
they should have, the result is a sense of powerlessness and dissatisfaction (Conley, Bacharach, and Bauer 1989).

Research on teacher attitude has indicated that individual personality characteristics, demographic variables, and specific environment factors all interact to determine whether or not a teacher will be satisfied with teaching as a career. Several researchers and theorists have suggested that the personality construct or locus of control may be an especially significant component related to teacher attitude. In recent years, there has been a growing concern with upgrading public schools. A critical component of improving schools is to assure that the school work environment and the management techniques used in schools enhance the satisfaction of teachers in the workplace (Conley 1989). However, when the administration gives too much direction and enforces too much control over teachers' activities, teachers may perceive the creation of rules as an infringement on the autonomy they expect as professionals. Bureaucratization results in increased routinization and mundaneness of work activities, and teachers' feelings may include lack of challenge, alienation, and dissatisfaction (Katz and Kahn 1978). A recent study by Conley (1989) stated predictions concerning bureaucracy and teacher satisfaction.

Interaction and communication among teachers and between teachers and supervisors are important because
they provide teachers with the critical information and instructions needed to perform their jobs. If teachers are isolated from other teachers and supervisors, they may not be satisfied with their jobs over an extended period of time (Conley, Bacharach, and Bauer 1989).

Supervision of teachers' work activities seems critical in an examination of teacher attitude. There are two aspects of supervision that should be examined in relation to teacher attitude: positive and negative. When applying positive supervision, supervisors show appreciation for teachers' activities and solicit input from teachers. When applying negative supervision, supervisors maintain a negatively critical orientation toward teachers and their work by criticizing teachers' work, refusing to help, or being generally unavailable (Conley, Bacharach, and Bauer 1989).

Research has noted that schools provide few opportunities for teachers to have a sense of professional growth and advancement in their careers (Carnegie Forum 1986). For the few existing promotions, teachers' professional norms dictate that the promotion process shall be fair, rational, and based on competence. To the degree that the promotion process is seen as nonrational, dissatisfaction is likely to result. In addition, if promotions are scarce, teachers will feel uncertain about promotion and blocked in their
careers (Milstein and Golaszewski 1983). As career ladder programs are proliferating, this issue is becoming critical.

Conley (1989) examined teacher attitude in forty-seven school districts in New York state. These districts were a random sample stratified according to geographic location, size, wealth of the district, and district expenditures. The research suggests that when addressing the issues of teacher attitude, educators must empirically delineate specific variables within such broad thematic categories as bureaucratization, power, supervision, communication, career development, and classroom environment. For example, when positioned with bureaucracy, the results of this study suggest that role ambiguity and routinization are conceptually and empirically distinct. The study also revealed when examining communication that contact with superiors was more important than contact with peers in predicting career satisfaction at the elementary level.

In dealing with career development, the research found rationality of promotion more important than uncertainty of promotion. These and other findings suggest that, as in any organization, before attempting to reform or change how schools operate as work organizations, educators must empirically identify the specific consequences of changing particular aspects of the work environment (Conley 1989).

In conclusion, the research suggests that those who choose to concern themselves with teacher attitude must
realize that, like the reform movement itself, there is no "quick fix." While there is plenty of room to question the unified salary schedule and to maintain that teachers' salaries must continue to increase, the findings suggest that improving the design of teachers' jobs and the managerial structures of schools are also critical in enhancing teacher attitude. If educators are going to continue to be concerned with the impact of reform efforts on teacher attitude, they must proceed cautiously, being specific and strategic about the changes that are made (Conley 1989).

Rural Schools

The knowledge and skills of America's workforce are expected to be greatly influenced by its public schools. Even though rural schools enroll a significant proportion of students in the United States, their status and problems have received relatively less attention than urban schools (Levine and Havighurst 1993).

Meyer, Tyack, Nagel, and Gordon (1979) demonstrated the role played by the rural school in its contribution to American society during a period as late as 1870 to 1930. Their regression analysis shows that, throughout this period, both urbanization and manufacturing had a consistently negative effect on overall school enrollment, whereas Republican party dominance had a consistently positive relationship on school enrollment during this era. This study
corrects the misperception that the increased access to public education was caused by industrialization, urbanization, and the concomitant growth of bureaucracy in American education. Meyer et al. suggest that the spread of schooling in the rural North and West can best be understood as a social movement which was deeply rooted in the commonly held ideology of nation building. This ideology combined the outlook and interests of small business entrepreneurs in a world market, evangelical Protestantism, and an individualistic conception of the polity.

While rural schools served as a site for local community events, it is clear that they also played an important role in integrating remote areas into a national political economy (Levine and Havighurst 1993). Programs that use rural schools as centers of entrepreneurship have been started around the nation. Jonathan Sher (1988), who heads North Carolina's Rural School-Based Enterprise Program, focuses the program on the delivery of services which develop rural entrepreneurs. Sher presents such training as a variety of cultural resistance and school reform. Sher is skeptical of the contribution of schooling to economic development, and he understands how schools train impoverished students for compliance, as well as the economic constraints under which schools operate. He contends that rural enterprise programs will accomplish several purposes. They will help keep students in school by making the schools
more relevant, they will improve students' self-esteem, and they will revitalize local communities.

Many students in rural areas are from low-income families and have relatively low achievement, particularly in such economically impoverished areas as Appalachia and the Ozarks (Levine and Havighurst 1986). In addition to educational disadvantages associated with rural backgrounds and dialect differences (Keefe, Reck, and Reck 1983), many rural students historically have low educational aspirations in circumstances in which advanced education was not perceived as necessary or even desirable for growth when preparing to be farmers or farm laborers (Fuller 1985).

Although academic performance is high in some rural communities and some students' aspirations certainly have escalated as farming has become highly technological, the relatively low status and economic differences experienced by many rural youth tend to generate relatively low aspirations.

One problem research analysts encounter in trying to delineate and find solutions to educational problems in rural areas is that rural locations are very diverse and the characteristics of rural schools and society are difficult to define and generalize (DeYoung 1987). This problem was addressed by educators trying to build a network to share information on common problems through the National Rural and Small Schools Consortium. Members of the consortium
determined that more than three hundred separate rural subcultures have been identified based on such characteristics as ethnic composition, degree of remoteness, and economic infrastructure (Montague 1986). These distinct differences in rural subcultures have been illustrated by Jonathan Sher (1983, 262):

Reliable hard data about the quality of small rural schools are so diverse, especially when viewed internationally, only compounds the problem. Indeed, one can find evidence to support nearly any characterization. Someone who wishes to describe these institutions as ineffective, stifling, third-rate, or worse will have little trouble finding schools that deserve such criticism. However, another person who wishes to portray rural schools as innovative, high-performing, delightful places will have equal ease in justifying such a glowing assessment.

Among the many diverse concerns affecting rural schools and society, several key problems persist. Among the most noticeable of these are the lack of financial resources, which has been intensified by economic recession in recent years; shortages of teachers; and difficulty in meeting the higher academic standards that increasingly have been mandated by state governments throughout the United States (Killian and Byrd 1988, Miller and Sidebottom 1985, Montague 1986b).

