EVALUATION RESULTS OF THE DELAWARE CHALLENGE GRANT PROJECT

LEAD EDUCATION AGENCY: CAPITAL SCHOOL DISTRICT

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EXECUTIVE SUMMARY

In 1995, the U.S. Department of Education awarded a five-year Technology Innovation Challenge Grant (TICG) to the Capital School District in Dover, Delaware. This report details evaluation findings from the first four years of Delaware's TICG implementation. The Delaware Challenge project targets elementary school students and employs Lightspan™ educational software in the classroom on desktop computers and at home on Sony Playstations™. The primary focus of this five-year evaluation is to provide information regarding how well the project has met its primary goals:

- ☑ generating more time for learning;
- ☑ increasing parent involvement in their child's education;
- ☑ providing professional development for teachers and other school staff;
- ☑ providing equitable access to technology and the information infrastructure; and
- ☑ improving student learning.

The evaluation of the Delaware Challenge project has proceeded along three lines of activity: 1) formative evaluation to provide relevant information to the project staff; 2) impact studies to assess the impact of the initiative on students and schools as it relates to teaching and learning; and 3) implementation assessment to determine how closely the project's actual implementation matches its intended implementation. Data to measure the progress towards project goals were collected using a variety of methods including surveys, interviews, self-report usage logs, achievement tests, and classroom observation. Selected evaluation results in the areas of classroom and home usage, student and parent perceptions, staff development and perceptions, and student achievement are highlighted below.

CLASSROOM USAGE

- The Lightspan software is used most often in the classroom as an individual activity, rather than as a group or whole class activity. A common model used is that of *Centers*, where the Lightspan software is the activity at one of several Centers. The use of computer Centers ranged from individualized, instructionally focused activity, to downtime activity with little or no connection to classroom instruction.
- On average, teachers reported spending about an hour a day (or 316 minutes per week) using the Lightspan software in the classroom.
- The Internet is becoming an increasingly important part of classroom component of the Lightspan project. While the project began primarily as software available on CD-ROM, the Lightspan Network (an Internet site available to schools participating in the project) has provided teachers with a variety of Internet activities and tools. In light of this, over half of teachers (55.6%) reported they use the Internet in the classroom at least one day a week.

HOME USAGE

- Like classroom implementation, the home to school connection varied by classroom. In many classrooms, the distribution of Lightspan CDs for home use was routinized; in some classrooms, it was erratic.

- When students used the Lightspan software at home, they tended to use it for a half hour or more, most often by themselves. Over two-thirds of students indicated they *sometimes* or *always* use Lightspan at home with a grown-up (usually a parent).
- Almost three-quarters of the students surveyed said they would (sometimes or always) rather use the programs than watch TV. For three consecutive years, the evaluation has found that students who use the Lightspan programs at home with a parent prefer the software to watching TV.

STUDENT AND PARENT PERCEPTIONS

- Nearly all students said they thought the Lightspan programs were fun to use, both at school and at home. Most parents said the project had been a positive experience and the Lightspan CD-ROMs were great learning tools for their child.
- Both parents and students indicated that they view the use of Lightspan software as a leisure activity. However, most parents thought the programs were a good use of student time outside of school.
- When asked about behavioral changes they had observed since their child's involvement with the project, many parents reported the amount of time their child spent . . . 1) watching television had decreased, 2) doing schoolwork had increased, and 3) participating in family activities had increased.

PROFESSIONAL DEVELOPMENT AND STAFF PERCEPTIONS

- Most school staff reported the Lightspan programs to be user-friendly and great learning tools for the students in their class.
- Over the past four years, project-related professional development has evolved from traditional training sessions to include classroom-based, job-embedded sessions. Implementation assessment revealed that professional development efforts have not successfully penetrated classroom curricula. That is, the Lightspan software has not been as closely integrated with classroom-level curriculum as is necessary for true curricular integration and implementation. Thus, classroom-based training activities, geared towards *what to use* and *when to use* (as opposed to simply *how to use*), will be increasingly important as the project strives towards sustainability in its final year.

STUDENT ACHIEVEMENT

- As would be expected in any given academic year, first and second grade student scaled scores on both the reading and mathematics achievement tests increased significantly from the pretest to the posttest. In relation to a national reference population, first grade students on average gained 5.9 percentile points in reading and 14.0 percentile points in mathematics. Second grade students on average gained 24.0 percentile points in reading and 16.2 percentile points in mathematics, as compared to the national reference population.
- No significant correlation was found between student *home usage* of the Lightspan software and student achievement gains. It is cautioned that readers do not interpret this as meaning that home usage does not influence achievement, but rather that these data do not provide conclusive evidence of a relationship.

- A significant relationship was found between *classroom usage* of the Lightspan software and student percentile gains in reading achievement (r= .202; p<.01). However, for female students, the more time spent in the classroom on the Lightspan software, the *lesser* the mathematics scaled score achievement gain (r= -.251; p<.001); this was especially true for female students who tested below the 50th percentile in mathematics on the fall test (r= -.378; p<.01). On the other hand, a positive relationship was found between classroom usage and percentile gains in mathematics for males who tested below the 50th percentile in the fall (r= .240; p<.05).
- Students who tested in the lower two quartiles during the fall testing experienced *much higher* reading and mathematics gains than students whose fall achievement scores were above the 50th percentile. While many students who tested above the median in the fall had no or moderate change in percentile, first graders who tested above the 50th percentile in reading experienced significant percentile declines.

A SNAPSHOT OF THE DELAWARE TICG FINDINGS

The Delaware Challenge project targets elementary school students and employs Lightspan™ educational software in the classroom on desktop computers and at home on Sony Playstations™.

For two consecutive years, first and second grade students who participated in the Delaware Challenge project experienced large and significant increases in both their reading and mathematics achievement scores.

In relation to a national reference population, second grade students have experienced double-digit increases in their percentile rankings in both reading and mathematics achievement.

Upon closer examination of the achievement gains from the fall pretest to the spring posttest, students who scored below the 50th percentile in fall testing had *much* greater achievement gains than their higher scoring peers.

Relating these achievement gains to program components has been difficult due to the varying implementations of the program across classrooms and the heavy reliance on self-report usage data to make correlations. Regardless, a small yet significant correlation was found between the amount of time a teacher spends using the Lightspan software in the classroom and individual student percentile gains in reading achievement.

The full report (T99-009) provides a detailed accounting of all evaluation results for the Delaware Challenge project, as well as recommendations for continued implementation of the Delaware Challenge project across elementary schools in Delaware. Researchers at the University of Delaware Education Research and Development Center (R&D Center) are available to answer questions regarding analyses presented in this report or to assist in their interpretation. R&D Center staff may be contacted via electronic mail at ud-rdc@udel.edu or by phone at (302) 831-4433.

INTRODUCTION

In the 1995-1996 school year, the University of Delaware Education Research & Development Center accepted a contract to conduct a statewide evaluation of the recently awarded Delaware Challenge Grant. This project and its attendant evaluation are funded through the U.S. Department of Education's Technology Innovation Challenge Grant program. The Delaware Challenge project targets elementary school students and employs Lightspan educational software in the classroom on desktop computers and at home on Sony Playstations. The purpose of the evaluation is to provide relevant information regarding the project implementation and its impact on student learning for both project improvement and accountability purposes.

In the Challenge Grant application submitted through Delaware's Capital School District in 1995, the goals of the project included the following:

- To generate more time for learning;
- To increase parent involvement in their child's education;
- To provide professional development for teachers and other school staff; and
- To provide equitable access to technology and the information infrastructure.

In addition, an overarching goal of the project is

- To improve student learning.

Therefore, the primary focus of this evaluation is to provide information regarding how well the Delaware Challenge project has met these five goals.

The evaluation of the Delaware Challenge Grant has proceeded along three lines of activity:

1) formative evaluation to provide relevant information to the project directors;
2) impact studies to assess the impact of the initiative on students and schools as it relates to teaching and learning; and
3) implementation assessment to determine how closely the project's actual implementation matches its intended implementation.

In the fall of 1998, twenty public elementary schools and one parochial elementary school were participating in the Delaware Challenge project. The schools spanned fifteen school districts (including at least one elementary school from every school district in the state that has an elementary school) and the Catholic Diocese of Wilmington. Figure 1 provides a listing of the participating elementary schools and their associated school districts.

SCHOOL	DISTRICT	SCHOOL	DISTRICT
Booker T. Washington	Capital	Richey	Red Clay
Brookside	Christina	Seaford Central	Seaford
Christ Our King	Catholic Diocese	Silver Lake	Appoquinimink
Dunbar	Laurel	Simpson	Caesar Rodney
East Dover	Capital	Smyrna	Smyrna
Fairview	Capital	South	Lake Forest
Frankford	Indian River	South Dover	Capital
H.O. Brittingham	Cape Henlopen	Towne Point	Capital
Hartly	Capital	Wilmington Manor	Colonial
Lulu Ross	Milford	Woodbridge	Woodbridge
Maple Lane	Brandywine		

Figure 1: Participating Schools

Five of these schools have been participating in the Delaware Challenge project for three and a half years, five for three years, six for two years, and five for one year. In addition five of these schools were selected as *target* evaluation schools, in which a more detailed evaluation of the implementation and outcomes would be administered. The target evaluation will be discussed in more detail in the following section.

METHODOLOGY

INTRODUCTION

The evaluation of the Delaware Challenge Grant began during the 1995-1996 school year with the collection of usage and perception data. Each year, the evaluation has been refined to further inform the theories underlying the project. Student achievement was measured for the first time in the 1997-1998 school year. This past school year (1998-1999), the Delaware Education Research & Development Center evaluated four aspects of the Delaware Challenge project:

- professional development provided to school staff;
- home and classroom usage of the Lightspan software;
- perceptions of students, parents, and school staff regarding the project; and
- student achievement in reading and mathematics.

Theory-based evaluation methods were used to determine what data elements to collect and elements of the Concerns-Based Adoption Model were used to analyze how these four measured aspects related to project implementation. While all project schools participated to some extent in the evaluation, five target schools were chosen for a more in-depth evaluation. All schools provided classroom usage information and

participated in end-of-year surveys. Target school classrooms also provided home usage data and participated in fall and spring achievement testing; these additional data were intended to provide linkages between home usage of the software, classroom usage of the software, and student learning in mathematics and reading.

THEORY-BASED EVALUATION

All projects are based on theories, although often unstated, of how and why they should "work" (Weiss, 1995). *Theory-based evaluation* provides a useful framework for formalizing the logic of the theories underlying a project and in guiding the determination of measurement points during the evaluation (Aronson, Mutchler, & Pan, 1998). Examining the theories on which a project is based aids in determining what evaluation data should be collected as well as when during the project lifecycle the data should be collected. However, evaluative data cannot be interpreted in isolation without also examining how the project was implemented. For example, if an evaluation reveals that student outcomes did not improve, it would be incorrect to automatically assume that the theories underlying the project should be rejected. Rather, the project's implementation should be examined to determine if the implementation was congruent with the hypothesized theories underlying the project. On the other hand, if student outcomes did improve, it is equally as important to postpone acceptance of the underlying theories until sufficient implementation has been verified.

The overarching goal of Delaware's Challenge Grant is to increase student learning. Theory-based evaluation methods were used to document why project staff believe this intervention will result in an increase in learning and to specify what data must be collected during the evaluation lifecycle to determine if intervention results support these theories. The critical theories behind this project are that through extending the learning day as well as through increased parent involvement in education, student learning will improve. Although, there are other theories project staff believe may aid in reaching their ultimate goal, such as improving teaching strategies and making learning fun through technology. With these theories in mind, data elements were identified that will aid in determining if the theories are acceptable.

Early Results	Intermediate Results	Long-Term Results
➢ Use of Lightspan software at home ➢ Use of Lightspan software in the classroom ➢ More time spent on educational activities at home	➢ Improved student attitudes towards learning ➢ Increased parent involvement with their child's education	➢ Improved educational achievement of students (better test scores)

Figure 2: Theory-Based Evaluation Outcome Grid

Based on these theories, classroom usage and student home usage of the software were collected (the hypothesis supposes that student learning time will increase prior to seeing an increase in achievement). Also collected was the amount of time the parent spends with the student at home on the software (the hypothesis presumes parent involvement will increase prior to seeing an increase in achievement).

While it was not measured this year, next year's evaluation (1999-2000) plans to measure changes in student attitudes towards learning (the hypothesis being that student attitudes towards learning will improve prior to seeing an increase in achievement). And, of course, student achievement is and will continue to be measured to determine if the ultimate goal of the project has been achieved. Figure 2 shows an abbreviated theory-based outcome grid for the Delaware Challenge project.

CONCERNS-BASED ADOPTION MODEL

In order to determine if the previously described home-school connection theory is an effective long-term strategy for improving student learning, it is necessary to first understand how the connection works as well as why the connection works, i.e. it is important to understand the implementation of the project. An effective model for examining the implementation of a project is the Concerns-Based Adoption Model (CBAM), a process-oriented approach that examines individual reactions to change (Hord, Rutherford, Huling-Austin, & Hall, 1998).

While CBAM includes several useful frameworks for examining a project and its attendant evaluation (e.g., Innovation Configurations and Stages of Concern), the concept of Levels of Use is particularly useful in aiding evaluators during outcome data interpretation. Research has shown again and again that even years after projects have been introduced into a school, there are people who do not use the intervention at all. As a result, new innovations are often discarded because the project did not produce the expected outcomes (Hord et al., 1998). Levels of Use (LoU) analyses can help evaluators measure implementation by describing the behaviors of project participants through various stages.

As a general rule, approximately 70% of first-year project participants will be at the Mechanical LoU, characterized by day-to-day use with little to no reflection. At least 20% of second and third-year project participants may still be Nonusers, either because they never used the project or because they used the project and decided, for whatever reason, that it was not appropriate for or applicable to them (Hord et al., 1998). Levels of Use analysis was used in this evaluation to examine how the project was implemented in the classroom. In addition. LoU was used to relate implementation factors to the collected outcome data, in an effort to provide evidence either supporting or discrediting the underlying project theories. A series of classroom observations and interviews with teachers and parents were conducted to determine the extent of and variability within Levels of Use.

Figure 3 lists the eight identified Levels of Use.

Level of Use		Description
Level 0	Non-Use	Little or no knowledge of the project, no involvement with the project, and does nothing toward becoming involved.
Level 1	Orientation	Acquires information about the project and explores what it will require.
Level 2	Preparation	Prepares for first use of the project.
Level 3	Mechanical Use	Focuses on day-to-day use of the project with little time for reflection.
Level 4A	Routine	Use of the project stabilizes.
Level 4B	Refinement	Varies implementation to increase classroom impact.
Level 5	Integration	Collaborates with colleagues to achieve a collective impact.
Level 6	Renewal	Explores alternatives to or major modifications to the project

Figure 3: Levels of Use

PROFESSIONAL DEVELOPMENT, CLASSROOM USAGE, AND PERCEPTIONS

A professional development survey was administered to school staff who had participated in training activities related to the project. A total of 45 school staff members completed professional development surveys over the course of the school year. Elements measured via the professional development survey are included in Appendix A.

Data regarding the usage of Lightspan software in the classroom were collected from classroom teachers weekly via a form on the World Wide Web. During the 1998-1999 school year, approximately 125 teachers completed over 1850 weekly logs. The classroom log gathered information on what programs were used, who was using them, how often they were used, and how they were used. An example of the classroom log is provided in Appendix A.

