Iowa Learning Technology Commission External Evaluation Report

Integrated Evaluation Results and Meta-Evaluation

2006-2007 Grant Year

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Executive Summary

The Iowa Learning Technology Commission (ILTC) contracted with an external meta-evaluation team (Phye, Herring, & Yarbrough) to complete a report of progress of the first round of grantees. Phye, Herring, and Yarbrough were contracted to complete the external evaluation for the first round of grantees at a cost of $25,000. This contract has been amended/extended for an additional $25,000 for the completion of the external evaluation of round two grantees. The Commission reviewed the draft report submitted by the team and has provided a response, including limitations and recommendations for the future. Additionally, revisions to the draft have been made to ensure its objectivity.

Six very different projects were funded and implemented during the 2006-2007 school year. These projects varied not only in their goals but in the implementation of the proposed innovations. The varied nature of these projects makes it impossible to provide a single summary evaluation statement about the successes observed. This is in part due to the fact that one is really dealing with six case studies rather than six variations on a single theme. Consequently, each project stands on its own merits and individual project strengths and weaknesses are identified using a basic organizational theme reflecting the mandatory project goals and outcomes that were identified in the request for proposals (RFP- 2005).

A dependable finding across all six projects was an interest in promoting the development of student achievement through the integration of technology and pedagogy. Some projects were more successful than others in this regard. If one were to apply a three category evaluation rubric with the category labels of outstanding, good, and needs improvement, the following evaluation rating would be appropriate. Outstanding projects were observed at Davenport, Pella and Sidney. Good projects were observed at North Cedar and Clay Central- Everly. For reasons that are discussed within the body of the report, Sioux Central would fall into the needs improvement category.

Davenport, Pella, and Sidney were projects that integrated the ILTC grant into existing programs. In other words, the innovations involved modifications and additions to programs already in operation rather than attempts to design a new project and assess change within a single year. While the North Cedar and Clay Central-Everly projects were good ideas, there were a number of problems that arose during implementation that made it difficult to effectively evaluate goals and outcomes. In part, this reflected overly ambitious plans for change without a realistic awareness of the magnitude of the changes that would be required to be successful. Sioux Central fell into the needs improvement category. This was the result of a drastic turnover in leadership at the school following the successful attainment of the grant and the implementation of the project in the summer and fall of 2006. Thus, it is difficult to pinpoint one specific incident. Rather, the principal who wrote the grant left the district, the district hired a new superintendent and the new administration simply had too many things to do in addition to oversight of the ITLC grant.

A reading of the following report will provide suggestions and insights for the ILTC commission, ITLC sponsors, and third party evaluators. First, it is difficult to demonstrate change in a school environment in a single year. This is particularly the case when the outcome is an improvement in student achievement. Realistically, when the innovation requires teacher change, system modification, and/or technology infusion as a precursor of student change, any achievement growth is typically observed between the second and third years. Second, the qualitative case study approach is appropriate for these evaluation efforts. However, one cannot infer cause and affect relationships between educational innovations or interventions and student change. Without inclusion of appropriate comparison groups as a part of the evaluation design, such inferences are not possible. Third, we are still working on cultural change involving communication among various stakeholders in education. There is a question of the fidelity of communication between grantees and evaluators. This is viewed as an issue that third party evaluators must be willing to deal with from the beginning of the grantee/evaluator relationship.

This latter point has precipitated a change in the procedures used by the evaluation team. When meeting for the first time with the second cohort of grantees, the evaluation team provided each project with an outline of the evaluation report that would be due at the end of the project year. At that time the type of quantitative data to be collected was verified. This is consistent with the purpose of the action plan that was required of everyone responding to the RFP.

Overall the first year projects were a success. As with all projects, some were superior to others. Two primary themes were recurring. Greater success is likely when ILTC grants can be integrated with existing school initiatives. Second, strong leadership at the building level is necessary. While a cadre of quality teachers is critical to the successful implementation of innovative practices, it is the building administration that must take responsibility for the oversight of the action plan and the evaluation activities.

Background

Purposes of this Work and this Report

The Iowa Learning Technology Commission grant recipients were each asked to provide internal evaluation information about their funded project accomplishments during 2006-2007. Each grantee's evaluation report was expected to address individual education plans for students; students' engagement and achievement; successful district-to-vendor relationships; research-based curricula and instruction; and the effective integration of technology and teacher training. The external meta-evaluation team (Phye, Herring, & Yarbrough) traveled to each site for at least two site visits, provided on-going evaluation and research consultation, reviewed grantees' evaluation plans and interim reports, suggested ways to address and document their project goals, and provided review and assistance where feasible and desirable. This third-party meta-evaluators' report provides the following:

1. Documentation and summaries of the evidence presented in the six individual evaluation reports about the impact of the ILTC funding.

2. An evaluation of the quality of the evidence from these six reports and what can accurately be concluded from them.

3. Suggestions for improvements in the ILTC grant program and in the evaluation guidelines and reports for the coming year (2007-2008).

Backgrounds and Perspectives Brought by the Meta-Evaluators

The three meta-evaluators bring numerous years experience with theoretical and applied educational research and are all experienced, practicing program/project evaluators. All three are tenured faculty at Board of Regents universities and are intimately familiar with K-12 and higher education in the State of Iowa.

Mary Herring is interim head of the Curriculum and Instruction Department at University of Northern Iowa, an associate professor and former coordinator of the Instructional Technology Division. Dr. Herring is the President-Elect of the Association for Educational Communication and Technology (AECT). AECT provides international leadership by promoting scholarship and best practices in the creation, use, and management of technologies for effective teaching and learning in a wide range of settings. She serves on the editorial board of Tech Trends. She is also a former curriculum auditor for Phi Delta Kappa's Curriculum Management, Inc. The Curriculum Management Audit is a third-party examination of the curriculum design and delivery system of a school or school district.

Dr. Herring provided consultation and review of the evaluations for the Clay Central-Everly Project: Standards Based, Student Centered, Technology Initiative (SST) and the North Cedar CSD's project. Other than her work as a 3rd party reviewing these districts' studies, Dr. Herring had no other direct relationship with these projects and no conflicts of interest.

Gary Phye is director of the Psychology in Education Research Lab (PERL) at Iowa State University and a professor of educational psychology in the Department of Curriculum & Instruction. Since its founding in 1998, PERL has provided educational research and evaluation support to a number of clients and sponsors at the federal, state, and local levels in the form of grants and contracts. More than 40 projects have been conducted in the past nine years and funding has exceeded 8 million dollars. In addition to his role as director of PERL, for the past 10 years Gary has served as editor of the Academic Press/Elsevier educational psychology book series and currently serves on the editorial boards for the Journal of Educational Psychology, Contemporary Educational Psychology and the Educational Psychology Review.

Dr. Phye provides consultation and review of the evaluations for Sioux Central's project, Project INNOvATE and the Sidney Community School District project. Other than his work as a 3rd party evaluator for these projects, he has no other direct relationship with these projects that would be a conflict of interest.

Don Yarbrough is Director of the University of Iowa Center for Evaluation and Assessment (CEA) and an Associate Professor of Educational Measurement and Statistics, with additional appointments in Educational Psychology, Educational Policy and Leadership Studies, and the Institute for Clinical and Translational Science (College of Medicine). Since its founding in 1992, the CEA under Dr. Yarbrough's direction has produced more than 100 evaluation reports for various clients and sponsors, including funded projects from NSF, HHS, NIH, NIMH, DE, FIPSE, and various state-, district- and locally funded initiatives. As a faculty member at the University of Iowa, Dr. Yarbrough has published widely on learning and outcomes assessment and program and project evaluation methodology. In addition to his faculty responsibilities, he is Vice-Chair of the Joint Committee on Standards for Educational Evaluation and is currently chairing the Task Force revising the Program Evaluation Standards, 3rd Edition.

Dr. Yarbrough provided consultation and review of the evaluations for Pella's project, Science at the Speed of Life and Davenport's Project Lead the Way. Other than his work as a 3rd party reviewing these districts' studies, he had no other direct relationship with these projects and no conflicts of interest.

Strengths and Limitations of this Work

Strength 1. High degree of expertise and dedication. This is important work and was taken seriously by the administrative bodies at the legislature and the Department of Education.

Strength 2. The utilization of a request for proposal (RFP) format provided a more equitable and valid procedure for the selection of projects than an earmark approach to funding. This approach provides the basis for project accountability as determined by the applicants when writing their respective grant proposals to address RFP requirements and recommendations.

Limitation 1. A one year time frame did not allow for more than preliminary work. The impact of project initiatives is difficult to observe in less than a three year period. This is basically due to the fact that organizational structures and systems are slow to respond to changes in operational conditions. This is particularly the case when intended outcome measures are changes in human behavior.

Limitation 2. There was uneven application of effort and interdependence with previous and contemporaneous funding and programs or projects. The less successful grantees in the first cohort of schools were those that did not integrate the new initiative with existing initiatives but tried to develop a new stand alone initiative.

Limitation 3. Grantees felt that the level of funding was limited given the array of intended goals and outcomes.

Limitation 4. Lack of attention to and evaluation of program evaluation theories. In some respects, the RFP is too broad. It may be feasible to consider sharpening the focus of the RFP in terms of goals and outcomes to "better fit" the requirements of current program evaluation models.

Limitation 5. Lack of alignment between grant assessment and evaluation section and program evaluation criteria. A process must be in place for data collection of the mandatory outcomes; this is an accountability requirement. However, from a research design perspective, being able to infer any causal relationship between these mandatory outcomes and the outcomes identified in the respective evaluation sections of a grant proposal is not possible in a case study approach (single case of project). The best one can do as an external evaluator is to provide evidence that appropriate processes were in place as a requirement of meeting RFP conditions.

ILTC Response

Caution should be utilized when making judgments regarding the success of ILTC grants. This report serves to measure progress after one year of implementation. A report on the second round of grantees will be available next year. The third round of grantees has only recently been awarded.

Several obstacles to analysis exist with regard to measuring progress with ILTC grants, including the types of data available for analysis, the small number of students represented by the data, and the limited amount of time schools have been involved with the grants. Comparative studies may yield differences between the academic performances of students from year to year; however, studies that rely on small numbers of students may not be reliable. Any conclusions made based upon small samples may be distorted. Additionally, the standard error of measure involved makes it difficult to determine whether or not students are actually making academic growth.

This report serves to provide an update on the progress of the first round of ILTC grantees. Awardees were required to collect predetermined types of data, according to the statute. Some round one participating schools failed to gather all the required data, making it impossible to draw conclusions on some data points. This issue was addressed in a preliminary meeting with the round two awardees. Though limited data are available for the purpose of assessing the success of round one awardees, the remainder of this report attempts to describe their progress.

Descriptions of the 2006-2007 Projects

Clay Central-Everly (High School)
This project equipped high school students with Tablet PCs. It also included software intended to improve reading performances by delivering a standard-based curriculum. The intent of the quality student-based curriculum was to achieve three district goals:

1. To increase high school reading proficiency.

2. To deliver a standards-based curriculum.

3. To ensure all students graduate with key 21st Century technology skills.

High school staff members received support for continuous professional development with Tablet PCs. Implementing this one-to-one SST Initiative at the high school was designed to bring this technology directly to the students. Targeted professional development focused on standards-based, technology-rich lessons and assessments with an emphasis on reading. Scientifically based research strategies in reading–such as think-, read-, and talk-alouds, QAR, and graphic organizers—were incorporated in all curricular areas. Grant and district funds provided the continuous professional development, hardware, and software necessary for implementation.

The Clay Central-Everly final report offered some reflections on the use of computers and software applications by the classroom teachers: *Mathematics:* Class Server a big plus! Both staff members reflected that their teaching techniques changed drastically. The learning curve for both teachers on Class Server would like to be enhanced next year!

Art Education: Class Server used exclusively for this discipline- also Adobe Suite using specifically for our new Graphic Design course. Cross curriculum items were addressed much better with our technology program. All assignments and tests were taken on the computer. Research and resources available through the computer for this discipline were another huge plus!

The district determined the need for the SST Initiative after examining relevant indicators. For example, according to ITED scores, 23% of the Clay Central-Everly 11th grade population is not proficient in reading and 50% fall between the 40th and 75th

percentile. Furthermore, 32% of students who took the ACT scored below 20. Students who cannot read classroom materials are less motivated by textbooks, are less inclined to read and may hesitate to complete assignments that reflect their deficits in reading. Students who can access texts on the computer and can use technology to demonstrate their proficiency in multiple formats will, in theory, be more motivated, challenged, and engaged. The most important process goals over the course of the grant year was to achieve these changes through the development of new staff and student skills as well as through changes in instructional strategies and curricula (see final report in Appendix A).

Davenport (High School)

Davenports' ILTC grant provided specific support for the implementation of Project Lead the Way (PLTW). This pre-engineering, high school level academic program has been developed and implemented widely through-out the United States. For example, Indiana alone has more than 231 high schools that are Project Lead the Way schools (a 45% increase in the 2006-2007 school year). Additional information including research reports, detailed descriptions of the curriculum, and news articles are available at the PLTW Web site: http://www.pltw.org/index.cfm#.

In Davenport, PLTW was implemented at Central, North and West High Schools (making Davenport the first PLTW school system in Iowa) during 2006-2007 with the goal of transforming existing technology education to prepare students for high skill, high demand occupations in technical fields. Funding from the ILTC was especially helpful by providing support for software, technology and teacher professional development, all requirements for being certified as a PLTW school. Major milestones for the 2006-2007 academic year included teacher and counselor professional development, enrolling more than 250 students in the program, and installing computer labs and Cognitive Tutor Algebraic Principles (CTAP) software to teach Algebra to 225 students. The Davenport evaluation report describes some specific project components and how engaging they are for students and teachers:

> PLTW is a very hands-on, project-based curriculum. In the first course, Introduction to Engineering Design (IED), the students do the majority of their work on a computer using the 3-D modeling software, *Inventor*, which is part of the AutoDesk Design Academy software package. IED students do projects in which they use calipers and micrometers to measure objects which they then design using the 3-D software. The calipers and micrometers were obtained using ILTC funds. Computers, software, and LCD projectors were all critical components of the Cognitive Tutor Algebraic Principles classrooms. In Principles of Engineering, the students construct things solving problems that are posed to them. Fishertechniks kits are required by PLTW for some of these problems and were obtained using ILTC funds. An example of a Fishertechniks kit is a marble sorter in which marbles are directed down different chutes as a light beam is shot through them determined by the color of the marble. The students build the marble sorter and then program

> it to do what they need it to do. It operates on the same principle as a vending machine dispensing food.

Davenport's PLTW is continuing and expanding its curricular offerings in the 2007-2008 academic year based on the solid foundation to which ILTC funding contributed (see final report in Appendix B).

North Cedar (Middle School)
North Cedar's project centers on the transition of sixth grade students entering into the North Cedar Middle School from the Mechanicsville Elementary and the Lowden Elementary sites. The data from North Cedar's Iowa Test of Basic Skills indicate that when the students arrive at the middle school a slight decrease in the growth of students occurs during their sixth grade academic year. This decrease is most evident in the area of reading.

Based on these findings, a leadership committee was formed to determine ways in which North Cedar could better serve its students. The committee investigated several instructional strategies to improve student performance on the Iowa Test of Basic Skills (ITBS) and the Measure of Annual Progress (MAPS).

> The committee elected to approach improving the students' test scores by incorporating several strategies. The strategies employed were:
>
> 1. Supporting students in their daily academic setting and creating greater interest in student work by utilizing a one-to-one computer initiative.
>
> 2. Changing how instruction would be delivered from teacher focused to project-based learning.
>
> 3. Rearranging the school day to allow students opportunities to meet with teachers in the core areas outside of their normally scheduled class periods.
>
> 4. Making the classroom presentation available to students at home via a local public access television station.

To use the computers effectively, the leadership team determined that project-based learning would allow for greater student engagement in the learning process, while keeping the teachers involved in the instructional process as facilitators.

