

The Impact of Implementation for an Integrated Learning System on Student Achievement and Attitudes in Reading for Middle School Students

Jennifer B. King

EME 7939

Computer-Augmented Instruction

Dr. James White

University of South Florida

Spring 2001

INTRODUCTION

Computer-based integrated learning systems (ILS) have become one of the fastest growing and largest markets for technology in schools. The impressive revenues generated over the last decade evidence the popularity of ILSs. In 1989, seven ILS software companies topped \$181 million (over half of the entire software market); in education, approximately \$200 million was spent on ILSs in 1990 (Bailey, 1993). By 2000, integrated learning systems continued to dominate the school technology market in step with the burgeoning growth of other technologies for education, such as distance learning, hypermedia, multimedia, and electronic cooperative learning.

ILSs are complex, integrated hardware/software management systems using computer-based instruction (CBI). Whereas traditional CBI or computer-assisted instruction (CAI) is ancillary in nature, or typically tacked on to school curricula in the form of supplemental diskette-based instructional software used for enrichment, integrated learning systems, in their true intended sense, have the potential to be an integral component of curricula. Integrated learning systems provide a structure that almost assures more consistent and regular use for basic skills instruction (Becker, 1993). Common subjects on ILS include computer skills, science, writing, social studies, foreign languages, and even entire English-as-a-second-language (ESL) programs. Several systems provide for the entire K-12 curriculum and follow behaviorally oriented programmed instruction (Van Dusen, 1995). Bailey (1993) recognizes five general characteristics of integrated learning systems:

- Instructional objectives are specified with individual lessons tied to objectives.
 - Lessons are integrated into the standard curriculum.
 - Courseware spans several grade levels in a comprehensive fashion.
 - Courseware is delivered on a networked system of computers.
 - Management systems collect and record results of student performance.
- (Bailey, 1993 p. 5)

In particular, an ILS can randomly generate problems, adjust the difficulty and sequence of problems based upon student performance, and provide appropriate and immediate feedback (Bailey, 1993). Instruction is “individualized” and “personalized” with an ILS. Van Dusen (1995) recognizes that perhaps, the greatest asset of integrated learning systems is the ability to tailor each lesson for the specific learning level of the student building, in a sequential fashion like a basal textbook. When integrated into curriculum, the teacher knows exactly where students are having difficulties and how long it takes for each student to answer each question on a test. Consequently, teachers are able to identify and individualize remediation activities for their students (Bailey, 1993). Furthermore, integrated learning systems follow more of a constructivist view of learning by providing a rich learning environment allowing students to construct meaning and enhance critical thinking (Van Dusen, 1995).

White (1993) notes that the extraordinary advantage that ILSs have over traditional classroom instruction is “the high level of attention [ILSs] command from pupils. One could argue that ILSs provide very lively—if not live—instruction, compared to the average classroom” (p. 116). The common reasons held by educators for supporting ILS instruction are that integrated learning systems,

- Provide systematic exposure to the curriculum
- Track errors, re-exposing the pupil to more instruction in order to reach the desired mastery level
- Provide motivation through interactivity and game format
- Provide an accurate and comprehensive record of each pupil’s progress
- Display the real curriculum to observation, review, and potential revisions, so that anyone can know exactly what a child has been taught (White, 1993 p. 115)

Yet, the observed shortcomings are also noted in literature. White (1993) found that educators arguing against ILS instruction commonly believe that,

- Machines are not as effective as live teachers
- ILS teaching is too mechanical, too impersonal
- Pupils will find ILS instruction boring and repetitive, and thus can lose their motivation to learn
- ILS can teach routine skills, but they cannot teach higher order thinking skills or conceptual thinking (p. 116).

Another complaint of integrated learning systems is the high costs of implementing the technology into a school or school district, upwards of \$125,000 for a 30-workstation configuration (Bailey, 1993)

An initial question posed by those in education involves whether or not integrated learning systems can be considered “good education?” White (1993) considers the term “good” dependent upon an individual’s basic educational assumptions.

If a person believes that all education should be conceptual, and that there is no place for rote learning or for drill and practice, then that person will dislike ILSs because ILSs do offer some rote learning and do offer practice (based on the ground that some learning has to be practiced until it is automatic, such as reading, vocabulary acquisition, and estimating of quantities). Such skills take practice that when made engaging and interesting is more likely to produce the practice. And the more systematic the practice, the sooner the skills are mastered—and *that* ILSs can provide (p. 116-117).

In contrast, Jay and Jay (1994) contend that while drill-and-practice programs appear to be motivational for students, they are no different in content than traditional workbooks. “Instructional activities which merely require filling in blanks or recalling answers [in paper/pencil format or via computer] doesn’t change the level of thinking required of the student. In both cases it is minimal” (Jay & Jay, 1994 Introduction, ix).

Yet, Sherry (1993) and Bracey (1993) believe that there is great promise if ILSs continue to be “designed around how people think and problem-solve” (Bracey, 1993 p. 149). Hawkins and Collins (1993) argue that infusion of technology into learning, in general, must become a priority in schools. “Technologies alone or in isolation very rarely themselves transform educational settings. Their most significant use is often in concert with significant change in the way things are done in a school” (Hawkins & Collins, 1992 p. 153). Jay and Jay (1994) concur noting that “it is far too easy for teachers looking for some kind of prepackaged teaching magic to grasp at almost anything that is published” (Introduction, ix). The “magic” occurs when the teacher can successfully integrate such programs into the context of his/her quality instructional practices.

Statement of Problem

The main question of the study concerns the effectiveness of integrating learning systems for enhancing the reading instruction proficiency of middle school students in grades six, seven, and eight. Very often, the implementation of an ILS is incongruent with the intended purpose of the system designers. Rather than being utilized in conjunction with classroom curricula under the guidance of a teacher, integrated learning systems are commonly implemented in a pull-out format where students are “pulled out” of the classroom, away from the curricular goals and objectives of the very subject matter that the systems are supposed to treat. Usually, the students manipulate the systems in a computer lab for approximately 50 minutes and on the average of two times per week. In some schools, students spend only ten minutes in a given week on the system (Van Dusen, 1995).

The utility of an ILS is maximized by a format whereby students are “pulled in” to the classroom, remaining with their teacher, while an ILS is carefully integrated into lessons, in line with the teacher’s goals and objectives for the class at large and each individual student. Van Dusen (1995) states that “in a well run ILS classroom, the software becomes the primary information provider.... And students spend a substantial portion of their day working on computers” (p. 6). Studies conducted by Van Dusen suggest that each student spend a minimum of *30 minutes per subject area per day* with an ILS in order to achieve significant learning gains. This amounts to approximately 150 minutes (2 ½ hours per day) or nearly 13 hours per week—that is 28-30% of daily instruction.

The main problem, and in fact, the biggest obstacle to effective use of integrated learning systems is the challenge teachers encounter in integrating them into the classroom. As the name suggests, an ILS requires integration with classroom practices. “An ILS curriculum is not intended to supplement the class curriculum; rather, there should be one curriculum that is presented through a combination of ILS activities, small-group instruction, one-on-one tutorials, and other activities” (Van Dusen, 1995 p. 6). In other words, an ILS drives classroom instruction with the teacher at the wheel. This requires the

careful selection and scheduling of learning events at the appropriate time by the teacher. Thus, ILS curriculum must be theory-based and in line with subject area benchmarks, not just some well-intended contrivance made by an isolated designer who is alienated from classroom instruction.

The degree to which an ILS is accurately and effectively implemented will have a tremendous impact on learner achievement and attitudinal outcomes. However, until schools implement integrated learning systems as theory suggests and as intended by designers, student gains will be minimal at too great a financial cost to schools and school districts.

PURPOSE OF STUDY

The purpose of this research is threefold: first, the researcher will examine the degree to which the integrated learning system was implemented at the school site by interviewing the lab manager and surveying classroom teachers and school administrators. Second, the researcher will correlate the degree of the ILS implementation to the reading achievement and attitudinal outcomes of students after receiving concentrated instruction with an integrated learning system during fourteen weeks of summer school. Third, after students complete summer school and graduate to the next grade level, Language Arts teachers will be interviewed during the next academic quarter to determine their perception of student achievement and attitudinal gains in reading after receiving the ILS treatment. The researcher contends that there is a direct relationship between the degree to which the ILS is implemented and student achievement and attitudes. With this in mind, the study is comprised of four parts and the following questions will be considered throughout the evaluation.

EVALUATION QUESTIONS

Part One: The implementation of the integrated learning system

- To what degree did computer lab coordinators implement the integrated learning system as theory suggests and as intended by the courseware designers?
- To what degree was teachers' classroom instruction integrated with the ILS curriculum?

Part Two: Student reading achievement and attitudinal outcomes

- Did students who received instruction from the integrated learning system show gains in reading over time?
- Can those gains in reading achievement be attributed to the use of the ILS?
- Did students attitudes about reading change after receiving instruction from an integrated learning system?
- Can those gains in attitudes about reading be attributed to the use of the ILS?

Part Three: Classroom teacher perceptions about student reading

- What were the perceptions of teachers about student reading in the first academic quarter for those who received instruction from the integrated learning system during summer school?

Part Four: Effect of ILS implementation (Lab Coordinator and Teacher Integration) on Student Achievement and Attitudinal Outcomes

- To what degree did the combined effect of ILS implementation by lab coordinator and teachers' integration of the ILS impact student achievement outcomes in reading?
- To what degree did the combined effect of ILS implementation by lab coordinator and teachers' integration of the ILS impact student attitudes about reading?

LITERATURE REVIEW

The Theoretical Basis of Integrated Learning Systems

The theoretical basis of integrated learning systems grew out of assumptions about the nature of learning and education that was exemplified in previous decades by “programmed learning” approaches established by the work of Skinner (1958). Those assumptions reflect a theory of child and adolescent learning that is both individualistic and solitary. Skinner’s concepts about programmed instruction were then applied to crude teaching machines, which first appeared in the late 1950s and the early 1960s. Computer-Assisted Instruction (CAI) emerged as a natural integration of computer technology and the programmed instruction movement. Ultimately, integrated learning systems, as they are utilized today, grew out of the burgeoning growth of CAI use as a method for facilitating effective instruction (Mills & Ragan, 1998).

As with Skinner’s model for programmed instruction, any ILS by nature remains highly individualistic. The primary advantage of integrated learning systems is the fact that students can potentially receive some measure of “individualized instruction,” which explains the positive responses of teachers and administrators. ILSs create a situation in which the attention of students is captured for a period of time in an individualized instructional session, thus, reducing the workload of the teacher (Divine, 2000).