Given the factor that school funding is closely associated with student population, rural schools suffer because of their size. A frequently impoverished economic base causes rural districts to suffer difficulty obtaining
the financial resources needed to provide a comprehensive educational program. Severe financial limitations thus constitute a recurring theme throughout Wayne Fuller's (1982) history of rural education in the Midwest. In addition to the inadequate financial base characteristic of many rural communities, according to Fuller, difficulties were also identified in adjusting to a more technologically advanced, industrialized society.

[Farmers] could scarcely help feeling that educating their sons and daughters would either lure them away from the farm, where their labor was needed, or make them discontented with a life in which the monotony of morning and evening chores was broken mainly by bone-wearying work. . . . They [also] seemed instinctively to fear that education, at least too much education, went hand in hand with wealth, luxury, and leisure and ended in corruption and decadence. (Fuller 1985, 37-38)

The rural life problem is no longer the farm problem. Fewer than 8 percent of rural people live on farms; half of those have gross sales of less than $1,000 per year. Rural areas seem to render specialized production by marginal enterprises which provide the nation with energy, minerals, food and fiber, and simple manufactured goods. Although productivity in rural industries is rising, labor inputs are falling. Rural residents have a long history of underemployment and low participation in the labor market (Levine and Havighurst 1993). To some degree, this history contributes to their acceptance of low wages and periods of
unemployment and underemployment as a condition of life (Cobb 1982).

In an attempt to address these economic concerns, educators and rural development experts suggest that more education and training will improve rural socioeconomic conditions. Contemporary reformers call for training entrepreneurs instead of employees, and they recommend training relevant to services instead of farming and manufacturing (Levine and Havighurst 1993).

Urban Schools

Schools in cities with population from about 5,000 to 15,000 are considered to exist in a small city. Small cities exhibit a five-class structure. One example is a midwestern community described under the names of Jonestown, Elmtown, and Midwest (Levine and Havighurst 1993). This city had a population of about 6,000 and represented the most common type of a small city in the north central states—a county seat, with both an industrial and an agricultural population.

In this community, the upper class constituted approximately 3 percent of the total population. Some members of this social class were descendants of a pioneer settler who, a hundred years earlier, had acquired large tracts of farmland that had now become the best real estate in the city. Others were executives of a small factory, or
they were the owners of banks, the largest farms, and the most profitable businesses.

The upper middle class in this study constituted about 10 percent of the population and consisted mainly of professional men, business executives, and owners of businesses and large farms. The lower middle class, about 30 percent of the whole population, consisted of mainly white-collar workers, owners of small retail businesses, a few foremen and skilled manual laborers, and the majority of the farmers who were considered prosperous. These people were perceived by those in the classes above them to be "nice people" but "social nobodies" (Levine and Havighurst 1993).

The upper working class, the largest group (30 to 40 percent of the population) were described as "poor but honest" people who worked as skilled or unskilled laborers or as tenant farmers. The lowest class, about 15 percent, consisted of people who were working hard to maintain a respectable kind of poverty and partly of people who seemed to the rest of the community to be generally immoral, lazy, and defiant of the law.

After the Jonesville studies were made, two other midwestern communities, one of 40,000 and the other of 100,000, were studied. The same picture of social structure emerged from both districts (Havighurst et al. 1962). Social class differences are difficult for a sociologist to
analyze in a large city on the basis of actual social participation (who associates with whom). In large cities only a handful of people are known to each other, and any given face-to-face interaction can involve only a fraction of the population.

In an attempt to understand the social structure of a metropolitan area of Kansas City in the 1950s, investigators found that residents made consistent evaluations of various symbols of status. They were aware of the prestigious ranking of various neighborhoods and tended to readily place persons on the social ladder based on home addresses. This ranking in social strata became the basis upon which, in the 1960s, 1970s, and 1980s, the federal government continued to award significant sums of money to what is now called Housing and Urban Development and thus the funding of state and federal educational programs.

Much of the crisis in education today reflects recent trends that have concentrated working-class and underclass students, many of whom are disadvantaged minority students, in the inner-city portion of a postindustrial, metropolitan society. Scott Miller of the Exxon Education Foundation has surveyed developments regarding the differential development of inner-city schools and communities and has summarized them by observing that

several of our inner cities have effectively become the planet's first truly international, multicultural, multilingual "developing countries." . . .
The nation-building agenda concerning nonwhites in the inner city has been transformed in recent years into a much larger, more complex challenge . . . and become a matter of even more pressing concern for overall moral, political, and economic health of the nation. (Miller 1986, 88)

Miguel Castells (1985, 28-29) has examined patterns of metropolitan development in relation to larger economic and social trends, and noted that

we are witnessing the rise of urban schizophrenia . . . involving the contradictory coexistence of different social, cultural, and economic logistics within the same spatial structure . . . thereby inducing a new territorial division of labor, based on polarized growth and selective development which reflects itself in the interregional cleavages, intra-metropolitan dualism, and simultaneous life and death of our great cities.

He further pointed out that much of the problem involving schools and society in inner-city poverty neighborhoods has its origins in the upgrading of professional and technical jobs in advanced service and high technology manufacturing . . . which require a fundamental retraining of labor, something the educational system is hardly able to assure, particularly in the secondary public school. (88)

Educators are concerned with these and other crises affecting urban education. One useful analysis has been provided by Daniel and Lauren Resnick (1985). They conclude that traditional arrangements for sorting and selecting students in urban school settings are no longer functional for the United States. The Resnicks first recognize that our historic efforts to provide equal educational opportunity and to stimulate national growth involved the movement
to make high school education not just available but compulsory for all students. With the exception of Japan, no other large nation has established a system of comprehensive high schools which provide some common academic emphasis for nearly all its youth.

The Resnicks also point out that traditional efforts to provide a common curriculum for all urban secondary students were possible only because ability grouping and tracking allowed the schools to differentiate within the comprehensive public school system. In referring to where America stands in rendering public education to students in urban schools, their observation is that we have compromised. Our rhetoric and our provision in most school systems of an undifferentiated high school diploma all suggest a decision against tracking. However, in reality we have considerable tracking . . . even if it is not always formally so labeled. Comprehensive high schools usually house several quite different sets of courses in which expectations and standards vary considerably. (Resnick and Resnick 1985, 8)

Other observers agree with the Resnicks that the most destructive consequence of the compromise educators reached in trying to provide opportunity for all while maintaining high standards for only a few has been that the great majority of students have not been challenged and helped to attain a high level of academic performance. Some students in the top track become advanced, independent learners, while the vast bulk of students receive relatively
low-level instruction emphasizing passive learning, memorization, and regurgitation of factual material and mastery of only very minimal standards (Goodlad 1984). This basic pattern has been significantly reinforced during the past fifteen years by the introduction of minimum competency testing, continuing and probably growing reliance on simplified textbooks, and mandated reforms that require or at least encourage teachers to emphasize such low-level skills as computation in math and the mechanics of language (Madaus 1988).