The project-based learning concept was a new instructional strategy for the teachers. In the past, teacher led discussion or lecture were the primary means of instruction in core classes. The daily schedule was changed to create a period when all teachers would be available to meet with students. The committee developed assigned rooms for the students to be placed into according to test results. For example, if a student had difficulty with math on the ITBS or MAPS test, the student was placed with a math teacher. The committee wanted students to have teachers available to them in the area of most need. If a student struggled in two areas, that student alternated the teachers from day to day which gave him or her opportunities to meet with both teachers.

The last component of the ITLC grant initiative was to develop a connection with local cable television providers. The school formed a partnership with the providers to have DSL placed in the students' homes at a reduced cost to the homeowners.

Sixty-eight 6th grade students participated in the year-long project. Four of the students entered the program during the middle of the school year or left prior to the completion of the school year. A 7th grade student with special needs participated in the pilot program, but in a limited number of classes. Parents and students were in-serviced prior to the start of the school year. They were informed of the appropriate use of the computer and how to log onto Class Server, the system or platform chosen by the school to present the information to the students (see final report in Appendix C).

Pella (High School)
Pella's ILTC proposal was called Science at the Speed of Life. Its goals were as follows:

1. To improve student achievement in the area of science literacy through the development of independent research questions requiring experimental investigation using advanced technology.

2. To increase student engagement with science professionals through electronic discussions involving pod casting and blogging.

3. To develop the learning skills required of a 21st century citizen through electronic research and presentations that are reviewed by peers and industry professionals.

These goals were accomplished in the high school science department using a team of four teachers working with approximately 650 students. The teachers, who were all familiar with constructivism and techniques to increase knowledge scaffolding, engaged students in a cycle of learning that encouraged them to connect learning to practical experiences. Such learning required that students become engaged in the topic, explore through problem solving, explain their results to others, elaborate on their initial conclusions and evaluate their own thinking as well as that of others. These skills are important in real life and are skills that can be used on the job. They go beyond and can not be acquired through traditional lectures, science demonstration experiments, or preparation for traditional classroom tests alone.

Most of the ILTC funding went to vendors to purchase classroom laptops, digital document cameras, science probes, ceiling-mounted projectors, DVD players, flex cam microscopes and Sympodium software. These items were used to increase engagement in daily lessons and increase the frequency and quality of interactions with science professionals.

Significant partnerships needed to be developed to make the project work. Pella developed vendor relationships with Apple computers, Pratt Audiovisual, and Vernier Probeware. The Technology Director and Technology Advisor were directly involved in

establishing and maintaining these relationships. Despite some hurdles at the beginning of the project, all equipment was working well within the first 6 weeks of the 2006-2007 academic year. The teachers found the training on the Vernier probes to be especially valuable for their lab work.

Education and business partnerships were established with members of the University of Iowa, Central College, Pella Corporation, Pella Regional Health Center, and local providers of science related services. The teachers established these relationships in alignment with curriculum integration opportunities. The PEERS project was developed with assistance from the local Director of Instruction.

Training and curriculum planning were completed during the summer of 2006 while the equipment was being installed. Teachers prepared for integration opportunities that would match the skills needed by the business partners with the problem solving activities they were developing. This allowed them to be ready with their first activities during the fall of 2006.

Probeware training took place during the summer of 2006 and helped teachers prepare lab activities to facilitate students thinking "like scientists." Teachers were also trained to use the display equipment. Additional (and potentially useful) training in some of the advanced applications was not available, given time limitations.

Implementation began in the fall of 2006. To start the year, teachers and their industrial partners developed realistic problem-solving scenarios. In this way, students were exposed to the way business and industry use scientific concepts in practice. Additional topics emerged throughout the year that allowed for the use of business, medical, and college partners. These electronic and personal interactions led to further blogging and emailing among students and teachers to expand upon students' initial knowledge. Even students who were not comfortable interacting with others face to face were willing to offer their views on the web or through e-mail. This extended dialogue has also increased the students' depth of understanding of the topics covered. The combination of increased rigor and relevance fed nicely into Pella's goals.

New modes of communication and display technologies made it possible to construct problem-solving solutions, lab reports, PowerPoint slides, podcasts, profcasts, and a variety of other presentations with greater flexibility and expertise than ever before (see final report in Appendix D).

Sidney (K-12)

Sidney Community Schools is a rural district with 385 students in preschool through 12, located in Southwest Iowa. The district was involved as a pilot school in the Iowa Professional Development Model in 2002. Because of this pilot project, Sidney had a pre-existing structure for engaging in high quality professional development, based upon student need. For three years, problem solving has been the focus of professional development. The district has used a study team model to implement problem-solving strategies. Professional development this year has continued to be delivered on a regular

basis. Every week, teachers meet in study teams to research, discuss, and collaborate about research-based practices for improving student achievement. Data from assessment instruments indicate that reading and writing were areas of need.

Prior to the award of the ILTC grant, the district's access to technology for student and staff use was limited to one lab at the elementary school and two labs at the secondary school. Additionally both buildings had at least one computer in each classroom, where access to the Internet was limited.

The Sidney Community School District used the revenue from the ILTC grant to advance student and staff achievement in technology use and communication skills. This was done through the purchase of technology and through continued commitment to professional development. All staff participated in professional development from LEA, AEA, and Apple professionals throughout the course of the year. Students and staff applied their problem solving and communication skills to produce podcasts that are available for viewing through the school's webpage. Students researched, analyzed and synthesized information related to grade-level curriculum. Using communication, particularly writing and speaking skills, students produced podcasts using the Apple iBooks and "Garage Band" from the Apple iLife Suite. Data included in the Sidney evaluation report indicated that in classrooms where laptops were being used on a regular basis for projects, student use of computers and software had increased, resulting in increased proficiency in use of technology. The project also increased parental involvement through technology by providing a parent's portal that provided web-based information about students assignments and performance. Sidney views the project as a success and plans for continued work on the goals of the project (see final report in Appendix E).

Sioux Central (Middle and High School)

This grant was written during the 2005-2006 school year. During the summer of 2006, the former elementary principal/curriculum director who wrote the grant resigned from his position. The district also had a change in superintendent positions. The superintendent under whom the grant was written also resigned in July 2006. So, it was not until fall 2006 that the new elementary principal and new superintendent were brought on board for this project. Therefore, the initial implementation efforts for this project were slow.

The original grant application was for students in grades 4-12. The intent was to implement Project INNOvATE in all 4-12 science classrooms. As implementation of this project began in fall 2006, the new leadership realized that full implementation would not be possible in all grades 4-12. The school narrowed its focus and implemented Earth Science in grade 8, Physical Science in grade 9, and Biology in grade 10.

The biggest problem with this project was the lack of funds in the grant for additional training on the usage of the probeware and laptop computers. The grant provided one day of training on September 18, 2007 with the use of the probeware. No additional funds were available for training throughout the year. Therefore, teachers were left on

their own to experiment with the probeware implementation as well as how to utilize inquiry learning with laptop computers (see final report in Appendix F).

ILTC Observations, Conclusions, and Recommendations

Promising Practice
Commission members have observed promising practices with regard to positive and innovative integration of technology into instruction. There is agreement that the grant process is worthwhile, captures promising and innovative practices, and includes a large range of stakeholders who support the programs. This support, it is perceived, leads to student and staff engagement, as well as community and parent enthusiasm and investment in the educational process. Community engagement, in particular, appears to be impacted by participation in the pilot projects, bolstered by the requirement for stakeholder role in the implementation of and/or the funding match for the project, as well as expectation for ongoing support of stakeholders.

In each round of grant awards, there was far more demand for access to grant funding than the given appropriation would allow. Additionally, parents and community members are proud of the accomplishments of their schools. There is agreement that these accomplishments need to be communicated to Legislators, Iowa Association of School Boards (IASB), Iowa Technology and Education Connection (ITEC), and School Administrators of Iowa (SAI).

Life-Long Learning
With innovation comes complication and increased risk. Education is moving toward a 24/7 education model and toward the promotion of life-long learning. ILTC members are encouraged by the promising practices observed during on-site visits to participating schools. High levels of student, staff, and parent engagement were evident. Teachers were also observed integrating technology into classroom instruction. Additionally, support for multiple student learning styles is being addressed through the use of technology.

High Level of Interest
62 ideas were submitted by school districts in the form of ILTC Part I concept paper applications, indicating the existence of a high level of interest. The number of ideas submitted also indicates the existence of need in the field of education that is greater than the Commission can fill. This may be a reflection of how difficult it is for districts to keep up with technology, especially as it relates to infrastructure, wireless access, and other basics. In terms of promising practice, the Commission is forced to eliminate a lot of deserving ideas because of funding constraints. It is generally felt that most grants awarded are having a positive impact on kids due to careful planning on the part of school leaders, but the evaluation of this process is on-going, since grant rounds two and three are still in progress.

Engagement
All students would probably be better served with greater access to technology because technology integration is a teaching and learning strategy that works for kids. Commission members witnessed firsthand the high levels of student engagement. Additionally, the data reported regarding decreases in discipline referrals may be another indicator of student engagement. Technology can support a diverse set of learning styles. Students impacted by these pilot projects are not only engaged in learning, but are engaged in exploring a greater variety of sources of information in what may be described as an immersive modality. In planning for participation in these pilots, each district selected the type of project that fit its needs; therefore, each participating district has experienced different successes. For that reason, it would be difficult to identify one single project that exemplifies best practice. At this point, the Commission is not in a position to say that any of the instructional practices being utilized by the first round of grantees should be replicated by all districts.

Sustainability
Sustainability of efforts is another difficulty facing technology grantees. Technology efforts that are funded for a one year period will be difficult to sustain. To maintain their efforts with technology integration, schools may be forced to seek alternate means of funding. Additionally, it is clear that staff turnover/continuity has an impact on the success of such projects. Without the sustained commitment of all staff, success is unlikely. Sustainability is also impacted by teacher training support. Additional technology resources must be accompanied by teacher training to ensure that technology is integrated into existing teaching practices.

Professional Development
It is generally agreed upon that instructional practice is key to the success of technology integration efforts. This equates to the need for professional development, a necessary component for ensuring that teachers are comfortable with technology, as well as know how to successfully integrate technology into existing effective teaching practices.

Based upon these conclusions and observations, the Commission makes the following recommendations:

- Continue the study of grant funding rounds two and three, using the lessons learned in round one. Ensure grantees are reporting consistently on mandated data points and understand legislative intent.
- Continue funding technology grants, in terms of the amounts available to schools, the number of schools that can take advantage of such grants, and the length of time for which each school is funded.
- Consider additional funding for this grant program, given that the demand for this initiative has consistently out-paced available resources.
- Continue to promote grant awardees that emphasize innovation regarding the use of technology as a tool to enhance instruction and learning.

Outcomes on Specific Indicators

For each project, this report evaluates the evidence provided and reports evidenced based information (any data collection, including qualitative and quantitative) related to the specific dimensions of quality listed in the Request for Proposals. Where the individual grantee evaluation report includes only opinion-based conclusions or did not address a dimension of quality, we indicate that no evidence was provided in that grantee's final report.

The Impact on Student Engagement

Clay Central-Everly (High School)
Visits by the external evaluator to the school found students using the computers in the classroom for classroom projects and note taking. The district's final report provided an overview of activities within the different departments.

The Business department used laptops daily for the grade nine required Computer Applications class. Frequent laptop use was observed for Accounting I and II; Intro to Business; and Business Law. The Industrial Technology Department used laptops and desktop computers for Diverse Tech., a computer aided drafting program. A CAD program was incorporated into the Woodworking classes at a more basic level with students drafting projects using the CAD program.

Math, Science and Social Science had frequent laptop use throughout the year and textbook for these classes were loaded on student laptops. The Art Design class, Music Theory and Music Theatre classes were also laptop based. Student consistently used their laptops 80% to 90% of the time with most assessments for the high school curriculum being done on the laptop.

Student online surveys were not done consistently and only one survey was reported completed, as opposed to the originally proposed three surveys. It was not indicated when this survey was completed. This survey reflected the installment of the laptop computer program and reactions to the new program by parents and students. The majority (97%) of the parents and students were supportive of the program and 3% were not, stating that the computer program was only another diversion from the normal school curriculum.

The final report offered that walk-throughs planned to gather data on this indicator were sporadic and that little data was recorded. No data was reported on student assignment completion as was indicated in the original grant proposal.

Davenport (High School)
During 2006-2007, 269 students participated in PLTW. During informal observations and interviews at West High School, the external evaluator concluded that students, their activities, and the projects they were working on suggested a high degree of involvement. Students worked independently and in teams and presented their projects to each other. During the evaluator's site visit at the open house, students were presenting their work to

community members, parents and other stakeholders. The end-of-year project report also included the following summary related to tracking and monitoring student engagement during instruction:

> Student engagement was measured by the Coordinator of Curriculum & Instruction responsible for implementing Project Lead the Way, Betty Griffin. She utilized the Instructional Practices Inventory model. Six levels of engagement on the part of the teacher and the student were recorded. This was done over the course of the school year as a result of 21 visits to PLTW classrooms and then merged onto one summary document. (See attachment: Project Lead The Way – Instructional Practices Inventory 2006-07) The optimum rating of a 6 for active learning/active teaching occurred 56% of the time. Teacher led conversation, a 5 rating, occurred 5% of the time. This is not surprising with such a computer-driven, project-based curriculum. Teacher led instruction, a 4 rating, occurred 29% of the time. This was especially prevalent at the beginning of class when teachers delivered PowerPoint presentations which are part of the PLTW curriculum and set the foundational knowledge necessary for students to do their work. Only 10% of the time was described as seatwork/teacher engaged work, a 3 rating. This tended to be time spent giving instructions for a test or for the students' portfolios. There was no evidence that the teachers were disengaged when students were doing seatwork, a 2 rating, or that there was total disengagement of the students and teachers, a 1 rating.

Students also wrote papers on engineering-related occupations and met practicing engineers in the local community, providing additional opportunities for motivation and engagement in the subject both in and outside of the classroom. Discipline problems were so rare that there was no need to track them in this group of students, according to the end-of-year report.

North Cedar (Middle School)

Teachers reported the time their students were engaged on the computer compared to the traditional assignment process and how much of the time was centered on the project-based learning as compared to teacher-directed instruction, using their lesson plans as a reference (see Table 1).

Table 1. Percentage of Student Computer Use and Project-Based Learning Use by Subject.

Subject Area	% of Student Computer Use	% of Project-Based Learning Use
English and Reading	95%	100%
Math	50%	10%
Science	90%	90%
Social Studies	80%	80%

For student enjoyment and engagement it was reported that the computer initiative was tremendously successful. The students indicated to the committee when they found out we did not get a grant for this year, that they wanted to take the computers with them to the seventh grade and have the sixth graders go without. The behaviors of the students would also support the enjoyment and engagement with the 6th grade having far fewer bad behaviors than students in the other two grades. The teachers expressed how it could be "fun" to be teaching and just how incredible the amount of information students could obtain in each topic area. The teachers expressed just how engaged their students were in the projects, especially the election debates, polls, campaign and the voting.

Pella (High School)
The Pella school system estimated the impact on student engagement by the frequency of lessons designed that used an inquiry process. They reported that 62.5% of lessons were inquiry-based, as indicated by involving one of the 5 E's (Engage, Explore, Explain, Elaborate, and Evaluate).

The 5E's were also used as a means of measuring the opportunities for students to engage in problem-solving experiences that mirror how scientists research in their own field. The tracking of teacher lesson plans indicated a student-centered approach that focused on posing research questions for investigation. This approach involved problem-solving activities that used the new technology and equipment to engage in experimentation or communication about experimental problem-solving and ethics issues.

Sidney (K-12)
Sidney reported that as a result of the ILTC project, they believed that student engagement had increased because more teachers were incorporating group projects into their curriculum activities. No quantitative data was provided to support this belief. The increase was evidenced by their weekly lesson plans and by regularly scheduled administrative walk-throughs. Administrators reported that it was "not uncommon to see students working in pairs in various locations in the building, … actively engaged in writing, rehearsing, recording or revising a podcast on the laptop computer." The number of projects is recorded in the check-out log in the appendix of this report, as well as by the number of podcasts published on the school website. End-of-year reflections by staff also indicated that students were more actively engaged with the use of the Apple laptop computers.