However, Becker (1993) contends that the reason for the implementation of integrated learning systems *not* reaching their potential is due to this notion of individualistic learning, “the ideology of autonomous tutoring by software and individualized pacing” (p. 13). Research in child and adolescent learning conducted over the past decade by social psychologists, cognitive psychologists, and sociolinguists argue that childhood learning is primarily a *social activity*. Most competencies arise only through the learner’s active integration of prior knowledge and new beliefs. These new ideas are comprehended, primarily, through dialogue, which a computer (to date) cannot generate. This does not mean that individualistic computer-based learning systems should be abandoned. Indeed, much of what

an ILS has to offer should be retained as part of an effective instructional system. Becker suggests that ILS developers critically analyze how to revise and refine their courseware, basing them “on a more accurate theory of effective classroom instruction and learning” (p. 15) recognizing that the old paradigm of computer-based instruction is no longer effective—if it ever was.

Slavin (1987) provides an alternate theory of effective instruction in classroom by attempting to incorporate the most critical elements for learning that are alterable by school practices. Slavin’s model of effective instruction requires that four problems of instruction in classroom settings be simultaneously solved: the problem of appropriate level of instruction for each child; the problem of academic learning time; the problem of incentive; and the problem of instructional quality. When an instructional system of any form holds these four problems in balance, then Slavin would contend that the system (in any form) is successful. Learning is a “multiplicative phenomenon—essentially dependent upon the weakest link in the chain” (Slavin, 1987). The outcome of an instructional intervention is only as successful as its least successful component—level of instruction, time, incentive, and instructional quality.

Integrated learning systems have the potential for addressing, at least, three of Slavin’s four components of effective instruction, perhaps, to an even greater degree than a human teacher. An ILS meets the problems of *appropriate level of instruction* and *incentive* through the use of adaptive instruction. Furthermore, the management systems inherent in any ILS design address the problem of *academic learning time*.

Adaptive Instruction

Integrated learning systems utilize an adaptive instructional strategy by using one or more procedures to modify instructional activities to adjust for the variance in the aptitudes of learners. Adaptive instructional strategies are inferences made by a computer program about the aptitudes of learners that modifies the instructional presentation—usually by increases or decreases in the grade level, quantity, tutorial assistance, or speed of the presentation (Mills & Ragan, 1994). Atkinson (1976) describes adaptive instruction as a process in which the sequence of instructional presentation and activities vary as a function of a learner’s performance history. Hansen, Ross, and Rakow (1978) define adaptive instruction as a corrective instructional process that facilitates appropriate interaction between the learner and the learning task by systematically adapting the allocation of learning resources to the learner’s aptitudes and recent performance. Hativa and Lesgold (1991) state that instructional software systems adapt instruction mainly to learning-rate differences. Corno and Snow (1986) note that the most direct manifestation of cognitive aptitude differences is learning-rate differences and that instructional designers usually build programs that adapt to learning-rate differences through individualized pacing with repetition.

Management Systems

Generally, an integrated learning system provides sufficient program capabilities to manage a learner's program and measure the achievement of objectives. However, management programs vary greatly among ILSs. The management approaches range from simple tracking of a student's time spent on a given learning activity to a complete evaluation of a student's programs each time the ENTER key is pressed (Wilson, 1990). In the past several years some of the ILS companies made significant changes in their management systems in response to customers' concerns for more flexibility and openness. Some companies have developed instructional management tools to integrate a broad set of curriculum materials. Others offer systems that can simultaneously manage several different hardware platforms. Some of the management systems make it easy for teachers to create customized, multidisciplinary course sequences. Integrated learning systems can also allow educators to customize student reports (Mills & Ragan, 1994). Some companies favor an approach to management that leaves more control in the hands of teachers over an approach that automatically assesses students and assigns lessons. Additionally, some companies have added new testing and prescription capabilities that reflect the objectives of widely-used standardized tests and then provide individual prescriptions specific to those test requirements (Sherry, 1992).

Slavin's Model and Addressing the Issue of Instructional Quality

Only instructional quality, Slavin's fourth component, remains elusive to both designers and the teachers/students who use an ILS for instruction. It is, in fact, Becker's (1993) contention that integrated learning systems are weakest in instructional quality, largely as a consequence of attending so ardently to the first—instructional level. Research shows that instructional quality is primarily hindered by poor implementation of an ILS (Mills & Ragan, 1998; Van Dusen & Worthen, 1993). Furthermore, instructional quality directly influences student outcomes.

A Review of ILS Research

Most ILS research suggests that implementation is the main factor inhibiting the success of systems, but very few studies approach ILS research from the perspective of implementation. To date, ILS research falls into three broad categories: comparative studies of ILS packages (Resta & Rost, 1986), the effectiveness of ILS instruction (Becker, 1993; Van Dusen, 1995; Van Dusen & Worthen, 1993), and evaluations of ILS packages for the decision-making purposes of stakeholders (Divine, 2000). Only one study was found to investigate the degree to which an ILS was implemented in a school district (Mills & Ragan, 1998); however, this study did not correlate implementation to student achievement and attitudinal outcomes. No studies, to date, have investigated the impact of ILS instruction on student attitudes, specifically, attitudes toward reading.

The earliest studies concerning integrated learning systems were comparative studies that compared groups of ILS packages implemented across districts at one given time. For instance, a study

conducted by Resta and Rost (1986) compared the effectiveness of four systems looking for matches between systems in curriculum content, standardized achievement test content, instructional and technical characteristics, documentation, management systems, diagnostic placement, programming, staffing and training, cost effectiveness, and student and teacher perceptions of value. The four systems included WICAT, Dolphin, CCC, and DEGEM (PLATO was dropped due to budget constraints). Results indicated that while the ILSs were very similar, all were found to be under-utilized during the first year of the study, largely due to staffing patterns resulting in no or little lab supervision and inconsistent student attendance. Mathematics impact was generally greater than reading and great importance was placed on having a full-time coordinator in the computer lab.

Furthermore, a review of the time-on-task information collected indicated that for many students the systems were inappropriately used resulting in student failure to experience the curriculum as it was designed. System reports documented that students often exited lessons prior to their completion and subsequently began a second lesson, repeating the mistakes and exit pattern of the previous lesson, all within the 15-20 minute session. Consequently, continuity and reinforcing aspects of the curriculum were interrupted by the user's inconsistency. Although students were enrolled in the ILSs from between 25 and 30 weeks, they accumulated *relatively little constructive time-on-task*. Lab supervision was directly linked to these problems; where there was stable supervision, attendance was greater and time-on-task was more productive (Resta & Rost, 1986).

The implementation and operation of the ILS labs were too inconsistent across the study making interpretation of achievement impact data difficult. Since the service problems were not related to the integrated learning systems, no comparisons of program effectiveness could legitimately be made. However, several overview statements can be made in the cases where sufficient service was provided:

1. Math impact was consistently greater than reading,
2. Considerably more time-on-task was provided when there was a full-time lab operator, and
3. Considerably more students were served when there was a full-time lab operator (Resta & Rost, 1986 p.8).

The greatest amount of research concerning integrated learning systems has sought to consider its effectiveness, either as compared to traditional instruction or in isolation while investigating the impact on student achievement outcomes. Yet, research findings are mixed concerning the effectiveness of ILS in education and ILS impact on student achievement. Becker (1993) argues that ILSs have not achieved their full potential in education and suggests that some of the disappointment has to do with "the ideology of autonomous tutoring by software and individualizing that accompanies ILS marketing and operational structures (p.13)." Becker writes,

To improve the effectiveness of their product, ILS developers must critically analyze how to revise and refine their packages, basing them on a more complete and more accurate theory of effective classroom instruction and learning (Becker, 1993 p. 15)

Other researchers like Van Dusen and Worthen (1994) claim that ILSs are ineffective due to underutilization and poor implementation of the systems.

Nevertheless, proponents of ILSs argue that they improve student learning. Van Dusen (1995) suggests that whether or not one views the research as supporting this claim depends in large part on the type of evidence one chooses to trust. For some, the testimonials of informed users, such as students, teachers, curriculum specialists, and administrators carry great weight. Other educators view such qualitative data as “quaint and provocative, but not scientifically defensible” (Van Dusen, 1995 p. 2). Opinions very often do not support the effectiveness of ILSs when compared to quantitative evidence collected by tests or more direct measures of student performance.

Nevertheless, ILS researchers have used both approaches. Van Dusen (1995) notes numerous studies showing positive student and administrator satisfaction with the systems (Sherry, 1990; Trotter, 1990). However, many of these studies did not address the impact of the ILS on student achievement. Trotter (1990) examined student outcomes reporting large gains on standardized test scores; however, Becker (1992) noted methodological flaws in many studies like that conducted by Trotter. In a meta-analysis conducted of nearly 100 studies, Becker concluded that they,

Provided little evidence of ILS impact on student achievement. Where differences were found between the achievement of ILS users and comparable non-users, Becker concluded they were too small to have any educational significance” [Van Dusen, 1995, p. 2 #10 p. 2].

Nevertheless, Becker (1993) revealed that integrated learning systems, when implemented properly, work best for students either in the upper 30% according to achievement distribution or the lower portion (30%) of the class distribution. Integrated learning systems are much less likely to help students in the middle of the class distribution (40%) “who are less likely to need a different level or pace of instruction compared to what they receive in traditional whole-class teaching” (Becker, 1993 p.20). Because integrated learning systems do not help students at all portions of the achievement distribution, their overall effectiveness frequently turns out to be *positive, but modest in magnitude*.

Stakeholders rely on evaluative studies to make informed decisions about future uses of integrated learning systems. For instance, Divine (2000) conducted a five-year Meta-evaluation on the integrated learning system of question in this study, CCC, or *Computer Curriculum Corporation*. Elementary, middle school, and high school adoption of the ILS in a mid-sized county in central Florida, as well as

student achievement gains across years and grade levels was the primary interest of the study. Primarily, the study looked at impact data regarding,

1. Number of students served,
2. CCC gains in the subject areas of reading/mathematics,
3. Accumulated time on the system in each content area, and
4. The amount of progress achieved by students on externally mandated standardized tests (Divine, 2000).