In addition, the traditional pattern in urban schools appeared to be producing relatively acceptable results for most students, until the emergence of postindustrial society and escalation of international competition substantially magnified the need to attain a higher level of performance on a more equitable basis that ensures improved achievement on the part of economically and socially disadvantaged students. After looking at the current status of curriculum and instruction in elementary and secondary urban schools, as well as recent national and state efforts to improve instruction, the Resnicks conclude that an important first step in raising educational standards is to improve the level of instruction through a nontracked curriculum that sets strong intellectual requirements for all students. "Nobody knows," they argue, "whether a strong intellectual program" for all students could work—whether most students
would remain in school and perform, or whether they would simply "drop-out" (Resnick and Resnick 1985, 90).
CHAPTER III
THEORETICAL FRAMEWORK

It is imperative that students entering the workforce today be well versed in the knowledge and practical uses of computers. As a necessary first step, their teachers must be encouraged to become knowledgeable in this area as well, so that they can effectively integrate technology into their regular process of teaching. An assessment of teacher job satisfaction, the teacher's ability to integrate technology programs into the regular teaching curriculum, and an assessment of student interactions as result of implementation of new technology must first be undertaken so that the overall impact of technology on student achievement can be measured. The purpose of this study was to assess the one dependent variable, teacher attitude, on the basis of five independent variables: teaching experience, delivery model, student groupings, decision making, usefulness of training, and grade level taught. Although many kinds of options are available for students to receive instruction via computer, the integrated learning system (ILS) was the tool for delivery of instruction in this study.
Integrated learning systems tend to individualize instruction because of the adaptive capabilities, based on student performance. Remedial or enrichment activities can be assigned appropriately on an individual basis as instruction adjusts to the student's prior knowledge, rate of learning, and student correctness of response. Instruction can meet the needs of several learner subgroups including gender and ethnic groups, learning disabled and gifted students, and preschool and postschool as well as school-age populations.

Recently, users of technology in the classroom have contended that computers have a number of positive effects on teacher job satisfaction, classroom interactions, and student interactions in the classroom. Students appear more attentive to computerized learning and more motivated to learning, to exhibit more on-task behavior at the computer, and to have a better attitude toward reading, mathematics, and other subjects. Students like the various features of learning on the computer, including immediate feedback, graphics, and audio features of integrated learning systems. Increasingly, the computer is seen as an agent of socialization in small-group classroom instruction. It is therefore fair to assume that classroom interactions do change as students become more free to make choices which govern their process for learning.
The general program components for the use of the Basic Learning System reading and mathematics programs were adhered to by each of the twenty schools used in this study. Students spent a minimum of 75 to 90 minutes weekly on the Basic Learning System if they were in the regular classroom; 120 to 150 minutes were allowed for students performing two or more years below grade level in reading or mathematics.

The Basic Learning System curriculum was developed based on the skills and objectives of the publishers of the major basal texts in reading and also for math. The skills that were taught most often by the publishers of major textbooks were the skills included as a part of the Jostens Basic Learning System curriculum. The assumption was that it is easier for a regular classroom teacher, using any reading or math textbook, to integrate the Jostens curriculum with the regular teaching curriculum. This study assessed teacher attitudes about whether this was a valid assumption.

Each student was to complete a minimum of one program level in a curriculum area for a full school year. A student was to receive lessons in all strands as sequenced in the Jostens Learning curriculum area for a program level. A student should complete lessons at the rate of twelve to fifteen lessons over a four-week period in a curriculum area.
Student placement in the integrated learning system may be determined either by teacher judgment or the Basic Skills Inventory (BSI), a placement test. Teachers may choose to place students consistent with their textbook placement or recent achievement score results. Continuing students were advised to take the BSI if less than one program level was completed the previous year. The BSI is a standardized test developed for the Jostens Learning System. It was administered to all grade levels. The placement level of students was regularly reviewed to confirm performance based on whether or not average lesson scores and average unit test scores were satisfactory.

Student Achievement Reports were generated from the management system and were used to monitor and review student placement within the system. Student Achievement Reports were used to monitor and modify initial student placement at the conclusion of four weeks of use and also to monitor student performance on lessons and unit tests. Reports include: Class Summary Report, Student Status Report, Student Lesson Report, Unit Test Report, Grouping Report, and Aggregate Time Report and Student Performance Report.

Teacher involvement in the twenty schools included: (1) when feasible, accompanying classes during sessions on the Jostens Learning System, in a lab situation; (2) reviewing Class Summary Reports or other reports on student
performance, as appropriate, on a regular basis; and (3) reviewing Unit Test results as students complete each unit.

All teachers received at least three hours of staff development activities for each curricular area, conducted by Jostens Learning or a designated district staff member, and additional staff development activities regularly conducted throughout the year. System attendants received a minimum of three days of initial training.

The intent of this study was to determine effects on teacher attitudes of implementation of the Jostens integrated learning system technology into the regular school curriculum.

**Definition of Terms**

The following definitions clarify the terms used in this study:

**Attitudes:** The way teachers feel toward the implementation of the integrated learning system as it is used for the purpose of teaching students.

**Computer assisted instruction (CAI):** A software platform on which the student interacts with the computer through a program that delivers lessons in drill and practice, simulation, problem solving, tutorial, and game format.

**Computer managed instruction (CMI):** Classroom instruction managed through computer assisted testing,
suggested remedial instructional strategies, record keeping, and reporting student performance.

**Consultant's experience:** The knowledge and skills derived from teaching in the classroom, serving as school administrator, and assisting school systems in their attempts to integrate technology into the regular teaching classroom. For this study, experience was determined by years of service as classroom teacher and service in the integrated technology area.

**Decision making:** Teachers' ability to share their views about the need for technology before it was purchased.

**Delivery models:** The three possible delivery models are distributed, laboratory, and combination. In a distributed setting teachers in each classroom may have an average of four computers, and students are assigned on a rotating schedule to log in and work on lessons for twelve- to fifteen-minute intervals. Distributed means that computers have been placed in the classroom. In the laboratory setting one classroom space has been designated the "lab." This classroom houses an average of fifteen computers and is staffed by a "lab attendant" who is responsible for coordinating schedules, running student data reports, and communicating with teachers about student progress on the system. Teachers are scheduled into the lab to bring their whole classes to receive individualized assistance on the
computer. The combination delivery model was not examined in this study.

**Integrated learning system (ILS):** For this study, the Jostens Basic Learning curriculum, a comprehensive K-12 curriculum in two specific areas, reading and math, which runs through a computerized network on computerized disk (CD). There are four possible types of computers on which the Jostens Basic Learning System runs: Jostens, IBM, Apple, and Tandy.

**ILS market:** School systems, local boards of education, school superintendents, school administrators, supervisors, teachers, parents, students, businesses interested in educating children through integrated learning system technology.

**Jostens Basic Learning System (BLS):** Another name for the computer-based integrated learning curriculum software which provides reading and math lessons for students in Grades K-12, focusing primarily on higher order thinking skills in reading and mathematics. Students learn to improve their thinking skills as a result of time spent on the Basic Learning System, in addition to overall improvement of math and reading skills. The BLS is delivered on a computerized CD-ROM disk.

**Rural school:** Any school located within a rural school district.
Rural school districts: Districts having fewer than 150 residents per square mile and located in counties in which 60 percent of the population lives in communities with fewer than 5,000 inhabitants.

School climate: School climate was measured through teacher responses to the attitude questionnaire.

Student grouping: Different ways of grouping students for receiving instruction in reading, writing, or math because of the use of ILS.

Student success on the BSI: Success was recognized as maintaining a minimum average of 60 percent on reading and mathematics lessons. It was believed that the ILS would identify student academic weaknesses more easily than traditional methods. It was also believed that the ILS would allow students to learn math concepts more easily and would be more motivational for students.