The perceptions of students, parents, and school staff were assessed through surveys, telephone interviews, and face-to-face interviews. Students were administered a ten-item survey during May of the school year. Over 1,700 students completed this survey. Also, during the summer, approximately 130 telephone interviews were conducted

with parents whose children had participated in the home component of the Delaware Challenge project.

School staff were administered an end-of-year survey and also participated in face-to-face or telephone interviews. Over two hundred school staff completed the perception survey. Staff from many participating schools were also interviewed to determine project satisfaction, perceptions, and experiences. The student survey, parent interview protocol, staff survey, and staff interview protocol are provided in Appendix A.

TARGET SCHOOL EVALUATION

As stated previously, this year's evaluation centered largely on five target schools, purposefully chosen because of their involvement and success with the program (in addition to other factors, such as geographic location and student population). Target school data were used to examine linkages between achievement and usage data sources. Specifically, the relationship between classroom and home usage of the software and gains in student learning was examined.

Home usage data were collected from parents of target school students via weekly usage logs. Over 16,400 weekly logs were collected from the first and second graders who attended the five target schools. The home usage log gathered information regarding the length of use of the Lightspan software and who was using the software. An example of the home usage log is provided in Appendix A.

Reading and mathematics fall (pretest) and spring (posttest) achievement tests were administered to target school students participating in the program in first and second grades. First-graders were given the Stanford Early School Achievement Test (SESAT) in the fall and the Stanford Achievement Test Version 9 (SAT9) open-ended format in the spring. Harcourt-Brace assures test equivalence between the SESAT and SAT9. Second-graders were given the SAT9 open-ended format in both the fall and spring. Over 750 first graders and more than 250 second graders participated in fall and spring achievement testing.

IMPLEMENTATION EVALUATION

Finally, the implementation of the Delaware Challenge project was evaluated to determine, to the extent possible, whether the outcomes measured were indeed attributable to the project's implementation. As mentioned previously, CBAM's Levels of Use framework was used in conjunction with impact data to interpret outcomes in light of the underlying project theories.

The focus of the implementation study was to further examine factors that contributed to the findings from last year's evaluation report, using data from the current year's evaluation of target schools. The home-school connection was studied to learn more about *how* the connection works and what factors might have accounted for the promising results found last year in the areas of student behavior and student achievement. The implementation study addressed the following research topics:

1. Classroom Component – Teacher Usage

   How are the Lightspan materials used in the classroom? Are the Lightspan materials integrated with other classroom lessons? For what purposes?

2. Classroom Component – Home Connection

   How do teachers manage the home-school connection? How often are Lightspan materials sent home with students? How do the materials sent home relate to classroom curriculum?

3. Home Component – Student Usage

   How do students use the Lightspan materials at home? How does the Lightspan software relate to other student homework activities? How often do students work on the Lightspan software for leisure versus for homework? Who do students like to work with and who do students usually work with when the use the software at home?

4. Home Component – Parent Role

   What is the role of the parent in working with students at home on Lightspan materials? How comfortable are parents with helping their children on program-related activities? What is the parent's relationship with the school?

The home-school connection in six Challenge Grant classrooms across two schools was studied. These two schools had been participants in the project for at least two academic years (i.e., since at least the 1997-1998 school year) and had both first and second grade implementations. The first school was chosen because it had moderate involvement with the program. The second school was chosen because it had been highly involved with the program and had demonstrated an exemplary understanding of the model. Two second-grade classrooms were studied at the first school and four were studied at the second school. Teachers in the six classrooms participated in a detailed interview examining how the Lightspan materials were used in and integrated with regular classroom instruction, as well as how the school to home connection was managed in the classroom.

The six classrooms were also observed periodically over a four-week period to further study the integration and utilization of Lightspan with in-classroom and out-of-classroom activities. Variation in implementation among these six teachers was examined through interview data and observation. These six classrooms involved approximately 150 students; discussions were held with several students from these classrooms to gain a better understanding about how they used the Lightspan materials at home, how their home use related to classroom activities, and how much they liked the software. Finally, selected parents of the students in these classrooms were interviewed about how often students came home with Lightspan software, their comfort level with helping their child with program-related activities, their involvement with student homework, and their relationship with the school. The parent and student interview data, as well as the written and verbal usage records, are used herein

to illuminate the home-school connection and the home usage-achievement linkage. Cross-case analysis was conducted to examine the implementation variation among classrooms and homes, the program components that worked well, as well as any barriers to effective use.

Results from each aspect of the evaluation are discussed in the following section. Other analyses can be generated upon request. The Delaware Challenge project evaluation plan is included in Appendix B.

RESULTS PART 1: OVERALL

The results detailed in this section are presented along several lines: (a) professional development provided to school staff; (b) classroom and home usage of the Lightspan software; (c) perceptions of students, parents, and school staff regarding the project; and (d) reading and mathematics student achievement.

PROFESSIONAL DEVELOPMENT

Professional Development Overview. Over the course of the project, professional development has evolved from traditional training sessions to small group and classroom-based professional development. Most professional development in the first two years of the project was traditional in that it was conducted during in-service days or after-school and focused on how to use the software in the classroom.

In previous years, evaluation findings raised the concern over the time it took to learn and use the software in the classroom. Because traditional professional development time that is built in to the school year is viewed by schools and districts as a very precious resource and has been increasingly "hands-off" to activities not considered integral to the district's core curriculum, the project has been faced with providing professional development in non-traditional ways. Efforts to provide professional development outside of regularly scheduled in-service days were also met with varying resistance due to the limited number of substitutes available and the hesitance of teachers to be out of their classroom and away from the students. Hence, in the third and fourth years of the project, professional development became a little less traditional and a little more focused on specific teacher needs. In order to facilitate this classroom-focused training model, teacher trainers were available to demonstrate or help teachers during the day in the teacher's classroom with classroom use of the software.

Professional Development Conference. A two-day conference for all Delaware Challenge teachers was held at the start of the 1998-1999 school year. This conference focused on the integration of Lightspan software with Delaware's content standards. A secondary purpose of this conference was to facilitate networking and sharing among project teachers. Following the conference, participants were asked to complete a professional development survey. Nearly all participants (97.8%) reported

that the training facilitator was well organized and knowledgeable. Most participants (92.9%) also said they were satisfied with the conference. All respondents (100%) who had an opinion about the conference said they would like to learn more about what was introduced during the various sessions.

When examining this professional development activity for the presence or absence of the eight critical elements of high quality professional development (see Table 1), the results were quite positive. The professional development was the strongest in the areas of *incorporates reflection*, *active engagement*, and *client-focused*. The elements of high quality professional development are detailed in Appendix D, as is a full accounting of the professional development instrument results.

Almost all respondents (97.7%) said they would be able to reflect upon the activity and generate connections to their own work. Most respondents (88.9%) reported that the activity provided active engagement for all participants. Many respondents (97.7%) also said the learning climate of the conference was collaborative. While no areas were identified as particularly weak, nearly half of participants (45.5%) reported having no input into the planning of this professional development activity.

When asked to suggest recommendations to the developers of this professional development activity, in the interest of improving it, several respondents mentioned the problem of not having enough time to explore and apply what was learned during the conference. However, participants did say they were pleased with the hands-on activities provided at the conference. Finally, several teachers commented that the session held by the Delaware Department of Education relating the software to Delaware's content standards was weak and poorly organized. This is disappointing considering a main focus of the conference was to highlight the link between the Lightspan software and Delaware's content standards. Yet, it has become quite clear over the past year that what is perhaps most important to encouraging appropriate use of the Lightspan software is the integration of the Lightspan software with school curriculum (which ideally has already been linked to Delaware's content standards as well as any districtwide curricular standards).

Professional Development Model. As mentioned above, the professional development model employed during the past two years of the Delaware Challenge project relied primarily on job-embedded activities. In particular, during the 1998-1999 school year, the project employed two full-time teacher trainers to work with classroom staff on the integration of Lightspan materials into the classroom curriculum. In addition, Lightspan had a teacher trainer available for consulting with teachers regarding classroom integration and school implementation. While all schools were offered ongoing professional development, not all schools took advantage of this training. Thus, the extent of professional development varied by school and classroom. This became evident during the implementation study when several of the classrooms observed had received a fair amount of professional development, while several others had little to no training and little to no knowledge of the applicability of the Lightspan software to the lessons they used in the classroom.

Table 1: Results of Professional Development Survey (N=45)

Scale	Number of Items	Mean Scaled Score	Mean Scaled Score as a % of Total Score
Appropriate Content	8	26.03	81.3%
On-Going & Sustained	5	16.25	81.3%
Active Engagement	6	20.28	84.5%
Collegial	8	26.85	83.9%
Job-Embedded	4	13.36	83.5%
Systemic Perspective	6	20.13	83.9%
Client Focused	5	16.87	84.4%
Incorporates Reflection	5	17.14	85.7%

General Comments	Strongly Disagree	Disagree	Agree	Strongly Agree	Not Appli-cable
The speaker/facilitator(s) of this professional development activity were well organized.	2.2%	0	22.2%	75.6%	0
I saw the speaker/facilitator(s) of this professional development activity as knowledgeable.	2.3%	0	27.3%	70.5%	0
I would describe the speaker/ facilitator(s) as effective.	2.2%	2.2%	26.7%	66.7%	2.2%
I would like to learn more about the topic(s) introduced at this activity.	0	0	25%	62.5%	12.5%
Overall, I am satisfied with this professional development activity.	2.4%	4.8%	26.2%	66.7%	0

Towards the end of year four, special small group training sessions were held with cohorts of teachers from the several schools. These sessions focused on how to organize the Lightspan materials and align them with school and classroom curriculum. Critical to the success of these sessions were that experts in the Lightspan software participated in and lead the discussion, as they had the background to identify appropriate CDs for certain topics and concepts. This training activity also focused on "what to use" and "when to use," as opposed to simply "how to use." This type of intensive, school and classroom focused training will be increasingly important as the project strives towards sustainability in its final year.

PROGRAM USAGE – CLASSROOM

Teachers were asked to complete weekly logs (submitted via a form on the World Wide Web) indicating how often they used the Lightspan software. During the school year, approximately 125 teachers completed over 1850 weekly logs. Analysis of the classroom logs found that teachers spent on average about an hour a day (or 316 minutes per week) using the Lightspan software in the classroom.

Over half (57.8%) of the teachers used the software as part of a small group activity at least once a week. Similarly, about half (58.1%) had students work individually on the computer at least once a week. This is a marked change from how the software was used last year, when less than half used the software as part of a small group activity (note: there was an increase of 12.3% of teachers reporting use of the software with small groups of students). However, like last year, over one-quarter (27.1%) of the teachers had students work individually with the software *five* days a week. Less than one-third (29.9%) used the software with the whole class at least once a week. As was found last year, Mars Moose and Googal were reported as being the two CD-ROMs most often used in the classroom. Table 2 details the classroom software utilization by instructional approach.

Table 2: Utilization by Instructional Approach (N=1,833)

Number of Days Used Per Week	Type of Instructional Approach Utilized (Percent Utilization)			
	Whole Class Activity	Small Group Activity	Individual Activity	Internet Use
No Days	70.1%	42.2%	41.9%	44.4%
One Day	18.3%	8.6%	5.1%	12.4%
Two Days	3.8%	6.9%	5.8%	7.9%
Three Days	2.3%	10.5%	8.2%	7.0%
Four Days	1.1%	10.9%	12.0%	8.2%
Five Days	4.4%	20.9%	27.1%	20.1%

The Internet is becoming an increasingly important part of the Lightspan project. While the project began primarily as software available on CD-ROM, the Lightspan Network (an Internet site available to schools participating in the project) has provided teachers with a variety of Internet activities and tools. Teachers can use the Lightspan Network to compete and collaborate on educational activities with classrooms across the country. In addition, the Lightspan Network can be used to write letters to characters introduced through the Lightspan CD-ROMs or to access on-line encyclopedias. In light of this, over half of teachers (55.6%) reported that they use the Internet in the classroom at least one day a week; one-fifth (20.1%) said they use the Internet five days a week.

PROGRAM USAGE – HOME

Parents of target school students were asked to complete logs indicating how often their child uses the Lightspan software at home. These logs were completed weekly and returned to the classroom teacher. Over 16,400 monthly logs were collected from the first and second graders who attended the five target schools.

Home usage logs indicated that students use the Lightspan software at home most often by themselves. In fact, over half (56.0%) of the occasions when students use the software at home, they are using it by themselves. Approximately one-quarter (28.1%) of the time they use the software, they are using it with other children (either a sibling or friend). Less than one-fifth (14.3%) of the time students use the software with their parents (see Table 3).

Table 3: Persons Utilizing the Lightspan Software in the Home (N=16,482)

Person(s) Using Software with Child	Percent of Occasions Using Software
Child	56.0%
Brother or Sister	23.8%
Parent(s)	14.3%
Friend	4.3
Other	1.6%

When students use the Playstation at home, they use it most often (65.7% of the time) for a half hour or more. Approximately one-third (35.3%)of the time they use it for less than 30 minutes. Nearly all of the time (90.9%) students use their Playstation, they are using Lightspan software. However, approximately 10% of the time they are using it with other software or games that they have either rented or bought. Usage did not differ much by the day of the week, however students did use the software slightly

more on Fridays than other days. This is most likely because most teachers distributed new disks to the students on Fridays.

PERCEPTIONS – STUDENTS

At the end of the academic year, students were asked to complete a survey indicating their attitudes towards computers and the Lightspan programs. Approximately 1,700 students completed this survey. Tables 4 and 5 include the results from the student survey.

Table 4: Results of Student Survey (N=1,706)

ITEM	RESPONSES			
	Yes	Some-Times	No	**Mean (Sd)**
Using the computer is scary.	3.1% (53)	8.4% (143)	88.5% (1510)	2.85 (.43)
The programs are fun to use.	76.5% (1302)	18.5% (315)	5.0% (85)	1.28 (.55)
I like having the programs at home to use.	70.3% (1134)	18.2% (293)	11.5% (185)	1.41 (.68)
At home, I would rather use these programs than watch TV.	34.7% (566)	39.8% (649)	25.5% (415)	1.90 (.77)
These programs are too hard for me to do.	6.9% (117)	24.5% (412)	68.6% (1155)	2.61 (.61)
I like it when my teacher shows the programs to the class.	77.3% (1280)	13.2% (219)	9.5% (157)	1.32 (.63)
I like it when I get to use the programs at school.	75.4% (1262)	17.1% (287)	7.5% (125)	1.32 (.60)
When I use the computer at school, I work with a buddy or two.	36.8% (623)	39.1% (662)	24.1% (409)	1.87 (.77)
I get to help choose what we work on with the computer.	30.6% (514)	35.2% (591)	34.3% (576)	2.03 (.80)
At home, a grown-up and I work together on the computer.	38.8% (641)	29.7% (490)	31.5% (520)	1.92 (.83)

IF YES, WHO:	NUMBER	PERCENT
☑ Mother	427	40.1%
☑ Both Parents	270	25.4%
☑ Father	158	14.9%
☑ Sibling(s)	103	9.7%
☑ Grandparent	17	1.6%
☑ Other	88	8.3%

Very few students (3.1%) thought computers were scary. Most students (95.0%) reported that the programs were fun to use. Nearly all students (92.5%) also reported that they like to use the programs at school at least sometimes. Similarly, many (88.5%) like having the programs to use at home. Over two-thirds of students (68.5%) indicated that they always or sometimes work on the computer at home with a grown-up. Most of these students (80.4%) said the grown-up they work with is a parent.