A major trend revealed in the Divine study was *that gains with CCC did not necessarily translate to gains on standardized tests*; a minimal transfer occurred between gains on the CCC system with externally mandated tests, such as the Stanford Achievement Test (SAT) and the Florida Comprehensive Achievement Test (FCAT). However, this did not mean that the ILS was ineffective. Findings showed that students appeared to be progressing as expected within the CCC system based on CCC management system guidelines for the recommended rate of progress per hour on the system. However, there were differential amounts of cumulative achievement accomplished by students using the CCC system both in terms of the progress measured by CCC and by external measures of progress, such as the SAT and the FCAT. Patterns included specifically at the middle school level (1999-2001) were the following:

1. Student time invested with CCC ranged from about 10 to 18 hours with slightly more time spent in math than in reading.
2. Gains within CCC were slightly higher in reading (.76) than in math (.63), despite a greater investment of time in math.
3. The hourly rate of progress was slightly above the rate expected by CCC guidelines in reading (.065/hour where .05 was expected) and slightly below the expected in math (.05/hour where .07 was the expected rate).
4. The greatest gains at the middle school level for students were in grades seven and eight in reading on standardized measures (SAT).
5. For students receiving CCC interventions, gains were not apparent from one year to the next in SAT Math.
6. Only about one-third of students participating in CCC were shown to be minimally successful on the FCAT in Math (38%) and reading (36%) at the eighth grade level.
7. Significant school effects were present for reading at the middle school level by all measures (CCC gains, SAT gains, and FCAT scores)
8. In Math, school effects were present only for gains made by students on the SAT and on FCAT Math scores themselves (indicating no relationship between systematic use of CCC as an intervention productive for the improvement of standardized math assessments (SAT or FCAT))

9. For predicting minimal success (Level 2 on the FCAT) in reading and math, students would need to perform at or above a CCC level of 6.6 (grade level) in reading and 6.2 (grade level) in math. In other words, the CCC generated entry and ending grade level reports were not found to demonstrate predictability to standardized achievement tests (Divine, 2000 p. 32-33).

Thus, research results for ILS effectiveness are mixed (Van Dusen, 1995). Furthermore, research on ILS and student achievement is “contradictory and inconclusive” (Bracey, 1991). For those who are “comfortable with casually conducted comparative studies or who accept testimonials of practitioners and opinions of expert observers, the effectiveness of ILSs has been amply demonstrated” [Van Dusen, 1995. #10 p. 3]. Yet, for those who demand the rigor of decisive experimental evidence, the effectiveness of ILSs on student achievement remains to be seen.

The research of Van Dusen and Worthen (1994) has led to another conclusion: as previously mentioned, most scientific studies of ILSs have failed to demonstrate their impact on student outcomes. Perhaps, the reason for the “no impact” findings reflect a failure of such studies “to examine whether or not the ILS has been implemented correctly and in the manner its designers proposed as necessary for its effectiveness” (Van Dusen, 1995 p. 3).

The *underutilization* and *misuse* of ILSs is a critical question, one unanswered in current research of ILS effectiveness. The disparity of implementation approaches is evidenced by “the failure to use ILSs in accordance with specific guidelines and practices designed to achieve optimal performance” (Van Dusen, 1995 p. 3). In the first year of a research study conducted by Van Dusen and Worthen (1994), apparent was the fact that ILS systems were not used to their full potential among school sites. In fact, the researchers noted that “none of the sites participating in the study” were using the ILSs as originally intended by the designers. “In some schools, students were spending as little as 10 minutes per week on the system” (Van Dusen, 1995 p. 3). Thus, it was not surprising to find that students the ILS schools showed no greater gains in achievement or attitudes than those in non-ILS schools. In the second year of their study, Van Dusen and Worthen encouraged better implementation strategies for ILSs. As a result, students spent significantly more time on the ILSs and teachers were more involved in integrating the system with classroom activities. The results were startling:

Students participating in the ILS classes scored higher on standardized tests than did those in traditional classes. The effect size for full implementation in reading was +.44, nearly a half standard deviation gain. Similar results were found when using objective referenced tests. Performance in reading and math were both statistically and educationally significant, with large effect sizes of +.40 and +.52, respectively. In general, as the level of implementation and teacher integration increased, so did student performance and student and teacher effort (Van Dusen & Worthen, 1994).

Van Dusen (1995) conducted studies for several school districts (each study funded by the school district and not the ILS vendor). The researchers held focus group interviews with more than 100 teachers and principals, made more than 100 structured classroom observations to chronicle ILS use and integration with classroom curricula, received surveys from nearly 300 ILS teachers and administrators, and obtained achievement and attitude data from nearly 5,000 students. While the researchers admit variability in the data, their general conclusion was that an ILS, if used appropriately, has real potential for improving student achievement. “Indeed, [ILSs] have the potential to transform the classroom into a better environment for learning” (p. 4).

Van Dusen states that the underutilization of computers, and specifically, ILSs is both a “pervasive and serious problem” (p. 3). No system can be effective unless it is fully and properly implemented. “Using an underimplemented ILS will have little effect on transforming the classroom as taking a fraction of a prescribed drug will have on curing an ailing patient” (p. 3). Unfortunately, in too many cases, the systems are not implemented as intended as theory suggests and by designers, and are too often used alone or in isolation of classroom instruction, divorced from curricular goals and objectives.

The research of Mills and Ragan (1998) was found to be the only of its type dealing, specifically, with the implementation of integrated learning systems. Their research described the development, validation, and research application of the Computer-Delivered Instruction Configuration Matrix (CDICM), an instrument for evaluating the implementation of ILSs (See Appendix, Figure 1). The CDICM consists of a 15-item checklist describing the major components of implementation of ILS technology to be completed by an evaluator based on responses supplied by teachers during an interview. The CDICM was used to examine the operational patterns of teachers (n=30) whose students interacted with an ILS using CCC’s *SuccessMaker* courseware in four elementary schools in a metropolitan school district.

The CDICM was developed from the Innovation Configuration Matrix (ICM), a tool developed by Heck, Steigelbauer, Hall, and Loucks (1981). The ICM was used for identifying the essential components of an innovation, the variations of implementation for each of the innovation components, and the assessment of the implementation of instructional technology and other educational innovations. Using the ICM as a guideline, Mills developed the CDICM to fit with the adoption and use of *SuccessMaker* in varying degrees and patterns of implementation. The matrix consisted of a component checklist comprised of five variations for each component with each successive variation indicating a level of use representing a closer approximation of ideal use. The researcher noted that while the CDICM was developed with *SuccessMaker* in mind, its application is relevant for many forms of computer-delivered instruction.

The components of technology use and the variation of the components selected for inclusion on the CDICM were presumed to reflect the actual and ideal practices of teachers involved with ILS implementation. Naturally, many forms of ILS use and adoption among teachers exist; the process of developing the instrument attempted to reflect the most accurate gradient of technology use from “least acceptable use of an ILS” to “ideal.”

The findings of the Mills and Ragan provided evidence for the proposition that not all ILS use is the same. There exist significant differences and variances in both the ILS implementation concerns and behaviors of teachers implementing an ILS. The level of ILS implementation was a function of implementation practices that included integration with classroom instruction, training in the use of an ILS, and the use of motivational strategies. Furthermore, just because a teacher was an effective implementer of an ILS was no guarantee that learners realized higher achievement using the ILS. Without the necessary organizational support from school or district staff, the expectation for instructional technology to improve the teaching and learning process cannot be sustained (Mills & Ragan, 1998).

As a consequence of their research, Mills and Ragan theorizes that promoting successful and effective implementation of integrated learning systems is dependent on the following:

1. Implementation of an ILS is a developmental process that is both nurtured and sustained and does not happen simply because expensive technology is in place at a given school site. When left to their own devices, teachers will implement an ILS to whatever level is their understanding (or misunderstanding) of the system and to the degree in which they feel comfortable with relinquishing control of their existing teaching patterns and practices.
2. Implementation by teachers occurs in different ways. The specific operational components of integrated learning systems must be communicated to teachers so that they understand what the program looks like when it is functioning at optimum use. Before learner achievement can be examined, it must be determined *to what degree the ILS has been implemented. A determination of the relative merit of an ILS should be based on an examination of the degree to which an ILS is actually used in relation to the intended use of the ILS.*
3. For systematic change to occur in the teaching/learning process in general, the existing system of educational practices needs to be fundamentally replaced with an improved system. Consequently, the integration of ILS instruction with classroom instruction is more apt to occur. Mills discovered that *teachers who incorporated ILS instruction into classroom instruction were more effective as implementers of ILSs or vice versa.*
4. Training should be a continuous process and not a one-time event. On-going training reaffirms fundamental practices that focus the user on the intended uses of the ILS and influences the concerns a user has about implementation.

5. ILS implementation must be teacher-driven. There is a perception that an ILS runs itself (Gleghorn, 1993). Simply placing learners with computers does not ensure that they will grasp the underlying structure of important ideas and concepts. Effective teaching practices accommodate effective ILS implementation.
6. An understanding of how the ILS is to be used and the expectations for learning must be clearly articulated. Once an ILS goes into a school building it is beyond the control of the designers and developers and it becomes the responsibility of the stakeholders in the change process to ensure that the ILS is properly implemented and that systematic change occurs (Mills & Ragan, 1998 p. 514).

Mills and Ragan recommend that further studies describing the implementation process for ILSs be conducted in future research.

Key components to ILS implementation

Like Mills and Ragan, the researcher of this study theorizes that the degree to which an integrated learning system is implemented is the key factor to its success or failure. In addition to this notion, this research hopes to underscore the fact that student achievement and attitudes concerning reading will increase in direct correlation to the degree of ILS implementation. In other words, the degree that an integrated learning system is implemented directly affects student achievement and attitudes in reading.

Most companies that offer ILS products have developed some form of implementation model (IM) for use by schools adopting their system, while outlining what the developers believe to be essential to successful implementation of their system. However, these practices outlined are rather general and non-prescriptive, and many simply sit in district offices and never make it to the schools (Van Dusen & Worthen, 1993). Interviews conducted by Van Dusen and Worthen (1993) noted that when given an IM, many teachers did not understand them or that principals believed the IMs did not fit the school design. Other respondents noted that the IMs did not allow for variations in ILS usage. In many cases, school personnel developed their own implementation procedures, although not typically an official document. Van Dusen and Worthen discovered that less than one-fourth of the teachers interviewed could articulate accurately what these procedures were (Van Dusen & Worthen, 1993). “In short, there appears to be an endemic inattention to proper implementation of IMs, and an urgent need for their clear delineation and distribution (Van Dusen & Worthen, 1993 p. 37).

Although strategies for ILS implementation varies from one company to the next, Van Dusen and Worthen (1993) observed some common themes for all systems—“components that we believe are essential to any effective implementation strategy” (p. 38). Based on studies conducted by Van Dusen and Worthen and the supported opinions of other researchers and commentators (Alifrangas, 1990; Becker, 1987; Hawkins, 1982; Mageau, 1992; White, 1989), *four distinct components of implementation* appear to be essential if an ILS is to have its desired impact on student achievement gains and attitude

change in reading proficiency. These four components are (1) student time on the system, (2) teacher involvement with the system, (3) integration into the curriculum, and (4) staff training.