Sioux Central (Middle and High School)
The goal was to use the number of failures to do assignments in the Earth Science (8th grade) class as a measure of increased student engagement. The number of Failure to Do Assignments (FDA's) in the 8th grade science class decreased from 35 FDA's in 1st quarter to 18 FDA's in 3rd quarter. The 4th quarter saw an increase to 27 FDA's. Comparing the science data according to semesters, there was a decrease from 67 FDA's in the first semester to 45 FDA's in the second semester. The ACE Science points (inappropriate classroom behaviors) decreased from 28 in the first semester to 19 in the second semester.

The Impact on Student Achievement

Clay Central-Everly (High School)
No data were provided or analyzed by the district demonstrating impact on student achievement. Anecdotal observations indicated, "We used the SRI tests for an assessment format in reading and then adjusted our instruction in each class as indicated by these assessments. We gave the SRI test format; used our ITED reading pieces and used teacher reflections on their own assessments to determine adjusted teaching methods for our students."

Davenport (High School)
Data provided in the evaluation report suggested that numerous students who took the CT Algebra Principles performed better than students with other pre-algebra preparation classes in the Fall 2006 Algebra 1 classes. However, this needs further study and may be a factor of who selected the CTAP. In addition, approximately 30 students scored high enough on the end-of-course college assessment and their in-class assessments to pay for and receive credit at the college level at Iowa State or at the University of Iowa.

North Cedar (Middle School)
The scores in Table 2 indicate the average growth of the students, using the National Grade Equivalency scale. In order to make any inferences about the relationship between implementation of the new program and changes in achievement based on scores it would be necessary to compare the average growth in grade equivalency of the 6th grade class which benefited from the program to the average growth in grade equivalency of 6th graders who did not, perhaps starting with 6th graders from the year before.

Table 2. Average Grade Equivalency Growth by ITBS Subject Category

	Average growth, measured as grade equivalency		
ITBS category	**6th Grade (n=2013)**	**7th Grade (n=2012)**	**8th Grade (n=2011)**
Reading Total	.8	.5	.7
Reading Comprehension	.7	.4	.6
Math Total	.4	.9	.9
Science Total	.7	1.3	.6
Social Studies	-.2	1.8	.6
Core Total	.4	.6	.7

Although North Cedar sixth graders showed growth in reading, math, and science, the table shows a decrease in social studies. The social studies results may be attributable to several different factors. The change from teacher-directed strategies to a project-based learning structure allowed students to gather a wider range of information than what was presented on the testing materials. Concentrating on themes rather than textbook chapters, the social studies teacher created a class that was less aligned with the content of the ITBS social studies test. Finally, an evaluation of the teacher's performance this

year showed that he engaged students at a much greater level with many different activities than he had in the previous years. For example, he made a large map of the continent of Africa and then had the kids go on a safari hunt of sorts for different items or facts about the countries. Anecdotal evidence supports the conclusion that the students were engaged more with the learning. However, in order to improve social studies scores, the focus of the course may have to change.

Pella (High School)
Pella reported progress in student achievement. As the implementation of the technology is quite new, however, it is unlikely that all the gains in student achievement can be attributed to the ILTC project. However, the Pella report emphasized that increased student engagement is an important factor in increased achievement.

Pella planned to use three measures of student achievement related to its project:

1. Proficiency in science, measured by ITED scores

2. Proficiency in problem solving, measured by locally established problem solving tasks

3. American College Testing General Test scores

Pella reported that there was a slight increase in the percentage of students who were proficient according to the ITED science results—from 87.3% to 87.7%. With regard to proficiency in problem solving, measured by locally established problem-solving tasks, 89.6% of Pella high school students achieved an average score of 70% or higher. Data on the ACT scores will be collected in future years.

Sidney (K-12)
The district continues to compile data from standardized tests, including the ITBS and ITED, but at this point reports that the data are inconclusive with regard to the grant's impact.

Sioux Central (Middle and High School)
Sioux Central reported that 84% of their 8th grade students in 2006-2007 were proficient in science, as compared to 82% of the 7th grade students the year before. 74% of Sioux Central students were proficient while in 9th grade in 2006-2007, as compared to 80% of the 8th grade students the previous year. 90% of Sioux Central students were proficient in science while in the 10th grade in 2006-2007, as compared to 72% of the 9th graders the previous year. In order to assess the impact of the new technology, it would be interesting to compare these changes in proficiency to the changes in proficiency among the same grades from the period 2004-2005 to 2005-2006, but that has not been done.

Demonstration of Successful District-to-Vendor Relationships

Clay Central/Everly (High School)

The district did not contact with Knowledge Network Solutions (KNS) to provide assessment of current technology usage or 8 days of Tablet PC integration into the classroom training, 3 days of curriculum development training, on-going support via e-mail, online conferences, and on-site visits. No reason was given for this decision.

It was reported that they "received support services from Karen Appleton, AEA 8 consultant concerning the use of resources for both staff and students." Data regarding the effectiveness of this relationship was not provided. The district did report on Microsoft's Class Server classroom management system use, "Most students when off school time used our "Class Server" frequently and about a 60% usage was observed for this activity." The district also "abandoned the Academy of Reading and Academy of Math testing as it became very cumbersome to operate and was extremely time-consuming for the students." No information was provided regarding indicated relationships with Gateway, Computrace, or NetOps.

Davenport (High School)
Davenport reported that PLTW has benefited from numerous excellent relationships with vendors and other community groups and higher education institutions. Vendors and other partners attended Steering Committee meetings regularly; helped with the certification process for the PLTW programs at the high schools, donated money and services and provided reduced pricing for equipment and shipping. The report did mention one challenge related to vendor relations and how it was dealt with:

> Getting materials from the vendors on time was a big challenge because PLTW has become so popular the suppliers could not fill the vendors' orders. In some instances we cancelled the order and paid a little more to get what we needed in time. There is too much PLTW curriculum so pacing was a challenge the first time the teachers taught the classes. The teachers kept good notes on what they did and met in June to discuss how to adjust the curriculum to create a timeline for next year.

It is anticipated that vendor relationships will improve even more as the PLTW curriculum and technology becomes more clear and standardized in the local high schools.

North Cedar (Middle School)
North Cedar reported that one vendor in particular had promised that the instructional portion of a classroom could be filmed and then played on a local access channel during the evening hours. Unfortunately the cable system started installing a fiber optic system at an inopportune time. During the changeover process the school was unable to transmit on their station. To compensate for this, classes were filmed and disks provided to students who had been absent upon their return to school. According to their report, it wasn't the ideal solution, but it did fulfill the purpose of the grant.

Other vendors that were influential in allowing the project to run smoothly included: Microsoft, Intel, Gateway, F & B Communications, Knowledge Network Solutions, Classserver, Broad Education and the Clarence Telephone and Cable Company. The Grant Wood Area Education Agency provided numerous individuals in support of the project. The members from Grant Wood included Keith Stamp (Area Administrator), Vicki Bone (Special Education Consultant), Diane Peters (Reading Strategist), Mike Macklin (School Improvement Consultant) and Jon Nietupski (Grant Writer).

Pella (High School)
According to the Pella report, the role of vendors was crucial to the success of their implementation. The equipment had to be operational on day one of the school year. In addition, prior training on the capabilities of the probeware as well as the display technology was also necessary. Both the trainings and the equipment set-up were provided in a timely fashion by Pratt Audiovisual and the Verneer company. According to their report, staff felt that this level of training was essential for them to be able to operate successfully. To their credit, the vendors delivered. After the first year's experience, the school recommended scheduling subsequent trainings throughout the year

to provide the support necessary to take advantage of the advanced features of the equipment.

While Pella reported progress in developing business and industry partners, project members feel there is still a ways to go. Survey results from students indicated that they are not making the connections to life and careers that the project team had been expecting. According to the Pella report, next year's implementation of the PEERS project with Pella Corporation and an expanding partnership with the University of Iowa are the next steps in this journey toward making science more relevant for students.

Sidney (K-12)
Sidney did not report vendor relationships, but did report on other partnerships. They reported that AEA 13 provided professional development assistance in technology and writing assessment, as well as technical support in the installation and use of the technology. They reported that because they have ICN access, they could purchase Internet Access and host podcasts on their own server. Drake University provided college credit for training in the 6+ Writing Traits.

Sioux Central (Middle and High School)
Sioux Central did not report measuring the success of vendor relationships with vendors this year. They are planning to develop a partnership for 2007-2008 with Gateway, where the portable wireless lab and server were purchased. A second vendor is PASCO Science, which provided the software/probeware for the project. One teacher also utilized material as part of prior training from the National Aeronautics and Space Administration (NASA).

Development of Individual Education Plans for Students

Clay Central/Everly (High School)

The Clay Central/Everly report did not address individual education plans.

Davenport (High School)
According to the Davenport report, PLTW worked with a model that recruits students with an interest in science and technology to enroll in the structured curriculum. The counseling and mentoring allowed students the personal support needed to help them decide whether and how to commit to the structured curriculum. The evaluation report does not address IEPs, but they appear not to play a large role in this project because once students committed to PLTW, their plan of study and curriculum was set.

North Cedar (Middle School)
The North Cedar report did not address individual education plans.

Pella (High School)
The Pella report did not address individual education plans.

Sidney (K-12)
Sidney reported that IEPs were not appropriate for this project.

Sioux Central (Middle and High School)
Sioux Central reported that IEPs were not appropriate for this project.

Effective Integration of Technology and Teacher Training

Clay Central/Everly (High School)
Clay Central/Everly reported that project members thought that they tried to implement far too much new computer technology in the first year. Despite frustrations and complications, however, they worked extremely hard to make sure that the system worked and to help one another learn the system, with definite benefits for the whole high school. They reported that all staff were engaged and on task on each and every staff development day and also trained every other Wednesday evening to learn the program.

Davenport (High School)
PLTW is very computer and software intensive, requiring professional development for the in-service teachers and counselors. As part of the requirement to participate in the program, Davenport agreed to send all PLTW teachers to 2 weeks of training provided through the PLTW organization for each course of the 5 required courses. Currently the training is only available out of state, requiring funds for registration, travel and accommodations for the 6 teachers sent to prepare for the 2 courses taught during Year 1. In addition, teachers participated in considerable self-study and preparation as well as on-site professional development and conferencing (supported by District funds). Lastly, Cognitive Tutor Algebra Principles, the Algebra preparation software for students, is also very technology intensive. It required 3 days of training for each of the 6 teachers involved in its implementation.

North Cedar (Middle School)
To institute the change in the delivery of instruction from teacher driven to teacher facilitated, the leadership team received training from Knowledge Network Solutions in developing and utilizing project-based learning in the classroom. Three units using the project-based learning format were developed by the committee during in-service opportunities afforded to the committee by the grant from ITLC. The three units of study that the leadership team developed were Ethics, Diversity, and Change.

The professional development was led in two different pieces. The first portion of the professional development was in the area of using the Microsoft platforms to support data acquisition and student presentations. The teachers were led through a process to use Power Point in making classroom presentations more powerful for student learning. Microsoft based Excel spreadsheets, and data base to support instruction in the classroom. KNS was the resource responsible for presenting the information to the teachers. Kelly Dietrich, KNS employee, presented the material to the staff and had the staff start developing materials that they would be able to use in their classrooms during the school year. Ms. Dietrich then led the staff in developing the project-based learning

system that was used by the staff. Kelly led the committee in looking back at our past curricular area lesson plans and to see if there were three or four common themes, that ran though all of the teachers areas. After identifying the common themes the group started to develop the first unit.

The staff continued to work on the unit several times during the summer and staff in-service days prior to the students starting school. During the school year the team met every third day during "teaming" time and after the end of the school day working on the units. During the school year, staff was provided three days of in-service to help develop the units. Substitute teachers were hired to replace the teachers in their classrooms to support the cultivating of curriculum.

As part of the project, a co-teaching format was incorporated in the social studies and science areas. The Level II & Level III teacher co-taught with the social studies and with science teachers. The balance that was achieved by these teachers in the classroom was amazing to see. Much of the success can be attributed to the personalities of the teachers and to the special education teacher's willingness to work extremely hard before and after school in developing the lesson plans with each individual teacher. If you were to attend a class, you could not pick out who was supposed to be the lead teacher and who was entering the room as the special education instructor.

The Level II/III teacher also carried this project back to her room. Her success may be attributed to several factors: 1) the teacher participated in the initial training of the teachers; 2) the teacher communicated frequently with parents on the phone about areas of concern with the students and the students' computer difficulties; and 3) the teacher spent numerous hours of her own time preparing the lessons for the students, so that her students would not be frustrated with some of the more advanced computer issues.

Pella (High School)
The Pella report addressed effective integration of technology and teacher training in its discussion of vendor relations. Vendors and other community members provided training for teachers to become more familiar with technology to be used in instruction.

Sidney (K-12)
Sidney reported that professional development resulted in the following outcomes:

1. 6+1 Writing assessments were incorporated into classroom instruction

2. 6+1 Writing Rubric was adopted and put into practice

3. Mobile Apple labs have been utilized by staff and students as evidenced by the data in appendix

4. Students incorporated research, problem solving, writing, reading, speaking, and technology into the creation of approximately 65 podcasts

5. Staff has learned the process for publishing student podcasts on the Sidney website: http://sidneyschools.connections.net

6. Podcast Rubric has been adopted

Sioux Central (Middle and High School)
Sioux Central reported that Rod Haenke from Instructional Designs, Inc. was hired in the summer of 2006 to provide two days of professional development training on using science inquiry with technology. One day of training was provided in September 2007 on how to use the probeware.

Curriculum Development to Establish Successful Research-Based Instructional Methods

Clay Central/Everly (High School)
The Clay Central/Everly report addressed this question through teacher comments. One language arts teacher reported that "research was more enhanced." Science teachers noted that "research topics and information available online was enhanced by the program."

Davenport (High School)
PLTW is a nationally developed, well-researched intervention. Research on PLTW effectiveness, how to recruit students typically under-represented in engineering and technical occupations, and how to make the curriculum and instruction more effective is taking place nationally and at Davenport. In order to further research on PLTW effectiveness, the national organization has recently hired a Director of Research and launched a more extensive research program.

North Cedar (Middle School)
The teachers were engaged with the project-based learning for a core of the instruction. Prior to the one-to-one computer initiative, the math instructor used lecture-guided practice with a limited amount of manipulatives used during the instructional process. By becoming involved in the project, he has greatly increased the use of manipulatives in his classroom. North Cedar faculty reported that students participated in research activities from 35-45% of the time within the English, Social Studies, Math and Science classrooms (see Table 3).

Table 3. Percentage of time students participate in research activities by subject.

Subject	Research
English	35%
Social Studies	50%
Math	45%
Science	45%

Pella (High School)
During the site visit, the Pella leadership team and the external evaluator discussed the research and scholarship supporting the assessment of student constructed science learning. The emphasis on methods to facilitate students' active learning and motivation to learn personally meaningful information is being informed by current scholarship in science education.

Sidney (K-12)
Not reported.

Sioux Central (Middle and High School)
During the year, teachers began to revise their lesson plans to include inquiry learning into the curriculum. Teachers also began the expansion of the use of scientific equipment and labs as part of the instruction in inquiry learning.

Other Outcomes for Schools

Use of Computers and Software for Writing, Analysis, Research, and Communication

Clay Central/Everly (High School)
Although Clay Central/Everly's grant application stated that the district would use "Teacher logs and Student product portfolios" no data was analyzed. Examples of student portfolios were submitted.

Davenport (High School)
Use of computers and software for writing, analysis, and research is integral to the PLTW intervention. Davenport reports that students used the new technology (computers and software) to conduct experiments, analyze them, and then prepare written reports.

North Cedar (Middle School)
North Cedar reported, in the Table 4 below, the amount of time that the core teachers spent in their classroom doing activities that involved writing, analysis, research, or non-computerized activities.