TABLE 5: CROSS-TABULATION OF STUDENT RESPONSES (N=1,609)

		At home, I would rather use these programs than watch TV.		
		Yes	Sometimes	No
At home, a grown-up and I work together on the computer.	Yes	17.2%	13.9%	8.0%
	Sometimes	8.6%	15.5%	6.0%
	No	8.6%	10.8%	11.4%

Nearly three-quarters (74.5%) of the students surveyed said they would (sometimes or always) rather use the programs than watch TV. About one-quarter (25.5%) indicated that they would rather watch TV than use the Lightspan programs. Of those who said they would rather use Lightspan programs, most (75.0%) reported that they work with a grown-up on the computer at least sometimes. Of those who said they would rather watch TV, nearly half (44.9%) said they did not work with a grown-up at home on the computer. A similar relationship between working at home with a parent and a preference for using the educational program over watching TV has been found consistently throughout the evaluation, i.e., three consecutive years. Clearly there is a connection between parent involvement and how a child chooses to spend his or her time at home.

PERCEPTIONS – PARENTS

Parents were asked whether they would be willing to participate in a 10-minute phone interview regarding the Delaware Challenge project. In late spring, approximately 130 telephone interviews were conducted with parents. Table 6 presents the results from this survey.

Most parents (91.6%) said the project had been a positive experience for their child, and many (88.4%) thought the Lightspan CD-ROMs were great learning tools for children. Many also agreed (85.3%) that the Lightspan software helped their child learn new things. However, about one-third of parents (32.6%) said that the software was too easy for their child, while only a few (10.1%) thought the software was too difficult. The percentage of parents who thought the software was too easy is slightly higher than last year (28.3%), yet still considerably lower than two years ago (55%).

Table 6: Results of Telephone Interviews with Parents (N=135)

ITEM	PERCENT RESPONDING				
	Less Than 1 Week	Between 1-3 Weeks	Between 4-6 Weeks	Between 7-10 Weeks	More Than 10 Weeks
Approximately how long did your son or daughter have possession of the Sony Playstation?	0.0%	0.8%	0.0%	1.5%	97.7%
	Always	Most of the Time	About Half of the Time	Seldom	Never
How frequently did your child work independently using the Lightspan CDs?	26.9%	48.5%	18.5%	4.6%	1.5%
How frequently did your child work with you (or other adults in your household) using the Lightspan CDs?	5.4%	6.2%	34.6%	45.4%	8.5%
	Increased		Stayed the Same		Decreased
Has the amount of time that your child spends watching television or videos increased, stayed about the same, or decreased since involvement with this project?	3.1%		58.9%		38.0%
Has the amount of time that your child spends doing schoolwork increased, stayed about the same, or decreased since involvement with this project?	27.9%		69.0%		21.7%
Has the amount of time that your child spends having playtime increased, stayed about the same, or decreased since involvement with this project?	13.2%		65.1%		21.7%
Has the amount of time that your child spends participating in activities with the family increased, stayed about the same, or decreased since involvement with this project?	16.3%		81.4%		2.3%

Table 6: Results of Telephone Interviews with Parents (continued)

ITEM	PERCENT RESPONDING				
	Yes		No		
Did you attend a parent training session at your child's school prior to receiving the Sony Playstation?	73.1%		26.9%		
Did any other adults in your household attend a parent training session at your child's school prior to receiving the Sony Playstation?	28.9%		71.1%		
	Father	Mother	Grand-parent	Aunt or Uncle	Brother or Sister
If "yes," could you tell me the relationship of this (these) adult(s) to the child?	59.5%	35.7%	2.4%	2.4%	0.0%
	Strongly Disagree	Disagree	Agree	Strongly Agree	Don't Know
The training session I attended was informative.	2.3%	3.9%	15.6%	55.5%	22.7%
I received information on how to get additional help if problems developed.	2.3%	6.2%	11.5%	73.8%	6.2%
Any problems I experienced related to this project were resolved in a timely manner.	1.5%	1.5%	8.5%	56.2%	32.3%
At the end of the training session, I felt confident that I could set-up and use the equipment in my home.	2.3%	1.5%	9.2%	60.8%	26.2%
The equipment was difficult for me to set-up at home.	79.2%	6.2%	5.4%	1.5%	7.7%
The Lightspan CDs are great learning tools for my child.	3.1%	6.9%	14.6%	73.8%	1.5%
The Lightspan CDs are too easy for my child.	26.4%	39.5%	25.6%	7.0%	1.6%
The Lightspan CDs help my child to learn new things.	3.9%	10.1%	26.4%	58.9%	0.8%
My child enjoys using the Lightspan CDs.	2.3%	7.0%	16.3%	74.4%	0.0%
The Lightspan CDs are too difficult for my child.	72.9%	17.1%	9.3%	0.8%	0.0%
My child usually works independently using the Lightspan CDs.	3.1%	5.4%	32.6%	58.9%	0.0%
My child and I use the Lightspan CDs together.	6.2%	31.8%	39.5%	22.5%	0.0%
This project has been a positive experience for my child.	2.3%	5.4%	13.1%	78.5%	0.8%

According to the parents interviewed, most children (91.5%) tended to use the Lightspan software at home independently. Last year's evaluation also reported parents as saying their child usually used the Lightspan software at home by themsevles. Although, many parents (62.0%) also reported that they *have* used the Lightspan CDs together with their child. When asked how frequently they used the Lightspan CDs together with their child, over half of parents (53.9%) responded "seldom" or "never." In fact, most parents (75.4%) said their child worked independently with the Lightspan CDs "always" or "most of the time."

When asked about behavioral changes they had observed in their child since involvement with the project, parents reported that the amount of time their child spends watching television either stayed the same (58.9%) or decreased (38.0%). On the other hand, parents said the amount of time their child spends doing schoolwork has either stayed the same (69.0%) or increased (27.9%). Several parents (16.3%) also said the amount of time their child spends participating in family activities has increased since involvement with the project.

Almost three-quarters of the parents (73.1%) interviewed attended a training session for this project. Most of these parents found the training session to be informative (71.1%) and were confident they could effectively set-up and use the equipment at home after the training session (70.0%). In fact, the majority of the parents (85.4%) did not have difficulty setting-up the equipment at home and most (85.3%) received information at the training session on how to get additional help if problems developed. Only a few parents (3.0%) said the problems they experienced related to the project were not resolved in a timely manner.

PERCEPTIONS – SCHOOL STAFF

School staff who participated in the project were asked to complete a written survey indicating their perceptions of the project. Table 7 details the survey results based on over two hundred school staff responses. Findings from this year's staff survey were similar to those of last year. For instance, nearly all staff (85.7%) stated that they felt comfortable using computers and most (95.6%) reported that their students enjoyed using the computer programs.

Last year, staff responses regarding usefulness and ease of use of the computer programs as well as the implementation of the project were mixed. This year, school staff were much more positive about the software and the implementation, with most staff saying the programs were user-friendly (85.9%) as well as great learning tools for their class (82.4%). Further, well over three-quarters of the respondents indicated that the computer programs helped their students to learn new things (86.4%), were easy for the children to use (89.8%), and age-appropriate for their class (89.7%).

Two years ago, over two-thirds of respondents said project-related problems were not resolved in a timely manner. Last year the percentage of staff whose problems were

Table 7: Results of School Staff Survey (N=205)

ITEM	RESPONSES				
	Strongly Agree	Agree	Disagree	Strongly Disagree	MEAN (Sd)
The training session I attended was informative.	**33.5% (62)**	**56.8% (105)**	**6.5% (12)**	**3.2% (6)**	**1.79 (.70)**
I received information on how to get additional help if problems developed.	**39.1% (77)**	**45.2% (89)**	**12.7% (25)**	**3.0% (6)**	**1.79 (.77)**
Any problems I experienced were resolved in a timely manner.	**33.0% (62)**	**51.6% (97)**	**11.7% (22)**	**3.7% (7)**	**1.86 (.76)**
At the end of the training session, I felt confident that I could set-up and use the equipment.	**36.2% (68)**	**39.9% (75)**	**19.1% (36)**	**4.8% (9)**	**1.92 (.86)**
The equipment was difficult for me to set-up.	**4.2% (8)**	**12.5% (24)**	**39.1% (75)**	**44.3% (85)**	**3.23 (.82)**
I feel comfortable using computers.	**43.3% (88)**	**42.4% (86)**	**13.3% (27)**	**1.0% (2)**	**1.71 (.72)**
The programs are user-friendly.	**40.2% (80)**	**45.7% (91)**	**11.1% (22)**	**3.0% (6)**	**1.76 (.76)**
The programs are easy for the children to use.	**42.0% (86)**	**47.8% (98)**	**9.3% (19)**	**1.0% (2)**	**1.69 (.67)**
The children enjoy using the computer programs.	**63.9% (131)**	**31.7% (65)**	**4.4% (9)**	**0.0% (0)**	**1.40 (.57)**
The programs help the children to learn new things.	**49.8% (102)**	**36.6% (75)**	**12.7% (26)**	**1.0% (2)**	**1.64 (.73)**
These programs are great learning tools for my class.	**50.7% (104)**	**31.7% (65)**	**16.6% (34)**	**1.0% (2)**	**1.67 (.78)**
The programs are age-appropriate for my class.	**46.8% (96)**	**42.9% (88)**	**9.3% (19)**	**1.0% (2)**	**1.64 (.68)**
This program has been a positive experience for me.	**46.3% (95)**	**35.6% (73)**	**16.6% (34)**	**1.5% (3)**	**1.73 (.78)**
This program was implemented very smoothly.	**34.5% (70)**	**36.5% (74)**	**21.2% (43)**	**7.9% (16)**	**2.02 (.93)**

not resolved in a timely manner had decreased to less than half. This year, the percentage further decreased, with less than one-fifth (15.4%) of respondents reporting that problems were not resolved in a timely manner. However, even with this improvement, over one-quarter of respondents (29.1%) still thought the program was not implemented very smoothly and some (18.1%) said the program had not been a positive experience for them. It is important to note though that over three-quarters of school staff (81.9%) said the program had been a positive experience.

STUDENT ACHIEVEMENT

Reading and mathematics achievement tests were administered to students in the first and second grades who participated in the target school program. A pretest was given to students in early fall 1997 and a posttest was administered in late spring 1998. Over 300 first-graders *at four schools across twenty classrooms* and approximately 250 second-graders *at three schools across fourteen classrooms* participated in the achievement testing. Students with missing or incomplete data were excluded from the analyses.

The following sections provide scaled scores, percentile ranks, and stanines. Scaled scores are raw scores that have been converted to make scores in a given content area comparable from form to form and level to level. Percentile ranks range from a low of 1 to a high of 99 and indicate the percentage of the reference group obtaining scores equal to or less than that score. The reference group is a national sample of students at the same grade taking the test at a comparable time of the year. A percentile rank of 50 denotes average performance. Stanines are derived from percentile ranks and also indicate a student's relative standing in a reference group. Stanines are normalized, standard scores that range from a low of 1 to a high of 9. A stanine of 5 denotes average performance. An assumption made in these analyses is that while a student's scaled scores should significantly increase in any given school year, a student's standing in relation to the reference group should not significantly change between the fall and the spring.

First Grade Achievement. Table 8 provides the mean scaled score, percentile rank, and stanine by semester for first grade reading and mathematics achievement. As would be expected in any given academic year, student scaled scores on both the reading and mathematics achievement tests increased significantly from the pretest to the posttest. Because no local comparison group was available, the analysis of the gains in student achievement over the school year is based primarily on norm-referenced scores. Unlike scaled scores, one would not necessarily expect significant gains in norm-referenced scores over the course of the school year.

An analysis of stanines revealed that there were significant achievement gains in reading ($p < .003$) and mathematics ($p < .001$). First grade students on average gained 5.9 percentile points in reading and 14.0 percentile points in mathematics. Further, both females and males showed significant stanine gains in mathematics, but not in reading. On average, female students' mathematics scores increased 14.4 percentile points in relation to the reference group. Males showed an average gain of 12.5

percentile points in mathematics. Table 9 shows the mean first grade reading and mathematics achievement scores by gender.

Table 8: Mean First Grade Reading and Mathematics Achievement Scores

	Reading				Mathematics			
	Fall 1997	Spring 1998	Fall 1998	Spring 1999	Fall 1997	Spring 1998	Fall 1998	Spring 1999
Scaled Score	466.8	524.5	471.7	529.7	488.1	561.9	489.1	567.3
Percentile Rank	55.2	50.67	47.6	53.5	49.5	54.6	44.2	58.1
Stanine	5.34	4.94	4.87	5.16	4.97	5.30	4.65	5.57

Table 9: Mean First Grade Reading and Math Achievement Scores by Gender

	Female				Male			
	Reading Fall	Reading Spring	Math Fall	Math Spring	Reading Fall	Reading Spring	Math Fall	Math Spring
Scaled Score	480.5	536.4	492.6	569.0	463.9	523.6	487.2	565.3
Percentile Rank	53.2	57.8	47.1	61.6	42.8	49.1	42.2	54.7
Stanine	5.24	5.49	4.88	5.78	4.55	4.85	4.53	5.34

The achievement results of individual schools were mixed. Only one first-grade school had significant gains in both mathematics and reading stanines. Two additional schools had significant mathematics stanine increases. While all schools significantly increased their scaled scores over the course of the year, one school had no significant gains when measured against the national normative sample of students.

Upon examination of the scores for individual classrooms, only two of the twenty first-grade classrooms (or 10.0%) across all schools showed significant stanine increases in reading. Nine (or 45.0%) of the first-grade classrooms realized significant stanine increases in mathematics. Percentile rank increases for these nine classrooms ranged from about 10% to nearly 30%.

Second Grade Achievement. Table 10 provides the mean scaled score, percentile rank, and stanine by semester for second grade reading and mathematics achievement. As with the first grade results, student scaled scores on both the reading and mathematics achievement tests increased significantly from the fall pretest to the spring posttest. Similar to the first grade results, second graders also significantly increased their standing in relation to the reference group.

Table 10: Mean Second Grade Reading and Mathematics Achievement Scores

	Reading				Mathematics			
	Fall 1997	Spring 1998	Fall 1998	Spring 1999	Fall 1997	Spring 1998	Fall 1998	Spring 1999
Scaled Score	539.2	568.1	520.6	566.1	559.5	589.1	556.4	586.0
Percentile Rank	40.2	55.4	29.7	53.7	43.0	56.9	38.9	55.0
Stanine	4.32	5.40	3.54	5.28	4.61	5.42	4.36	5.32

An analysis of stanines revealed that there were significant achievement gains in reading ($p < .001$) and mathematics ($p < .001$). Second grade students on average gained 24.0 percentile points in reading and 16.2 percentile points in mathematics. Further, both females and males showed significant gains in reading and mathematics stanines. Females showed an average increase of 23.0% and 14.6% in reading and mathematics, respectively. Males showed an average gain of 24.9% and 17.9% in reading and mathematics, respectively. Table 11 shows the mean second grade reading and mathematics achievement scores by gender.