Student Time on the System

Student time on the system refers to the amount of time the student is actively *engaged* with the computer. Very often, student time is depicted in IMs as “scheduled time” (although this way of defining time on an ILS may itself be a hindrance). The majority of ILS developers have designed their systems to be implemented in such a way that students would receive a large portion (at least 25%) of their instruction in a particular subject through the ILS. That is, one-fourth of a teacher’s classroom instruction, as well as his/her lesson planning, should emphasize ILS use. However, the research of Van Dusen and Worthen (1993) noted that the majority of schools observed in their studies (over 80%) scheduled each student with the ILS for less than 60 minutes per week. This is approximately only one-twelfth of classroom instruction via ILS per subject area per week.

In addition, the researchers found from observations of students working on computers that the actual *engaged time* or time-on-task was often significantly less than the *scheduled time*. Scheduled minutes were consumed in getting to the computers; other time was wasted while waiting to log-on or for the system to boot-up. More time was wasted when students had problems and awaited the assistance of the teacher or lab manager. Very often, this “down time” resulted in off-task behaviors. Van Dusen and Worthen discovered that during a scheduled 30-minute session, students were actively engaged for only about 16 minutes. These factors underscore the probability that many schools may not be allocating enough time to effectively implement their ILS, even though they may be meeting formal implementation standards for *scheduled time*.

According to teachers and administrators, the leading impediments to providing adequate time are: not enough computers, scheduling difficulties that result in the underutilization of computers, and unawareness of the discrepancy between scheduled and engaged computer time. A last concern that often complicates ILS implementation is the opinion held by a majority of school principals that the policy of “equal access” to program interventions mandates that *all* students should be scheduled for time on the ILS, even if it results in each student receiving far too little time to be meaningful (Van Dusen & Worthen, 1993).

Teacher Involvement with the System

As the name “integrated learning systems” denotes, most ILS systems were never intended to be stand-alone computers in which children were sent to work in isolation apart from curricular goals and objectives provided by classroom instruction. Key to ILS implementation is the requirement that teachers be involved with their students while they work on the ILS. The amount of student learning which takes place with an ILS depends on how the teacher manages student information; the variety of instructional

strategies employed; how well motivated the students are; the amount of time scheduled for individual students to work on the systems; and the balance between using an ILS and other teaching tools (Blickhan, 1993).

The research of Van Dusen and Worthen (1993) revealed that after discussing implementation with principals, there are three teacher behaviors that the majority of principals (80%) agreed are essential to effective implementation: (1) teachers serving as a resource to students while working on the ILS, i.e. responding to student problems in the lab or monitoring use in a distributed setting model (computers in the classroom); (2) teachers actively monitoring student progress while students are working on the computers; and (3) teachers using reports generated by the system.

Teacher behaviors vary depending on the configuration model that the school uses for distributing computers. As broad categories for ILS configuration, Divine (2001) suggests that the systems can be planned as “open” or “closed.” These terms convey the extent of integration that is expected between teachers and the content of the system’s curriculum. If teachers intervene and select specific portions of skills or content for a group of students, it is considered an “open” system. In contrast, if students are pretested and placed into the system with the system pacing and moving the student along without any teacher intervention, then the system is considered “closed.” Divine (2001) contends that the best model is the “open” plan, since it encourages teacher integration of ILS courseware with classroom practices. Nevertheless, these plans are determined by either the school or district and become a part of the delivery system used at each school site.

Furthermore, there are three dominant models for ILS implementation typically utilized by teachers. First, in the distributed system, the least common and most expensive model, computers are “distributed” amongst classrooms in a school (approximately four per classroom). Second, the computer lab (the most common model) typically utilizes between 30 and 40 networked computers made available to student according to a rotating schedule. Finally, the independent study lab, combination of the previous two models, utilizes a lab configuration that is smaller than the traditional lab containing a networked system of about 10 computers. The nature of the independent lab is to accommodate an ever-changing student population, for instance, adult learners preparing for the GED or an alternative high school emphasizing remedial and transitional courses for student re-entrance into the mainstream (Robinson, 1993).

Unique problems while working with students occur in all of the three models. In most schools utilizing a lab setting, teachers accompanied students to the lab, but much of the time they were engaged in activities not related to ILS work, i.e. grading papers or conversing with the lab manager. Few teachers actively monitored student progress and only reacted to student needs when called upon for assistance (although very often deferred to the lab manager). In the distributed setting, teachers were even less

involved with students as they worked on the ILS (95% of the students reported little or no interaction with teachers while working on the ILS). The main difficulty for teachers is dividing themselves between students who are working on computers and the balance of the class who are not (Van Dusen & Worthen, 1993).

A common problem in both lab and distributed settings is the lack of teacher use of system-generated reports. Blickhan (1993) suggests that teachers can and should generate student reports for parents, students, and district administration as a tracking device of student growth. Furthermore, all individuals involved should have training on how to read these reports and use them in productive and meaningful ways. Across their studies, Van Dusen and Worthen (1993) found that less than half of the teachers used the reports on a regular basis. This low level of report usage means that a potentially important aid in keeping track of student performance and individual needs is wasted. Many teachers commented that they were “unaware of how to use the reports” or “what types of information could be found on the reports” (Van Dusen & Worthen, 1993 p. 41). Teachers also reported lack of time and training as a major hindrance to using reports.

Integration with the Classroom Curriculum

According to Van Dusen and Worthen (1993), integration refers to “the consolidation and synthesis of information from the ILS and the classroom” (p. 41). Just as the name “ILS” implies, the system is not intended to be a supplement to classroom instruction, but rather an extension of the basic curriculum. The researchers noted that a pervasive feeling persists among teachers (nearly 75% of those surveyed), that is—an ILS should be used mainly as a *supplement*, despite school district policy to the contrary. Balancing instructional strategies (or selecting the best strategies for each lesson) both in the classroom and in the ILS lab is significantly important. Also important is that teachers bridge what is happening in their classrooms with the ILS lessons on some regular basis, for example, by “using math manipulatives to learn a concept, then pursuing the same concept in the ILS format” (Blickhan, 1993 p. 111).

One way to insure integration is by providing correlations (not statistical) of the ILS objectives to the district texts. Most major companies producing integrated learning systems use some form of this strategy. However, Van Dusen and Worthen (1993) reported that most teachers were unaware of such resources, even though over 75% of them reported that there was good overlap between the ILS and classroom curriculum. The major issue arises from not *helping teachers see how to use this fit*. Also, ILS integration is further facilitated by offering more flexibility through lesson sequence changes or “tailoring features” so that teachers can more easily incorporate ILS objectives into their classroom instruction. When this is the case, a higher degree of integration occurs (Van Dusen & Worthen, 1993).

Nevertheless, having access to text/ILS correlations and providing more flexibility in altering lessons was not enough to ensure that teachers would integrate the ILS into the classroom. According to Van Dusen and Worthen in the schools they observed, the researchers found that less than 25% of the teachers made use of the “tailoring” features on a frequent basis, and another 25% never did. Interviews with the teachers indicated that few were even aware of or understood the flexible nature of integrated learning systems, what the system had to offer, or how they should be involved with it as a classroom teacher.

ILS integration requires that ILS developers provide curriculum maps for all grade levels and/or subject matter areas. Developers must ensure that: (1) the curriculum maps are easily accessible to teachers, (2) teachers be made aware of those maps, and (3) teachers be given extensive training in using them. Furthermore, teachers must be held accountable for what students are learning on the ILS and the use of this information for student grades or reports of student progress to parents (Van Dusen & Worthen, 1993). Evaluation of task performance is essential when using an ILS. Teachers must monitor and adjust programs on a regular basis in order for the instruction to be effective (Blickhan, 1993). When students and teachers are not held accountable for ILS use, it tends to de-emphasize the value of the ILS experience (Van Dusen & Worthen, 1993).

Staff Training

In the schools studied, Van Dusen and Worthen (1993) noted that teachers, principals, and lab managers were nearly unanimous in their perception that high-quality staff development was essential to effective ILS implementation. However, ILS implementation becomes a “leap of faith.” In most cases, teachers do not receive adequate training or planning time to comprehend the range of resources that are available to them. Consequently, they lack confidence in their ability to master this ILS tool and to play a significant role in its use (Robinson, 1993).

The main hindrance to good staff training in ILS use appears to be its cost. Training experiences vary from one company to another in the variability of the quality, availability, and cost of training in ILS use. Teachers and administrators suggested that ILS training should focus not only on basic elements of the system, but also on *how to integrate* the ILS into the curriculum and how to both generate and interpret reports. Training should occur early in the school year with follow-up sessions throughout the school year with individual tutorials, as is necessary and feasible. Furthermore, company personnel supervising the training should be well versed in the IMs. While this point seems too obvious to state, Van Dusen and Worthen (1993) were surprised to find that many company representatives interviewed were unfamiliar with the IMs that their companies had proposed to guide the use of the integrated learning systems (Van Dusen & Worthen, 1993)!

In the studies conducted by Van Dusen and Worthen concerning ILS implementation, teachers, principals, lab managers, and company personnel provided information about factors they felt either facilitated or hindered schools' use of integrated learning systems. From their responses, the researchers identified five general strategies that are likely to further enhance the four components of ILS implementation discussed earlier. Van Dusen and Worthen suggest

- (1) Developing and distributing written IMs to all participating school staff. The IMs provided by ILS developers should be specific, yet providing enough flexibility for modifications to meet the specific needs of the individual school.
- (2) Ensure teacher "buy-in"—that is, allow teachers to be involved with every component of ILS implementation, from the purchase of the system to how the system is managed on the school site. In the Van Dusen and Worthen studies, the researchers found that less than 3% of the teachers were involved in the decision to purchase the ILS, and less than 10% played a major role in implementing the system. Consequently, many teachers feel no particular commitment to seeing the ILS succeed, nor do they take advantage of opportunities provided by integrated learning systems to affect student achievement and attitudes.
- (3) Provide competent personnel to supervise/manage computer use. In an ILS comparative study, Resta and Rost (1986) determined that common to all ILSs are their under-utilization or lack of a full-time lab coordinator or manager to facilitate student use and teacher integration. In seven studies, Van Dusen and Worthen found that 66% of the teachers suggested that a lab manager was essential, and another 15% strongly recommended having a person in that role versus having a lab available outfitted with hardware and software but without the "human" element. Furthermore, lab managers are essential for the smooth operation of an ILS, for scheduling and monitoring students on systems, and increasing teacher involvement by facilitating report generation and monitoring student progress.
- (4) Establish a monitoring system. Once a school or school district has adopted an ILS, it is important that the integrated learning system be monitored and maintained. A monitoring system would involve logging computer use, staff training, and the level of teacher involvement. In addition, incentives or special recognition to teachers successfully integrating an ILS into class curriculum could be handled through a monitoring system.
- (5) Principals should provide strong leadership. The principal is essential to helping the school staff "catch the vision" of how the ILS can be effectively implemented. Principals can provide incentives for teachers who are successful implementers of the technology.