Teacher satisfaction with system: The degree to which teachers are happy with the delivery model, its integration with the regular curriculum, staff development they received, etc. This variable is measured through teacher responses on the attitude questionnaire.

Urban school: Any school located within an urban school district.

Urban school districts: Districts having more than 150 residents per square mile and located in counties in
which 60 percent of the population lives in communities with more than 5,000 inhabitants.

**Usefulness of training**: Whether the training was adequate to support successful use of the ILS as teachers delivered regular instruction in the classroom.

**Null Hypotheses**

The following null hypotheses were developed for this study:

**Null Hypothesis 1**: There is no significant difference in the attitudes of rural teachers toward the implementation of an ILS based on years of experience.

**Null Hypothesis 2**: There is no significant difference in the attitudes of rural teachers toward the implementation of an ILS based on the delivery model.

**Null Hypothesis 3**: There is no significant difference in the attitudes of rural teachers toward the implementation of an ILS based on teacher decision making.

**Null Hypothesis 4**: There is no significant difference in the attitudes of rural teachers toward the implementation of an ILS based on usefulness of training.

**Null Hypothesis 5**: There is no significant difference in the attitudes of rural teachers toward the implementation of an ILS based on grade level.
Null Hypothesis 6: There is no significant difference in the attitudes of rural teachers toward the implementation of an ILS based on student grouping.

Null Hypothesis 7: There is no significant difference in the attitudes of urban teachers toward the implementation of an ILS based on years of experience.

Null Hypothesis 8: There is no significant difference in the attitudes of urban teachers toward the implementation of an ILS based on the delivery model.

Null Hypothesis 9: There is no significant difference in the attitudes of urban teachers toward the implementation of an ILS based on teacher decision making.

Null Hypothesis 10: There is no significant difference in the attitudes of urban teachers toward the implementation of an ILS based on usefulness of training.

Null Hypothesis 11: There is no significant difference in the attitudes of urban teachers toward the implementation of an ILS based on grade level.

Null Hypothesis 12: There is no significant difference in the attitudes of urban teachers toward the implementation of an ILS based on student grouping.

Limitations

There is no reason to believe that the schools surveyed were a true ideal replication of the audiences which use integrated learning systems. Neither is it fair
to assume that integrated learning system technology is a better choice for the delivery of instructional technology to the classroom. As this study was conducted, new advancements in the field of integrated learning system technology made the Basic Learning System an "older" form of technology. Hopefully, this research can be helpful in designing a strategy that will be useful in determining an approach to the integration of computer technology in the classroom.
CHAPTER IV
METHODS AND PROCEDURES

Instrument

The purpose of this chapter was to describe the process used in designing the survey which assessed teacher attitudes about the implementation of technology in their respective rural and urban schools. A review was made of the job descriptions and evaluation instruments for teachers and students using the Jostens Learning System technology. In addition, telephone interviews were held with Jostens consultants, teachers using the technology, principals, other Jostens administrators, and researchers from Baylor University who were responsible for improving teacher attitude toward using technology in the regular classroom setting. The Guidelines for Evaluation of Programs and Services designed by Jostens (1990) was used as a guide for the purpose of evaluating teacher attitude toward the technology.

Using the information from this review, a list of tasks and responsibilities was compiled. The list was developed by including specific items which were repeated frequently in any of the telephone interviews held with
actual users of the technology (cited in the previous paragraph). The activities selected for inclusion in this study were grouped into five categories which were established in the review of selected literature for this study and which were identified as being the five major functions of technology as it is effectively implemented in the classroom. These functions were teaching experience, delivery model, teacher decision making, teacher training, and grade level. The completed list of tasks and responsibilities included a total of sixty-eight items.

Using the list of tasks and responsibilities, a checklist was devised to be used in sampling the opinions of selected teachers as to the relative importance of the tasks and responsibilities identified by the checklist. The checklist was comprised of actual items on the sampling survey, with a line in front of the number for the teacher to indicate acceptance by placing a checkmark in front of each item.

The checklist was mailed to a total of 150 teachers who would not participate in the final survey. These teachers were from states other than those included in the final survey. They were chosen randomly at each individual school.

The completed responses were returned to the principal and were forwarded to the researcher responsible for tabulating responses. Of the sixty-eight items, sixty were
chosen without exception by teachers as being significant. These sixty items were used as the actual survey.

Population

The 150 teachers included in the study were selected from lists of teachers obtained from Jostens Learning Corporation. The selected group included teachers from twenty schools in the eastern region of the United States. Ten were randomly chosen from urban settings, and ten were randomly chosen from rural settings. The sample included schools in North Carolina, South Carolina, Kentucky, Pennsylvania, and New York. These schools met three specific criteria: (1) students used the Jostens Basic Learning System curriculum; (2) settings included laboratory, distributed, or combination models for delivery; and (3) student time on the system adhered to the minimum standards of thirty minutes minimum per day and no less than three visits per week for laboratory schools, and three visits per student per week for students using distributed classroom settings. Of the 150 teachers selected, 150 responded for a return rate of 100 percent. This high rate of return occurred because either the Jostens Education consultant or the principal hand carried the questionnaire to each respondent and ensured its return in a prompt and efficient manner.
All of the teachers included in this study were experienced. The range was from three years to twenty-one years. All those who were included in the study were at the time of the study serving as regular classroom teachers using technology in their respective classrooms or as regular classroom teachers taking their students to a laboratory setting to use computers for thirty-minute blocks of time.

**Data Analysis**

The study is based upon the results of a quasi experiment involving certified teachers at twenty rural and urban elementary schools. Analysis of variance (ANOVA) was used to analyze data received from the survey questionnaire in an effort to prove the validity of each null hypothesis. The probability level of .05 was used to test each null hypothesis for acceptance or rejection.
CHAPTER V
ANALYSIS OF THE DATA

This chapter presents an analysis of the data retrieved through the completion of a teacher survey which measured teacher attitudes about the impact of using ILS technology. Since the study was quantitative, the findings are displayed in tabular format and are explained through accompanying narratives. Tables included in this chapter describe the data and the findings therein. Each null hypothesis is restated, followed by a data table which illustrates how the data were analyzed. The one-way ANOVA was used to analyze each of the twelve null hypotheses.

**Null Hypothesis 1:** There is no significant difference in the attitudes of rural teachers toward the implementation of an ILS based on years of experience. Questions 14, 16, 18-22, 52, and 60 were used from the survey for testing this hypothesis.

Table 2 represents data which compare the difference in years of experience among rural teachers on the basis of two categories: teachers with 0-14.9 years of experience, and teachers with 15-30 years of experience. Note that in the sampling the teachers with 15-30 years of teaching
<table>
<thead>
<tr>
<th>District</th>
<th>0-14.9 Years Experience</th>
<th>15-30 Years Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>n=37, Mean=2.03</td>
<td>n=26, Mean=2.32</td>
</tr>
</tbody>
</table>

*Significant at p < .05.

experience agreed less often with the notion that computers were useful or necessary in the school setting. Their responses also indicated that they felt less strongly about ILS technology and its ability to enhance the overall learning process. Teachers with less experience indicated that they were more likely to enjoy taking students to the lab or work with them on the computer if a distributed network was used in the regular classroom setting. There is a significant difference between the attitudes of the two groups of rural teachers on the basis of years of experience as indicated by the P value of .029. The null hypothesis is rejected because there are significant differences in years of teaching experience between the two groups of rural teachers.
Null Hypothesis 2: There is no significant difference in the attitudes of rural teachers toward the implementation of an ILS based on the delivery model. Questions 6, 14-22, and 52-54 were used for testing this hypothesis.