Table 4. Percentage of time core teacher spent doing activities in their classroom by subject

Subject	Writing	Analysis	Research	Non-computer
English	40%	20%	35%	5%
Social Studies	10%	20%	50%	20%
Math	2%	3%	45%	50%
Science	15%	30%	45%	10%

Pella (High School)
According to the Pella report, teachers have focused on developing lessons in which students used computers or associated hardware to conduct scientific investigations. Students conducted a variety of activities, including:

1. Use of scientific probeware for investigation
2. Gathering and graphically displaying problem-solving results for elaboration to peers
3. Posting of results on Moodle web sites
4. Feedback on results through blogging with teachers, peers, and professionals
5. Podcasting using iTunes and Profcast
6. Virtual problem solving
7. Multimedia presentations

Sidney (K-12)
The use of computers and software has increased as evidenced by a number of indicators provided in the Sidney report. A technology survey was completed by 268 third through twelve grade students. Students were asked to compare their skill level from 2003, prior to the initiation of the grant project, to the current year. The skills they were asked to compare included Internet Research, E-mail, Chat/IM, Word Processing, Spreadsheets, Downloading and Saving, PowerPoint, iMovie, iPhoto, Computer Software and Hardware, Production of a Podcast and Production of a Vodcast. As evidenced by the results of this survey, the majority of the students indicated an increase in their skill level and application on each of the skills in question. (see appendix B) For example, on the use of the Internet, 21.6% of the students indicated a skill level of 4 or 5 (5=high) in 2003, and 82.5% indicated a skill level of 4 or 5 in 2006, an increase of 60.9%. In the area of word processing, the increase was from 27.2% indicating a skill level of 4 or 5 in 2003, and 68.7 in 2006, an increase of 41.5%. Because podcasting and vodcasting were new initiatives with this grant, the students had no experience with either of these skills. The increase in their skill level with creation of a podcast is evidenced by the number of podcasts currently published on the school's website. An additional indicator of an increase in productivity in the use of computers and software is evidenced by the documented use of the Apple computers on mobile carts in both the elementary and secondary buildings. This information was documented on check-out logs collected by the technology coordinator. This data is displayed in the appendix on the Laptop Usage Charts.

Sioux Central (Middle and High School)
In the Sioux Central report, increased use of computers was measured by the collection of computer log data from the science teachers. The data show an increase of computer

usage in the Earth Science class from 7 times during the first semester to 25 times in the second semester. Computer usage decreased in the Physical Science class from 14 times in the first semester to 7 times in the second semester. Computer usage in the Biology class increased from 11 in the first semester to 32 in the second semester. The overall computer usage (grades 8, 9, 10) increased from 37 in the first semester to 64 in the 2nd semester.

Movement Toward Student Centered Classrooms

Clay Central-Everly (High School)
The district reports use of the following formats in the classroom for the 2006-2007 school year as evidence of student centered classrooms:

1. Several research data was collected for all of the classes

2. Class Server was consistently used by both parents and students

3. Student was required in several classes at all grade levels to develop slide shows and PowerPoint presentations**.** These were done not only for classes, but also other community activities and extra-curricular activates the students were involved in.

4. They had one evening with the parents and used students to demonstrate the use of our new software and how teacher/student communication was used. Parents also were involved in the learning of the wireless system so they could also view student work, school announcements, etc.

5. Portfolios were developed for each student with most of the emphasis based on the production of assignments and storage of school work used.

Davenport (High School)
The Davenport end-of-year report did not address student centered classrooms. However, the curriculum and instruction for Project Lead the Way is student centered through the use of problem based learning, student group projects and self- and group-evaluation, and through diagnosis and adaptation of instruction to students' needs.

North Cedar (Middle School)
North Cedar reported that teachers were engaged with the project-based learning for a core of the instruction. The three teachers who taught science, social studies and English established high expectations for using project-based learning in their classrooms on a

daily basis. The math instructor was involved in project-based learning but on a much smaller scale than the other teachers. The numbers reported in section 4.2.6 indicate this. Prior to the one-to-one computer initiative, the math instructor used lecture-guided practice with a limited amount of manipulatives used during the instructional process. When he became involved in the project, he greatly increased the use of manipulatives in his classroom.

The enjoyment teachers derived from the experience and the degree to which they felt they were making a difference were not measured with any specific instruments. However, four out of the five main teachers involved in the project stated that it was a positive experience for them and want to continue to use the computers in the future. Only the math teacher is hesitant in using the computers for the 2007-2008 school year. The teachers expressed that it could be "fun" to be teaching and that it was incredible to see the amount of information students could obtain in each topic area. The teachers expressed that their students were very engaged in the projects, especially the election debates, polls, campaign and the voting.

Pella (High School)
Teachers developed real-world problem-solving scenarios for each unit of study in the high school science curriculum. Students were offered choices in activities through multiple scenarios and independent research tasks. The tasks have specific criteria to inform evaluation but are open-ended to allow students to tailor them toward specific areas of interest. Pella's report indicated that 89.6% of the science students performed at the proficient level or above in locally developed problem-solving activities. The project's focus on thinking helped to focus students on rigorous problems and communicate solutions like scientists.

Sidney (K-12)
Explicit instructional plans submitted by each teacher throughout the year indicated that teachers were beginning to shift the focus of their classrooms from "teacher-centered" to "student-centered". Examples of this appeared in instructional lesson plans collected by the building administrator. An increase in the number of plans that include individual research and writing, group work on podcasting, and peer assistance was documented in explicit instructional plans as well as in weekly lesson plans.

Sioux Central (Middle and High School)
The Sioux Central report indicated that the move to more student-centered classrooms was measured by the use of inquiry-based lessons at the start of the 2006-2007 school year compared to the end of the year. The number of estimated inquiry-based lessons remained about the same from first semester to second semester. Sioux Central concluded that additional efforts will need to be made in 2007-2008 to do a better job of collecting lesson plans to get an accurate count.

Disciplinary Issues

Clay Central/Everly (High School)

Student disciplinary issues were tracked by a comparison of referrals between the 2005-2006 school year and the 2006-2007 school year. There was a dramatic decrease in the numbers, from 204 in 2005-2006 to 87 in 2006-2007. The district felt that the use of computers contributed to this decrease.

Davenport (High School)
Davenport reported that disciplinary issues were so rare as to not be an issue with this project.

North Cedar (Middle School)
The disciplinary problem data was based on the TATs for behavior issued by the teachers. The 6th grade teachers issued 139 TATs compared to 192 for the 7th grade students and 282 for the 8th grade students. According to the North Cedar report, the comparison of these numbers to the number of TATs generated by 6th graders before the implementation of the program was valuable in helping to determine the effect of the program on discipline. For the 6th grade students over half of the disciplines issued occurred in a single classroom. A group of students in an exploratory classroom misbehaved frequently in the second quarter, reflected in the reporting. The staff members believed that the students were better behaved when they had their computers and were engaged in an activity. The only problem that the team experienced as a whole occurred when students were instant messaging each other against their teachers' instructions. Even 7th and 8th grade teachers who had the 6th grade students in their 6th hour guided studies classes noted how much more engaged the 6th grade students were compared to the other students.

Pella (High School)
According to the Pella report, engaging the students more deeply in problem solving and the use of 21st century technology skills is a key factor in engagement (Grant goal #3). Students with high levels of engagement rarely have problems with discipline.
Pella defined a disciplinary problem as one that resulted in an office referral requesting action by the Principal or Assistant Principal. During 2006-2007, Pella had a total of 14 office referrals from the four science classrooms involved in the project. This number includes everything from excessive tardies to disrespect and is considered to be a very low number of referrals. While they do not attribute this positive level of behavior entirely to the infusion of technology, teachers did note that their students were very respectful of the technology and were on task when using it.

Sidney (K-12)
Sidney reported that discipline was not a problem.

Sioux Central (Middle and High School)
See discussion under student engagement.

Other Outcomes Important to the Projects

Pella (High School)

According to Pella's report, one of the key goals in this project was to use technology to connect students to science-related careers that they might not encounter elsewhere. This goal was intended to increase the relevance of science to the common student. 43% of the students surveyed agreed that they saw applications to various careers in what they were learning in science class. 44% said that they saw a connection between what they were learning in science and how it could apply to their own lives. Survey data indicated that the project still has a way to go in this area.

Other Outcomes for Educators, Administrators, Parents and Community or Organizations

Clay Central-Everly (High School)
Did not report.

Davenport (High School)
Davenport reported good levels of parent involvement, successful acquisition of technology and software, development of new technology intensive classrooms, and teacher and administrator enthusiasm for the project. As of December 2006, Davenport was the first multi-high school district in Iowa to be certified as a PLTW school. District enthusiasm is quite high, as indicated by the following quote from their report:

> This is a tremendous program that can serve as a model "program of study" for education in general with its emphasis on staff development for the teachers before they teach the class plus on-going teacher staff development, counselor training, rigorous and relevant curriculum linked to industry standards, end-of-course assessment, and college credit.

The 3rd party evaluator reported that this was a mature program with widespread and solid district and external support. In addition to ITLC funding, the PLTW intervention received extensive external and internal resource allocations. He noted especially how effective the project management was and how community support, steering committee work, and local administration worked together effectively.

North Cedar (Middle School)
The data for the parental involvement is derived from a parent survey taken at the end of the school year. Of the possible 64 sets of parents, 31 parents responded to the on-line survey. Fifty-five percent of the responding parents indicated that they logged on to their child's Class server account on a daily basis. Eighty-seven percent of the parents indicated that they logged on to their child's Class server account on a weekly basis and one hundred percent logged at least once during the month. Another question, which was relevant for student achievement, was the extent to which parents felt involved in their child's educational pursuits. Every parent responded that they have assisted their child on research or homework assignments.

Pella (High School)

Parental involvement was not a focus of the project. However, Pella has had considerable interest from parents with science-related careers serving as resources.

Sidney (K-12)
Parental involvement in the use of technology has increased over the past year. A technology survey was completed by 66 parents in the district. From these surveys, it was determined that 68.2% of them receive e-mail notices about school activities and announcements. 35.5% of the parents who responded indicated that they access school communication using technology on at least a weekly basis. When asked if the Sidney School system is doing an adequate job of providing technology and training for students, 84.8% of them responded positively.

Comments from parents on the survey include the following to support positive outcomes from the grant:

1. "I am very pleased with Sidney's commitment to technology. It is very important with today's job market that our students stay current on the advances in technology. Thank you for recognizing the importance of this aspect of education."

2. "I receive e-mails from school every day. I feel it is a great way to communicate and keep me updated on daily happenings at school."

3. "I feel that the school is doing their best to provide computer access to parents."

4. Thanks for all the time and effort that your staff has taken to learn all the new technology that the grant has helped bring to our district. Keep up the great work with my kids!"

The number of "hits" on the school's parent access page was collected. Data indicate an increase of 25% in the number of hits on the parent access page from November 7, 2006 to May 20, 2007.

Sioux Central (Middle and High School)
Parental involvement data were collected using PowerSchool, a school wide database system that monitors student attendance, grades and student demographics. The middle school data show the total access hits by parents to the PowerSchool system increased from 1182 in the first semester to 1322 in the second semester. The high school data shows the total accesses by parents to the PowerSchool system remained essentially the same from the first semester (4659) to the second semester (4624).

Lessons Learned by Individual Projects

North Cedar (Middle School)
In retrospect, North Cedar official believe they should have been less aggressive at trying to change so many areas at once. They went from teacher directed instruction to project-

based instruction, changed the daily schedule to add a guided study hall for all students, and went to a computer initiative for the 6th grade students. It would have been much easier to manage one or two of these initiatives than all three simultaneously.

North Cedar hopes to bring the project forward to the seventh graders in several classrooms. The social studies teacher and reading teacher would like to be able to use class server in their classrooms next year. This means, that a third of the seventh graders' classes would be on-line and using computers during their daily lessons. This plan can be accomplished if they allow the seventh grade students to check out computers similar to what they anticipate doing for the sixth grade students.

Pella (High School)
Pella plans to expand the use of the technology in the classroom. This will include videoconferencing, professional critique of projects, expanded problem solving scenarios, and a variety of experimental design additions.

Pella's plans also include the model they have established with Pella Corporation as a result of their partnership. It is built in five levels:

Level 1: Awareness activities on what an engineer does that articulate with the curriculum in grades 3-12.

Level 2: Engagement activities at Pella High, Pella Corporation, and the University of Iowa for the students who indicate a desire to explore engineering on the eighth grade plan.

Level 3: Mentoring for students who enter engineering college by Pella Corporation and the University of Iowa.

Level 4: Possible early acceptance into the internship program at Pella Corporation. It would also include reverse mentoring of Pella students.

Level 5: Potential hiring by Pella Corporation

Pella would like to repeat this model in various other science careers. Many of these may need to use technology to complete, as it would not be possible to bring them to Pella. Pella believes that this hands-on contact with careers will continue to increase the relevance of the science curriculum to our students.

Sidney (K-12)
As we designed the professional development with Apple professionals this year, we grouped the staff according to grade level, K-6 and 7-12. While this was effective in that some of the staff who was more proficient with technology could assist others, we have decided that next year is will be more beneficial to provide "ability grouped" instruction. Those staff members who are proficient will be grouped together to move at a more accelerated pace through the training. Those who are still at the frustration level will be able to move at a less intense rate. Following the training from Apple, we will again rely

on those more proficient teachers to become mentors as the teachers work in study teams to implement and integrate technology.

We have discussed the sustainability of the work from this grant and believe we have in place several items for that purpose. First of all, the AEA will provide two days of professional development in this district on the use of iMovie we have again contracted with Apple for technology training from their facilitators. We have two dates in August and two in November contracted with them. Secondly, we have made arrangements to update the elementary computer lab with Apple computers that will have more capabilities for this project. Thirdly, we have entered into a leasing agreement with Apple to allow us to purchase twenty-four additional iBooks to expand the number of mobile labs in the district to six. Lastly, we will continue to provide staff with the time to collaborate together in study teams with a weekly late start devoted to professional development.

Sioux Central (Middle and High School)
It is the intention of Sioux Central to continue to implement this project within the next school year. We will look at the data (lesson plans, computer use logs, ITBS/ITED, etc.) at the end of the second and third year to see if trends change and were impacted by the use of the material. Since we have the equipment and have begun to implement the probeware, we will continue to do our own in-house professional development and continue to collect data

APPENDIX A
Clay Central-Everly (High School)

Clay Central/Everly High School
Iowa Technology Learning Center
Final Year Report
Submitted July 18, 2007

This final report for the Iowa Technology Learning Center will focus on three main areas as we have concluded the 2006-2007 school year and the data included in this report is the final data reported to our Iowa State Department of Education. The three areas of reporting involve our assessment data, teacher reflections and outcomes and an overall summary of our first year of computer initiative programming here at Clay Central/Everly High School.

Teacher Reflections and Outcomes: The following questions were given to the entire high school staff and their reflections are included in the first section of this report:

1. What kinds of curriculum adjustments did you make this year using technology versus other years?
2. What were your successes and failures using technology this year?
3. What kinds of what were your assessments used this year with technology?
4. How did you use your reflective journaling?
5. Other Grant Opportunities: do we want to pursue more grants next year?

I have written the reflections of the staff by **subject areas** as follows:

Language Arts: (2 teachers) - Student involvement with their own learning was enhanced by the use of technology, but tests were still given by normal pencil and paper method. Research was more enhanced in this department, but with message text and communication enhanced online the possibility of plagiarism and cheating was also enhanced. As with any new program, the learning curve of the instructor was challenged and will improve with continued use of the computer program. More "walk along" assignments involving more teacher and student communication during class time was also improved. (See attached comments). Class Server a big plus!

Social Studies: (1 teacher) – Reflected the change in which students viewed their work habits concerning projects and activities versus the large posters and maps previously used in this area. Note taking was one failure as students tended to use flash drives to copy each other's notes; rather than take notes on their own during designated class time. This is the first time that computer generated tests were used in this area.

Mathematics: (1.5 teachers) – Class Server a big plus! Both staff members reflected that their teaching techniques changed drastically. My first year teacher mentioned frequently that she doesn't know how she would teach now she has used technology in her classroom for all of her student lessons and presentations! The learning curve for both teachers on Class Server would like to be enhanced next year!