Summary of Literature Review

In summary, the literature concerning integrated learning systems suggests both positive and negative perspectives from designers of the technology and the teachers and students who use them. On

the positive side, both critics and proponents describe ILSs as “ground-breaking teaching tools which capitalize on innovative ideas about learning” (Bailey, 1993 p. 4). Meanwhile, on the negative side, Bailey (1993) offers three major criticisms of ILSs: (1) the high cost, (2) an instructional image of a “drill-and-kill” approach to basic skills learning, and (3) the increasing loss of curriculum control by teachers and administrators—approximately 25% of a teacher’s instructional time provided by an ILS (Van Dusen & Worthen, 1993).

While traditional computer-based instruction (CBI), by nature, is ancillary or supplemental to classroom instruction, computer-based ILSs have the potential for true integration with the goals, objectives, and practices of the classroom teacher. When implemented appropriately, ILSs have a great potential for improving student achievement and attitudes. However, the underutilization of integrated learning systems is a serious problem and no great or lasting effects of ILSs can be realized until the systems are fully and properly implemented (Van Dusen & Worthen, 1993).

METHOD

Overview of the Research Design

The research design is presented in summary form in Table 1. The three parts of the study can be viewed as an in-depth case study of one school’s use of an integrated learning system. The study employed both quantitative and qualitative data-gathering and analysis procedures, with students, teachers, and school administrators serving as separate sources for each part of the study.

Part 1 is comprised of two sections: (a) ILS lab implementation by lab coordinator(s) and (b) classroom teachers’ uses of an ILS. Section A (ILS Lab Implementation) employed a quasi-experimental design to assess implementation strategies among school sites for integrated learning systems. In order to confirm consistency of findings at the single school site where the summer school ILS lab will be studied, Part 1 will consist of one nonrandomized independent sample of lab managers in the school district including the single lab manager conducting summer school for the study. Section B (Teacher Use of an ILS) will utilize one nonrandomized independent sample of classroom teachers and administrators at the summer school site to determine the extent of teacher involvement with system. Part 2 (Student Outcomes) will employ a quasi-experimental design, since it will not be feasible to randomly assign students to the ILS treatment. The aim of Part 2 is to assess student gains on reading achievement and changes in their attitude concerning reading after receiving the ILS treatment by employing a pretest/posttest measure on the two indices. Part 3 (Classroom Teacher Perceptions) sought to determine teachers’ perceptions during the first academic quarter about student reading after receiving the ILS treatment in summer school. Qualitative analysis of teachers’ responses will be conducted following interview protocol. Part 4 (Effect of ILS Lab Implementation and Teacher Use of an ILS on Student

Reading Achievement/Attitudinal Outcomes) will employ a factorial design to investigate the combined effects of the two independent variables, ILS lab implementation and teacher use of an ILS on the dependent variables of reading achievement and attitudes. The procedures for each part are delineated next with attention to instrumentation, sampling, and data analysis techniques.

Part 1: (ILS Implementation)

Instrumentation. For Section A, the researcher developed the *Integrated Learning System Implementation Questionnaire (ILSIQ)* based on Mills and Ragan's (1998) Computer-Delivered Instruction Configuration Matrix (CDICM) to survey lab managers (See Appendix, Figure 2). The final 15-item CDICM allowed for a range of scores from 0 to 75. The standard error of measurement for the field test was 3.68 while the interscorer reliability coefficient (3 scorers) was .96 for all items. The administration of the CDICM yielded a coefficient alpha of .61 $p < .01$ for the total scale (Mills & Ragan, 1998). The ILSIQ questionnaire is comprised of 24-items on a five-point Likert scale from "Acceptable use of an ILS" to "Unacceptable use of an ILS," thus, allowing for a range of scores from 0 to 120. A field test will be conducted prior to the final administration of the ILSIQ. The ILSIQ will be made available to managers in both paper and web versions and will be administered throughout the summer school session until all lab managers have been contacted.

For Section B, classroom teachers and administrators will be surveyed using the *Teacher Uses of an Integrated Learning System Questionnaire (TUILSQ)* developed by the researcher for the study (See Appendix, Figure 3). The TUILSQ is based on Van Dusen and Worthen's (1993) four distinct components of ILS implementation and contains six items in a checklist format where subjects "check all that apply" to their ILS use. The questionnaire allows for a range of scores from 0 to 38; item six provides an opportunity for teachers' open-ended responses. A field test of the original 7-item questionnaire yielded an alpha reliability coefficient of .85. Confusion with item one regarding teachers' amount of reading instruction attributed to the coefficient; many respondents confused this item with reading instruction pertaining with the ILS, not that which occurs in their classrooms. This item was eliminated from the final questionnaire providing a reliability of coefficient of .96. The questionnaire will be used to survey classroom teachers and administrators about student time with the ILS, teacher involvement with the system, ILS integration with classroom curriculum, and staff training. The TUILSQ will be conducted at the midpoint of the summer session (week 7).

Sample Selection. In Section A, all lab managers in the district (N=30) will be included in the study and will be asked by letter to participate. This sample will also include the lab manager of the summer school ILS lab, which is the focus of the study. In Section B, all classroom teachers (N=50) and all administrators (3) at the school site will be included in the study.

Analysis. For Section A, analysis of ILS use by lab managers implementing the integrated learning system will be conducted through pattern analysis of the survey data to determine dominant configuration patterns or variations in lab coordinators' ILS implementation. The general patterns that emerge will be analyzed by a cluster analysis that identifies relatively homogenous groups of cases based on selected characteristics. One-way analysis of variance (ANOVA) will be used to examine differences among the configuration patterns for each of the components measured by the ILSIQ.

For Section B, analytical procedures for teacher use of an integrated learning system using the TUILSQ will include counting frequencies and percents of teachers' selected responses to items with a qualitative analyses of their open-ended comments. A one-way ANOVA will be conducted to compare the means of responses within subject area groups (i.e., Language Arts, mathematics, and science) and between subject area groups (Language Arts to mathematics).

Part 2: Student Outcomes

Instrumentation. Part 2 utilizes the *Attitudes About Reading Inventory (AARI)* (Powell 1971) containing 20-items to measure students' attitudes about reading during and after the ILS treatment (See Appendix, Figure 4). Powell's (1971) AARI yielded a split-halves coefficient of .76; the Spearman-Brown Prophecy Formula reliability coefficient was .86. The researcher conducted a pilot of the instrument with 40 seventh grade students, which yielded an alpha reliability coefficient of .92. For the study, students will respond to a five-point Likert scale with choices ranging from "This statement is true for you almost all the time" to "This statement is just about never true for you." The inventory ranges from a score of 0 to 100.

Part 2. Student achievement outcomes will be measured by using their Student Tests for Accelerated Reader (S.T.A.R.) scores taken at Time 1 (end of previous year) and Time 2 (end of summer school). Adaptive branching within S.T.A.R. enables the reading diagnostic program to interact with each student during their reading test, evaluating each answer and dynamically creating the next question at a higher or lower difficulty level. To appropriately compare test results between students who did not take the same reading test, and more importantly, to provide a basis for deriving the norm-referenced scores, S.T.A.R. uses a proprietary Bayesian statistical model to convert each individual student's test results to scores on a common scale. A probability-weighted likelihood approach is used in scoring S.T.A.R. tests, which takes into consideration more information than the simple maximum likelihood approach. This conversion results in the student's Scaled Score, ranging from 50 to 1350. During the norming of S.T.A.R., the test makers computed test-retest correlation coefficients between the first and second tests that students completed. Based on Scaled Scores, the reliability estimates by grade (1 – 12) ranged from

.95 to .85. Student's Scale Scores from S.T.A.R. will be used to determine student gains in reading from Time 1 to Time 2 (Advantage Learning Systems, 1996).

Sample Selection. The student sample will include approximately 250-300 students served by the integrated learning system during summer school. Students will be selected for participation in the study by school faculty and administrators, prior to the summer session, if identified as "at-risk" or considered a year or more below their present grade level in reading proficiency, i.e. an eighth grader reading at a fifth grade level. Students will range in age from 11 to 15, the majority of which (approximately 72%) will be males. Students using the ILS (treatment group) at each grade level will be matched with a non-ILS (comparison) group on four critical variables that the literature suggests are factors influencing the outcomes: socio-economic status (SES) as determined by enrollment in the free or reduced lunch program, age, ethnicity, and gender. In addition, students will be matched by stanines (1-3) from standardized testing.

Analysis. Student achievement data, or S.T.A.R. scores will be gathered for Time 1 and Time 2 for both the treatment and comparison group. The student attitude survey (AARI) will be administered at the same points in time to both groups, as well. Analytical procedures for Part 2 will include an examination of change trajectories in achievement and attitude, the calculation of effect sizes (Glass' Δ), and Paired Difference t-Tests to measure the mean difference between the paired scores of the treatment and comparison groups.

Part 3: Classroom Teacher Perceptions

Instrumentation. The *Teacher Report of Student Reading (TRSR)*, developed by the researcher, contains 10-items used to determine teachers' perceptions about student reading after receiving the ILS treatment (See Appendix, Figure 5). A three-point Likert scale will be utilized with responses ranging from "Agree" to "Disagree." The questionnaire will range in score from 0 to 30. A field study will be conducted prior to the study in order to determine item reliability of the questionnaire. The TRSR will be administered during week nine (the end) of the first academic quarter of the upcoming school year.

Sample Selection. All Language Arts teachers (8) with students in their classrooms who received instruction from the integrated learning system during summer school will be included in the study. These teachers comprise grade levels from six to eight.

Analysis. Analysis procedures for Part 3 will include counting frequencies and percents of teachers' selected responses to items with qualitative analyses of their open-ended comments. The qualitative analysis will start with a line-by-line coding of verbatim teacher responses followed by a clustering of major themes and sub-themes found in the data. Once the themes are extracted, representative quotes will be identified under each thematic category.

Part 4: Effect of ILS Lab Implementation and Teacher Use of an ILS on Student

Reading/Attitudinal Outcomes

Analysis. Part 4 involves neither instrumentation nor sampling. In order to investigate the combined effect of the two independent variables, ILS lab implementation and teacher use of an ILS on the two dependent variables, student reading achievement and attitudinal outcomes, the researcher will conduct a multifactor analysis of variance.