Table 11: Mean Second Grade Reading and Math Achievement Scores by Gender

	Female				Male			
	Reading Fall	Reading Spring	Math Fall	Math Spring	Reading Fall	Reading Spring	Math Fall	Math Spring
Scaled Score	526.7	568.8	558.2	586.5	513.9	563.2	555.2	586.2
Percentile Rank	32.8	55.8	40.5	55.1	26.6	51.5	37.9	55.7
Stanine	3.78	5.38	4.48	5.33	3.30	5.15	4.29	5.37

All three first grade schools participating in the achievement testing showed significant stanine growth in both reading and mathematics. In fact, one second-grade school showed a 17.6 percentile point increase in mathematics and a 26.2 percentile point increase in reading. Upon examination of the scores for individual classrooms, ten of the fourteen second-grade classrooms (or 71.4%) showed significant stanine increases in reading. Eight (or 57.1%) of the second-grade classrooms realized significant stanine increases in mathematics.

RESULTS PART 2: UNDERSTANDING THE IMPACT ON ACHIEVEMENT

Because classroom usage data, home usage data, and achievement data were collected for all students in the thirty-four target classrooms, various relationships between these data sources can be analyzed. In particular, five questions were addressed:

1) How does classroom usage relate to achievement gains?
2) How does home usage relate to achievement gains?
3) How does classroom usage relate to home usage?
4) How does individual achievement relate to average classroom achievement?
5) Does achievement increase more for some students than others?

CLASSROOM USAGE AND ACHIEVEMENT

To determine the extent to which classroom usage relates to student achievement, teacher reports of the time spent using the software in the classroom were correlated with achievement gains. This analysis revealed that the total minutes spent using the software in the classroom was significantly correlated with the percentile gain in reading achievement ($r = .202$; $p < .01$). This relationship proved to be the strongest with second graders who tested in the second quartile (i.e., between the 25th percentile and the 50th percentile) in the fall, however the number of students by grade and quartile were too few to make a confident judgment of whether this relationship is strong enough to be considered true. See Figure 4 for a pictorial display of the relationship between percentile ranks and quartiles.

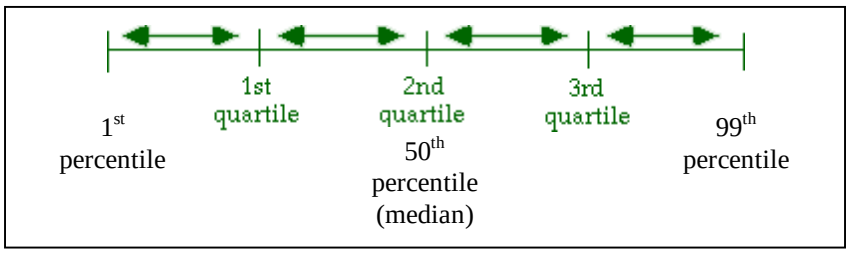

Figure 4: Quartiles and Percentiles

For female students, the more time spent in the classroom on the Lightspan software, the lesser the mathematics scaled score achievement gain ($r = -.251$; $p < .001$). The negative correlation between mathematics scaled score gain and the time spent using the Lightspan software in the classroom was focused on female students who tested below the 50th percentile in mathematics on the fall test ($r = -.378$; $p < .01$). This relationship did not hold for males and did not seem to be related to the grade level of the student. However, the correlation between classroom usage and achievement for females was strong enough to impact overall classroom correlations, with average classroom scaled score gains in mathematics achievement being negatively related to classroom usage ($r = -.222$; $p < .001$).

On the other hand, a positive relationship was found between the percentile gain in mathematics for males who tested below the 50th percentile in the fall ($r = .240$; $p < .05$). This positive relationship was not strong enough to impact overall classroom correlations.

HOME USAGE AND ACHIEVEMENT

A further analysis was conducted to examine the relationship between student achievement gains and the amount of time spent at home on the software. No significant correlation was found between home usage and student achievement. It is cautioned that readers do not interpret this as meaning that home usage does not affect achievement, as the completeness of the home usage data is questionable. That is, it is likely that the home usage data *understates* home usage, due to poor response rates. In fact, in-depth implementation analyses (through student discussions, random in-class student surveys, and random home phone calls) at case study schools corroborate that home usage of the software is likely understated by self-report home usage logs. Again, this is not to imply that there is or is not a relation between out of school Lightspan use and student learning, but rather that these data do not provide conclusive evidence either way.

CLASSROOM USAGE AND HOME USAGE

To determine if teacher usage is related to student usage of the software, classroom usage of the Lightspan software by teachers was correlated with home usage of the software by students. Home usage of about 350 students who had complete home and classroom usage statistics were analyzed; results indicated that classroom usage *did not* influence home usage overall, by grade, or by gender.

As indicated in the previous section, the reader should take caution in interpreting findings involving usage data because of the nature of self-report home usage of the Lightspan software (as described above). Further, it is likely that self-report classroom usage of the Lightspan software *overstates* true classroom usage of the software (per implementation analyses of teacher interview, staff survey, and classroom observation data).

STUDENT ACHIEVEMENT AND CLASSROOM ACHIEVEMENT

Because a strong relationship between individual student achievement gains and average classroom gains would indicate an overall classroom effect on achievement, data were analyzed to determine the likelihood that a common factor might account for student learning. Thus, individual achievement gains in reading and mathematics were correlated with average classroom gains in reading and mathematics. While a high correlation between the two might seem inevitable, it is in fact not certain that a strong relationship would exist due to the potential for considerable variability in individual student gains due to varying influences in student learning.

In mathematics, individual achievement gains were highly correlated ($r=.712$; $p<.000$) with the average classroom mathematics gains. In reading, individual achievement gains were only somewhat correlated with average reading gains for the classroom ($r=.295$; $p<.000$). Both of these relationships held for males and females, as well as first and second graders.

ACHIEVEMENT GAINS BY QUARTILE

Similar to the analysis between individual and classroom achievement gains, individual scaled score growth was compared to individual percentile growth. A high correlation would signify that achievement is fairly consistent across normal curve percentiles. A low correlation would indicate that achievement gains varied by percentile. In mathematics, scaled score and percentile gains were fairly highly correlated ($r=.866$; $p<.001$). In reading, scaled score and percentile gains were also significantly correlated, but not to the extent of mathematics gains ($r=.597$; $p<.001$).

A secondary analysis was performed to examine percentile growth by quartile (note: a quartile is the student's respective percentile ranking divided into four equal categories; a student's quartile in mathematics and reading were determined by their fall achievement scores). Table 12 provides percentile growth and the corresponding number of students in each quartile.

Table 12: Achievement Gain by Quartile

	First Grade				Second Grade			
	N	Reading	N	Math	N	Reading	N	Math
Quartile 1	42	31.6**	60	20.6**	69	32.6**	53	18.2**
Quartile 2	25	18.4	62	15.6**	48	19.2**	51	28.1**
Quartile 3	37	-23.0**	52	10.4**	18	5.9	23	6.4
Quartile 4	32	-47.8**	24	3.7	10	-8.9	22	-3.5

**p<.001

In mathematics, percentile growth was significant in the lower two quartiles and not significant in the higher quartiles. Similarly, in reading, percentile growth was significant in the lower quartiles. Further, first graders experienced a significant reading percentile decline in the two highest quartiles. The relationships found were consistent for both males and females, i.e., both males and females in the lower quartiles performed significantly better than students in the higher quartiles.

RESULTS PART 3: IMPLEMENTATION

INTRODUCTION

Classrooms in two schools participated in an in-depth study of the program's implementation. The study addressed the following four program components:

- Classroom Component – Teacher Usage
- Classroom Component – Home Connection
- Home Component – Student Usage
- Home Component – Parent Role

The initial data collection activities generated case-specific data to each of these orienting components. Subsequent coding of interview and observation data yielded a within-site coding matrix. Cross-case comparisons were made to examine the coding from each individual site by orienting variable, that is the role of classroom component, home component, etc. A cross-site coding procedure was then used to generate the findings as delineated in this report. Assertions were built based upon thematic findings common across both cases. Each of the cross-case data analyses was designed to enhance the generalizability of the findings.

For the purpose of this analysis, the two cases will be called Pacific Elementary School and Atlantic Elementary School. These names in no way relate geographically or otherwise to the two schools studied. Further, the results outlined in this section not only relate to classroom observation and interviews at these two case study schools, but when appropriate are supplemented with parent and staff interview data across all participating Challenge Grant schools.

PACIFIC ELEMENTARY SCHOOL

Pacific Elementary School is a pre-kindergarten through fourth grade school in an urban community. The student population is very diverse with the majority being African-American students. White students account for approximately forty percent of the student population and Hispanic students about six percent. Well over half of the student population are from low income families (as defined by students who are eligible for meal subsidies). Additionally, over one-fifth are special education students. Mobility is moderate, as about ten percent of the students who attend the school in the

fall do not remain there throughout the entire school year. State assessment results show Pacific Elementary on par with the district and state averages in both mathematics and reading. Writing scores are slightly below the district and state averages. Additionally, close to ten percent of the students are enrolled in the school through the state's school choice program, while the other students were assigned to the school based on their residence.

Pacific Elementary was part of the first phase of schools to become involved with Delaware's Technology Innovation Challenge Grant. Thus, some Pacific teachers have been using the Lightspan software for approximately four years. While early involvement with the program might seem to be beneficial, Pacific's early involvement was wrought with disappointments, challenges, and frustrations that have hindered the program's growth and potential. Because the technology was fairly new in 1995 and because program delivery had many wrinkles to iron out, Pacific experienced much of the brunt of hardware and software order glitches, software bugs, training shortcomings, and logistical failures.

The use of Lightspan software at Pacific Elementary is encouraged by the principal, but not monitored or pushed. Lightspan software is not a priority in the district's curriculum, although teachers may use it in their classroom if they wish. Two Pacific Elementary teachers were studied over a period of four weeks to understand both the classroom component of the Lightspan program as well as the home-to-school connection.

ATLANTIC ELEMENTARY SCHOOL

Atlantic Elementary School is also a pre-kindergarten through fourth grade school, but in a rural community. With slightly fewer than 500 students enrolled, Atlantic Elementary averages about 17 students per teacher. The student population is very diverse with the majority being white students and about thirty percent being African-American students. A little less then ten percent of the student population are special education students. Over half of the student population are from low income families (as defined by students who are eligible for meal subsidies). Mobility is fair, as approximately five percent of the students who start the school year do not remain there throughout the school year. State assessment results show Atlantic Elementary scoring slightly below the district and state averages in mathematics, reading, and writing. Additionally, just over five percent of the students are enrolled in the school through the state's school choice program, while the other students were assigned to the school based on their residence.

Atlantic Elementary was part of the third phase of schools to become involved with Delaware's Technology Innovation Challenge Grant. Thus, Atlantic teachers have been using the Lightspan software for approximately two years. By the time Atlantic became involved with the program, most of the challenges experienced by the Phase One schools had been ironed out. Several Atlantic teachers have taken a particular interest in using technology and have developed good implementations of the

Lightspan program, while several are still deciding how best to incorporate the program into their classroom. Four Atlantic teachers, with varying implementations of the program, were studied over a period of four weeks to understand both the classroom component of the Lightspan program as well as the home-to-school connection.

CLASSROOM COMPONENT: TEACHER USAGE

HOW ARE THE LIGHTSPAN MATERIALS USED IN THE CLASSROOM?

ASSERTIONS:

- **Implementation varies from classroom to classroom. Successful implementation does not seem to hinge upon teachers' technical capacity nor administrative support.**
- **The use of computer centers ranged from individualized, instructionally focused activity to downtime activity with little or no connection to classroom instruction.**
- **Longer participation in the program does not guarantee an improved quality of classroom implementation.**

Program Usage and Implementation Context. The use of the Lightspan materials in the classroom varies considerably from teacher to teacher and from school to school. Further, not only was this variability observed with regards to the degree of program use, but also to the configuration of the program's classroom implementation. Teacher use in case study schools ranged from *Non-Use* due to multiple factors including limited teacher capacity and interest, innovation overload, negative attitudes towards technology, and lack to sufficient training to *Mechanical* and *Routine Use*. Mechanical Users of an innovation focus primarily on day-to-day use of the project with little time for reflection, while Routine Users have stabilized the project's implementation into their normal practices. For instance, in a Mechanical Use classroom:

> Mrs. Cooper is focusing on plants this week. She instructs half of the class that she will be helping them with plant vocabulary for the next half hour. The other half of the class is told to spend 15 minutes working on reading their book and 15 minutes on the computer. Sarah is told to work on the computer with Alyson for the first 15 minutes and then let James and Othell work on the computer.
>
> Sarah sits down at the computer and puts on the headphones. Alyson sits down next to her with a second set of headphones. Sarah takes the Playstation controls and starts the Lightspan program. Because the teacher could not find a Lightspan CD that focused on plants, she chose another Lightspan program for the students to work on when they were at the computer. At the end of

> the 15 minutes, Sarah and Alyson went back to their desk to work on their reading, while James and Othell took the Playstation controls.

In a Routine Use classroom, Mrs. Jones spends 10 minutes every morning recording the day's weather and leading the class through several mathematical computations based on the weather. Next, the class participates in several routine activities to get students warmed up to the day. Mrs. Jones has incorporated the Lightspan Network into these activities. A typical morning in Mrs. Jones classroom might be:

> Mrs. Jones asks Andrew to go to the computer and find the day's high temperature forecast. Andrew approaches the computer at the front of the classroom and uses a bookmarked Internet site to find this temperature. (Note: the computer is connected to a television display so that all students can view the weather forecast.)
>
> Andrew says "The temperature will go to 82° today with partly cloudy skies." Mrs. Jones says "Thank you, Andrew. Class, yesterday it got up to 87°. How much cooler will it be today than it was yesterday?" Sarah raises her hand and says "five degrees." Mrs. Jones then says, "If it the temperature gets up to 95° tomorrow, how much warmer will it be than today?" Peter raises his hand and says "13 degrees."

Very few Challenge Grant teachers have progressed beyond Routine Use of the software. In several schools, however, discussions were beginning regarding how to integrate their program efforts with other teachers within that school.

Level and configuration of program use at the classroom level do not seem to hinge upon the technical literacy of the teacher nor the level of administrative support within the school. For instance, the more technologically literate teachers do not necessarily have more successful classroom implementations. In fact, teachers who allowed students to explore and "figure out" the use and sharing of technology themselves (perhaps due to their teaching style or perhaps due to their own comfort level with the computer) were often more successful than those teachers who preferred to be the user or demonstrator of the software.

> Once Mrs. Jones is finished with the morning mathematics exercise, she goes to the computer and logs on to the Lightspan Network. Mrs. Jones says to the class "Are you ready for the Daily Flash?" The students cheer "Yeahhhh!" Mrs. Jones looks at yesterday's Daily Flash and finds that Mr. Peterson's classroom in Akron, Ohio won. They did get the right answer though (Mona Lisa), but Mr. Peterson's class guessed the right answer first. Today the Daily Flash question asks "What is a velocipede?" The puzzle gave them several options, but the students could not agree on the correct answer. The teacher went to Compton's Encyclopedia on the Web. She looked up the definition of a velocipede and found that it was an early name for a bicycle.

While in the preceding example the students were quite attentive to what Mrs. Jones was doing on the computer, they also seemed to be more concerned about her *hand movements* with the mouse controls than with solving the puzzle. When Mrs. Jones allowed the *students* to control the mouse or when the teacher permitted students to

directly operate the Playstation controls, the students seemed to be more focused on problem solving and understanding the game than on the mechanics of the controls.