Clay Central/Everly High School
Iowa Technology Learning Center
Final Year Report
Submitted July 18, 2007

Science: (1.5 teachers) – Research topics and information available online was enhanced by the program. My curriculum was enhanced but not changed by the use of the technology and computers.

Family and Consumer Science (1.1 teachers) – Recipes and cookbook items were addressed using Power Point. The use of the CHOICES program was a great benefit for our work study students. Our computer orientation could be more in-depth as the feeling was that students was shown how to use the computer, but not shown how to take care of the computer as well as we could have.

Foreign Language (.5 teacher and .5 teacher) - Assignments should be put on the Class Server for student availability. Textbook for German has links to reinforce grammar, vocabulary, reading and culture.

Business (1 teacher) – Student on task time a challenge. Several units for our Business courses were on the Class Server. The use of Excel and Quickbooks for our two Accounting Courses was a huge plus!

Art Education (1 teacher) – Class Server used exclusively for this discipline- also Adobe Suite using specifically for our new Graphic Design course. Cross curriculum items were addressed much better with our technology program. All assignments and tests were taken on the computer. Research and resources available through the computer for this discipline were another huge plus!

Special Education (1 teacher and 1 Teacher Associate) – Also our Technology Coordinator; reflected on his own understanding of Class Server and getting many diversified programs for each students on the Class Server. Assessments used were reading comprehension questions, career choices, writing and responding on the Class Server.

SECTION II. ASSESSMENT DATA

As we studied our ITED test scores and looked closely at our ASSET scores students scored very well and improved in their overall ability as good progression took place this first year of technology. The staff and principal felt that because of technology the student has a much broader understanding of concepts taught and thus scored better on their standardized testing.

Clay Central/Everly High School
Iowa Technology Learning Center
Final Year Report
Submitted July 18, 2007

SECTION III. OVERALL OUTCOMES OF THE PROGRAM

This final section of my report deals with overall outcomes and changes which we will attempt to make in coming years:

1. One of our greatest fears as we entered this program is the ability of our hardware and server to handle the bulk of information and transmission of that information between staff and students. We had a few flaws in the system, but overall this part of the system handled things very well.

2. Another fear we faced this year was preventing students from using these new "machines" for things other than education. We are looking to update our discipline procedures and system concerning the misuse of computers. On the other hand we had only 6 or 7 takeaways the entire year which was a plus and a good reflection of our student body this past year.

3. Student use of computers as a supplement to a program versus the ultimate tool of education and learning- we will continue to work with our students and monitor the use of our computers in our building. Most staff reflected that with other types of software we might be able to check each period of students and monitor their "time on task" better without taking their creativity away. Also the fear of students using a computer for note taking, writing assignments and other such tasks and convincing them that the computer IS a benefit to their learning. Trust in the machine and system is the convincing part that much be achieved.

4. We felt that we put two years of computer technology into this first year. Despite some frustrations and complications at times the staff worked extremely hard to make sure that the system worked. They worked very hard at professional staff development days to help each other learn the system- this was a definite plus for our high school portion of the school district! All staff were engaged and on task with each and every staff development day and also trained every other Wednesday evening to learn the program.

In summation I would like to thank Dr. Mary Herring from UNI and the entire Iowa Technology Learning Center for this opportunity. It was a great adventure and well worth the time and effort.

Charles A. Kuester
Grant Coordinator and Principal

APPENDIX B
Davenport (High School)

Davenport High School
ILTC Evaluation Report
Final Report

Executive Summary

Project Lead The Way (PLTW), a nationally-recognized pre-engineering program, was implemented at Central, North, and West High Schools in Davenport, Iowa. The first of 5 courses, Introduction to Engineering Design and Principles of Engineering were offered beginning in the fall of 2006. One new course will be added each year for the next 3 years. High-end computer labs at each of the high schools had to be installed to run the special software needed for this program. These were funded through other sources, but Cognitive Tutor Algebraic Principles (CT AP) computer labs were installed to provide support for students who needed accommodations for the algebra which is pre-requisite for getting into PLTW. Teachers needed to be trained for PLTW and CT AP and instructional materials were obtained to teach the classes.

Description of the Project

The most important aspects of the situation/context in which the project took place:
This project was undertaken to help transform the current technology education department (formerly industrial technology) to deliver a rigorous and relevant curriculum that prepares students for careers in high skill, high wage, and high demand occupations.

The project goals and objectives:
The primary goal of this project was to prepare students for careers in high skill, high wage, and high demand occupations by implementing *Project Lead The Way (PLTW)*, a nationally recognized pre-engineering program, over the next 4 years in all 3 high schools in the Davenport Community School District. Furthermore, PLTW shall serve as a model for educational reform which sets high expectations for teachers and students and results in college credit being awarded for students who meet those expectations. Since algebra is a prerequisite to take PLTW, an accommodation was provided for students who are not successful in a traditional algebra classroom. Cognitive Tutor Algebraic Principles (CT AP), a computer-based mathematics delivery system, was instituted as a "bridge" to algebra. This means that students take CT AP before they take Algebra I so they can master the foundational concepts.

Curriculum Achievement Outcome: Students will increase academic achievement by participating in a rigorous and relevant Engineering, Industrial & Technological Sciences Career Pathway.

Post-Secondary Outcome: High school students have the opportunity to accrue college credit for successful completion of all PLTW course requirements and mastery on the final assessment. Students who complete PLTW will enroll in engineering and engineering-technology courses in 2- or 4-year colleges.

Career Development Outcome: Students will be interested in and prepared for careers in high skill, high wage, and high demand occupations.

The numbers and types of teachers, other school personnel and students served by the project:
Six technology education teachers were sent to 2 weeks of PLTW training during the summer of 2006 so they could become certified to teach PLTW classes. Seven counselors attended PLTW training so they could advise students about PLTW. During its first year of implementation, 269 students participated in the PLTW program at Central, North, and West High Schools. Six mathematics teachers attended 3 days of CT AP training to qualify them to teach Cognitive Tutor Algebraic Principles. Approximately 225 students were in CT AP classes during the 2006-2007 school year.

The involvement of school and district personnel and the roles they played in the project:
There has been tremendous support for PLTW at all levels. As evidence of this support, the program was implemented just 14 months after we first heard about the program. This is virtually unheard of in our district for a program of this magnitude. Upper level administration approved moving forward with the initiative and scheduled a date to appear before the Board of Education. The Board gave its approval approximately 4 months after we first heard of the program. The Career & Technical Education Curriculum Coordinator took responsibility for establishing an advisory council, implementation details, facility needs, marketing, securing funding, etc. Building administration participated on visits to other districts that had the program; promoted the program to parents, students, and staff; and served on the advisory council. Counselors participated on visits to other districts that had the program; helped recruit students; and served on the advisory council. Teachers participated on visits to other districts that had the program; recruited students; promoted the program to parents and the community; helped renovate facilities; participated in training; served on the advisory council. The technology department was instrumental in securing and installing the technology and with helping establish the infrastructure to support the labs. The Development Office Supervisor and Support Services Specialist helped secure grants and serve on the advisory council. Building principals and the Director of Curriculum & Staff Development dedicated funding to the program.

The involvement of community and business partners, including any advisory boards:
The Project Lead The Way Advisory Council was formed approximately 6 months before the program was ever implemented. The Council is made up of many different engineers from companies including John Deere, the Rock Island Arsenal, Alcoa, the U.S. Army Corps of Engineers, and Packaging Technologies. It also has representation from Junior Achievement, the City of Davenport, the president of Davenport's PTA, and our Area Education Agency. Counselors, principals, teachers, students, central office administrators, and parents also serve on the Council. It meets monthly and is very well attended with typically over 20 people in attendance each month. The Council has played a critical role in many aspects of the program. It has had input into the design of the

program. For example, the Council influenced our decision to implement Civil Engineering & Architecture year two rather than Digital Electronics (DE.) The engineers all agreed that DE should be added after we have more enrollments and that we might want to consider having it at just one or two of the schools since it may appeal to a narrower student audience. Some examples of student experiences/resources provided by to the Council include: Principles of Engineering students were able to tour highly specialized areas of the Rock Island Arsenal, a Council member from the U.S. Army Corps of Engineers gave presentations to classes, and a female engineer from Alcoa spoke with high school females about engineering as a career. Many of the Council members participated in the certification process last December that led to Davenport becoming nationally certified after only one semester of implementation.

The involvement of institutions of higher education:
St. Ambrose University, Scott Community College, and Hamilton Technical College all have representatives who are very active on the Project Lead The Way Advisory Council. Each of them participated in the certification process and has been supportive in countless ways. For example, St. Ambrose University shared their rapid prototype printer with PLTW students. Scott Community College (SCC) and St. Ambrose teamed with Davenport Schools to create a CO2 dragster competition for PLTW students. Engineers from the Council were invited to help judge the competition. St. Ambrose and SCC hosted a "Girls Night Out" in which they invited our female students and their parents who are interested in engineering as a career to attend an evening in which female engineers met informally with them and answered their questions about what they do in their job. The University of Iowa and Iowa State University award college credit to PLTW students who meet predetermined criteria and SCC will do the same next year. We had 29 students who opted for the college credit this year and several others who qualified. Both the U of I and ISU host the counselor/teacher training and student symposiums on alternate years. The colleges and universities invite PLTW students to come visit their engineering departments.

The nature of and any changes in vendor relationships:
Dell computer provided a great low price for really robust computers for use in our PLTW computer labs. Dell also donated the 6 teacher laptop computers that we needed. Gateway, Intel, and Microsoft also donated 9 Tablet PC computers that enable students and teachers to do really creative applications in the classroom and allow students without computers at home to check them out. Teachers were provided training on how to use these computers.

The resources used and the materials, software, equipment, infrastructure and other durables acquired:
PLTW is a very hands-on, project-based curriculum. In the first course, Introduction to Engineering Design (IED), the students do the majority of their work on a computer using the 3-D modeling software, Inventor, which is part of the AutoDesk Design Academy software package. IED students do projects in which they use calipers and micrometers to measure objects which they then design using the 3-D software. The calipers and micrometers were obtained using ILTC funds. Computers, software, and

LCD projectors were all critical components of the Cognitive Tutor Algebraic Principles classrooms. In Principles of Engineering, the students construct things solving problems that are posed to them. Fishertechniks kits are required by PLTW for some of these problems and were obtained using ILTC funds. An example of a Fishertechniks kit is a marble sorter in which marbles are directed down different chutes as a light beam is shot through them determined by the color of the marble. The students build the marble sorter and then program it to do what they need it to do. It operates on the same principle as a vending machine dispensing food.

The professional development, curriculum development, planning, instruction and other activities made possible by the project:
As a nationally-recognized program, PLTW holds high standards for schools that offer the program. When we signed the contract, we agreed to send our PLTW teachers to 2 weeks of training for each course that they will teach. Since we were implementing 2 PLTW courses at each of the 3 high schools, it necessitated sending 6 teachers to the 2-week training last summer. We must also send teachers to training this summer to train them for the new Civil Engineering & Architecture class that we will implement this coming school year. The staff development is only offered out-of-state since PLTW was relatively new to Iowa when we began. Housing, registration, and travel expenses made the training expensive since we had so many teachers. The teachers participate in additional training as well as several curriculum council days throughout the year in which they meet to discuss curriculum and instruction issues they may have, but these were funded using district dollars. Cognitive Tutor Algebraic Principles required 3-days of training for each of the 6 teachers.

Any significant impediments, barriers or problems and how they were dealt with:
Getting materials from the vendors on time was a big challenge because PLTW has become so popular the suppliers could not fill the vendors' orders. In some instances we cancelled the order and paid a little more to get what we needed in time. There is too much PLTW curriculum so pacing was a challenge the first time the teachers taught the classes. The teachers kept good notes on what they did and met in June to discuss how to adjust the curriculum to create a timeline for next year.

Student engagement:
Student engagement was measured by the Coordinator of Curriculum & Instruction responsible for implementing Project Lead The Way, Betty Griffin. She utilized the Instructional Practices Inventory model. Six levels of engagement on the part of the teacher and the student were recorded. This was done over the course of the school year as a result of 21 visits to PLTW classrooms and then merged onto one summary document. (See attachment: Project Lead The Way – Instructional Practices Inventory 2006-07) The optimum rating of a 6 for active learning/active teaching occurred 56% of the time. Teacher led conversation, a 5 rating, occurred 5% of the time. This is not surprising with such a computer-driven, project-based curriculum. Teacher led instruction, a 4 rating, occurred 29% of the time. This was especially prevalent at the beginning of class when teachers delivered PowerPoint presentations which are part of the PLTW curriculum and set the foundational knowledge necessary for students to do

their work. Only 10% of the time was observed as seatwork/teacher engaged work, a 3 rating. This tended to be time spent giving instructions for a test or for the students' portfolios. There was no evidence that the teachers were disengaged when students were doing seatwork, a 2 rating, or that there was total disengagement of the students and teachers, a 1 rating.

Disciplinary problems:
No evidence was collected on disciplinary problems. Students in these classes tended not to be problematic and did not warrant tracking this information. In fact, students requested coming in before school and during lunch because they wanted to get a head start on their projects.

Use of computers and software for writing, analysis, and research:
Introduction to Engineering Design and Principles of Engineering are both very computer-driven and utilize AutoDesk Design Academy software—especially the 3-D modeling software, Inventor. Students in both Introduction to Engineering Design and Principles of Engineering are required to do a career research paper on an engineering-related career. Students in both classes must compile a portfolio of all their work. Students in Principles of Engineering must do a write-up of all their projects. (See attachments: Conveyer belt write-up and Temp fan write-up…)

Movement toward student-centered classrooms:
The majority of the projects are student-centered. Students work independently and in teams. They present their projects before their class and in front of other audiences such as the advisory council.

Parental involvement:
No evidence was collected on parental involvement. However, parents were involved in the certification process, served on the advisory council, invited to Open Houses, and attended student presentations. Parental support has been very positive.

Improved vendor and other business relationships:
Many businesses are represented on the Project Lead The Way Advisory Council and members are very dedicated. (See attachment: PLTW membership list) They attend the meetings regularly, volunteered their time during the certification process, and have sponsored special activities for students. Our local Optimist Club donated money to PLTW to fund field trips and industry tours. Mid-west Tech loaned a 3-D printer to one of our high schools for several months so the PLTW students could use it. It dropped the $500 shipping charges and upgraded the model of 3-D printer when we then placed an order with them.

Increased student achievement:
The Project Lead The Way end-of-course college assessment is the ultimate measure of student achievement. It was our goal for 1 or 2 of our students to achieve at a high enough level on the end-of-course college assessment during our first year of implementation that they would qualify for college credit. The curriculum and assessment

are standardized across the nation. The assessment is administered in a highly controlled setting with a different assessment being released each time it is given. A student must achieve a course grade of 85% and then score at least 70% on the college assessment. The assessment is scored first by the high school PLTW teacher and then re-scored by a university professor. In Davenport during our first year of implementation, 29 of our students scored high enough and paid to receive college credit at either the University of Iowa or Iowa State University. (See attachment: Students Who Paid for the College Credit 2006-2007) Several other students attained this standard but chose not to seek the college credit.

Though it is too early to know what impact Cognitive Tutor Algebraic Principles will have on PLTW, it has been successful in and of its own right. Data is not in for second semester, but of the courses that help students prepare for Algebra 1, those students in Cognitive Tutor Algebraic Principles performed best in their coursework during the fall of 2006. (See attachment: Grade Distribution)

Other outcomes important to the project:
The fact that all three Davenport high schools became nationally certified PLTW sites during the first semester of implementation attests to the success we have experienced. At that time (December 2006), Davenport was the first large, multi-school district to be district-certified in the state of Iowa. (We probably still are.)

Conclusions about overall value of the project:
This is a tremendous program that can serve as a model "program of study" for education in general with its emphasis on staff development for the teachers before they teach the class plus on-going teacher staff development, counselor training, rigorous and relevant curriculum linked to industry standards, end-of-course assessment, and college credit.