Materials

The research described in this study considers the instructional courseware developed by Computer Curriculum Corporation (CCC). The CCC Curriculum profiles (1989) describe CCC courseware as “performance-based instruction that leads to rapid academic gains” (p. 2) as a result of an individualization process that continuously adapts instruction for each learner. Several features in the design of CCC courseware contribute to the individualization of instruction:

1. The foundation of instructional strategies employed by CCC courseware is the availability of comprehensive curricula in several skill areas. A vast amount of instructional material is required in order to individualize and adapt instruction for a large number of learners.
2. Initial placement motion (IPM) adapts the beginning level of instruction to learner performance. During the first ten sessions a learner spends in a course, the system automatically adapts the level of instruction to the learner’s functional level based on the learner’s actual performance regardless of initial enrollment level.
3. Tutorial support in the form of focused sequential practice, interactive tutorials, repeated prerequisite instruction, and immediate or delayed review is activated when a learner has difficulty in mastering a learning objective (Mills & Ragan, 1994 p. 539).

The CCC courseware used for this study is Successmaker, which includes The Reading Network (TRN), Reader’s Workshop (RS), and Language Arts Strands (LAS). Within the first session, the initial placement motion (IPM) process determines the learner’s functional level in the courseware. For instance, after the first session with the reading software, seventh grader Mary will initiate the program at an IPM of 5.5 (or reading level between grades five and six). In standard motion throughout the course, the management system evaluates Mary’s pattern of correct and incorrect responses and determines her mastery of each exercise class or set of exercises. Throughout the program, Mary will receive immediate feedback for correct and incorrect responses and may receive tutorial assistance when in err. After demonstrating mastery, or at least 80% accuracy, she will be moved to the next exercise class with increasing challenge and difficulty. A skill remains active until the learner demonstrates mastery of it or

takes the maximum number of exercises allowed for the skill. It is possible, and in fact, is hopeful that the learner will “top-out” or achieve the highest level of mastery for the courseware. In other words, for the example above, Mary’s final IPM for The Reading Network (TRN) is 6.99, the highest level for TRN. At this point, Mary will exit TRN, use another component of the courseware, or be mainstreamed to standard Language Arts classes as “new and improved”[Computer Curriculum Corporation, 1989 #3]

In this study, 250-300 middle school students in grades six through eight will use *SuccessMaker* courseware in a computer lab twice a day (morning and afternoon) in a five-day weekly cycle for ten weeks. Lab occupancy affords 30 computers outfitted with *SuccessMaker* courseware; approximately 40 students will occupy the lab during a given session. A lab coordinator will rotate students by alternating their lab session between time on the computer or with worksheets. In the morning, students will spend 40 minutes with either RW and/or worksheets; they will return in the afternoon for 40 minutes with MCS (Math Concepts and Skills) and/or worksheets. Mathematics outcomes will not be included in the study. Low-ability students, those with an initial IPM level in reading of 3.99 (approximately fourth grade) or lower (as low as 1.00 or first grade), will spend both sessions with TRN until achieving the highest level of mastery (6.99) before working with RW and/or MCS [Computer Curriculum Corporation, 1989 #3].

Implications

Computer-delivered instruction and integrated learning systems represent one stage in a long succession of technologies and innovations embraced by education in the last several decades. Although the problem of ILS implementation is relatively new, the issue of properly or adequately assimilating technology into the classroom and promoting its effective use has long been a matter of research discussion and debate. This study will focus on describing the concerns and implementation practices of ILS lab coordinators and classroom teachers while implementing an integrated learning system. While this notion has been theorized in literature (Mills & Ragan, 1994, 1998), no research has studied the effect of ILS implementation strategies on student achievement and attitudinal outcomes in reading. This study will investigate the impact of implementation on these indices with the main premise being that the degree to which an integrated learning system is implemented fully and as intended by courseware designers, student achievement and attitudinal outcomes in reading will increase. Ultimately, the potential of ILSs and other forms of computer-delivered instruction may be unfulfilled when the technology is ineffectively or improperly implemented. The significance of these findings will be profound when student gains can be used to justify the hefty price tag of just one integrated learning system in a school district. The results of this study can be applied in other settings where stakeholders require data to justify decisions concerning technology purchases, as well as teachers and administrators who desire to maximize their own uses of integrated learning systems. Since the implementation of ILSs

is a complex process, further studies that describe the implementation process for ILSs should be conducted. Furthermore, student achievement and attitudinal outcomes in mathematics achievement would, likewise, be a worthwhile venture.

Appendix

References

Advantage Learning Systems, I. (1996). STAR Reading: Understanding Reliability and Validity. Wisconsin Rapids, WI: Advantage Learning Systems, Inc.

Alifrangas, C. (1990, March 1990). An Integrated Learning System in an Elementary School: Implementation, Attitudes, and Results. Paper presented at the International Conference on Technology and Education, Brussels, Belgium.

Atkinson, R. C. (1976). Adaptive instructional systems: Some attempts to optimize the learning process. In D. Klahr (Ed.), Cognition and Instruction. New York, NY: Wiley & Sons.

Bailey, G. D. (1993). Wanted: A Road Map for Understanding Integrated Learning Systems. In G. D. Bailey (Ed.), Computer-based Integrated Learning Systems (pp. 3-9). Englewood Cliffs: Educational Technology Publications, Inc.

Becker, H. J. (1987). Equity in School Computer Use: National Data and Neglected Considerations. Journal of Educational Computing Research, 3, 289-311.

Becker, H. J. (1992). Computer-based Integrated Learning Systems in the Elementary and Middle Grades: A Critical Review and Synthesis of Evaluation Reports. Journal of Educational Computing Research, 8(1), 1-41.

Becker, H. J. (1993). A Model for Improving the Performance of Integrated Learning Systems. In G. D. Bailey (Ed.), Computer-based Integrated Learning Systems (pp. 11-31). Englewood Cliffs: Educational Technology Publications, Inc.

Blickhan, D. S. (1993). The Teacher's Role in Integrated Learning Systems. In G. D. Bailey (Ed.), Computer-based Integrated Learning Systems (pp. 109-113). Englewood Cliffs, NJ: Educational Technology Publications.

Bracey, G. W. (1991). ILS Research Isn't Helpful. Electronic Learning.

Bracey, G. W. (1993). The Bright Future of Integrated Learning Systems. In G. D. Bailey (Ed.), Computer-based Integrated Learning Systems. Englewood Cliffs, NJ: Educational Technology Publications, Inc.

Corno, L., & Snow, R. E. (1986). Adapting teaching to individual differences among learners. In M. C. Wittrock (Ed.), Handbook of Research on Teaching (3rd ed.). New York, NY: Macmillan Publishing Company.

Computer Curriculum Corporation (1989). Curriculum Profiles. Sunnyvale, CA: Computer Curriculum Corporation.

Divine, K. (2000). A Meta-Evaluation of CCC Labs in Pasco County (1995-2000). Wesley Chapel, FL: District School Board of Pasco County.

Gleghorn, S. R. (1993). A study of innovation configurations for integrated learning systems (Vol. 54). Dissertation International Abstracts: University Microfilms No. AAD93-32907.

Hansen, D. H.; , Ross, S., & Rakow, E. (1978). Paper presented at the Annual Meeting of the American Educational Research Association, Toronto, Canada.

Hativa, N., & Lesgold, A. (1991). The computer as a tutor--can it adapt to the individual learner? Instructional Science, 20(1), 49-78.

Hawkins, J. (1982). The Flexible Use of Computers in Classrooms (Technical Report 6). New York, NY: Bank Street College, Center for Educational Research, Field, and Administrative Services.

Hawkins, J., & Collins, A. (1992). Design-Experiments for Infusing Technology into Learning. In G. D. Bailey (Ed.), Computer-based Integrated Learning Systems. Englewood, NJ: Educational Technology Publications, Inc.

Heck, S., Steigelbauer, S. M., Hall, G. E., & Loucks, S. F. (1981). Measuring innovation configurations: Procedures and applications. Austin, TX: Research and Development Center for Teacher Education, University of Texas.

Jay, M. E., & Jay, H. L. (1994). The Library/Computer Lab/Classroom Connection: Linking Content, Thinking, Writing. New York, NY: Neal-Schuman Publishers, Inc.

Mageau, T. (1992). Two Teaching Models That Work. Electronic Learning, 12, 16-22.

Mills, S., & Ragan, T. (1994, February 16-20, 1994). Adapting Instruction to Individual Learner Differences: A Research Paradigm for Computer-based Instruction. Paper presented at the National Convention of the Association for Educational Communications and Technology, Nashville, TN.

Mills, S., & Ragan, T. (1998, February 18-22, 1998). An Implementation Model for Integrated Learning Systems. Paper presented at the National Convention of the Association for Educational Communications and Technology, St. Louis, MO.

Resta, P. E., & Rost, P. (1986, April 16-20, 1986). CAI: A Model for the Comparison and Selection of Integrated Learning Systems in Large School Districts. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.

Robinson, S. (1993). Integrated Learning Systems: Staff Development as the Key to Implementation. In G. D. Bailey (Ed.), Computer-based Integrated Learning Systems (pp. 93-101). Englewood Cliffs, NJ: Educational Technology Publications, Inc.

Sherry, M. (1990). Implementing an Integrated Learning Systems. Phi Delta Kappan, 72, 118-120.

Sherry, M. (1992). The new ILSs: Branching out. Technology and Learning, 13(2), 16-29.

Sherry, M. (1993). Integrated Learning Systems: What may we expect in the future? In G. D. Bailey (Ed.), Computer-based Integrated Learning Systems (pp. 137-141). Englewood Cliffs, NJ: Educational Technology Publications, Inc.

Skinner, B. F. (1958). Teaching Machines. Science, 128, 969-977.

Slavin, R. E. (1987). A Theory of School and Classroom Organization. Educational Psychologist, 22(2), 89-108.

Trotter, A. (1990). Computer Learning. American School Board Journal, 177, 12-18.

Van Dusen, L. M. (1995). Can integrated instructional technology transform the classroom? Educational Leadership, 53(2), 28-34.

Van Dusen, L. M., & Worthen, B. R. (1993). Factors That Facilitate or Impede Implementation of Integrated Learning Systems. In G. D. Bailey (Ed.), Computer-based Integrated Learning Systems (pp. 115-119). Englewood Cliffs, NJ: Educational Technology Publications, Inc.

Van Dusen, L. M., & Worthen, B. R. (1994). The Impact of Integrated Learning System Implementation on Student Outcomes: Implications for Research and Evaluation. International Journal of Educational Research, 51, 13-24.

White, M. A. (1989). Current Trends in Education and Technology as Signs to the Future. Education and Computing, 5, 3-10.

White, M. A. (1993). Are ILSs Good Education? In G. D. Bailey (Ed.), Computer-based Integrated Learning Systems (pp. 115-119). Englewood Cliffs, NJ: Educational Technology Publications, Inc.

Wilson, J. (1990). Integrated learning systems: A primer. Classroom Computer Learning, 10(5), 22-26.

**COMPUTER-DELIVERED INSTRUCTION CONFIGURATION MATRIX (CICM)
Evaluation Model for Integrated Learning Systems (ILS)**

Rules for Rating:

1. Any information in the interview may be used to rate any single component.
2. Rate to the highest level of use described by the respondent for any single component.