> While Mrs. Smith works with a group of six students on their vocabulary, Deidre is using Lightspan on the computer and Kenny is watching her. Mrs. Smith kindly yet forcefully speaks from across the classroom to Deidre, telling her she needs to give Kenny a turn. Kenny gently pushes Deidre's chair over a little to position his chair in front of the computer. Kenny tries to take the Playstation controls from Deidre. Deidre pulls the controls back, but regardless Kenny is still intently watching Mars Moose on the screen and listening to Mars Moose teach them about counting and directions. They tug back and forth on the controls for a few seconds and then Deidre hands the controls to Kenny. Deidre said with a proud grin "You go first. I go second."

Contrary to many common beliefs about the role of leadership in implementation, strong administrative support of the program does not seem to guarantee its successful implementation. Likewise, weak administrative support does not seem to guarantee program failure. In other words, classroom implementation of the program seems to depend less upon institutional factors and more upon individual teacher choices and teaching styles. One teacher described the role of the school's administration in the program's implementation as follows:

> "I think that administration wants to be committed to it…they are committed to it because it has provided technology for us that we wouldn't ordinarily have had. I think that the actual working of how the disks go home, who monitors these things, you know, the actual administration of the whole thing, is not even thought of."

Specific individual factors that may be related to successful program implementation will be explored further in next year's evaluation.

Mechanical and Routine Use. As stated above, while some teachers at program schools would be considered Non-Users (see Figure 3), most would be considered Mechanical Users. Some teachers' use has stabilized into Routine Use, but that routine is not of an ideal implementation where the Lightspan software is closely integrated with the classroom curriculum or where Lightspan home-school connection is closely connected. The following is an example of where the routine usage of the Lightspan software has been integrated well into the classroom curriculum, however Mrs. Jones has not linked the classroom curriculum with the Lightspan CD that students take home each week.

> This week Mrs. Jones is teaching the solar system. The students have made a solar system mobile, learned a song about the planets, and read books about the sky. Mrs. Jones puts a Mars Moose CD in the computer and asks the students "Who is the Big Daddy of the solar system?" The students yell "The Sun!" Mrs. Jones goes to the solar system part of the Lightspan CD. The students are blurting out "Let's go to Mars!" and "Let's go to Pluto!" Mrs. Jones decides to go to Jupiter. Mars Moose says Jupiter is so big that all the other planets can fit inside it.

> Next, Mrs. Jones goes to Pluto and Mars Moose says "Pluto is the tiniest of all planets. It is made out of ice and rocks." Mars Moose tells the students that Uranus has 15 moons and that Venus has volcanoes and is very hot." And then he says "Mercury is the second smallest planet in the solar system and it is closest to the Sun." And then Mars Moose instructs that the Earth is the same size as the planet Venus.
>
> Mrs. Jones gave Antoine a basketball to hold, while she held a globe of the Earth. Mrs. Jones demonstrated with the basketball and the globe what Mars Moose had told them about the Earth (i.e., that the Earth orbits around the sun and that no matter how it orbits it is always in the same position in relation to the other planets). At the end of the lesson, Mrs. Jones gave the students a worksheet on the planets to complete for homework.

Few, if any, teachers have progressed beyond Routine Use. Progression from Non-Use of the program to Mechanical Use (focused on day-to-day use) to Routine Use (where day-to-day use has become stabilized) seemed to depend upon several factors, such as teachers' beliefs about technology, their expectations of students, their individual teaching style, and the length of time the teacher had used the program. However, teachers who had been involved with the program for several years and still used the program (i.e., had not abandoned use), tended to have settled into a more Routine Use of the program. Whereas, teachers who had been using the program in the classroom for only a year or two tended to more Mechanical Users.

Use of the Lightspan program in the classroom took two forms: 1) use of the Ligthspan CD-ROM software and 2) use of the Internet component of Lightspan (the Lightspan Network, including activities such as Wacky Writer's Silly Sentence, Daily Flash, writing to Mars Moose, and Starboard). All program users focused on the first form (Lightspan CDs), while only a few had integrated the Lightspan Network into their daily classroom activities.

Two common models of classroom implementation were typical. In the first model (referred to herein as the *Leader* model), the Lightspan software or Network was used primarily as a whole class activity led by the teacher. Very little individual or small group use of the software occurred in these classroom. Leader classrooms tended to be fairly traditional in that the teacher's role is that of leader and manager. Hence, classroom activities tend to be quite structured and the daily events are routinized.

> Next, as she did most mornings, Mrs. Jones went to an activity on the Lightspan Network called Wacky Writer. The students were really following along. Peter said aloud, "What did you click on?" They students wanted to know every step. Mrs. Jones asked Paul to pick a topic. Paul picked "Pets." Mrs. Jones said that she would do this Wacky Writer, but that the students could do their own at recess. Mrs. Jones read from the screen to the class, "Create your own silly sentence by choosing from the words below." For instance, the screen prompted the student to choose an adjective to replace playful (from a list of adjectives that included lonely, noisy, and frisky). For this activity, the resulting sentence was "Paul's silly sentence about pets: My frisky cat growled loudly at the table during the party."

In the second model (referred to herein as the *Facilitator* model), the Lightspan software was used primarily as an individual or small group activity, usually through the use of Centers.

Facilitator classrooms tended to be less traditional than Leader classrooms, where most classroom activities (including Centers) were small group or individually based. In addition, the structure and implementation of Centers also varied from classroom to classroom. For example in one Facilitator classroom with a highly-structured Center, students are instructed to attend one or two of several Centers each day. The theme of the Centers is tied in with the lesson, when possible. An example of an instruction sheet that might be provided to students is shown in Figure 4. In this example, two Centers are selected that the student is to attend; the Lightspan software would be available as an activity at the Computer Center.

STUDENT CENTERS	
1. Computer	5. Arts and Crafts
2. Mathematics	6. Spelling
3. Reading	7. Listening
4. Vocational	8. Writing

Figure 4: Example of "Center" Use of the Software

Centers also serve in some classrooms as filler or "downtime" activity, with little or no connection to the classroom instruction. This use occurred during homeroom while other children were at breakfast, time before recess and lunch, or during the time when special education students re-entered from pull-out classes.

> It's 12:35 on a typical day. It's "choice time". (teacher's words) Katie, Jimmy, and Anna play with Mars Moose. Two of them read aloud the directions while Anna moves the cursor about the screen, eagerly trying to "get all the things on the top." In the midst of the excitement about their progress, the teacher says "It's time to go to recess. Line up." Anna retorts "I got two more to go!" She leaves the program in the middle, wanders about the room and approaches the front of the line to show the teacher a Spanish version of Peter Rabbit that has caught her interest. They all leave for recess. "Choice time" lasted for 10 minutes.

Access and use of the Centers was also used in some classrooms as a means to reward student behavior and effort. Discipline is often a central focus and anything that adds to effective classroom management is welcome. In some classrooms, Lightspan software served this purpose.

> Nicole is the only child working on the Lightspan software during this class time. I ask Mrs. Stevens, a classroom paraprofessional, about it and she tells

> me that Nicole has already finished her counting sheets. For this reason, she is "permitted to work on the software". She laughingly says "they get to learn more and they don't even know it." She also shares that Nicole was retained last year, "this is her second time through 2nd grade…She has probably already had that and that's why she's ahead maybe."

In another classroom where the Lightspan program is implemented through Centers, the Center approach itself is used as an incentive for good behavior because the teacher knows how much the students enjoy the variety and activity involved with Centers.

> It is a very nice day outside and Mrs. Carter's classroom has been unusually talkative. Mrs. Carter had planned to have the students do Centers, but she is clearly frustrated with the class. Mrs. Carter asks "Raise your hand if you would rather sit at your desk?" No one raised a hand. She then asks "Raise your hand if you would rather do Centers?" Everyone raised their hand. Mrs. Jones then said "Don't go to Centers unless your morning work is finished."

As has been mentioned by teachers in previous years' evaluations, some teachers have found the Lightspan software especially useful with their special needs students. One teacher said:

> "It keeps their attention . . . you put a video in and there's something about it . . . I don't know what or why. But [some special needs] children can really sit for longer periods of time when they're in front of a computer or a video. It is effective for students with hyperactivity."

This was observed with several attention deficit-hyperactivity disorder children during the case study. While other Centers may not keep the attention of a special needs child during the time allocated for each Center (e.g., the child starts to wander around the room halfway through their time at the Center), the Computer Center (where Lightspan is used) engages the child such that they do not want to leave even when it is time to move on to the next Center.

ARE THE LIGHTSPAN MATERIALS INTEGRATED WITH OTHER CLASSROOM LESSONS?

ASSERTIONS:

- **Lightspan materials were seldom closely integrated with other classroom lessons.**
- **Teachers saw the Lightspan CDs as an acceptable learning reinforcement during the school day, as well as a positive way for students to spend time outside of school.**
- **The use of Lightspan was often <u>limited</u> to a reinforcement activity or an educational way of filling free time.**
- **Some teachers do not yet see how the Lightspan program fits with current school/state curriculum nor how it can fully complement their individual modes of instruction.**

Classroom Integration. Classroom observations and teacher interviews revealed that the Lightspan materials were seldom closely integrated with other classroom lessons. However, there were times when an effort would be made to choose a CD that corresponded with a particular classroom lesson. Several case study teachers said such integration with classroom lessons took considerable time and many had not yet been able to take that time. The lack of integration between Lightspan and classroom curricula, due to time constraints, was echoed by teachers at other schools during staff interviews as a considerable barrier to program use.

Some teachers were caught between the Preparation and Mechanical Use stages in regards to classroom integration. They do not yet see how the Lightspan program fits with current school/state curriculum nor how it can fully complement their individual modes of instruction. One teacher described the curriculum disconnection:

> "It has been very difficult for me to incorporate it, and to fit it in. It takes a huge amount of time to go through the skills, and pick it apart, and see where it does support your curriculum."

Another teacher indicated that she valued the software as a means to reinforce or remediate students' basic skills but saw limitations for students with higher skill levels.

> "I'd like to use it as reinforcement for skills that children are having difficulty with...where the kids are still working on basic skills, phonics and things like that…It doesn't grab the upper level students' attention as well as the middle or bottom ones."

Regardless of these integration problems, case study teachers, as well as teachers at many other participating schools, had generally positive attitudes towards the Lightspan software. These teachers saw the Lightspan CDs as an acceptable learning reinforcement during the school day, as well as a positive way for students to spend time outside of school.

> "Anything that's going to help them fortify their basic skills I think is wonderful. Because even, just sitting there and having to read what they have to do next is helping them."

Teachers also recognized that their students had fun using the Lightspan CDs. As one teacher put it:

> "They're learning and they don't realize they're learning. They think it's fun."

However, in most cases, the use of Lightspan was limited to a reinforcement activity or an educational way of filling free time.

> Mrs. Smith had about half an hour before lunch. She had the students wash their hands and asked them if they would like to play a Lightspan game called Sports Complex until it was time to go to lunch. Mrs. Smith asked, "Do you think we can do level 2?" The students cheered "Yeahhhh!" Mrs. Smith gave a student in the class, Latisha, the Playstation controls. The other students gather around Latisha to watch her do level 2; the students were very excited and intently following along. After Latisha had finished, Mrs. Smith said "I'm

> not sure if we have enough time to do level 3 before lunch. Do you want to try?" The students yelled "Yeaahhhhh, " even louder than before. In fact, the students decided they wanted to play level 4, because it was the hardest level. Mrs. Smith said "Listen . . . it is harder." Peter said, "whooooa" when the complicated maze showed on the screen
>
> Even though the maze was displayed on the TV screen, the students were pushing to get closer to the computer screen. Mrs. Smith decided to take the controls for level 4 because it is pretty hard. Though, she let the students tell her what to do. The students were all following along and directing Mrs. Smith. The students were so mesmerized and concentrated on the game that they forgot that they were already late for lunch. Mrs. Smith said "Do you think we can do it?" The students all yelled "Yeeeesssss." When they won the game, the students jumped up and down, shrieked and yelled. They were clearly very proud.

When asked specifically as to how the program might be incorporated as a teaching tool as opposed to being limited to a learning reinforcer, one teacher said:

> "It's hard for me to give up teaching time to a computer. You know? I use it more for reinforcement."

Training Response. To address such concerns, curriculum integration meetings were held in the spring at several schools to discuss Lightspan alignment and integration with the school's curriculum. Teacher feedback about these training sessions indicated that they were invaluable, because teachers were able to determine and map out in advance what CDs could be used with what lessons throughout the year. After this training, teachers said:

> "I think next year . . . after our last meeting where we went through and decided what disks go with what we're teaching . . . and if I had that, I think I would use it a lot more."
>
> "In hindsight, I wish they had done something like that from the beginning."

Up until this spring, the responsibility for making sense of the software and how it aligned with the classroom instruction was with the individual teacher.

> "They told us when we got it, 'Take the play station home, and take the CD's home and play with them.'"

Some might compare this curricular approach to a publishing company delivering a textbook series and instructing the teachers to read them all then figure out how to fit them into their curriculum.

This type of workgroup training helped to eliminate the primary concern voiced by teachers that made using the software difficult, i.e., the time it took to figure out the CDs. However, while these focused professional development sessions were seen largely as a success, feedback also revealed a single workgroup session focusing on integration is not sufficient, as it takes more than a two to three-hour time block to get

through an entire grade's curriculum. In addition, some teachers questioned why this activity came so late in the implementation of the program.

CLASSROOM COMPONENT: HOME CONNECTION

HOW DO TEACHERS MANAGE THE HOME-SCHOOL CONNECTION? HOW OFTEN ARE LIGHTSPAN MATERIALS SENT HOME WITH STUDENTS? HOW DO THE MATERIALS SENT HOME RELATE TO CLASSROOM CURRICULUM?

ASSERTIONS:

- **Like classroom implementation, the home to school connection varies by classroom. In many classrooms, the exchange of Lightspan CDs was routinized; in some it was erratic.**
- **The home component of the Lightspan program is primarily seen as an additional yet optional home activity for the students.**

The Home-School Connection. Like classroom implementation, the home to school connection varies by classroom. In many classrooms, the exchange of Lightspan CDs was routinized, with students receiving a new CD each week. Because the organizational management required to exchange Lightspan CDs with students was time-consuming, some schools chose one staff member (such as the school librarian) or a central location (such as the school library) for the management of the entire home distribution component. Because of this, the home component of the Lightspan program was often separate and rather remote from the classroom component. In fact, in many cases, classroom teachers were not aware at any given time what Lightspan CD was at home with the students.

In a typical implementation of the Lightspan program, all students receive a new CD each Friday. That is, on Friday, students return their Lightspan CD to the library and exchange it for a new CD. All students in a classroom receive the same CD and are free to use that CD as much or as little as they want. Teachers said that it was not uncommon for a student to want a new CD before Friday, but as one teacher said:

> "Depending on the CDs, sometimes they say they'd prefer to have it changed sooner than a week. But for the record keeping and bookkeeping, when you've got 300 students involved in it . . . it's kind of hard to do it more than once a week."

Home usage logs were also collected each Friday with the exchange of CDs. The Lightspan CDs and home usage logs are sent home in the same small pouch. One parent commented:

> "The pouch is great, because then I know where everything is . . . his little log form and everything. And with them being smaller, it fits in that pouch. That's nice."

Yet some classrooms and schools had less than model implementation. Student participation in the program varied from class to class; in some less than 1/3 of the students took home software. In addition the distribution and return of software were erratic. Some teachers questioned the level of parental commitment:

> "I don't see parent support very much at all. Because otherwise, those logs would be filled out, and they would be returned. And those disks would come back once a week."