Table 3 presents data which compare teacher acceptance toward using technology in the classroom in rural schools on the basis of whether the technology is being used in a laboratory setting or as student stations placed in groups of three or four in each classroom. Sixty of the total group of sixty-four teachers who responded used the distributed model. They used the ILS technology within their regular classrooms. These teachers indicated that they agreed that technology was useful when integrated with regular instruction, that teaching was easier with the use of technology, and that technology enhanced the learning process for students. The four teachers using the laboratory setting were more neutral in their responses toward ILS technology and their ability to integrate this technology with the regular process of teaching. Teachers using the distributed model expressed more favorable responses to the implementation and use of technology because they could teach their classes on a more routine basis without the interruption of having to stop regular instruction and escort an entire class to the ILS laboratory. Teachers using the distributed model were able to teach on a regular,
Table 3  
Rural Teacher Attitudes on the Basis of Delivery Model

<table>
<thead>
<tr>
<th>District</th>
<th>Distributed Model</th>
<th>Laboratory Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean</td>
</tr>
<tr>
<td>Rural</td>
<td>60</td>
<td>2.11</td>
</tr>
</tbody>
</table>

*Significant at p < .05.

uninterrupted basis while students rotated on a scheduled basis to use the computer stations within the classroom.

The difference in mean score between the two groups of 0.61 could be attributed to those and other differences in use of the computer stations. For example, when rural students attended the computer lab, they sat at the computer for a minimum of two times weekly. There was a loss of instructional time when students relocated from the classroom setting to the laboratory setting to receive instruction on the ILS. There was also less interaction between teachers and students in a laboratory setting because there were more students on the system at one time. The larger the ratio of students to teacher, the less the amount of direct interaction between teacher and student.

In the regular classroom setting, students used the computer stations throughout the instructional day. As the
teacher taught the regular curriculum, students proceeded in groups of three or four to the back of the room, logged onto the computer station, and received instruction for an average of thirty to forty minutes daily. When there was a problem, the student requested help from the teacher or a regular classroom aide.

The probability of .023 indicates a significant difference in the attitudes of rural teachers using a distributed or laboratory model. The null hypothesis is therefore rejected.

**Null Hypothesis 3:** There is no significant difference in the attitudes of rural teachers toward the implementation of an ILS based on teacher decision making. Questions 2, 14-22, and 52-54 were used for testing this hypothesis.

Table 4 reflects the differences in rural teacher attitudes about technology on the basis of whether they felt they were able to participate in the decisions which led to the purchase and implementation of technology in their respective schools. The statistical analysis of the data obtained from this experiment indicates that there is not a significant difference in the rural teachers' attitudes about their input in the decisions which placed technology in their schools.

Teacher attitudes about technology were not affected by their input or lack of input into the decision-making
process. All teachers indicated that they at least knew someone who was on the decision-making committee or heard about the technology issues from other teachers. They all agreed that they were aware of the decision before they were required to implement the technology.

The null hypothesis therefore is accepted because the probability of .298 indicates that there is no significant difference at or below the .05 level.

Null Hypothesis 4: There is no significant difference in the attitudes of rural teachers toward the implementation of an ILS based on usefulness of training. Questions 5, 14-22, 42, 47-50, and 52-54 were used for testing this hypothesis.
Table 5 shows the significance of the usefulness of teacher training on the effective use of an integrated learning system as it relates to overall attitudes about using ILS technology for the purpose of teaching students.

Table 5
Rural Teacher Attitudes on the Basis of Usefulness of Teacher Training

<table>
<thead>
<tr>
<th>District</th>
<th>n</th>
<th>Mean</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>64</td>
<td>2.13</td>
<td>.265</td>
</tr>
</tbody>
</table>

Average Responses by Grade Level Taught:

- Grade 1 2.24
- Grade 2 2.33
- Grade 3 1.94
- Grade 4 2.03
- Grade 5 1.88
- Grade 6 1.80
- Grade 7 2.29

Responses indicated that teachers in Grades 3, 4, 5, and 6 strongly agreed more often that more training was necessary. All teachers indicated that training was a critical factor which affected their attitudes about using technology effectively in the classroom. Although the significance is not critical, it is important to note that teachers did express interest in receiving more specialized
training which would allow them to become more familiar with the lessons and would also allow them to integrate the lessons into their daily lesson plans. Teachers in Grade 6 agreed more strongly with this notion (1.80), and teachers in Grade 2 agreed less (2.33).

The differences in response did not support the rejection of the null hypothesis. The .265 probability level exceeds the .05 level for rejection of the null hypothesis; therefore, the null hypothesis is accepted.

**Null Hypothesis 5:** There is no significant difference in the attitudes of rural teachers toward the implementation of an ILS based on grade level.

Table 6 provides data which shows a mean response to items of 2.13. This average response indicates that all rural teachers were positive about the use of ILS technology. Teachers in Grade 6 were more positive (1.80), and teachers in Grade 2 were less positive (2.33). Although the responses vary, the differences in response did not support the rejection of the null hypothesis. The .265 probability level exceeds the .05 level for rejection of the null hypothesis; therefore, the null hypothesis is accepted.

**Null Hypothesis 6:** There is no significant difference in the attitudes of rural teachers toward the implementation of an ILS on the basis of student grouping.
Table 6
Rural Teacher Attitudes on the Basis of Grade Level Taught

<table>
<thead>
<tr>
<th>District</th>
<th>n</th>
<th>Mean</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>58</td>
<td>2.13</td>
<td>.265</td>
</tr>
</tbody>
</table>

Average Responses by Grade Level Taught:

- Grade 1: 2.24
- Grade 2: 2.33
- Grade 3: 1.94
- Grade 4: 2.03
- Grade 5: 1.88
- Grade 6: 1.80
- Grade 7: 2.29

Questions 7, 35-37, 39-41, and 44 were used to support this hypothesis.

Table 7 presents data which support this hypothesis. Since the probability is .264, the null hypothesis is accepted because this significance exceeds the standard probability measure of .05. Teachers in rural schools indicated that they do not regroup students because they are using ILS technology in the areas of reading, writing, and mathematics. Although the majority of teachers did agree that they did group students for instruction on the ILS, the null hypothesis is accepted because the difference is not significant enough to prove that the sampling differences...
Table 7

Rural Teacher Attitudes on the Basis of Student Grouping

<table>
<thead>
<tr>
<th>District</th>
<th>n</th>
<th>Mean</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>64</td>
<td>2.16</td>
<td>.264</td>
</tr>
</tbody>
</table>

Average Responses:
- Agree: 1.96
- Neutral: 2.04
- Disagree: 2.29
- Strongly disagree: 2.30

are not due to error in the population. The differences among teachers are not significant enough to prove that significant differences in how students are grouped for reading, mathematics, and writing do occur among all teachers.

Null Hypothesis 7: There is no significant difference in the attitudes of urban teachers toward the implementation of an ILS based on years of experience. Question 14, 16, 18-22, 52, and 60 were used from the survey for testing this hypothesis.