	5 IDEAL USE	4	3	2 MINIMAL USE	1 UNACCEPTABLE USE
Component 1 Instructional System and Design of ILS	Describes individualized prescriptive strategies	Describes instructional presentation and mastery of skills	Describes enrollment levels	Describes different content areas only	Has no understanding of instructional design or no understanding is necessary
Component 2 Training Use in ILS	Initial training, continued training, and program updates are conducted	Initial training and continued training is conducted	Initial training or orientation is conducted	Training is self-directed and occurs on-the-job	Received no training
Component 3 On-going Support System and Communication in Use of ILS	Formal grade/department level meetings to discuss how ILS are conducted	Building level meetings with vendor or principal to discuss ILS are conducted	Technology committee meets periodically to discuss ILS instruction	Informal discussions with lab manager or other teachers	No attention is given to on-going support
Component 4 Instructional Goals or Expectations for Use of ILS	Accomplishment of goals is celebrated	Instructional goals for ILS are accomplished	A plan for accomplishing instructional goals is stated	Goals or expectations for ILS are stated	No goals or expectations for ILS instruction are set
Component 5 Integration of ILS Courseware with Classroom Instruction	ILS is used as a tool for regularly accomplishing classroom instructional objectives	Plans lessons that integrate ILS courseware with classroom instruction in multiple subjects (Worksheets may be used)	Plans lessons that integrate ILS courseware with classroom instruction in one subject (Worksheets may be used)	ILS courseware supplements classroom instruction	ILS courseware is not integrated with classroom instruction
Component 6 Integration of ILS Courseware with Curriculum	Sequence and selection of courses/lessons are adjusted to align with or support district curriculum	ILS courseware supplements district curriculum in multiple subjects	ILS courseware supplements district curriculum in one subject	ILS courseware is correlated to district curriculum when possible	ILS courseware is not integrated with district curriculum
Component 7 Appropriate Selection of Courses, Enrollment Levels, and Options of ILS	Individualized learning sequences are designed and modified based on test scores, monitoring student progress, forecasts of learning gains	Learning sequences are individualized for each student based on test scores or monitoring of student progress	Test scores or prior ILS performance are used to enroll students in same courses at different grade levels	Students are enrolled in same courses at grade level	Students are enrolled at beginning level of course or strand
Component 8 Effective Scheduling of ILS	All students are scheduled for regular use and makeup sessions are provided	All students are scheduled for regular use	Some students are scheduled for regular use	Some students are scheduled for occasional, remedial or specialized use	Students are not scheduled for either occasional or regular use
Component 9 Clear Rules for Daily Procedures Using ILS	Orientation to rules and procedures is presented	Rules and procedures are established and handed out to students in printed form	Rules and procedures are established and posted in lab or classroom	Some rules and procedures are established by the teacher	No rules and procedures are established

	5 IDEAL USE	4 ACCEPTABLE USE	3	2 MINIMAL USE	1 UNACCEPTABLE USE
Component 10 Sufficient Time on Task for Each Student Using ILS	Amount of instructional time is determined by targeted gain for students	Students receive more than 30 minutes of ILS instruction per week and makeup sessions are provided	Students receive more than 30 minutes of ILS instruction per week	Students receive at least 30 minutes of ILS instruction per week	Students do not receive regular weekly instruction using ILS
Component 11 Teacher Facilitation and Intervention Using ILS	Continuously facilitates instruction; provides intervention strategies including worksheets, selected practice, tutoring, or small group instruction	Continuously facilitates instruction	Occasionally facilitates instruction or facilitates when students request assistance	Facilitation and intervention is provided primarily by lab manager	Teacher is not present or does not facilitate ILS instruction
Component 12 Effective Use of Reinforcement and Motivational Strategies Using ILS	Recognizes individual and group achievement through use of individual and group motivational strategies involving parents or community sponsors	Recognizes individual achievement through use of individual motivational strategies including certificates, wall charts, or individual competition	Recognizes group achievement through use of group motivational strategies including contests or team activities	Explains reasons for using ILS and encourages students to actively participate in ILS instruction	No motivational strategies or activities are used
Component 13 Student Feedback and Use of Reports Generated by ILS	Reports are used to provide information for determining classroom instruction or classroom activities	Reports are used to review student progress and modify student enrollment	Reports are used for progress review by lab manager, teacher, or principal	Reports are used infrequently or on a limited basis	Reports are not run or distributed
Component 14 Instructional Assessment of ILS Courseware	Evaluation or assessment of students includes mastery level, lesson completion, or courseware content for multiple subjects	Students receive a letter or numeric grade for ILS achievement in multiple subjects	Students receive a letter or numeric grade for ILS achievement in one subject	ILS is optional for inclusion in the evaluation or assessment of students	ILS is not included in the evaluation or assessment of students
Component 15 Teacher Knowledge and Skills Using ILS Routines and Equipment	Familiar with course content for multiple courses, can modify instructional levels or other student enrollment information, and can use custom reports or forecasting reports to make instructional decisions	Familiar with course content for multiple courses and can modify instructional levels or other student enrollment information	Familiar with course content and student resources for multiple courses	Familiar with course content and student resources for one course	No familiarity with course content, student resources, or management system

Source: Mills, Steven C. and Ragan, Tillman R. (1998). *An Implementation Model for Integrated Learning Systems*. In: Proceedings of Selected Research and Development Presentations at the National Convention of the Association for Educational Communications and Technology (AECT), February 18-22, 1998, St. Louis, MO. Sponsored by the Research and Theory Division.

Figure 2.

**Integrated Learning Systems Implementation Questionnaire
(ILSIQ) © Jennifer Brown King, 2001**

Demographic section.

- 1. Specify your gender.**
 - a. Male
 - b. Female
- 2. Specify your age.**
 - a. 50+ years of age
 - b. 40-39 years of age
 - c. 30-39 years of age
 - d. 20-29 years of age
- 3. What level of education have you acquired?**
 - a. Graduate degree
 - b. Master's degree
 - c. Bachelor's degree
 - d. Associate's degree or Technical degree
 - e. High school diploma
- 4. Describe your educational background.**
 - a. Specialized in secondary education.
 - b. Specialized in elementary education.
 - c. Specialized in special education.
 - d. Specialized in liberal arts education or general studies.
 - e. Specialized in studies other than education.
- 5. Describe numbers of years of experience in education.**
 - a. 30+ years
 - b. 20-29 years
 - c. 10-19 years
 - d. 5-9 years
 - e. 4 or less years
- 6. Describe your experience with technology.**
 - a. Graduate studies involved technology usage
 - b. Undergraduate studies involved technology usage
 - c. Previous work experience, in the field of education, with technology
 - d. Previous work experience, outside of education, with technology
 - e. Present work entails first experience with technology

ILS Integration section.

- 7. Describe in your own words the organization of ILS instruction?**
 - a. ILS instruction organized as individual prescriptive strategies for each student.
 - b. ILS instruction determined by mastery (or lack of mastery) of skills for each student.
 - c. ILS instruction determined by ILS enrollment levels for each student.
 - d. ILS instruction determined by low achievement in certain subjects.
 - e. ILS instruction not strictly organized; students log-on to computers and interact with the courseware that is available for them.
- 8. How much formal training have you had in the use of ILS?**
 - a. Initial training, continued training, and regular program updates.
 - b. Initial training and continued training.
 - c. Initial training and orientation.
 - d. Self-directed training on-the-job.
 - e. Received no training.

- 9. What formal or informal communication such as meetings or discussions has occurred to support you in the use of ILS?**
 - a. Formal grade/department level meetings to discuss how ILS is conducted.
 - b. Building level meetings with vendor or principal to discuss how ILS is conducted.
 - c. Technology committee meets periodically to discuss ILS instruction.
 - d. Informal discussions with lab manager or other teachers.
 - e. No attention is given to on-going support.
- 9. What goals do you set for your class for ILS instruction?**
 - a. Instructional goals and classroom teacher prescriptive plans are used to set goals for each student.
 - b. A plan for accomplishing instructional goals is discussed with classroom teacher.
 - c. Instructional goals for ILS are determined by courseware output by ILS on each student.
 - d. Goals or expectations for ILS are determined by the courseware when each student logs on.
 - e. No goals or expectations for ILS instruction are set for students.
- 10. How do you determine if these goals are accomplished?**
 - a. Conferencing with the classroom teacher, individual students, and/or administrative staff and comparing student progress with instructional plans.
 - b. Conferencing with the classroom teacher and comparing student progress with instructional plans.
 - c. Using instructional plans for each student to compare with student progress.
 - d. Using the courseware management system to branch students to higher levels of instructions as determined by the courseware.
 - e. Unsure of methods to determine accomplishment of student goals.
- 11. When planning for classroom instruction, how do you integrate or coordinate ILS instruction into classroom activities?**
 - a. ILS is used as a tool for regularly accomplishing classroom instructional objectives.
 - b. Plan lessons that integrate ILS courseware with classroom instruction in multiple subjects.
 - c. Plan lessons that integrate ILS courseware with classroom instruction in one subject.
 - d. ILS courseware supplements classroom instruction.
 - e. ILS courseware is not integrated with classroom instruction.
- 12. Does ILS integrate with district or grade level curriculum? If so, in what ways and with what courses?**
 - a. Sequence and selection of courses/lessons are adjusted to align with or support district curriculum.
 - b. ILS courseware supplements district curriculum in multiple subjects.
 - c. ILS courseware supplements district curriculum in one subject.
 - d. ILS courseware is correlated to district curriculum when possible.
 - e. ILS courseware is not integrated with district curriculum.
- 13. How many courses are integrated with ILS instruction?**
 - a. Five or more courses
 - b. Four courses
 - c. Three courses
 - d. One or two courses
 - e. No courses
- 14. How do you determine courses, level, and sequence of instruction students receive using ILS?**
 - a. Individualized learning sequences are designed and modified based on test scores, monitoring student progress, and forecasting of student learning gains.
 - b. Learning sequences are individualized for each student based on test scores or monitoring of student progress.