Lessons learned about what to do and not do:
We would not do much of anything differently other than to figure out a way to target females earlier.

Recommendations to others about how to be successful with similar projects:
The program needs an advocate at the administrative level, but the time demands for that person are a huge challenge. The program is expensive to implement; I am encouraging a smaller district nearby to send some of their students to our district for PLTW. The marketing and buy-in at all levels of the organization has been very successful in Davenport—it would be difficult if a district did not have this. The Project Lead The Way Advisory Council has been immensely successful. We were able to obtain a couple of grants to help with the major costs of implementing three new labs and to get the program off the ground. I don't know what we would have done without them.

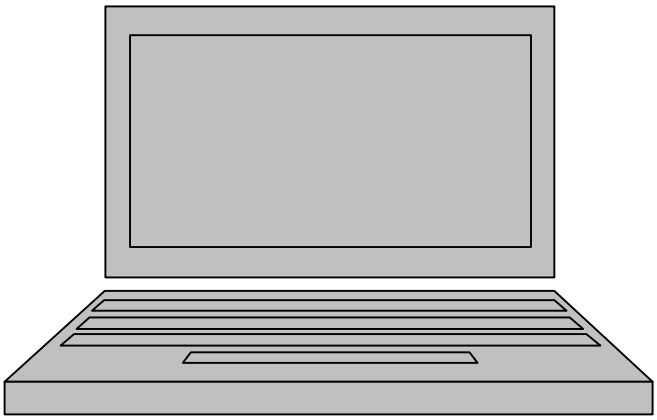
Suggestions for improving the local project or the larger state-level Iowa Learning Technologies program:
Support for PLTW has been overwhelming, and ILTC played a big part in its successful implementation. We anticipate the program growing and expanding. However, it is a

multi-year project being implemented in a large district at 3 large high schools. Another round of ILTC dollars to help with implementation of Computer Integrated Manufacturing, a very expensive equipment-intensive PLTW class would be very helpful.

Plans for the coming year with regard to sustaining, expanding or curtailing the project and the rationale for those actions:
Introduction to Engineering Design and Principles of Engineering will continue to be offered at all 3 high schools. Civil Engineering & Architecture will be added this coming school year. Student enrollment for next year supports our ability to do this. Many approaches will continue to be used to build the program including: counselor training, presentations to community and school groups, face-to-face recruitment, Open House displays, posters around school, media coverage, PLTW t-shirts, a women in engineering assembly, parent-teacher conferences, and student competitions.

PLTW provides the rigor and relevance that our district believes is so critical. The college credit is important to our district and to our parents. The district has embraced career pathways and Project Lead The Way is a component of the Engineering, Industrial & Technological Sciences Career Pathway. The PLTW Advisory Council has a strong community component including influential people who can help keep PLTW alive and strong. The Council will focus on the "career enhancements" that it can provide outside of the classroom to help students get a richer, deeper understanding of engineering and engineering-technology careers. We will strive to create a system that organizes these resources including classroom contacts, speakers, field trip, industry tours, female engineers, etc. into an easily-accessible database for PLTW teachers.

APPENDIX C
North Cedar (Middle School)



North Cedar Middle School

ILTC Evaluation Report

Mark Dohmen
Dave Hedrick
Todd Hoefler
Laura Cady
MaDonna Gretten
Shawn Driscoll
Greg Fisher
7-24-07

ITLC Computer Grant Evaluation Report

1. A short Executive Summary, addressing the most important points of your full report.

The reason for the grant was to reduce the achievement gap for our students when they go from their elementary setting and enter the middle school. Student achievement scores in all areas and more specifically, in reading, indicate a leveling off of student achievement or even a slight decline in test results. We are implementing the computer project to assist in giving students another way of connecting with the curriculum. The staff feels that instruction using project-based learning improves student motivation and will result in an increase in test scores.

2. A description of the project;

The ITLC Grant Project centered on the transition of sixth grade students entering into the North Cedar Middle School from the Mechanicsville Elementary and the Lowden Elementary sites. The data from our Iowa Test of Basic Skills indicated that when the students arrived at the middle school a slight decrease in the growth of our students occurred during their sixth grade academic year. The decrease in the growth was most evident in the area of reading.

Using this data, a leadership committee was formed to determine ways in which we could better serve our students. The committee members were: Mark Dohmen (6th grade language arts), Laura Cady (6th grade science), Todd Hoefler (6th grade social studies), Dave Hedrick (6th grade math), Sara Lange (technology instructor), MaDonna Gretten (Level II special education teacher), Tim Geyer (Information Technology Specialist) and Greg Fisher (principal). The committee investigated several instructional strategies to improve student performance on the standardized test scores; Iowa Test of Basic Skills (ITBS) and the Measure of Annual Progress (MAPS). (Shawn Driscoll replaced Tim Geyer on the committee after the initial portion of the process was begun.)

The committee elected to approach improving the students' test scores by incorporating several strategies. The strategies employed were:

1. Supporting students in their daily academic setting and creating greater interest in student work by utilizing a one-to-one computer initiative.
2. Changing how instruction would be delivered from teacher focused to project-based learning.
3. Rearranging the school day to allow students opportunities to meet with teachers in the core areas outside of their normally scheduled class periods.
4. Making the classroom presentation available to students at home via a local public access television station.

The one-to-one computer initiative was first approached when we looked at the mission statement of the North Cedar Schools. To paraphrase the statement, it states that we are responsible for creating lifelong learners. The computer is going to be a major part of our students' lives and the committee determined that we need to give our students the opportunities to develop more fully in this area. The best way to do that is to get computers into the hands of our students on a regular basis.

When the leadership team researched the use of computers, the evidence suggested that the greatest increases in student achievement occurred when the computer was a tool to support the instruction being done in the classroom and not as a stand alone instructional instrument (student driven instruction). To use the computers effectively, the leadership team determined that project-based learning would allow for greater student engagement in the learning process, while keeping the teachers involved in the instructional process with the teachers acting as facilitators, instead of teacher led instruction.

The project-based learning concept was a new instructional strategy for the teachers. In the past, teacher led discussion or lecture were the primary means of instruction being done in the core classes. To institute the change in the delivery of instruction from teacher driven to teacher facilitated, the leadership team received training from Knowledge Network Solutions in developing and utilizing project-based learning in the classroom. The committee was taken through in-service training on project-based learning in July of 2006. The members of the committee were given a brief history about project-based learning, including research that supported the philosophy of the teacher as a facilitator in the instructional process.

After getting a good background in project-based learning, the leadership team started to develop a unit under the guidance of KNS. The committee developed their first unit titled "Ethics." Three units using the project-based learning format were developed by the committee during in-service opportunities afforded to the committee by the grant from ITLC. The three units of study that the leadership team developed were Ethics, Diversity, and Change.

The third component of the committee's work centered on changing the daily schedule to include a portion of the day that students could meet with the core teachers outside of the normal class period. The daily schedule was changed to reflect a period where all teachers would be available to meet with students. The committee developed assigned rooms for the students to be placed into according to test results. For example, if a student had difficulty with math on the ITBS or MAPS test the student was placed with a math teacher. The committee wanted students to have teachers available to them in the area of most need. If a student struggled in two areas, that student alternated the teachers from day to day which gave him or her opportunities to meet with both teachers. Students were allowed to get passes from teachers, if they needed help in other areas, on an as needed basis.

The last component of the ITLC grant initiative was to develop a connection with our local cable television providers. We formed a partnership with the providers to have DSL placed into the students' homes at a reduced cost to the homeowners. Another proposal of the grant was to have the science, math, English, and social studies classes taped and played back on a local cable station daily.

Sixty-eight 6th grade students participated in the year long project. Four of the students entered into the program during the middle of the school year or left prior to the completion of the school year. A 7th grade student with special needs participated in the pilot program, but in a limited number of classes. Parents and the students were in-serviced prior to the start of the school year. They were informed of the appropriate use of the computer and how to log onto Classserver. Classserver was the system or platform chosen by the school to present the information to the students.

The vendors that were influential in allowing the project to run smoothly included: Microsoft, Intel, Gateway, F & B Communications, Knowledge Network Solutions, Classserver, Broad Education and the Clarence Telephone and Cable Company. The Grant Wood Area Education Agency provided numerous individuals in support of the project. The members from Grant Wood included Keith Stamp (Area Administrator), Vicki Bone (Special Education Consultant), Diane Peters (Reading Strategist), Mike Macklin (School Improvement Consultant) and Jon Nietupski (Grant Writer).

Mary Herring was selected as the on-site evaluator for our computer initiative. Mary provided readings from current research, along with ideas from a former student to take the project into other directions. Ms. Herring provided support to the school by attending an open house featuring the computer initiative. She, along with our local politicians, school board members attended what was a "typical" day of school for our 6th grade students. In the classroom the members of the legislature and Ms. Herring were free to ask questions of the students. The guests got to view how interactive the students were on the computers with the teacher, other students and educational sources. Ms. Herring, using her educational background, was able to ask questions of the students that provided enlightenment for the politicians as to how the new format was beneficial to the students' education.

The resources that we used:

1. Gateway Laptop Computers
2. Classserver platform and the products associated with Classserver
3. En Carta learning system
4. Battery Charging Station
5. Teacher Tablet computers from Gateway
6. Vast Science Kits
7. LCD units in each classroom
8. Digital camera in each classroom
9. Knowledge Network Solutions (KNS)

The professional development was led in two different pieces. The first portion of the professional development was in the area of using the Microsoft platforms to support data acquisition and student presentations. The teachers were led through a process to use Power Point in making classroom presentations more powerful for student learning. Microsoft based Excel spreadsheets, and data base to support instruction in the classroom. KNS was the resource responsible for presenting the information to the teachers. Kelly Dietrich, KNS employee, presented the material to the staff and had the staff start developing materials that they would be able to use in their classrooms during the school year. Ms. Dietrich then led the staff in developing the project-based learning system that was used by the staff. Kelly led the committee in looking back at our past curricular area lesson plans and to see if there were three or four common themes, that ran though all of the teachers areas. After identifying the common themes the group started to develop the first unit.

The staff continued to work on the unit several times during the summer and staff in-service days prior to the students starting school. During the school year the team met every third day during "teaming" time and after the end of the school day working on the units. During the school year, staff was provided three days of in-service to help develop the units. Substitute teachers were hired to replace the teachers in their classrooms to support the cultivating of curriculum.

As part of the project, we incorporated a co-teaching format in the social studies and science areas. MaDonna Gretten, Level II & Level III teacher co-taught with Todd Hoefler in social studies and with Laura Cady in science. The balance that was achieved by these teachers in the classroom was amazing to see. Much of the success can be attributed to the personalities of the teachers and to the special education teacher's willingness to work extremely hard before and after school in developing the lesson plans with each individual teacher. If you were to attend a class, you could not pick out who was supposed to be the lead teacher and who was entering the room as the special education instructor.

Ms. Gretten also carried this project back to her room. She had a much greater level of success with her Level II students and their participation in the project than did our Level I instructor. In many other school systems this is a non-typical situation. This may attributed to several factors: 1. Ms. Gretten participated in the initial training of the teachers. 2. Ms. Gretten communicated frequently with parents on the phone about areas of concern with the students and the students' computer difficulties. 3. Ms. Gretten spent numerous hours of her own time preparing the lessons for the students, so that her students would not be frustrated with some of the more advanced computer issues.

Mark Dohmen, Shawn Driscoll and Greg Fisher presented at the "ITech" conference. Some members of the ITLC Grant Committee were in attendance and their support was appreciated. Shawn Driscoll and Greg Fisher made a presentation at the Iowa State Capitol for the Education Committee concerning the initiative and met with local representatives at a luncheon following the presentation.

A positive relationship developed with McGraw-Hill during this project. Todd Hoefler, social studies instructor, mentioned to the area representative from McGraw-Hill that we were doing the computer project and wanted to know if they had any resources to use for computers. The representative provided computer textbooks for the school, at no cost. Mr. Hoefler used the computer textbook and internet resources to support the social studies curriculum entirely.

There were some barriers in the implementation process and daily usage of the computers. We anticipated that the skill level of our students in using a computer would encompass all levels. However, we did not anticipate how much time and effort would be required in acclimating parents in working on the computer. In retrospect, we could have easily had just an in-service for the parents on how to access class server, using class server and how to access on-line materials that the teachers were going to utilize. We spent as much time with parents in the early stages of the project as we did the students.

Another issue we faced was in how our internet delivery service from the high school to the middle school functioned. We are on a system in which our main internet service from Grant Wood AEA arrives at the high school in Stanwood. A radio stationed in Stanwood broadcasts the internet to a tower on the grain elevator in Clarence. From the elevator the signal travels by radio to another located at the middle school. Most of the time, the strength of signal, radio operation and the weather cooperated in providing good service. However, there were several days that difficulties did occur in the system preventing students from accessing the internet and class server.

Another issue that we dealt with involved how a vendor had promised several things and then was unable to fulfill their promises. This particular vendor had promised us that the instructional portion of a classroom could be filmed and then played on a local access channel during the evening hours. Unfortunately the cable system started installing a fiber optic system and during the change over process we were unable to transmit on their station. To compensate for this we would film the classes and provide the disk to the student upon their return to school. It wasn't the ideal situation we had envisioned, rather one that did fulfill the purpose of the grant.

3. **Description and documentation for identified outputs and outcomes. The nature of the evidence/documentation should be clear. Appropriate analyses or summaries of the documenting evidence should be identified and/or made available. The report should discuss the project's positive and negative effects on student engagement, disciplinary problems, use of computers and software for writing, analysis, and research, movement toward student-centered classrooms, parental involvement, increased student achievement, other outcomes important to the project.**

3a. Student engagement and disciplinary problems

The discipline system at North Cedar Middle School is called the TAT system. This system was implemented in the early 1990's and has remained as part of the school

procedures since. The TAT system is based on looking at the students behaviors in three different areas. The areas are organizational skills, academic preparation. Students receive a TAT if they fail to meet the expectation of the teachers in the classroom. A student will receive a TAT in organization if they don't bring all the required materials to class or if they fail to have their parents look at a message the teacher wrote to the parent at an earlier time. A student receives a TAT in academics if they fail to have an assignment done at the start of the class. Students receive a TAT in behavior if the students misbehave in the classroom, but not to the extent that they are disrupting the educational environment that they are a danger to themselves or others.

In looking at the student engagement, issue the information that supports engagement the most is the academic TAT given to the students. We do not have data that follows the students from the elementary to the middle school, since at the elementary level the students are not disciplined using the TAT system. So instead we compared data against the 7th and 8th grade students in the middle school.

During the entire school year the 6th grade students received 342 academic TAT compared to 527 for the 7th grade students and 1037 for the 8th grade students. When we compare the 6th to the 7th that is 36% drop in the number of late assignments and when compared to the 8th grade it is 68% late assignments.

The teachers were asked to determine how much time they students were engaged on the computer compared to the traditional assignment process and how much of the time was centered on the project-based learning as compared to teacher directed instruction. The teachers were asked to use their lesson plans as a reference in the data. In English and reading the computer was used 95% of the time compared to the traditional method, and the project-based learning was used 100% the time compared to teacher driven instruction. In the math the computer was used 50% of the time compared to the traditional method, and the project-based learning was used 10% of the time. In science the computer was used 90% of the time compared to the traditional method, and the project-based learning was used 90% of the time. In social studies the computer was used 80% of the time and the project-based learning was used 80% of the time.

The disciplinary problem data is based on the TAT for behavior issued by the teachers. The 6th grade teachers issued 139 TAT compared to 192 for the 7th grade students and 282 for the 8th grade students. For the 6th grade students over half of the disciplines issued occurred in a single classroom. There was a group of students that were in an exploratory classroom that misbehaved frequently in the second quarter and this is reflected in the reporting. The team believes that the students were better behaved when they had their computers and were engaged in an activity. The only issue that we had, as a staff, was when students were instant messaging each other when they were given instructions not to. Even 7th and 8th grade teachers that had the 6th grade students in their 6th hour guided studies classes noted how much more engaged the 6th grade students were compared to the other students.