As stated earlier, because teachers usually do not manage their own classroom to home connection, they are not necessarily aware of which CD the student has at home. Thus, the home component of the Lightspan program is rarely coordinated with classroom lessons or the classroom component of the Lightspan program nor is the home component individualized based on student needs. The home component of the Lightspan program is primarily seen as an additional yet optional home activity for the students. That is, teachers do not *require* students to work on the Lightspan CDs at home nor do students view the Lightspan CDs as *homework*.

HOME COMPONENT: STUDENT USAGE

HOW DO STUDENTS USE THE LIGHTSPAN MATERIALS AT HOME? WHO DO STUDENTS WORK WITH AND WHO DO THEY LIKE TO WORK WITH AT HOME? HOW OFTEN DO THEY WORK ON THE LIGHTSPAN CDS FOR LEISURE VERSUS HOMEWORK? HOW DOES THE LIGHTSPAN SOFTWARE RELATE TO OTHER STUDENT HOMEWORK ACTIVITIES?

ASSERTIONS:

- **Both parents and students view the use of Lightspan software as leisure activity.**
- **Students prefer to "play" the software with their friends.**
- **Many parents indicated that their child would often rather use the Lightspan software than watch television.**
- **Some parents and students think the software is not challenging enough, while a few believe it is too hard.**

Is Lightspan Homework? Student use of the Lightspan software at home with the Sony Playstation is seen (by both parents and students) as a leisure activity. Many parents view it as a video game. In fact, one parent whose children have low usage of the software said:

> "They're not really video game kids."

One parent with two children participating in the program also questioned whether it was being used for educational purposes.

> "I feel that it's a tool that's helping children... So sometimes I wonder if they're really using them for the school things, or if they're using them for other games."

Another parent who was initially skeptical that Lightspan was just a game, in time became quite supportive of the program. This parent said:

> "I wasn't going to stop home schooling . . . my extra tutoring . . . for a video game. There's no way . . . but THIS is okay."

Regardless, students think using the Lightspan CDs is fun and the parents know this:

> "The homework was something she had to do to learn, but the Playstation was something that . . . it was more of a fun activity."

> "He enjoys the program. It's something he can do, and it's not like homework."

When asked about *who* they like use the Lightspan software with at home, students seemed to prefer working individually or with their "best" friend on the Playstation. Parents also indicated that the kids would rather "play" with their friends. One parent said,

> "They don't want you around. They can run it, they can turn it on. They do what they have to do, and they do it."

Lightspan at Home. During parent interviews, some parents said their child got very excited to receive a new CD on Fridays. One parent said that her child gets so anxious to hurry home on Fridays that she is greeted with:

> "Mom, I got a disk. Let's go. I got to go. Let's go. Let's go. I want to go home now, Mom."

This parent said that if her child liked the CD, once he got it home he would play it daily (sometimes for three or four hours without stopping). In fact, during parent interviews, many parents indicated that their child would often rather use the Lightspan software than watch television.

Most students in the case study classrooms were second graders and many of them had been involved with the program since first grade.

> Mrs. Brown is starting an activity using Cali's Geotools. In this lesson, the students draw shapes using pencil and paper and then draw shapes using the computer. Eric and Patrice said "I played this last year." Peter, Ophelia, and Kenny said "Me too!" Mrs. Brown asked "Have you every watched the same movie twice?" Eric said "Millions of times!" Mrs. Brown said "Well, playing the same game twice just makes you smarter."

Some of these students (as well as the parents of these students) thought the programs were sometimes too easy, especially since they had played the same program the year

before. Parental concerns about the software not challenging their children were not uncommon. Various comments include:

> "It wasn't as challenging for him. 'I did this last year' was the comment I got."
>
> "So I know the little guys, well, they walk right through that. They get bored with it. They play with it for a half an hour, 45 minutes, and they're done with it."
>
> "Yeah. He likes it . . . I think he just would have liked for it to have been a little more challenging. I think just because they were . . . not all of them . . . but some of them were repeats from last year, and he didn't like that. That was the only thing he was discouraged about. The rest of it, he loved." This parent went on to say "I'd like to see them just do certain CDs just for each grade."

These parents' comments are partially reflective of the separation between the classroom component and home component of the program implementation. This separation resulted in both a lack of integration with classroom curriculum and a lack of coordination across grade levels involved with the program. The comments also reflect concerns about the nature of the software programs themselves.

HOME COMPONENT: PARENT ROLE

WHAT IS THE ROLE OF THE PARENT IN WORKING WITH STUDENTS AT HOME ON LIGHTSPAN MATERIALS? HOW COMFORTABLE ARE PARENTS WITH HELPING THEIR CHILDREN ON PROGRAM-RELATED ACTIVITIES? WHAT IS THE PARENT'S RELATIONSHIP WITH THE SCHOOL?

ASSERTIONS:

- **Most parents thought the program was a good use of student time outside of school.**
- **Parents overwhelmingly viewed the programs as video games, but recognized that they were more educational than anything they could rent or buy.**

Parent Role. The parents interviewed were quite aware of the Challenge Grant program and most thought it was a good use of student time outside of school. Delaware's Challenge Grant focuses on schools with a high percentage of students from low socioeconomic status families. Many of these families are single-parent households, where the primary caregiver is a working mother or grandmother. A few of these parents are able to find time to attend school functions, but for the most part, parents have little involvement with their child's teacher or school.

A parent training activity is required for any family who borrows a Playstation from the school. For many parents, the Lightspan training session was one of few times the

parent had visited their child's school or met their child's teacher. After attending the training session, very few parents reported problems connecting and setting up the Playstation with their home television.

As mentioned above, parents overwhelmingly viewed the programs as video games, but recognized that they were more educational than anything they could rent or buy. It was seen as a supplement to other homework or as an educational way to spend time, not as homework in and of itself. Parents would sometimes play the programs with their child or watch their child play the programs. Since the programs are educational, parents seemed to have no problem allowing their child to use the programs as much as they liked and without supervision. Most parents said that they would like to see the program continued and would rent or buy the CDs if they could.

IMPLEMENTATION STUDY CONCLUSIONS

The case studies revealed that there are many factors at work that have bearing on implementation. These include but are not limited to curriculum alignment, teacher interest and capacity, teaching style, teachers' expectations of students, classroom management, community involvement, and teachers' beliefs about the value of the software itself. Yet, this in-depth study at two schools as well as follow-up interviews with teachers from most participating schools revealed that professional development is perhaps the most critical component of the project's implementation. Professional development was found to be a primary determinant of a teacher's level of use. And, in some cases, insufficient professional development was found to be a major obstacle to successful classroom implementation. This is not to say that teachers were asking for more professional development or that the quality of existing professional development was inadequate, but rather that current professional development efforts have not successfully penetrated classroom curriculum. Hence, the Lightspan software has not been as closely integrated with individual teachers' classroom curricula as might be necessary for sustainability beyond the project's funding cycle. The professional development model failed, in some schools, to address the complexity of the type of alignment necessary for true curricular integration and implementation.

As mentioned above, the Lightspan software sent home with students is rarely coordinated with classroom lessons or other homework activities; the Lightspan software is viewed as supplemental to the classroom curriculum and to regular homework. It is clear that the project is working hard to promote institutionalization of the project so that use continues when the grant formally ends. While intensive teacher training provided in the last year might seem contradictory to creating a self-sufficient Lightspan teacher, it is in fact critical to sustainability that teachers and schools have it "all figured out" (to the extent possible) before the project ends.

What complicates the implementation effort is that teachers are overloaded with innovation and expectations set by others. Some might mistakenly equate the differentiated implementation as teachers' resistance to change or simple lack of technical capacity. However, in many cases the problems result from teachers not

seeing how this initiative can help them and their students perform better. They do not see how technology "fits" into what they believe they should be doing. Many teachers believe there is no more room in the instructional day to "fit in" something else. However, those who see value in the program call for some organizing structure that will help them make sense of it all. Furthermore, implementation is complicated by the expectations of powerful others outside the school, as demonstrated by mandated high-stakes testing programs and accountability initiatives that are at the forefront of the state's reform agenda. In light of these circumstances, for any innovation to sustain, it needs to be seamless with the state and school efforts. There is no room for, or willingness to pursue, initiatives that appear additive or separate. Those innovations that will survive must be supportive of and integrated within the initiatives to which the state and the schools are committed.

Thus, it is recommended that considerable resources and attention be focused on intensive training (e.g., alignment of the Lightspan curriculum with school grade-level curriculum) for those schools and teachers who plan to continue to use Lightspan and who voice a commitment to the program. Resources should be directed towards school- and classroom-focused integration activities for existing project schools who show interest and promise, as opposed to expending resources on project expansion or directing resources towards any current schools who clearly have no interest in or commitment to the project. Moreover, these efforts must recognize the predominance of the current standards and accountability context within the state and ensure that the program will help teachers, schools, and students reach goals set by those initiatives.

CONCLUSIONS

Delaware's Technology Innovation Challenge Grant project focuses on establishing and improving the home-school connection in order to improve student learning. The primary purpose of the evaluation is to research the effectiveness of using home-based instructional activities to reinforce school-based curriculum.

Perceptions and Usage. Many parents whose children participate in the home component of the project reported that the amount of time their child spends watching TV or videos has decreased since involvement with the project. In fact, almost half of the students said they like the programs so much that they would rather use the software than watch TV; this is especially true for students who use the software programs at home with a grown-up. When students use the instructional software at home, they usually use it between 30 and 60 minutes. About one-third of parents indicated that the amount of time their child spends doing schoolwork and the amount of time their child spends participating in family activities have increased since involvement with the project. School staff were also pleased with the parent involvement spurred on by the project.

Student Learning. As would be expected in any given academic year, first and second graders increased their mathematics and reading test scores significantly over the

course of the year. Student achievement scores were further analyzed in relation to a national reference population. In relation to this reference population, first grade students had significant gains of on average 5.9 in reading and 14.0 percentile points in mathematics. Second grade students also significantly increased both their reading and mathematics achievement scores in relation to the reference population. On average, second grade students outperformed 24.0% more of the students in the reference group in the spring than they did in the fall on the reading assessment. On the mathematics assessment, second grade students increased their standing in relation to the reference group an average of 16.2 percentile points.

Focused Implementation. Analyses of disaggregated student achievement data suggest that the Lightspan implementation be focused on underachieving students, i.e., students who test below the median. Students below the 50th percentile seemed to benefit greatly from using the Lightspan software, while students above the 50th percentile in reading and mathematics seemed to not be helped or perhaps even be hurt academically by using the Lightspan software.

Professional Development. Most Lightspan teachers would be considered Mechanical or Routine Users. Still, Routine Users of the Lightspan Program did not have an ideal implementation, that is the home-school connection was not closely connected. Levels of Use analysis suggests that sustainability beyond the project funding will be difficult without more intensive professional development. It is recommended that considerable resources be directed towards school and classroom based training focused on aligning the Lightspan curriculum with classroom curriculum.

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APPENDIX A

SAMPLE INSTRUMENTS

CLASSROOM USAGE LOG

Week of : ___________________________________ School: ____

Approximate number of students in class: ___________ Teacher: ____

Grade level of class: K 1 2 3 4 5 6

	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Minutes used					
How was the program used? (circle all that apply)	whole class activity small group activity individual activity	whole class activity small group activity individual activity	whole class activity small group activity individual activity	whole class activity small group activity individual activity	whole class activity small group activity individual activity
How many students were involved?					
What product(s) were used? (circle all that apply)	Mars Moose Googol Mona & Moki Quaddle str.at.e.s Timeless Math **Affiliates:** Science is Elementary 16 Tales Head to Toe Every Child Can Succeed Story Lane Theater **Others:** Cool Math Write Away Creative Camp Creative Isle Internet	Mars Moose Googol Mona & Moki Quaddle str.at.e.s Timeless Math **Affiliates:** Science is Elementary 16 Tales Head to Toe Every Child Can Succeed Story Lane Theater **Others:** Cool Math Write Away Creative Camp Creative Isle Internet	Mars Moose Googol Mona & Moki Quaddle str.at.e.s Timeless Math **Affiliates:** Science is Elementary 16 Tales Head to Toe Every Child Can Succeed Story Lane Theater **Others:** Cool Math Write Away Creative Camp Creative Isle Internet	Mars Moose Googol Mona & Moki Quaddle str.at.e.s Timeless Math **Affiliates:** Science is Elementary 16 Tales Head to Toe Every Child Can Succeed Story Lane Theater **Others:** Cool Math Write Away Creative Camp Creative Isle Internet	Mars Moose Googol Mona & Moki Quaddle str.at.e.s Timeless Math **Affiliates:** Science is Elementary 16 Tales Head to Toe Every Child Can Succeed Story Lane Theater **Others:** Cool Math Write Away Creative Camp Creative Isle Internet

Please return this completed form (along with the completed Student Usage Logs) to your Challenge Grant Contact Person by the 1st of every month.

STUDENT USAGE LOG

Student Name: _____

Teacher Name: _____

CHALLENGE GRANT/LIGHTSPAN STUDENT USAGE LOG

OCTOBER 2 - OCTOBER 8, 1998

Directions: Check or circle your answer to each question.

	How long did you use the playstation?	Who used the programs with you?	What programs did you use?
Friday	☐ Less than 15 minutes ☐ About 15 minutes ☐ About 1/2 hour ☐ About 1 hour ☐ More than 1 hour	☺ Just me ☺☺ Me and my brother/sister ☺☺ Me and my parent(s) ☺☺ Me and a friend ☺☺ Me and _____	☐ Lightspan software from school ☐ A game that I rented ☐ A game that I bought ☐ Other: _____
Saturday	☐ Less than 15 minutes ☐ About 15 minutes ☐ About 1/2 hour ☐ About 1 hour ☐ More than 1 hour	☺ Just me ☺☺ Me and my brother/sister ☺☺ Me and my parent(s) ☺☺ Me and a friend ☺☺ Me and _____	☐ Lightspan software from school ☐ A game that I rented ☐ A game that I bought ☐ Other: _____
Sunday	☐ Less than 15 minutes ☐ About 15 minutes ☐ About 1/2 hour ☐ About 1 hour ☐ More than 1 hour	☺ Just me ☺☺ Me and my brother/sister ☺☺ Me and my parent(s) ☺☺ Me and a friend ☺☺ Me and _____	☐ Lightspan software from school ☐ A game that I rented ☐ A game that I bought ☐ Other: _____

More on back ⇨⇨⇨⇨

Monday	☐ Less than 15 minutes ☐ About 15 minutes ☐ About 1/2 hour ☐ About 1 hour ☐ More than 1 hour	☺ Just me ☺☺ Me and my brother/sister ☺☺ Me and my parent(s) ☺☺ Me and a friend ☺☺ Me and _____	☐ Lightspan software from school ☐ A game that I rented ☐ A game that I bought ☐ Other: _____
Tuesday	☐ Less than 15 minutes ☐ About 15 minutes ☐ About 1/2 hour ☐ About 1 hour ☐ More than 1 hour	☺ Just me ☺☺ Me and my brother/sister ☺☺ Me and my parent(s) ☺☺ Me and a friend ☺☺ Me and _____	☐ Lightspan software from school ☐ A game that I rented ☐ A game that I bought ☐ Other: _____
Wednesday	☐ Less than 15 minutes ☐ About 15 minutes ☐ About 1/2 hour ☐ About 1 hour ☐ More than 1 hour	☺ Just me ☺☺ Me and my brother/sister ☺☺ Me and my parent(s) ☺☺ Me and a friend ☺☺ Me and _____	☐ Lightspan software from school ☐ A game that I rented ☐ A game that I bought ☐ Other: _____
Thursday	☐ Less than 15 minutes ☐ About 15 minutes ☐ About 1/2 hour ☐ About 1 hour ☐ More than 1 hour	☺ Just me ☺☺ Me and my brother/sister ☺☺ Me and my parent(s) ☺☺ Me and a friend ☺☺ Me and _____	☐ Lightspan software from school ☐ A game that I rented ☐ A game that I bought ☐ Other

Remember to give your log to your teacher on Friday!!