Table 8 shows data which compare the difference in mean attitudes of teachers on the basis of two different groups of years of experience, those teaching 0-14.9 years and those teaching 15-30 years. A probability of .168
Table 8
Urban Teacher Attitudes on the Basis of Years of Experience

<table>
<thead>
<tr>
<th>District</th>
<th>0-14.9 Years Experience</th>
<th>15-30 Years Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean</td>
</tr>
<tr>
<td>Urban</td>
<td>17</td>
<td>2.60</td>
</tr>
</tbody>
</table>

indicates that there is no significant difference among the urban teachers on the variable years of experience; therefore, the null hypothesis is accepted.

A difference in mean score of 0.26 indicates that all teachers agreed that technology was useful for the purpose of delivering instruction to students. Teachers with more experience felt less positive about the use of technology for the purpose of delivering instruction to students and its usefulness in the classroom setting. Teachers having 0-14.9 years of experience agreed more often that the technology was useful.

**Null Hypothesis 8:** There is no significant difference in the attitudes of urban teachers toward the implementation of an ILS based on the delivery model. Questions 6, 14-22, and 52-54 were used for testing this hypothesis.
Table 9 presents data which compare teacher acceptance toward using technology in the classroom in urban schools on the basis of whether the technology was used in a laboratory or distributed setting. Seventeen teachers used computers within the regular classroom setting (distributed), and fifty-one teachers used the laboratory. Teachers using the lab were less positive about the use of the ILS for instruction. A mean score of 2.86 indicated that they more often were neutral or merely agreed that the technology was useful for the purpose of delivering instruction to students. The difference in mean score between the two groups of 0.22 shows very little difference in response. The null hypothesis is accepted because the probability of .354 exceeds the .05 level for rejection.

Table 9

Urban Teacher Attitudes on the Basis of Delivery Model

<table>
<thead>
<tr>
<th>District</th>
<th>Distributed Model</th>
<th>Laboratory Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean</td>
</tr>
<tr>
<td>Urban</td>
<td>17</td>
<td>2.68</td>
</tr>
</tbody>
</table>

Null Hypothesis 9: There is no significant difference in the attitudes of urban teachers toward the
implementation of an ILS based on teacher decision making. Questions 2, 14-22, and 52-54 were used to test this hypothesis.

Table 10 reflects responses on the basis of whether urban teachers felt they were able to participate in the decisions which led to the purchase and implementation of technology at the school level. The statistical analysis of the data obtained from this experiment indicates that there are significant differences in teacher responses to these items. The majority of teachers were neutral about their input into the decisions which impacted the implementation of technology. Almost as many teachers (2.90) responded that they strongly agreed that they had input into the decisions. Almost all teachers responded equally to items used to support this hypothesis. The null hypothesis is rejected because the probability of .003 is much lower than the .05 level necessary to support significance.

Null Hypothesis 10: There is no significant difference in the attitudes of urban teachers toward the implementation of an ILS based on usefulness of training. Questions 5, 14-22, 42, 47-50, and 52-54 were used for testing this hypothesis.

Table 11 shows the significance of teacher training on the effective use of an ILS as it relates to overall attitudes of urban teachers about using ILS technology for
Table 10
Urban Teacher Attitudes on the Basis of Input in Decision Making

<table>
<thead>
<tr>
<th>District</th>
<th>n</th>
<th>Mean</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>70</td>
<td>2.81</td>
<td>.003*</td>
</tr>
</tbody>
</table>

Average Responses:

- A: Strongly agree, 2.90
- B: Agree, 2.43
- C: Neutral, 3.05
- D: Disagree, 2.70
- E: Strongly disagree, 2.37
- F: I don't know, 1.40

*Significant at p < .05.

Table 11
Urban Teacher Attitudes on the Basis of Usefulness of Teacher Training

<table>
<thead>
<tr>
<th>District</th>
<th>n</th>
<th>Mean</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>61</td>
<td>3.518</td>
<td>.518</td>
</tr>
</tbody>
</table>

Average Responses by Grade Level Taught:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>3.82</td>
</tr>
<tr>
<td>Grade 2</td>
<td>3.42</td>
</tr>
<tr>
<td>Grade 3</td>
<td>3.29</td>
</tr>
<tr>
<td>Grade 4</td>
<td>3.49</td>
</tr>
<tr>
<td>Grade 5</td>
<td>3.23</td>
</tr>
<tr>
<td>Grade 6</td>
<td>0.00</td>
</tr>
<tr>
<td>Grade 7</td>
<td>3.64</td>
</tr>
</tbody>
</table>
the purpose of teaching students. Teacher response indicated that there is no significant difference in teacher attitude. The mean response of 3.518 indicated that, overall, urban teachers were neutral or disagreed that training was adequate. All teachers, with the exception of teachers in Grade 6, indicated that they were neutral about training or that they were displeased with the quality of the training which supported the use of the ILS. The probability of .518 exceeds the level of .05 for rejecting the null hypothesis; therefore, the null hypothesis is accepted.

Null Hypothesis 11: There is no significant difference in the attitudes of urban teachers toward the implementation of an ILS based on grade level. Questions 1, 14-22, and 52-54 were used to support this hypothesis.

An analysis of the data, presented in table 12, shows that all teachers indicated they were neutral or disagreed that the integrated learning system did enhance their attitudes about effectively using technology for teaching students. Teachers in Grades 1 and 7 disagreed more often than teachers in Grades 3 and 5.

The probability of .518 is greater than the .05 level of significance for urban teachers. Thus, the null hypothesis of no significant difference among the urban teachers on the basis of grade level is accepted.

Null Hypothesis 12: There is no significant difference in the attitudes of urban teachers toward the
Table 12

Urban Teacher Attitudes on the Basis of Grade Level Taught

<table>
<thead>
<tr>
<th>District</th>
<th>n</th>
<th>Mean</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>61</td>
<td>3.52</td>
<td>.518</td>
</tr>
</tbody>
</table>

Average Responses by Grade Level Taught:

- Grade 1: 3.82
- Grade 2: 3.42
- Grade 3: 3.29
- Grade 4: 3.49
- Grade 5: 3.23
- Grade 6: 0.00
- Grade 7: 3.64

implementation of an ILS on the basis of student grouping. Questions 7, 35-39, 40-41, and 44 were used to support this hypothesis.

Table 13 presents data concerning whether teachers grouped students differently to receive instruction in the areas of reading, mathematics, and writing because of the use of ILS technology. All teachers were neutral or disagreed that they grouped students differently. This means that teachers continued to teach students reading, mathematics, and writing in the same manner in which they delivered instruction before technology was implemented in their schools. The probability of .112 exceeds the minimal
Table 13
Urban Teacher Attitudes on the Basis of Student Grouping

<table>
<thead>
<tr>
<th>District</th>
<th>n</th>
<th>Mean</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>59</td>
<td>2.78</td>
<td>.112</td>
</tr>
</tbody>
</table>

Average Responses:

- Agree: 2.37
- Neutral: 2.92
- Disagree: 2.84
- Strongly disagree: 2.65

level of .05 probability needed to reject the hypothesis; therefore, the null hypothesis is accepted.
CHAPTER VI
FINDINGS, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Findings

This study has examined the effect of implementing an integrated learning system into the regular teaching curriculum on the basis of teaching experience, delivery model, teacher participation in decision making, usefulness of training, grouping students for instruction, and grade level taught in rural and urban schools. The outcomes of this study are summarized as follows:

1. There is a significant difference in rural teacher attitudes toward implementation on ILS technology on the basis of years of teacher experience. There is no significant difference among urban teachers in their attitudes toward technology on the basis of years of experience. Teachers with more experience felt less positive about the use of ILS technology.