3b. Use of computers and software for writing, analysis, and research.

The table indicates the amount of time that the core teachers spent in their classroom doing activities that involved writing, analysis, research, or non-computerized activities.

Subject	Writing	Analysis	Research	Non-computer
English	40%	20%	35%	5%
Social Studies	10%	20%	50%	20%
Math	2%	3%	45%	50%
Science	15%	30%	45%	10%

3c. Movement toward student centered classrooms.

The teachers were engaged with the project-based learning for a core of the instruction. Three teachers, those that taught science, social studies and English, established high expectations for using project-based learning in their classrooms on a daily basis. The math instructor was involved in the project-based learning but on a much smaller scale than the other teachers. The numbers reported in section 3b indicated this. Prior to the one-to-one computer initiative, the math instructor used lecture-guided practice with a limited amount of manipulatives used during the instructional process. By becoming involved in the project, he has greatly increased the use of manipulatives in his classroom.

3d. Parental involvement

The data for the parental involvement is derived from a parent survey taken at the end of the school year. Of the possible 64 sets of parents only 31 parents responded to the on-line survey. Question one of the survey asked the respondents how many parents logged on daily. Fifty-five percent of the parents indicated that they logged on to their child's Class server account on a daily basis. Eighty-seven percent of the parents indicated that they logged on to their child's Class server account on a weekly basis and one hundred percent logged at least once during the month. Another question, which was relevant for student achievement, is the parent being involved in the student's educational pursuits. Every parent responded that they have assisted their child on research or homework assignments.

3e. Increased student achievement

	6th Grade (2013)	7th Grade (2012)	8th Grade (2011)
Reading Total	.8	.5	.7
Reading Comprehension	.7	.4	.6
Math Total	.4	.9	.9
Science Total	.7	1.3	.6
Social Studies	-.2	1.8	.6
Core Total	.4	.6	.7

The scores above indicate the average growth of the students, using the National Grade Equivalency score. The core total score was disappointing in that we had increased in reading, math, and science and the only area with a decrease score was in social studies. Looking at the social studies score, we attribute the results to several different factors. In changing the instructional practices from teacher directed to a project-based learning structure, students gathered a wider range of information than what was presented on the testing materials. The teacher used themes instead of going chapter by chapter and this did not match up well with the ITBS materials. Finally in evaluating the teacher's performance this year he did engage students at a much greater level with many different activities than he had in the previous teachings. For example he made a large map of the continent of Africa and then had the kids go on a safari hunt of sorts, for different items or facts on the countries. We believe the students were engaged more with the learning however, we need to change the focus of the materials or the area of engagement.

3f. Other outcomes important to the project

The area of the teachers enjoying what they are doing and making a difference with the students were not measured with any devices, but four out of the five main teachers involved in the project stated that it was a positive experience for them and want to continue to use the computers in the future. Only the math teacher is hesitant in using the computers for the 2007-2008 school year. The teachers expressed how it could be "fun" to be teaching and just how incredible the amount of information students could obtain in each topic area. The teachers expressed just how engaged their students were in the projects, especially the election debates, polls, campaign and the voting.

4. After the completion of the discussion of the outcomes, including any not mentioned above that are important for this project, the report should conclude with a discussion of the following; conclusions about overall value of the project, lessons learned about what to do and not do, recommendations to others about how to be successful with similar projects, suggestions for improving the local project or the larger state-level Iowa Learning Technologies program, plans for the coming year with regard to sustaining, expanding or curtailing the project and the rationale for those actions.

4a. Conclusions about overall value of the project

The committee at North Cedar Middle School has reviewed the ITBS scores with several areas of concerns being brought to light. We noticed that our scores on capitalization and punctuation dipped compared to previous years. We believe that students relied on the spelling and grammar check to assist them in writing the sentences. The team feels that our students will have to write and produce more authentic work without the use of these tools.

The committee was pleased with the slight increase in NGE scores in the areas of reading and comprehension for our students. We are looking at ways that we can

increase the growth of all students in this area more substantially than was done this school year. We had started Second Chance Reading for our struggling readers and desire to use some of the procedures to support all students in the area of reading. However, the committee is unsure how to meet the students' needs with Second Chance Reading by using the computer. We are concerned that the students will not focus as sharply if they aren't reading in a book format. We can't find research to support our conclusions; rather we just have apprehension in this area.

For student enjoyment and engagement the computer initiative was tremendously successful. The students indicated to the committee when they found out we did not get a grant for this year, that they wanted to take the computers with them to the seventh grade and have the sixth graders go without. The behaviors of the students would also support the enjoyment and engagement with the 6th grade having far fewer bad behaviors than students in the other two grades.

The teachers really enjoyed having the class server platform in which to have the students work. They liked the ability of the system to provide instantaneous feedback to students on their work. The teachers liked the concept of project-based learning and how they could collaborate on the different assignments. Only the math teacher felt he had difficulties being part of the projects. He is a younger teacher made out of the "old school" format and didn't know how to adjust to the projects as well as the other teachers.

4b. Lessons learned about what to do and not do

In retrospect, we should have been less aggressive at trying to change so many areas at once. We went from teacher directed instruction to project-based instruction, changed the daily schedule to add a guided study hall for all students, and went to a computer initiative for the 6th grade students. It would have been much easier to manage one or two of these initiatives than all three simultaneously.

We should have provided several days of student in-service prior to handing out the computers instead of only 1.5 hours. The computer skills of the 6th grade students were so diverse that we needed to start from the beginning with all students and bring them up to speed prior to the start of school. Instead, this took our sixth grade teaching team longer than we had anticipated during the regular school days at the start of the year.

We need to keep our teacher teaming time in place to allow the teachers to meet on the project-based learning components for a greater duration of time. When we created the guided study halls for the students this caused a reduction in the teacher team-meeting from forty-two minutes to twenty minutes. This was not a very good trade off for the teachers. The teachers would tell you that the more time that they could have gained during the initial year would have been beneficial to them. When we did our whole staff in-service, the administration should have provided more opportunities for the sixth grade teachers to work on this initiative, instead of working with the entire group on other activities.

4c. Recommendations to others about how to be successful with similar projects

We think that other schools should provide opportunities for parents to learn computer skills and how to utilize the system better, such as we did for the students. We found that we had to provide expertise to many parents, with in-home system setup, and software support when we had envisioned that most parents would be well versed in computer usage.

Students in the sixth grade are at the lowest age level of students that the committee feels can benefit from the computers. The reason this group was chosen was that we had a transition from other buildings to our building. Research indicates that any time there is a transition, a dip in scores occurs on a regular basis. We wanted to remove this dip by providing the students with a different format and taking away some of the transition issues. We would recommend that if you have a transition with higher level students that have better computer skills, then many of your start up problems with students and parents may be drastically reduced or even eliminated.

The committee recommends starting just one portion of the initiative at a time and not trying to do so much. It places the staff under extreme pressure to learn how to use the system prior to the students' usage and then developing projects for their units. Our staff was under a lot of stress during the initial stages of implementing the changes.

Another crucial area is making sure that your vendors are on board with the process and are capable of meeting their commitments. We had a vendor that got involved in other projects and couldn't live up to their commitment entirely. They did provide some of the services just not all of the expected services. We had left a lot of the commitments to oral agreements and had not obtained written confirmation for all of the parts. Therefore it was easier for this vendor to feel less committed to the overall success of the project.

It is important that schools have a technology person dedicated to the initiative and willing to work long hours putting the computers together and getting the platform ready to go. We were fortunate to have had a person with this kind of dedication to the program. He went above and beyond the call of duty. Without a person who desires the best for students, you will have a difficult time being successful.

4d. Suggestions for improving the local project or the larger state-level Iowa Learning Technologies program

Areas where we feel we could have used more support in include, looking for authentic assessment materials. With project-based learning, a smaller portion of time is spent on rote memorization. More time is spent on research and analysis, which is not reflected very well in the testing materials that we utilized. I would like to have the students tested on how well they can utilize the internet, and find relevant facts, and be able to use them to support their points of view.

4e. Plans for the coming year with regard to sustaining, expanding or curtailing the project and the rationale for those actions

The computer initiative will look similar to last year's program with only slight modifications. Instead of giving all the sixth graders computers that they can take home on a daily basis, we will provide computers for students that do not have computers at home. Since our student platform is web-based all of our students can access the system if they have a computer that is on-line. We are hoping that by doing this and making the computers available to all sixth grade students during the day, we can reduce the number of mechanical problems that occurred with the computers.

We are reducing the guided study time to twenty minutes daily instead of the forty two minutes that we had this year. This will bring back the teacher teaming time and will keep the students focused on getting their work done in the normal classroom and not waiting for the guided study hall to complete their assignments.

The teachers will still be using the project-based learning model making sure that when we are doing writing assignments, we do not let the students use the spelling and grammar checks before sending in their papers. We will be looking for ways that we can support vocabulary and spelling improvement on the computers.

We are hoping to bring the project forward to the seventh graders in several classrooms. The social studies teacher and reading teacher would like to be able to use class server in their classrooms next year. This means, that a third of the seventh graders' classes would be on-line and using computers during their daily lessons. We can do this plan if we allow the seventh grade students to check out computers similar to what we anticipate doing for the sixth grade students.

APPENDIX D
Pella (High School)

ILTC Evaluation Report for the Pella Community School District

Executive Summary

The Learning at the Speed of Science grant began with three goals:

Goal Area 1 - Improve student achievement in the area of science literacy through the development of independent research questions that require experimental investigation using advanced technology
Goal Area 2 - Increase student engagement with science professionals through electronic discussions involving pod casting and blogging
Goal Area 3 - Develop the learning skills required of a 21st century citizen through electronic research and presentations that are reviewed by peers and industry professionals.

We set out to impact these areas through the development of rigorous inquiry-based curriculum that used technology. Our objective was to increase the relevance of science through industry connections that showed students how people use what they are learning in school on a daily basis.

Students were involved in a variety of learning experiences that gave them the opportunity to do exactly what we set out to do. These experiences included the following:

- Solving of manufacturing problem-solving scenarios posed virtually by industry professionals.
- On-line discussions with professionals on issues regarding product development and professional ethics.
- Electronic discussion groups to analyze classroom solutions.
- Enhanced use of science probe ware to gather, display, and explain scientific data.
- Development of multimedia podcasts and a rating system to analyze them for the level of scientific thinking displayed. This involved the application of software called profcast to combine the podcast with Power Point technology in a seamless manner.
- Changing of teaching methodology to expand the use of the virtual classroom using a product called Moodle.

Our data shows the increase in relevance of topics that was perceived by our students. It also shows enhancement of teaching methods using the model of the 5 E's that is supported by the National Science Teacher Association. This student focused method of instruction becomes attainable when technology is available that engages students on a daily basis.

The final piece that is exciting is a spin off with some of our partners. Our contacts with Pella Corporation and the University of Iowa have helped us develop the Pella

Engineering Education Resources for Schools (PEERS) project that will begin this fall. This project will provide students in grade 3-8 with real world problems and demonstrations in the world of engineering that align with our curriculum. This will continue in grades 9-12 with the addition of a mentoring program for any student that has expressed an interest in engineering on their 8th grade career plan. These students will interact with professional engineers on site at Pella Corporation and the University of Iowa. They will also have opportunities for participation in engineering competitions with coaching from staff engineers. If these students continue into college engineering programs, additional mentoring and internship opportunities will be available to them with the future goal of bringing them back to our community for high wage, high skill employment. This is in line with the relevance we feel this project will offer for our students as they explore multiple careers and develop life-long skills.

2. Description of the Project

As listed in the Executive Summary, the project goals were as follows:

Goal Area 1 - Improve student achievement in the area of science literacy through the development of independent research questions that require experimental investigation using advanced technology
Goal Area 2 - Increase student engagement with science professionals through electronic discussions involving pod casting and blogging
Goal Area 3 - Develop the learning skills required of a 21st century citizen through electronic research and presentations that are reviewed by peers and industry professionals.

These goals were accomplished in our high school science department using a team of four teachers working with approximately 650 students. The teachers had a good background in the field of constructivism. This methodology uses scaffolding, or the building of knowledge, through a process of engaging students in a cycle of learning that causes them to connect learning to practical experiences. It must be built in a manner that allows students to become engaged in the topic, explore through problem solving, explain their results to others, elaborate on their initial conclusions and evaluate their own thinking as well as that of others. These are employment skills not grasped in a traditional lecture, experiment, and test classroom.

Most of our funding went to vendors to purchase classroom lap tops, digital document cameras, science probes, ceiling mounted projectors, DVD players, flex cam microscopes and sympodium software. All of these items work in concert to allow for highly engaging lessons on a daily basis and interactions with science professionals on a more frequent basis than ever before possible.

Significant partnerships needed to be developed to make this work. We were involved with vendor relationships with Apple computers, Pratt Audiovisual, and Venier probware. Our Technology Director, and Technology Advisor were directly involved in establishing and maintaining these relationships. While some details were hurdles at the

beginning of the project, all equipment was working well within the first 6 weeks of school. The teachers found the training on the Vernier probes to be especially valuable. It opened them to a great deal more use in the lab experiences.

Education and business partnerships were established with members of the University of Iowa, Central College, Pella Corporation, Pella Regional Health Center, and local providers of science related services. The teachers established these relationships in alignment with curriculum integration opportunities. The PEERS project was developed with assistance from the local Director of Instruction.

Training and curriculum planning was completed during the summer of 2006 while the equipment was being installed. Teachers prepared for integration opportunities that would match the skills of their business partners with their problem solving activities. This allowed them to be ready with their first activities during the fall of 06.

Training was done with the probeware during the summer of 06. This opportunity was a great way to prepare to execute lab activities in a manner that would aid our students in thinking like scientists. Training was also done on using the display equipment. While this went well, we could still use additional training to learn some of the advanced applications.

Implementation activities began in the fall of 2006. Teachers used business partners to develop problem-solving scenarios that were realistic to start the year. This took abstract topics and exposed students to their use in business and industry. Additional topics emerged throughout the year that allowed for the use of business, medical, and college partners. These electronic and personal interactions led to further blogging and emailing to expand upon the initial knowledge. We have learned that some students who would not interact personally will offer viewpoints in this manner. The expanded dialogue also has increased the level of thought over these topics. This combination of increased rigor and relevance fed nicely into our goals.

The ability of our students to enhance their modes of communication was extremely valuable. The display technology makes it possible to construct, problem solving solutions, lab reports, power points, podcasts, profcasts, and a variety of other presentations without the previously experienced hurdles. Removing these hurdles has increased the student's exposure to these 21st century skills.

3. Description and Documentation of Identified Outputs and Outcomes

Student Engagement –
We have defined student engagement as lessons that are designed using an inquiry process. Our data has shown that 62.5% of lessons offered students those opportunities as indicated by involving one of the 5 E's (Engage, Explore, Explain, Elaborate, and Evaluate).

We have used the 5E's to document increased opportunities for our students to engage in problem solving experiences that mirror how scientists research in their own field. The tracking of teacher lesson plans indicates a student-centered approach that focuses on posing research questions for investigation. This approach involved problem solving activities that used the purchased technology to engage in experimentation or communication over experimental problem solving or ethics issues.

Disciplinary Problems – Engaging the students more deeply in problem solving and the use of 21st century technology skills is a key factor in engagement (Grant goal #3). Students with high levels of engagement rarely have problems with discipline.

We defined a disciplinary problem as one that resulted in an office referral requesting action by the Principal or Assistant Principal. During the 2006-2007 school year we had a total of 14 office referrals from the four science classrooms involved in the project. This includes everything from excessive tardies to disrespect and is considered to be a very low number of referrals. While we cannot attribute this positive level of behavior all to the infusion of technology, teachers did note that their students were very respectful of the technology and were on task when using it.