CHALLENGE GRANT TECHNOLOGY PROJECT

STUDENT SURVEY
SPRING 1999

What grade are you in? K 1 2 3 4 5 6

Are you a: Boy or Girl

Please circle the word that says how you feel most of the time about the Lightspan Program.

1. Using the computer is scary.	Yes	Sometimes	No
2. The programs are fun to use.	Yes	Sometimes	No
3. I like having the programs at home to use.	Yes	Sometimes	No
4. At home, I would rather use these programs than watch TV.	Yes	Sometimes	No
5. These programs are too hard for me to do.	Yes	Sometimes	No
6. I like it when my teacher shows the programs to the class.	Yes	Sometimes	No
7. I like it when I get to use the programs at school.	Yes	Sometimes	No
8. When I use the computer at school, I work with a buddy or two.	Yes	Sometimes	No
9. I get to help choose what we work on with the computer.	Yes	Sometimes	No
10. At home, a grown-up and I work together on the computer.	Yes	Sometimes	No

If yes, who: _____

THANK YOU!!

CHALLENGE GRANT TECHNOLOGY PROJECT

SCHOOL STAFF SURVEY
SPRING 1999

Please respond to this survey based on your own experiences. Responses will be treated confidentially and no individual will be identified in any report of the data. Do not write your name on this survey. If you want to clarify your answers, please write your comments in the left margin. Thank you for your assistance.

Using the scale below, please indicate your level of agreement or disagreement with each of the statements listed by checking the appropriate box. Mark only one box for each item.

	Strongly Agree			Strongly Disagree
The training session I attended was informative.	❒	❒	❒	❒
I received information on how to get additional help if problems developed.	❒	❒	❒	❒
Any problems I experienced were resolved in a timely manner.	❒	❒	❒	❒
At the end of the training session, I felt confident that I could set-up and use the equipment.	❒	❒	❒	❒
The equipment was difficult for me to set-up.	❒	❒	❒	❒
I feel comfortable using computers.	❒	❒	❒	❒
The programs are user-friendly.	❒	❒	❒	❒
The programs are easy for the children to use.	❒	❒	❒	❒
The children enjoy using the computer programs.	❒	❒	❒	❒
The programs help the children to learn new things.	❒	❒	❒	❒
These programs are great learning tools for my class.	❒	❒	❒	❒
The programs are age-appropriate for my class.	❒	❒	❒	❒
This program has been a positive experience for me.	❒	❒	❒	❒
This program was implemented very smoothly.	❒	❒	❒	❒

OVER ➨

How has this program affected the way that you teach reading in your class?

How has this program affected the way that you teach math in your class?

In your opinion, how has this project affected parent involvement in your school? Please discuss any changes in parent-initiated contacts.

In your opinion, what are the strengths or benefits of being a part of this project?

In your opinion, what are the weaknesses or drawbacks of being a part of this project?

If you could make one recommendation to improve this program, what would it be?

SPRING EVALUATION -- PARENT INTERVIEW PROTOCOL (IN-DEPTH)

1. **How long has your child been involved with the Lightspan project?**

   PROBE: Was this the first year? Or were they also involved in first grade?

2. **One of the major goals of the Lightspan project is to extend the learning day through a home-school connection. To what extent do you think this goal has been met in at home?**

   PROBE: Have you seen any evidence that your child is spending more time on educational activities at home?

3. **How often does your child come home from school with Lightspan Playstation software?**

   PROBE: Is your child given specific homework assignments with the Playstation?

   Does your child play with the Lightspan software because they choose to or because they are told to (by their teacher)/assigned work to do on it?

4. **What kind of feedback have you heard from your child about the Lightspan software?**

   PROBE: Does your child think it is fun? Do you think s/he understand they are doing an educational activity?

   Does your child think it is too hard? Do s/he get frustrated with it? Does your child think it is too easy? Do s/he get bored with it?

5. **How does your child use the Playstation?**

   PROBE: Does s/he usually use it by themselves? With a friend? With a sibling? With an adult?

   If your child could choose who to use it with, who do you think they would choose?

   Does your child sit quietly when the use it or interact with the TV (making faces, comments, talking, etc)?

   Does your child usually use Playstation software? Have they purchased other software? If yes, what kind of software (educational, games, etc.)? Does your child rent software for the Playstation? If yes, what kind of software (educational, games, etc.)?

   Does your child ask to use the Playstation? Do you think your child would rather use the Playstation or watch TV/videos?

   Does the Playstation tie up the only TV in the house or do you have more than one TV?

6. **What do you personally think of the Lightspan project?**

   PROBE: Do you think the Lightspan project has been a worthwhile use of your child's time? Why or why not?

   Do you think your child learns more from the CDs than from doing traditional homework? Why do you think so?

7. **How well prepared did you feel to help your child with the Playstation software?**

   PROBE: Were you able to set up the Playstation when you first got it? Did the school provide help in case you had a problem?

   Were you provided with training about the Lightspan project? What did you think about this training? Was it enough to help? Did you want more training but did not know how to get it?

8. **If the school still offered the Lightspan software to you once the "project" is over, would you continue to use it? If you had to purchase the Lightspan software once the "project" was over, would you purchase it?**

[Thank them for their time and let them know that we will share a copy of our report with them in late July. Explain that these interviews will represent one piece of the report.]

SPRING EVALUATION -- TEACHER INTERVIEW PROTOCOL

1. **With which aspects of this project do you feel that your school has had particularly good success?**

   PROBE: What have your found that has worked really well for your school?

2. **What were the challenges that your school has faced while implementing the Challenge Grant project?**

   PROBES: Which of them were you able to successfully resolve?
   How did your school resolve these challenges?
   Which ones weren't you able to successfully resolve?
   Ideally, what would it have taken to resolve it (them)?

The success of a program is often dependent upon the commitment of key people in it.

3. **How would you describe the level of commitment of your teachers regarding this program?**

   PROBES: What makes you think that?
   What do you think has lead to their level of commitment? or lack thereof?

4. **How would you describe the level of commitment of parents regarding this program?**

   PROBES: What makes you think that?
   What do you think has lead to their level of commitment? or lack thereof?

5. **Are there any other people that you believe need to have a high level of commitment to the project to ensure its success?**

   PROBES: What makes you say that?

6. **What do you feel has been the greatest benefit of being a participating school in this project?**

7. **If you could pass on one piece of advice to a school just beginning this project, what would tell them (maybe one DO and one DON'T)?**

SPRING EVALUATION -- TEACHER INTERVIEW PROTOCOL

(TARGET SCHOOLS SUPPLEMENT)

1. How long has your school been involved with the Lightspan project?

PROBE: How long have you personally been involved with the Lightspan project?

2. One of the major goals of the Lightspan project is to extend the learning day through this home-school connection. To what extent do you think this goal has been met in your classroom?

PROBE: Have you seen any evidence that student's are spending more time on educational activities outside of the classroom? Do you think this change is related to the Lightspan project?

3. How do you manage the student's use of the Lightspan Playstation software?

PROBE: Do you decide which CDs to send home with students? If so, how do you determine? If not, do the students ask for a new CD when they are ready?

Do all students take home the same CD at the same time? How often do you collect the CDs and distribute a new one?

Do you assign the students specific homework with the CDs? If so, how? If not, do the students work on the CDs as they want to (i.e., not necessarily tied in to the classroom activities)?

4. What kind of feedback have you heard from students or parents about the Lightspan software?

PROBE: Do the students think it is fun? Do you think they understand they are doing an educational activity?

Do the students think it is too easy? Do they get bored with it?

Do the students talk about the CDs among themselves, i.e., comparing where they are with the CDs? Do the students seem proud when they finish a CD?

Do you think the parents understand it is an educational activity? Have any parents complained that they think it is a waste of time (i.e., that their child is just playing)?

5. What do you personally think of the Lightspan project?

PROBE: Do you think the Lightspan project has been a worthwhile use of your and your students' time? Why or why not?

Do you think the Lightspan software is challenging? Why or why not?

Does the Lightspan software "fit" well within your curriculum or are is it more of a burden to try to find a time where it seems appropriate to use it?

Do you think the student's learn from the CDs? Do you think they learn more from using the CDs in the classroom or at home? Why do you think so?

Are there components of the Lightspan project that you think are really good? If so, what? Are there components that need some more work? If so, what?

6. How well prepared did you feel to help your students with the Playstation software?

PROBE: Were you provided with training about the Lightspan project? What did you think about this training?

Do you feel like you have a good understanding of the Lightspan project and how to use the software in the classroom?

What could be done to help you feel more comfortable with the project/software?

7. Do you think you will continue with the Lightspan software once the "project" is over?

PROBE: Will you continue with the classroom component, home component, or both? Why?

CHALLENGE GRANT PROJECT

PARENT SURVEY
SPRING 1999

"Good afternoon (morning, evening). I am (interviewer's name), calling for Delaware Education Research & Development Center at the University of Delaware. We are conducting a survey to find out how parents feel about the Delaware Challenge Grant - Lightspan Program. Our survey should take 10-15 minutes."

"Our study requires that we speak with a parent or guardian of the child who is participating in this project. Are you one of the parents of this child?"

If "yes", *"Then you are the person I need to speak with."* Go to section A.

If "no," "May I speak with him or her?" Repeat introduction at top of page.

Section A

"First, I'd like to ask you a few questions about you and your child's participation in this project."

What elementary school does your child attend? (Record School Name and Number)

1. *Did your son or daughter receive a Sony Playstation to use at home as part of this project?*
   A= yes *B= no*

2. If "no," *did your son or daughter receive a Multimedia computer to use at home as part of this project?*
   A= yes *B= no*

If parent responds "no" to both questions 1 and 2, please thank them for their time and end the call.

3. *Approximately how long did your son or daughter have possession of the Sony Playstation (or Multimedia Computer)?*
   A=Less than 1 week
   B=Between 1-3 weeks
   C=Between 4-6 weeks
   D=Between 7-10 weeks
   E=More than 10 weeks

4. *How frequently did your child work <u>independently</u> using the Lightspan CDs?*
   A= Always
   B= Most of the time
   C= About half of the time
   D= Seldom
   E= Never

Section A (continued)

5. How frequently did your child work with you (or other adults in your household) using the Lighspan CDs?
A= Always
B= Most of the time
C= About half of the time
D= Seldom
E= Never

6. Did you attend a parent training session at your child's school prior to receiving the Sony Playstation?
A= yes B= no

7. Did any other adults in your household attend a parent training session at your child's school prior to receiving the Sony Playstation?
A= yes B= no

8. If "yes," *could you tell me the relationship of this (these) adult(s) to the child?*
A=father
B=mother
C=grandparent
D=aunt or uncle
E=brother or sister

Section B

"Now, I'd like to ask you a few questions about your opinion of this project. Please indicate your level of agreement or disagreement with each of the following statements on a scale of 1 to 4, where 1 is strongly disagree and 4 is strongly agree."

1=strongly disagree 2=disagree 3=agree 4=strongly agree 5=don't know

9. The training session I attended was informative.

10. I received information on how to get additional help if problems developed.

11. Any problems I experienced related to this project were resolved in a timely manner.

12. At the end of the training session, I felt confident that I could set-up and use the equipment in my home.

13. The equipment was difficult for me to set-up at home.

14. The Lightspan CDs are great learning tools for my child.

15. The Lightspan CDs are too easy my child.

16. The Lightspan CDs help my child to learn new things.

Section B (continued)

17. My child enjoys using the Lightspan CDs.

18. The Lightspan CDs are too difficult for my child.

19. My child usually works independently using the Lightspan CDs.

20. My child and I use the Lightspan CDs together.

21. This project has been a positive experience for my child.

Section C

"Now, I would like to ask you a few questions about the amount of time devoted to specific activities that your child participates in has changed. "

22. Has the amount of time that your child spends watching television or videos increased, stayed about the same, or decreased since involvement with this project?

A = Increased
B = Stayed the same
C = Decreased

23. Has the amount of time that your child spends doing school work increased, stayed about the same, or decreased since involvement with this project?

A = Increased
B = Stayed the same
C = Decreased

24. Has the amount of time that your child spends having playtime increased, stayed about the same, or decreased since involvement with this project?

A = Increased
B = Stayed the same
C = Decreased

25. Has the amount of time that your child spends participating in activities with the family increased, stayed about the same, or decreased since involvement with this project?

A = Increased
B = Stayed the same
C = Decreased

Section D

"These last few questions ask for your thoughts on the project as a whole."

26. In your opinion, what are the strengths or benefits of being a part of this project?

27. In your opinion, what are the weaknesses or drawbacks of being a part of this project?

28. If you could make one recommendation to improve this project, what would it be?

Thank you very much for your time!

APPENDIX B

EVALUATION PLAN

DELAWARE CHALLENGE GRANT -- EVALUATION PLAN

Outcome Areas	Definition of Outcome	Indicator or Measure	Source of Data	Timeline	Responsibility
STUDENT ACHIEVEMENT Questions: Is there an increase in student achievement for students in this program?	Student Achievement in Reading and Mathematics	Stanford 9 Reading and Mathematics (Grades 1 and 2); Delaware State Testing Program (Grade 3)	Students	Academic Years 3-5 (beginning Fall 1997) Grades 1 and 2: Fall and Spring testing Grade 3: Spring testing	Students will complete tests; Data provided by Harcourt-Brace and Delaware Department of Education; Analysis and Reporting by the Delaware Education R&D Center
PROGRAM USAGE Questions: What does the usage look like in the classroom?	Frequency and type of use	Weekly classroom usage logs	Teachers	Academic Years 1-5 (beginning Spring 1996)	Data compiled by the classroom teacher and submitted through the World Wide Web; Analysis and Reporting by the Delaware Education R&D Center
What does the usage look like in the home?	Frequency and type of use	Monthly home usage logs	Parents	Academic Years 1-5 (beginning Spring 1996)	Data compiled by the classroom parent and submitted on paper through the teacher; Analysis and Reporting by the Delaware Education R&D Center

Outcome Areas	Definition of Outcome	Indicator or Measure	Source of Data	Timeline	Responsibility
PROGRAM SATISFACTION Questions: What do teachers think about this project?		Interviews and focus groups; Staff survey	Teachers/School Staff	Academic Years 2-5 (beginning Fall 1996)	Interviews conducted by members of the R&D Center; staff survey sent directly to teacher; professional development survey administered by the trainer; Analysis and Reporting by the Delaware Education R&D Center
What do teachers think about the training they received?		Professional Development survey	Teachers		
What do parents think about this project?		Interviews	Parents	Academic Years 2-5 (beginning Fall 1996)	Interviews conducted by members of the R&D Center; survey administered by the trainer; Analysis and Reporting by the Delaware Education R&D Center
What do parents think about the training they received?		Training surveys	Parents		
What do students think about this project?		Student survey	Student	Academic Years 2-5 (beginning Fall 1996)	Survey administered by the classroom teacher; Analysis and Reporting by the Delaware Education R&D Center
DEMOGRAPHICS Question: What are the demographic characteristics of schools and students in the program?					