2. There is a significant difference in the attitudes of rural teachers toward the ILS technology on the basis of the delivery model, distributed or laboratory. Rural teachers tend to use distributed settings more often. There is no significant difference in the attitudes of urban
teachers on the basis of the delivery model. Urban teachers tend to use laboratories more often. Technology is easier to integrate when it appears within the walls of the regular classroom setting.

3. There is no significant difference in the attitudes of rural teachers toward the ILS technology on the basis of their participation in the decision-making process. There is a significant difference in the attitudes of urban teachers with regard to participation in decision making. Urban teachers indicated that they did participate in the decisions which placed technology in their classrooms or in laboratories within their schools.

4. There is no significant difference in the attitudes among rural teachers or among urban teachers on the basis of the usefulness of their training relative to the effective implementation of technology and integration of the ILS technology into the regular classroom teaching curriculum. Neither group expressed significantly different responses as measured by the survey about the impact of training. Both groups indicated consistently that training should be improved.

5. There is no significant difference among rural teachers or among urban teachers in their attitudes toward the implementation of the ILS on the basis of the grade level they teach. More rural teachers felt that technology could be best implemented contingent upon the grade level
they were assigned to teach than urban teachers. Among the urban teachers, all responses indicated that they were close to the mean, or neutral. Among the rural teachers, the responses were close to the mean according to grade level; however, their responses were more positive overall.

6. There is no significant difference in the attitudes among rural teachers or among urban teachers on the way they group students as a result of using integrated learning system technology for receiving instruction in reading, mathematics, and writing. Teachers tended not to regroup students for these instructional activities in reading, math, or writing because of ILS technology.

Conclusions and Implications

Based on these findings, this study suggests that there are significant differences in teacher attitudes about technology on the basis of whether they teach in a rural or an urban setting. Teachers in urban schools use laboratory settings and therefore regroup their students to receive instruction in other disciplines more often because of technology. Rural teachers used technology more often in their classrooms, which allowed for more ease of implementation. This analysis allows inferences which relate to five areas: delivery model, usefulness of training, grade level taught, years of experience, and student grouping.
Computers can be used more effectively when they are placed within the regular classroom setting. Although urban teachers indicated that they used computers most often in the laboratory setting and that their perceptions were more positive toward the use of technology, it must be understood that this assumption does not imply that the use of technology in a laboratory is more effective. When students are forced to move from one location to another, there is an automatic loss of instructional time. When computers are housed within the walls of the regular classroom, students are free to move throughout the day, based on a preassigned schedule, to receive instruction from the ILS without breaking instruction for the entire group. There are more problems with regard to implementing this distributed model when teachers are not properly trained. It is important that teachers are fair, firm, and consistent in their classroom management style when attempting to operate in a distributed ILS setting.

Training sessions are typically held on-site or off-site. Each has its benefits. Holding training sessions on-site may reduce the anxiety some new users may feel. Equipment is frequently set up differently in different locations. To a novice, this can be confusing and frustrating. When training sessions are conducted effectively, teacher attitudes about using the ILS could become more positive. These sessions should include time for teachers
to match their regular teaching objectives to the lessons which appear within the integrated learning system curricula. At the same time, teachers should be taught how to effectively examine student report data to adequately assess the instructional level of both the whole class and individual students. If growth in overall student achievement is expected to occur, then student instructional levels must be assessed, and students must be allowed to receive instruction at or above this level. These measures should be conducted incrementally, at a minimum of four times during the school year. It is easy to adjust the level upon which students receive instruction when this level is measured by the ILS management system.

The idea that teacher attitudes about technology affect implementation success not only makes intuitive sense but appears repeatedly in the literature. Successful implementation occurs when teachers have positive attitudes about ILS technology. The more people who share a passion for the new system, the greater the span of contacts they can make among the educators who will be adopting it. When teachers participate in the decisions which affect their use of ILS technology, their attitudes tend to be more positive. Although this study indicated there was no difference between urban and rural teacher attitudes toward the implementation of ILS technology, it must be clearly understood
that teacher attitudes toward the technology are more positive when they feel that they participated in the decision-making process.

Implementation can proceed from the top down. In such cases, the impetus for adopting the new technology comes from senior administrators or school principals. These individuals commit resources which make the critical decisions. In top-down implementations, the administrators drive the decision. In a bottom-up implementation, the teachers make the decision. They recognize and demonstrate the need for the new technology and convince those who control the resources to provide them. These teachers learn about the technology and identify uses for it while administrators respond on the basis of their input. Since many school decisions are made at the site level around the country today, it is important to allow teacher input as technology decisions are made. When teachers feel involved, they tend to better accept new technology.

**Recommendations**

The following recommendations are offered when schools consider successful implementation of integrated learning system technology.

1. Consider the goals of the schools and clarify the purchase of the ILS based on the relationship between these goals and the interrelatedness of the technology
curricula with the school curricula. Teachers can decide on a set of learning goals for the district and not ask (or be asked) about how technology could advance or support these goals. At the same time, technology specialists can decide to spend money on technology that they believe will be useful and not ask (or be asked) how this purchase relates to the district's newly defined goals. Unless both agendas are made part of the larger restructuring efforts, the opportunity for synergy will be lost.

In any district, the chances are high that teachers or computer coordinators who are expert at integrating technology into classroom settings should be sought out and included in the decision-making process. They have a great deal to contribute.

2. Reconsider how technology is organized in the district. Schools should examine standardized achievement data and compare this analysis against the population of students on the ILS management system. Students should be taught at or above their instructional levels if true gains in student achievement are expected to occur. There should always be a positive correlation between what teachers teach in the regular classroom setting in the areas of reading and mathematics and the lessons students receive on the ILS system.

3. Publish the comparisons of student performance on the management system so that student performance can be
compared teacher by teacher and grade by grade. Teachers tend to buy into the effective integration process when they know that the performance of all students in their classrooms will be compared on an incremental basis.

Summary

There should be an effort in schools using ILS technology toward building coherence of educational goals, approaches, tools, and structures. Successful implementation of integrated learning systems will not succeed unless its ambitious goals for improved student achievement are realized. ILS technology investments are expensive for schools and school districts. If schools do not see a difference in student performance after the investment of millions of dollars in an ILS, future purchases become questionable. It is important to always match the teaching curricula with the ILS curricula and measure student performance qualitatively and quantitatively throughout the school year. When this feedback is given to teachers and central office administrators, incremental adjustments can be made in the levels upon which the students receive instruction so that their improved achievement can be ultimately evidenced.
APPENDIX

Use of Integrated Learning Systems Survey

This information is being gathered following the implementation of the integrated learning system (ILS) in your school. Because we value your opinion, we are asking you to respond to the following items. Please circle your answer after reading each question. This will ensure your anonymity to the researcher and will allow the researcher to match your responses.