- c. Test scores or prior ILS performance are used to enroll students in same courses at different grade levels.
 - d. Students are enrolled in courses at grade level.
 - e. Students are enrolled at beginning level of course or strand.
- 15. How do you determine modifications to student enrollment on ILS?**
- a. Using test scores, monitoring student progress, looking at forecasts of learning gains, and conferencing with the classroom teacher.
 - b. Using test scores, monitoring student progress, and conferencing with classroom teacher.
 - c. Using test scores, prior ILS performance, and if necessary, conferencing with classroom teacher.
 - d. Based on grade level of student.
 - e. Based on beginning level of course or strand.
- 16. What students in your class receive ILS instruction? Are makeup classes provided for when students miss ILS instruction or when your class misses a scheduled lab time?**
- a. All students in the school are scheduled for regular use and makeup sessions are provided.
 - b. All students in the school are scheduled for regular use.
 - c. Some students in the school are scheduled for regular use.
 - d. Some students are scheduled for occasional, remedial or specialized use.
 - e. Students are not scheduled for either occasional or regular use.
- 17. How are students selected to receive ILS instruction?**
- a. All students in the school receive ILS instruction.
 - b. Reading or mathematics teachers select students for ILS instruction.
 - c. Students with low standardized test scores and/or grade point averages in core subjects receive ILS. Instruction.
 - d. Classroom teachers choose which students receive ILS instruction.
 - e. Individual classes are scheduled for ILS instruction and may choose/or not choose to participate.
- 18. Have rules or procedures been established for students using ILS? If so, how do students know these rules or procedures?**
- a. Orientation to rules and procedures is presented at regular intervals during school year.
 - b. Rules and procedures are established and handed out to students in printed form.
 - c. Rules and procedures are established and posted in lab or classroom.
 - d. Some rules and procedures are established by the teacher.
 - e. No rules and procedures are established.
- 19. How much time do students spend each day or week using ILS? How do you determine the amount of time students spend using ILS?**
- a. Amount of instructional time is determined by targeted gain for students.
 - b. Students receive more than 30 minutes of ILS instruction per week and makeup session are provided.
 - c. Students receive more than 30 minutes of ILS instruction per week.
 - d. Students receive at least 30 minutes of ILS instruction per week.
 - e. Students do not receive regular weekly instruction using ILS.
- 19. How do you determine the amount of time students spend using ILS?**
- a. A combination of what is required by ILS curriculum, administrative decisions, and the requests of classroom teachers
 - b. Administrative decisions and classroom teachers expectations and instructional plans for individual students
 - c. Classroom teachers expectations and instructional plans for individual students
 - d. Instructional plans for individual students and the parameters of the school's daily schedule
 - e. The parameters of the school's daily schedule and the time it affords for each student

- 20. What do you actually do while the students are using ILS?**
- Facilitate instruction, provide intervention strategies including worksheets, selected practice, tutoring, or small group instruction.
 - Facilitate the instruction of the ILS.
 - Occasionally facilitate instruction or facilitate when students request assistance.
 - Occasionally facilitate instruction when a classroom teacher requests assistance.
 - Manage the hardware/software in the lab and answer questions of students when necessary.
- 21. How do you keep students motivated about using ILS?**
- Recognize individual and group achievement through use of individual and group motivational strategies involving parents or community sponsors.
 - Recognize individual achievement through use of individual motivational strategies including certificates, wall charts, or individual competition.
 - Recognize group achievement through use of group motivational strategies including contests or team activities.
 - Explain reasons for using ILS and encourage students to actively participate in ILS instruction.
 - No motivational strategies or activities are used.
- 22. How do you use the student reports generated by ILS?**
- Reports are used to provide information for determining classroom instruction or classroom activities.
 - Reports are used to review progress and modify student enrollment.
 - Lab manager, teacher, or principal uses reports for progress review.
 - Reports are used infrequently or on a limited basis.
 - Reports are not run or distributed.
- 22. Is ILS included in your evaluation and assessment of students?**
- Evaluation or assessment of students includes mastery levels, lesson completion, or courseware content for multiple subjects.
 - Students receive a letter or numeric grade for ILS achievement in multiple subjects.
 - Students receive a letter or numeric grade for ILS achievement in one subject.
 - ILS is optional for inclusion in the evaluation or assessment of students.
 - ILS is not included in the evaluation or assessment of students.
- 23. In what ways do you use ILS for evaluation and assessment of students?**
- To determine achievement gains of students, compare with grade point averages in core subjects and provide information for the implementation of individual, school wide, and district intervention strategies; to classroom teachers about individual student performance; to parents about students' strengths and weaknesses
 - To provide information for the implementation of school wide and district intervention strategies
 - For classroom teachers of core subjects for the implementation of individual instructional plans, to document student performance, and to provide information to parents about students' strengths and weaknesses
 - To document student performance in the lab and provide information for future use of ILS
 - To file information for summative decisions about individual students by request of administrative staff, classroom teacher, or parent
- 24. What courses on the ILS are you most familiar with?**
- Familiar with course content for multiple courses, can modify instructional levels or other student enrollment information, and can use custom reports or forecasting reports to make instructional decisions.
 - Familiar with course content for multiple courses and can modify instructional levels or other student enrollment information.
 - Familiar with course content and student resources for multiple courses.
 - Familiar with course content and student resources for one course.
 - No familiarity with course content, student resources, or management system.

Figure 3.

TEACHERS USE OF AN INTEGRATED LEARNING SYSTEM QUESTIONNAIRE

© Jennifer Brown King, 2001

First, what do you teach:

Directions: This survey will be used to gather information about using CCC courseware in your school. Your answers are confidential and will be used for the purposes of improving CCC reading instruction. Your cooperation is greatly appreciated.

STUDENT TIME WITH CCC

Think of the typical student in any of your classes that is currently using CCC. Now answer the following questions by selecting the best answer.

1. What is the average amount of time that the student spends *per day* with CCC? *Circle your answer.*
 - a. It varies depending on the schedule of the student
 - b. Once a day for one class period
 - c. At least twice a day as a part of two courses
 - d. At least three times a day as a part of three courses
 - e. In every class (5) for at least 15-20 minutes as a part of each class

TEACHER INVOLVEMENT WITH CCC

2. In which of the following ways have you and the CCC lab manager worked together to use CCC for improvement in student reading? *Check all that apply.*

The CCC lab manager provides me with student generated reports that I use to . . .

- a. Track student progress in reading
 - b. Plan reading instruction for my classroom
 - c. Evaluate classroom strategies for reading instruction
 - d. File with other pieces of the students work
 - e. Assign the students a grade (as a component of their overall grade)
 - f. Communicate with the students about their strengths and weaknesses in reading
 - g. Communicate with parents about students' strengths and weaknesses in reading
 - h. Communicate with the administration about students' strengths and weaknesses in reading
 - i. Other: _____
-

3. How would you describe your involvement while your students use the CCC lab? *Check all that apply.*

While my students use CCC . . .

- a. I am rarely in the lab.
 - b. I serve as a resource to them.
 - c. I conduct small group instruction.
 - d. I conduct one-to-one tutoring.
 - e. I respond to computer/technical problems that arise.
 - f. I monitor their progress.
 - g. Other: _____
-

(Continued on next page)

INTEGRATION INTO THE CURRICULUM

4. How do *you* use CCC? *Check all that apply.*
- Remediation of basic skills included in your lesson plans
 - Practice for upcoming tests
 - To reinforce skills recently taught
 - Reading level used to help students select appropriate reading materials
 - Method for managing small group instruction (e.g., one group on CCC/second group with teacher)

CCC generated student reports as ...

- A component of your classroom grading
 - Feedback for students
 - Feedback for parents
 - Feedback for the administration
 - Other:
-
-

STAFF TRAINING

5. Did you participate in any of the following training activities? *Check all that apply.*

In-service activities for CCC...

- Uses in your classes
- Strategies and lesson planning
- Strategies for small and large group instruction

Faculty meetings about...

- Visions and goals for CCC at your school site
- Uses for CCC at your school site
- CCC strategies and lesson planning
- CCC strategies for small and large group instruction

District-wide training about...

- Visions and goals for CCC uses in the district
- CCC implementation models in the district

One-to-one training with you about...

- CCC strategies for your classroom
 - Using computer generated student reports
 - Balancing small and large group instruction
 - Other:
-
-

ADDITIONAL COMMENTS

6. Are there any additional comments that you have or observations that you would like to make? Write them in the space provided.

Figure 4

INTERMEDIATE READING ATTITUDE INDEX
Annelle Powell
College of Education
University of Georgia, Athens, GA
© Annelle Powell, 1971

Directions:

Circle "1" if the statement is true for you almost all the time.

Circle "2" if the statement is true for you much of the time.

Circle "3" if the statement is true for you about half the time.

Circle "4" if the statement is true for you some of the time.

Circle "5" if the statement is just about never true for you.

1. I read before I go to bed.....	1	2	3	4	5
2. I am a poor reader.....	1	2	3	4	5
3. I listen when other people talk about the books they like.....	1	2	3	4	5
4. Reading is my favorite subject at school.....	1	2	3	4	5
5. I read when I can do what I want to do.....	1	2	3	4	5
6. I am a good reader for my age.....	1	2	3	4	5
7. I read catalogues.....	1	2	3	4	5
8. I read aloud for other children at school.....	1	2	3	4	5
9. I read recipes.....	1	2	3	4	5
10. I read the newspaper.....	1	2	3	4	5
11. I answer questions about books I have read.....	1	2	3	4	5
12. I write poetry.....	1	2	3	4	5
13. I talk about books I have read.....	1	2	3	4	5
14. Reading makes me feel good.....	1	2	3	4	5
15. Free reading time is the best part of the school day.....	1	2	3	4	5
16. It is hard to write about a book I have read.....	1	2	3	4	5
17. I read hard books.....	1	2	3	4	5
18. I read poems.....	1	2	3	4	5
19. When I have the chance, I help make plays out of stories that I have read	1	2	3	4	5
20. I get good grades on reading tests.....	1	2	3	4	5

DRAFT

Figure 5.

TEACHER REPORT OF STUDENT READING

© Jennifer Brown King, 2001

STUDENT INFORMATION

The student _____ exited the CCC courseware for remedial instruction in reading. When he/she began CCC, their individual reading level (IRL) was _____. By exiting the CCC program, they achieved a reading level of _____ according to the CCC courseware management system. Based on these exiting criteria, answer the following questions concerning this student.

TEN QUESTIONS ABOUT THE STUDENT ABOVE

Directions: For the following items, circle (1) Disagree, (2) Unsure, (3) Agree.

1. The CCC exiting criteria for this student is correct and he/she should no longer be using CCC for remedial reading instruction.....1 2 3
2. The student's reading skills have improved.....1 2 3
3. The student is reading more books on his/her own.....1 2 3
4. The student is choosing a variety of books to read.....1 2 3
5. The student requires less help with his/her reading assignments.....1 2 3
6. The student is a more independent reader.....1 2 3
7. The student is reading at or above their grade level.....1 2 3
8. The student's reading assignments are turned in on time.....1 2 3
9. The student actively engages in silent reading during class time.....1 2 3
10. Your team has noted improvement in this student's reading skills across subjects.....1 2 3

ADDITIONAL COMMENTS

Are there any additional observations that you would like to make about the student? Please comment in the space provided below.