APPENDIX C

DEMOGRAPHIC INFORMATION

DELAWARE CHALLENGE DEMOGRAPHIC INFORMATION

- ☑ **Over 2,500 elementary students participated in Delaware's Challenge Grant project.**
- ☑ **Almost 90% of these students are in grades 1-3.**
- ☑ **Approximately 40% of these students are from low socioeconomic status families.**
- ☑ **Approximately 40% of these students are in the race minority.**
- ☑ **Approximately 10% of these students receive special education services.**

GRADE LEVELS INVOLVED	K	1	2	3	4	5	6	TOTAL
Number of Teachers	2	54	42	39	7	4	2	150
Number of Students	64	857	767	784	191	86	8	2757
Number of Female Students	0	424	310	329	71	36	0	1170
Number of Male Students	0	457	353	361	51	42	0	1264
Number of Caucasian Students	26	567	424	491	129	60	0	1697
Number of African American Students	31	321	302	254	52	22	8	990
Number of Hispanic Students	7	69	31	29	9	3	0	148
Number of Asian American Students	0	8	9	8	1	0	0	26
Number of Native American Students	0	1	3	2	1	1	0	8
Number of Students Receiving Special Education Services	12	83	79	84	24	4	0	286
Number of Students Receiving Title I Services	21	420	367	274	36	12	0	1130
Number of Students on the Free or Reduced Lunch Program	0	353	291	321	23	29	0	1017

*Results based on 21 Demographic Surveys Returned By Participating Schools.

APPENDIX D

RESULTS OF THE STAFF PROFESSIONAL DEVELOPMENT SURVEY

Elements of Quality Professional Development 1

Appropriate Content

- *Professional development should incorporate content knowledge and specific research validated practices that support demanding content standards (such as cooperative learning techniques for math within the heterogeneous classroom). Professional development should link this new knowledge to the prior knowledge of the participants. Professional development should deliver content appropriate to the needs of participants. Where these include process or management skills, links should be made to the teaching of (or establishing an effective learning environment for teaching) rigorous content.*

On-going and Sustained

- *Professional Development should be long-range in nature, recognizing that learning is incremental and meaningful learning needs to be supported over time. This allows participants to experiment with and reflect on their practice in a supportive setting. Professional Development should be sustained as a coherent effort for a minimum of two to three years and not consist of single events, weekend conferences, or activities that recur over a year with different people. Such activities can be useful as initiating events (e.g., to introduce ideas); they are not strategies through which deep growth and change are accomplished.*

Active Engagement

- *Participants should experience through first-hand and active engagement the curriculum / pedagogy / assessment activities as a model of what needs to occur in the classroom. Activities must be inquiry-based and be as varied and engaging for the participants as they are for students. The facilitators of the activity should model the practices that they advocate.*

Collegial

- *Teams of professionals should work together on real work: development of curriculum, problem solving concerning classroom practices, reflection about pedagogy, development of common language, and engagement in reciprocal observation and feedback. This element also requires that the participants be actively involved in the design and implementation of activities that have direct application to their work.*

Job-Embedded

- *Professional development activities occur as a natural and normal aspect of a professional's life. It is embedded in the routine organization of the school day and year and viewed as an integral part of the life of the school. It represents a mutual obligation: on the part of the system to provide opportunities for and on the part of the individual to engage in life-long learning. Professional development should require participants to plan and reflect upon their professional activities and practice.*

Systemic Perspective

- *Professional development should incorporate all groups involved in the education of children. All parts of the system have a role and responsibility in the change process, and parts of the system must shift its practice in concert with each other.*

Client-Focused and Adaptive

- *Professional development should be based on the interests and needs of the participants and the schools in which they serve. Professional development activities, just as people, should grow and change over time adapting appropriately to changing needs and changing people. Professional development should be based on formal analyses of needs. There should also be a balance between the support for institutional initiatives and the support for those initiated by participants, individually and collectively.*

Incorporates Reflection

- *Participants must have time to analyze and reflect, with opportunities for the infusion of new information and perspectives, as well as criticism and guidance from external sources. Professional development should not attempt to deliver practices simply to be uncritically replicated in the classroom or school. They should challenge, enhance, and make connections to their current practice. This creates a cycle of experience and reflection that promotes continuous improvement.*

1 Adapted from P. LeMahieu, P. Roy, H. Foss: Elements of Quality Professional Development, University of Delaware and Delaware Department of Public Instruction

PROFESSIONAL DEVELOPMENT EVALUATION SURVEY

SCALED SCORES

SCALE	RANGE OF VALUES	N	MEAN SCALED SCORE	*MEAN OF REFERENCE	*%ILE RANK OF MEAN
Appropriate Content	8 - 32	45	*26.03*	25.83	59.2%
On-Going & Sustained	5 - 20	45	*16.25*	16.31	47.7%
Active Engagement	6 - 24	45	*20.28*	20.46	50.4%
Collegial	8 - 32	45	*26.85*	25.61	46.6%
Job-Embedded	5 - 16	45	*13.36*	13.42	60.6%
Systemic Perspective	6 - 24	45	*20.13*	19.52	44.1%
Client-Focused & Adaptive	5 - 20	45	*16.87*	16.02	52.5%
Incorporates Reflection	6 - 20	45	*17.14*	17.19	53.1%

* Reference Group for this Analysis is entire R&D Center professional development evaluation database to date (n=1,775).
The percentile ranks were calculated based on comparisons of group mean to individual mean scaled scores.

Professional Development Evaluation Survey

Report of Findings

The Delaware Education Research and Development Center has compiled the following report of participant responses to your professional development activity. The survey items examine the eight research-based *Elements of Quality Professional Development.*

Participant Information *Total Number of Respondents = 45*

What is your gender?	A) Female	86.7%
	B) Male	13.3%
	C) No Response	0
What best describes your ethnic/racial group?	A) African-American	2.2%
	B) Asian/ Pacific Islander	0
	C) Hispanic	0
	D) Native American	0
	E) White	93.3%
	F) No Response	4.4%
How long have you worked in education?	A) Less than 1 year	2.2%
	B) 1 to 2 years	6.7%
	C) 3 to 5 years	20%
	D) 6 to 10 years	20%
	E) 11 or more years	51.1%
	F) No Response	0
What is your current assignment?	A)Teacher	82.2%
	B) Building Administrator	6.7%
	C) Central Office Admin.	0
	D) Other	11.1%
	E) No Response	0

APPROPRIATE CONTENT *Professional development should incorporate content knowledge and specific research validated practices that support demanding content standards (such as cooperative learning techniques for math within the heterogeneous classroom). Professional development should link this new knowledge to the prior knowledge of the participants. Professional development should deliver content appropriate to the needs of participants. Where these include process or management skills, links should be made to the teaching of (or establishing an effective learning environment for teaching) rigorous content.*

	Strongly Disagree	Disagree	Agree	Strongly Agree	Not Appli-cable
As a result of this professional development activity, I am better aware of how the Content Standards relate to curriculum.	2.2%	11.1%	44.4%	37.8%	4.4%
As a result of this professional development activity, I am better aware of how to accommodate the background and interests of students in my professional practice.	0	4.5%	72.7%	15.6%	6.8%
As a result of this professional development activity, I am better aware of how to engage students in their learning.	0	0	42.2%	51.1%	6.7%
This experience was focused on content throughout.	0	4.4%	71.1%	15.6%	6.8%
The professional development activity increased my understanding of the nature of curriculum needed to address the Content Standards.	2.2%	6.7%	60%	24.4%	6.7%
This professional development activity focused on topics relevant to my professional needs.	0	6.7%	40%	48.9%	4.4%
This professional development activity helped me to be better aware of how the Content Standards relate to instruction.	2.2%	6.7%	64.4%	20%	6.7%
As a result of this professional development activity, I am better aware of how to "reach" all students.	0	6.7%	66.7%	26.7%	0

ON-GOING & SUSTAINED *Professional Development should be long-range in nature, recognizing that learning is incremental and meaningful learning needs to be supported over time. This allows participants to experiment with and reflect on their practice in a supportive setting. Professional Development should be sustained as a coherent effort for a minimum of two to three years and not consist of single events, weekend conferences, or activities that recur over a year with different people. Such activities can be useful as initiating events (e.g., to introduce ideas); they are not strategies through which deep growth and change are accomplished.*

	Strongly Disagree	Disagree	Agree	Strongly Agree	Not Appli-cable
I see this professional development activity as a part of my life-long learning process.	0	0	37.8%	60%	2.2%
This professional development activity builds on others throughout the year.	0	6.7%	51.1%	37.8%	4.4%
This professional development activity is congruent with others that I have experienced in the last two years.	11.4%	11.4%	43.2%	20.5%	13.6%
This activity is part of a coherent professional development plan offered from one year to the next.	2.3%	16.3%	48.8%	16.3%	16.3%
This professional development activity is one of many that I will attend or have attended this year.	0	4.5%	54.5%	38.6%	2.3%

ACTIVE ENGAGEMENT *Participants should experience through first-hand and active engagement the curriculum / pedagogy / assessment activities as a model of what needs to occur in the classroom. Activities must be inquiry-based and be as varied and engaging for the participants as they are for students. The facilitators of the activity should model the practices that they advocate.*

	Strongly Disagree	Disagree	Agree	Strongly Agree	Not Appli-cable
This professional development activity provided active engagement for all participants.	4.4%	4.4%	20%	68.9%	2.2%
This activity involved mainly listening to speakers.	15.6%	60%	22.2%	2.2%	0
I was able to participate in small group activities.	0	4.4%	24.4%	71.1%	0
It was apparent that the perspectives of educators like myself were accommodated in the design of this professional development activity.	0	6.8%	50%	43.2%	0
This activity itself modeled the practices that it advocated for its participants.	0	6.8%	52.3%	40.9%	0
I was engaged in a variety of "hands-on" activities during the professional development session.	2.3%	6.8%	27.3%	61.4%	2.3%

COLLEGIAL *Teams of professionals should work together on real work: development of curriculum, problem solving concerning classroom practices, reflection about pedagogy, development of common language, and engagement in reciprocal observation and feedback. This element also requires that the participants be actively involved in the design and implementation of activities that have direct application to their work.*

	Strongly Disagree	Disagree	Agree	Strongly Agree	Not Appli-cable
As a result of this activity, I gained a better understanding of others' professional goals and practices.	0	8.9%	46.7%	42.2%	2.2%
I chose to participate in this professional development activity.	2.2%	2.2%	40%	55.6%	0
This professional development activity fostered collegial interaction among the participants.	0	0	20%	77.8%	2.2%
I can see how this activity has direct application to my practice.	2.2%	2.2%	20%	75.6%	0
I had input into planning this professional development activity.	11.4%	34.1%	27.3%	4.5%	22.7%
As a result of this professional development activity, I will be observing other educators to expand my professional repertoire.	2.3	20.5%	50%	9.1%	18.2%
This professional development activity focused on topics relevant to my professional needs.	0	6.7%	40%	48.9%	4.4%
Views of the participants were heard and respected.	0	2.2%	35.6%	62.2%	0

JOB-EMBEDDED *Professional development activities occur as a natural and normal aspect of a professional's life. It is embedded in the routine organization of the school day and year and viewed as an integral part of the life of the school. It represents a mutual obligation: on the part of the system to provide opportunities for and on the part of the individual to engage in life-long learning. Professional development should require participants to plan and reflect upon their professional activities and practice.*

	Strongly Disagree	Disagree	Agree	Strongly Agree	Not Appli-cable
I see this professional development activity as a part of my life-long learning process.	0	0	37.8%	60%	2.2%
Professional development within my school/district permits me to work with my peers regarding instruction.	2.2%	15.6%	44.4%	33.3%	4.4%
This professional development activity is one of many that I will attend or have attended this year.	4.5%	54.5%	38.6%	2.3%	0
This activity helped me to reflect upon my practice.	2.3%	2.3%	59.1%	31.8%	4.5%

SYSTEMIC PERSPECTIVE *Professional development should incorporate all groups involved in the education of children. All parts of the system have a role and responsibility in the change process, and parts of the system must shift its practice in concert with each other.*

	Strongly Disagree	Disagree	Agree	Strongly Agree	Not Appli-cable
*This professional development activity increased my appreciation of the scope of systemic reform.	0	7%	62.8%	27.9%	2.3%
The main focus of this professional development activity was on issues related to student learning.	0	6.7%	28.9%	62.2%	2.2%
This experience increased my understanding of assessment appropriate to support instruction.	6.7%	17.8%	40%	22.2%	13.3%
I see this professional development activity as a part of a systemic effort to improve schools.	0	0	28.9%	64.4%	6.7%
Educators from various fields and levels attended this professional development activity.	0	0	44.4%	53.3%	2.2%
The professional development activity increased my understanding of the nature of curriculum needed to address the Content Standards.	2.2%	6.7%	60%	24.4%	6.7%

CLIENT-FOCUSED & ADAPTIVE *Professional development should be based on the interests and needs of the participants and the schools in which they serve. Professional development activities, just as people, should grow and change over time adapting appropriately to changing needs and changing people. Professional development should be based on formal analyses of needs. There should also be a balance between the support for institutional initiatives and the support for those initiated by participants, individually and collectively.*

	Strongly Disagree	Disagree	Agree	Strongly Agree	Not Appli-cable
I had input into determining the topic for this professional development activity.	13.6%	18.2%	43.2%	6.8%	18.2%
I chose to participate in this professional development activity.	2.2%	2.2%	40%	55.6%	0
This experience drew on the expertise of its participants.	0	0	0	87.5%	12.5%
This professional development activity focused on topics relevant to my professional needs.	0	6.7%	40%	48.9%	4.4%
The learning climate of this professional development activity was collaborative.	0	2.2%	33.3%	64.4%	0

INCORPORATES REFLECTION *Participants must have time to analyze and reflect, with opportunities for the infusion of new information and perspectives, as well as criticism and guidance from external sources. Professional development should not attempt to deliver practices simply to be uncritically replicated in the classroom or school. They should challenge, enhance, and make connections to their current practice. This creates a cycle of experience and reflection that promotes continuous improvement.*

	Strongly Disagree	Disagree	Agree	Strongly Agree	Not Appli-cable
I was given time to reflect upon my learning and how to apply it.	4.5%	11.4%	50%	31.8%	2.3%
This activity helped me to reflect upon my practice.	2.3%	2.3%	59.1%	31.8%	4.5%
Views of the participants were heard and respected.	0	2.2%	35.6%	62.2%	0
I will be able to reflect upon the experiences from this professional development activity and generate connections to my own work.	0	2.2%	33.3%	64.4%	0
The learning climate of this professional development activity was collaborative.	2.2%	2.2%	26.7%	68.9%	0

GENERAL COMMENTS	Strongly Disagree	Disagree	Agree	Strongly Agree	Not Appli-cable
The speaker/facilitator(s) of this professional development activity were well organized.	2.2%	0	22.2%	75.6%	0
I saw the speaker/ facilitator(s) of this professional development activity as knowledgeable.	2.3%	0	27.3%	70.5%	0
I would describe the speaker/facilitator(s) as effective.	2.2%	2.2%	26.7%	66.7%	2.2%
I would like to learn more about the topic(s) introduced at this activity.	0	0	25%	62.5%	12.5%
Overall, I am satisfied with this professional development activity.	2.4%	4.8%	26.2%	66.7%	0

*Total response rate is less than 100% because some participants chose not to answer this question.