1. I teach: A B C D E F G
   A. First grade
   B. Second grade
   C. Third grade
   D. Fourth grade
   E. Fifth grade
   F. Sixth grade
   G. Other

2. When our school decided to implement an ILS, I: A B C D E
   A. was part of the decision-making committee.
   B. knew someone who was on the decision-making committee.
   C. heard about it from other teachers.
   D. did not know we were getting an ILS.
   E. was not on staff.

3. Our school has had an ILS for: A B C D E F
   A. less than three months.
   B. less than six months.
   C. less than one year.
   D. one year.
   E. two years.
   F. three years or more.
4. I have received the following hours of training on the ILS:
   A. None
   B. One hour
   C. Two to five hours
   D. Six to ten hours
   E. Eleven or more hours

5. The training I received was:
   A. marginal at best.
   B. interesting but not useful.
   C. informative but there is still more I need to know.
   D. excellent.
   E. not applicable.

6. Our ILS is set up in:
   A. a self-contained lab setting.
   B. a distributed network.

If you answered Question 6 with response A, please answer Question 6a. If you answered Question 6 with response B, please answer Question 6b.

6a. Our lab has:
   A. six to ten computer stations.
   B. ten to fifteen computer stations.
   C. fifteen to twenty computer stations.
   D. twenty to twenty-five computer stations.
   E. twenty-five to thirty computer stations.
   F. more than thirty stations.

6b. My classroom has:
   A. one to three computer stations.
   B. four to six computer stations.
   C. seven to ten computer stations.
   D. eleven to fifteen computer stations.
   E. fifteen to twenty computer stations.
   F. twenty or more computer stations.
<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
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<tbody>
<tr>
<td>7. I have used computers before.</td>
<td>A B C D E F</td>
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<td>8. I have taken courses in computer science or educational computing.</td>
<td>A B C D E F</td>
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<td>9. I taught myself to use a computer at home.</td>
<td>A B C D E F</td>
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<td>10. Instruction should be delivered by the teacher and learned by the student.</td>
<td>A B C D E F</td>
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<tr>
<td>11. Instruction should occur in a manner that allows the teacher and student to discuss the topic.</td>
<td>A B C D E F</td>
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<tr>
<td>12. Instruction should occur in a manner that allows students to talk to each other about the topic.</td>
<td>A B C D E F</td>
</tr>
<tr>
<td>13. Instruction should occur with students learning by discovery with the teacher facilitating rather than leading the class.</td>
<td>A B C D E F</td>
</tr>
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<td>14. Technology is useful in the classroom setting.</td>
<td>A B C D E F</td>
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<tr>
<td>15. Technology is most useful in the classroom when integrated with regular instruction.</td>
<td>A B C D E F</td>
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<tr>
<td>16. Technology is necessary in the classroom setting.</td>
<td>A B C D E F</td>
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<tr>
<td>17. Teaching is easier with the use of technology.</td>
<td>A B C D E F</td>
</tr>
<tr>
<td>18. Computers are useful in the school setting.</td>
<td>A B C D E F</td>
</tr>
<tr>
<td>19. Computers are necessary in the school setting.</td>
<td>A B C D E F</td>
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<tr>
<td>20. Technology enhances the teaching process.</td>
<td>A B C D E F</td>
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<tr>
<td>21. Technology enhances the learning process.</td>
<td>A B C D E F</td>
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<tr>
<td>A. Strongly agree</td>
<td>D. Disagree</td>
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<tr>
<td>B. Agree</td>
<td>E. Strongly disagree</td>
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<tr>
<td>C. Neutral</td>
<td>F. I don't know</td>
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<td>22. I look forward to going to the computer lab with my class, or forward to working with my students on the computer if using a distributed network.</td>
<td>A B C D E F</td>
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<tr>
<td>23. My students spend a sufficient amount of time on the ILS each week.</td>
<td>A B C D E F</td>
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<td>24. The ILS is supportive of classroom instruction.</td>
<td>A B C D E F</td>
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<td>25. Ways I can use the ILS to help with daily management are not clear at this time.</td>
<td>A B C D E F</td>
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<tr>
<td>26. I have learned the skills that enable me to use the ILS to help with daily instructional management.</td>
<td>A B C D E F</td>
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<tr>
<td>27. I can use the ILS report system to check student progress on the ILS curriculum.</td>
<td>A B C D E F</td>
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<td>28. I can use the ILS to help direct my classroom instruction.</td>
<td>A B C D E F</td>
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<tr>
<td>29. I can integrate my curriculum with the ILS curriculum.</td>
<td>A B C D E F</td>
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<td>30. I believe students who work on the ILS show a more positive attitude toward learning than students who do not work on the ILS.</td>
<td>A B C D E F</td>
</tr>
<tr>
<td>31. I believe students who work on the ILS show a more positive attitude toward technology than students who do not work on the ILS.</td>
<td>A B C D E F</td>
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<tr>
<td>32. The ILS has no impact on my use of time at school.</td>
<td>A B C D E F</td>
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<tr>
<td>33. The ILS makes a difference in the way I plan for instruction.</td>
<td>A B C D E F</td>
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<tr>
<td>34. My students enjoy using the ILS.</td>
<td>A B C D E F</td>
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<tr>
<td>35. The ILS affects how I group my students for reading.</td>
<td>A B C D E F</td>
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</table>
36. The ILS affects how I group my students for math. A B C D E F

37. The ILS affects how I group my students for writing. A B C D E F

38. I prefer that all my students work on the same skill at the same time. A B C D E F

39. Because of the ILS, I spend less time giving direct instruction in reading compared to last year. A B C D E F

40. Because of the ILS, I spend less time giving direct math instruction compared to last year. A B C D E F

41. Because of the ILS, I spend less time giving direct instruction in writing compared to last year. A B C D E F

42. I learned how to temporarily place students into lessons (T-Plug) during my ILS training. A B C D E F

43. I learned how to use ILS management reports during my ILS training. A B C D E F

44. The ILS automatically decides where my students need to be in the ILS curriculum. A B C D E F

45. Students are recycled through the ILS lessons they do not master. A B C D E F

46. It is difficult to integrate ILS lessons with regular classroom instruction. A B C D E F

47. After receiving ILS training I feel as though I need someone with me in the lab all the time (or at student stations in my classroom). A B C D E F

48. After receiving ILS training I am comfortable with the lab but not sure of how to best use it. A B C D E F
A. Strongly agree  D. Disagree
B. Agree  E. Strongly disagree
C. Neutral  F. I don't know

49. After receiving ILS training I am ready to use the lab reports to drive my classroom sequence of instruction.

50. After receiving ILS training I am ready to integrate my classroom instruction with the computer curriculum.

51. The ILS software is correlated with lessons I teach in the classroom.

52. I am pleased with the quality of the ILS software.

53. The ILS complements (is supportive of) classroom instruction.

54. The ILS software meets my students' needs.

55. I would like to use the ILS to customize lessons for students.

56. My school has a lab attendant or person who is responsible for the ILS.

57. My school has a lab attendant or person who is competent.

58. I use a computer:
   A. Every day.
   B. Every week.
   C. Every month.
   D. Occasionally.
   E. Rarely.
   F. Never.

59. My classroom configuration is:
   A. Self-contained
   B. Departmentalized
   C. Academically teamed
   D. Open concept
   E. Other (Please specify in this space:____________)

60. I have taught ______ years.
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