Use of computers and software for writing, analysis, and research – Teachers have focused on developing lessons where students used computers or associated hardware to conduct scientific investigations. Students did a variety of activities that involved this:

- Use of scientific probe ware for investigation
- Gathering and graphically displaying problem solving results for elaboration to peers
- Posting of results on Moodle web sites
- Feedback on results through blogging with teachers, peers, and professionals
- Podcasting using itunes and profcast
- Virtual problem solving
- Multimedia presentations

Movement toward student centered classrooms – Teachers have developed real-world problem solving scenarios for each unit of study in the high school science curriculum. This methodology has focused the learning on the student at all levels of the high school science program. Students are offered the opportunity for choice in activities by having multiple scenarios and/or by letting them generate independent research tasks. These tasks have specific criteria to drive evaluation, but are open ended to allow them to gear them toward specific areas of interest.

We applied this to our Goal #1 dealing with the improvement of science literacy.
Our data indicates that 89.6% of our students performed at the proficient level or above in locally developed problem solving activities. This focus on thinking about relevant issues is leading us to helping students solve rigorous problems and communicate the solutions like a scientist.

Parental involvement – This was not a focus of our project, however we have had considerable interest from parents in science related careers in serving as resources.

Improved vendor and other business relationships – We needed to have our equipment operational on day one of the school year and we needed training on the capabilities of the probe ware as well as the display technology. Both trainings were provided in a timely fashion by Pratt Audiovisual and the Verneer company. Our staff felt that this level of training was essential for them to be able to operate successfully and that has proven to be true. If we were to do this over again, we would have scheduled subsequent trainings throughout the year to provide the support necessary to move to the advanced features of the equipment.

While we feel we have made progress in developing business and industry partners, we still have a way to go. Our students indicated that they still are not making the connections to life and careers that we are expecting. Next year's implementation of the PEERS project with Pella Corporation and an expanding partnership with the University of Iowa are the next steps in this journey toward science relevance for students.

Increased student achievement –We are making progress in student achievement. We cannot attribute all gains in student achievement to technology, as the implementation is too new. We do know that the increased levels of engagement are important in helping our students achieve at high levels in this area and will continue to work toward improving that.

We defined student achievement in three ways:

ITED science proficiency – We have improved slightly this year at the 11th grade level which is the only one tested at Pella High. (87.3% to 87.7% proficient)

Problem solving proficiency – 89.6% of our students achieved an average score of 70% or higher on locally established problem-solving tasks.

ACT – It is much to early to attribute any gains here to the project. We will track this for future reference.

Other outcomes important to the project – Our highest potential for impact deals with science relevance. One of the key goals to this project is to use technology to connect our students to science related careers that they would not see in any other way. This goal is intended to increase the relevance of science to the common student.

Survey data indicates we still have a way to go in this area. 43% of the students surveyed agreed that they see applications to various careers in what they are learning in science. 44% said that they saw a connection between what they are learning in science and how it could apply to his or her life. These numbers indicate that we have a start but still have more work to do.

4. Project Conclusions and Next Steps

Conclusions:

We have learned a great deal from the implementation of this project. Many of the conclusions are qualitative in nature at this time as it is very difficult to correlate a direct cause and effect relationship to student achievement this early into the initiative.

1) **We need to be deliberate in making the connections that science has to our world.** Students are not making these connection on their own due to the limited contact they have with science related careers that are of interest to them. Without the use of distance learning to overcome the lack of exposure that rural students experience, we will not be able to correct this issue. This project is at the edge of correcting this issue, but we need a worldwide expansion of our professional pool of contacts.
2) **Our changing world makes it imperative that we partner with the world of work to develop problem solvers. -** Our version of 21st century skills needs to continuously evolve with that of business and industry. The contacts developed during this project showed us what is important to them. While we cannot simulate all work worlds, we can develop problem solvers that are capable of being successful in many environments. This emphasis on process over content became even more evident.
3) **Virtual interaction cannot stand alone as the difference maker; it must be paired with the face of the individual. –** Our surveys showed that students did not consider blogging to be "speaking" with an industry professional. We need to pair it with video conferencing, vodcasting and ichat technology to boost the level of the experience.

Lessons Learned

1) **Interactions with the technology need to be planned with specific objectives to help students make the connections to scientific careers. -** Our data indicates that students enjoy interacting with the technology and use it to execute the process of scientific inquiry well. They did not, however, indicate our desired level of improvement in making the connections to the scientific work world on a consistent basis.
2) **Training is essential to reaching proficiency in the technology. -** Teachers worked extremely hard to learn the capabilities of the technology that was acquired. Without the training that they did formally and informally, the application of the equipment in the classroom would have suffered. Their level of commitment to making this work showed the importance of collective efficacy in making an initiative successful.
3) **There is never enough time during the school year. –** The challenge of change frequently involves scheduling enough time to allow it to be disciplined in nature. We had a regular monthly meeting schedule but we

could have used twice as much time for collaboration between the teachers to work on ideas and analyze the success of implementation.

Recommendations to Others:

Our recommendations to others really hinge upon the lessons learned.

1) **Provide sufficient training time** – The experts from the vendor partners were worth the money in our experience. The probes would have been underused if training had not been done. Teachers also need follow-up collaboration time. It is expensive, but essential.
2) **Achieve teacher buy-in –** This was not a project proposed to the teachers, it was from the teachers. Professionals who believe they can make a difference are the key to any change. Find the great ideas the staff would like to do with technology and capitalize on them.
3) **Collect formative data –** Data taken at the end of an initiative is not diagnostic. We want to perform corrections along the way not autopsies at the end.

Suggestions for Improvement

We would recommend a conference presentation requirement to help disseminate the project to a larger audience. Our group presented at the ITEC conference in Des Moines and to the AEA 11 Curriculum Directors Network. The presentations made us focus on our efforts and resulted in many questions from other districts. This type of public forum allows others to benefit from the focused efforts of specific districts.

Future Plans

We have plans to expand the use of the technology in the classroom. This will include the videoconferencing features of our equipment, professional critique of projects, expanded problem solving scenarios, and a variety of experimental design additions.

Our plans also include the model we have established with Pella Corporation as a result of our partnership with them on this project. It is built in five levels:

Level 1 – Awareness activities on what an engineer does that articulate with our curriculum in grades 3-12.
Level 2 – Engagement activities at Pella High, Pella Corporation, and the University of Iowa for the students who indicate a desire to explore engineering on the eighth grade plan.
Level 3 – Mentoring for students who enter engineering college by Pella Corporation and the University of Iowa.
Level 4 – Possible early acceptance into the internship program at Pella Corporation. It would also include reverse mentoring of Pella students.
Level 5 – Potential hiring by Pella Corporation

We would like to repeat this model in various other science careers. Many of these may need to use technology to complete, as it would not be possible to bring them to Pella.

This hands on contact with careers will continue to increase the relevance of the science curriculum to our students.

The overall value of this project has all ready been great and it will only increase from here. We have a vision of a master database that connects our teachers and students to specific careers around the globe. The people in these careers will dialogue with our students to solve actual problems faced in that job. Students will be able to connect their current learning with the jobs they are considering for life.

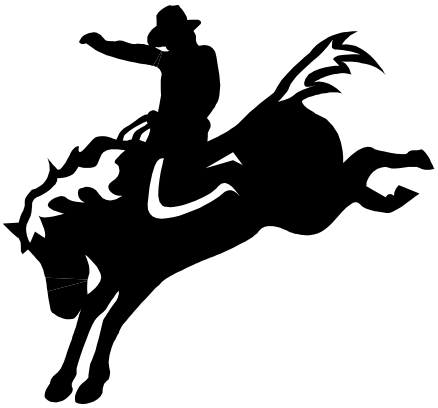
We would like to thank the legislature and the ILTC for this opportunity. Our students and teachers are the beneficiaries of a new and improved way of teaching. We enthusiastically encourage the expansion of this funding stream.

APPENDIX E
Sidney (K-12)

Sidney Community School District

Iowa Learning Technology Commission Grant

Evaluation Report



July 2007

Sidney Community School
ILTC Evaluation Report
July 2007

Executive Summary

The Sidney Community School District used the revenue from the ILTC grant to advance student and staff achievement in technology use and communication skills. This was done through the purchase of technology and through continued commitment to professional development. All staff participated in professional development from LEA, AEA, and Apple professionals throughout the course of the year. Students and staff applied their problem solving and communication skills to produce podcasts that are available for viewing through our school's webpage. Students were challenged to research, analyze and synthesize information related to grade-level curriculum. Using the communication skills of writing and speaking, podcasts were produced by the students using the Apple iBooks and "Garage Band" from the Apple iLIfe Suite. Data included in this report indicates that in classrooms where laptops are being used on a regular basis for projects, student engagement has increased. The use of computers and software has increased resulting in more student-centered classrooms and increased proficiency in use of technology. Parent involvement through technology has increased. While student achievement and discipline is continuing to be monitored, the data is inconclusive at this point regarding any positive impact from this initiative. The year-long project has been successful for this district and plans are in place for continued work on the goals of the project.

Important Aspects of the Situation/Context

Sidney Community School is located in extreme southwest Iowa. It is a rural district with 385 students in preschool through 12. The district was involved as a pilot school in the Iowa Professional Development Model in 2002, thus had in place a structure for engaging in high quality professional development, based upon student need. For three years, problem solving has been the focus for professional development. The district has used a study team model to implement problem solving strategies. Professional development this year has continued to be delivered on a regular basis; as every week, teachers meet in study teams to research, discuss, and collaborate about research-based practices for improving student achievement. Data from assessment instruments indicate that reading and writing were areas of need.

Prior to the award of the ILTC grant, the district's access to technology for student and staff use was limited to one lab at the elementary school and two labs at the secondary school. Additionally both buildings had at least one computer in each classroom, where access to the Internet was limited.

Goals and Objectives of the Project
The overall goals of the ILTC grant for Sidney Community School were as follow:

- To positively impact student achievement by combining the efforts of the past three years in the area of problem solving with technology and communication skills
- To continue to increase students' problem solving skills
- To increase student's abilities to reach higher levels of analysis and synthesis of classroom concepts by infusing problem solving, organization, and communication skills
- To create podcasts and vodcasts in an effort to combine all initiatives within the scope of professional development
- To provide professional development for staff in the areas of technology and writing assessment skills

Staff and Student Involvement
All K-12 staff members, as well as administrators, have been involved in this project. These staff members include all elementary classroom teachers, all special education teachers, art, physical education, music, and all content area teachers (math, English, science, history, etc.) Both administers in this district have also been highly involved in this project as leaders and learners.
All K-12 students within the district have been involved in this project.

STAFF	NUMBER	STUDENTS	NUMBER
Elementary	18	Elementary	185
Secondary	19	Secondary	200
Administration	2		

Roles and Responsibilities
Superintendent—Researched technology options, researched additional funding streams, supervised installation of equipment, arranged professional development, designed and provided leadership for professional development, provided publicity for the project at all stages of development.

Technology Coordinator—Researched technology options, supervised and coordinated installation of equipment, arranged professional development, designed and provided leadership for professional development, provided publicity for the project at all stages of development, designed links on the website for public access to the podcasts, published podcasts on the server, provided trouble shooting and technical assistance to staff and students in both buildings throughout the project, tracked parental involvement through the school website (JMC data).

Elementary Principal—Researched technology options, designed and provided leadership for professional development, provided publicity for the project at all stages of development, provided trouble shooting and technical assistance to staff and students in the elementary building.

Technology Associate—Provided trouble shooting and technical assistance to staff and students in both buildings throughout the project

Instructional Staff—Engaged as active learners in the fields of technology and language arts in an effort to instruct students, served as peer tutors and facilitators in the both the learning and teaching processes

Community/Business Partners
Area Education Agency—Provided professional development assistance in technology and writing assessment, provided technical support in the installation and use of the technology

ICN—Allowed the purchase of Internet Access through the ICN. This allowed us to host the podcasts on our own server.

Institutions of Higher Learning—Drake University—6+ Writing Traits college credit

Resources Used
See appendix—Chart of Apple Products Purchased

Professional Development
Professional Development for this project began in August (as evidenced by the calendar of professional development activities in Appendix), with two days of intensive training with the Professional Development team from Apple Computers, Inc. The training continued on a weekly basis throughout the year, facilitated by the Area Education Agency, Apple, and LEA leadership team.

As a result of this professional development, the following have occurred:

- 6+1 Writing assessments have been incorporated into classroom instruction
- 6+1 Writing Rubric has been adopted and put into practice (see appendix)
- Mobile Apple labs have been utilized by staff and students as evidenced by the data in appendix
- Students have incorporated research, problem solving, writing, reading, speaking, and technology into the creation of approximately 65 podcasts
- Staff has learned the process for publishing student podcasts on the Sidney website: http://sidneyschools.connections.net
- Podcast Rubric has been adopted (see appendix)

Impediments/Barriers
- Wireless issues with airports—we discovered a few "dead" spots throughout the buildings as we installed the airports for wireless accessibility.
- Connectivity between buildings—a new server was needed in the elementary in addition to a new Apple server in the elementary
- Need for more laptops—adding two carts in the district

- Professional development—we discovered a need for the professional development in the area of technology to be leveled according to the skill level of the various staff members.
- No additional staff was hired to work directly with staff in the classroom
- Use of ipods—need to incorporate the use of the ipods for educational purposes
- Money issues

Outputs/Outcomes of this project:

Student Engagement
As a result of this technology project, we believe that student engagement has increased, as more teachers are incorporating group projects into their curriculum activities. This is evidenced by their weekly lesson plans, but also by the administrative walk-throughs that occur. It is not uncommon to see students working in pairs in various locations in the building. On these occasions, these groups of students are seen actively engaged in writing, rehearsing, recording or revising a podcast on the laptop computer. The number of these projects can be evidenced on the check-out log in the appendix of this report, as well as by the number of podcasts published on the school website. End-of-year reflections by staff also indicate that students are more actively engaged with the use of the Apple laptop computers. (see appendix)

Disciplinary Problems
Disciplinary problems continue to be monitored by the office staff. While it is difficult to determine the precise reason for the number and nature of the referrals, we will continue to monitor and report this data. At the elementary school, the number of disciplinary referrals has decreased during the last 5 years. In 2003-2004, there were a total of 140 referrals to the office, in 2004-2005, 76; in 2005-2006, 77, and in 2006-2007, 69. At the secondary level, 2004-2005, 110; 2005-2006, 89, and in 2006-2007, 132.

Use of computers and software
The use of computers and software has increased as evidenced by a number of indicators. A technology survey was completed by 268 of our third through twelve grade students. Students were asked to compare their skill level from 2003, prior to the initiation of the grant project, to the current year. The skills they were asked to compare included Internet Research, E-mail, Chat/IM, Word Processing, Spreadsheets, Downloading and Saving, PowerPoint, iMovie, iPhoto, Computer Software and Hardware, Production of a Podcast and Production of a Vodcast. As evidenced by the results of this survey, the majority of the students indicated an increase in their skill level and application on each of the skills in question. (see appendix) For example, on the use of the Internet, 21.6% of the students indicated a skill level of 4 or 5 (5=high) in 2003, and 82.5% indicated a skill level of 4 or 5 in 2006, an increase of 60.9%. In the area of word processing, the increase was from 27.2% indicating a skill level of 4 or 5 in 2003, and 68.7 in 2006, an increase of 41.5%. Because podcasting and vodcasting were new initiatives with this grant, the students had no experience with either of these skills. The increase in their skill level with creation of a podcast is evidenced by the number of podcasts currently published on the school's website.

An additional indicator of an increase in productivity in the use of computers and software is evidenced by the documented use of the Apple computers on mobile carts in both the elementary and secondary buildings. This information was documented on check-out logs collected by the technology coordinator. This data is displayed in the appendix on the Laptop Usage Charts.

Student-centered Classrooms

Explicit instructional plans submitted by each teacher throughout the year indicate that teachers are beginning to shift the focus of their classrooms from "teacher-centered" to "student-centered". Examples of this can be found in instructional lesson plans collected by the building administrator. An increase in the number of plans that include individual research and writing, group work on podcasting, and peer assistance is evidenced in explicit instructional plans as well as in weekly lesson plans.

Parent Involvement

Parental involvement in the use of technology has increased over the past year. A technology survey was completed by 66 parents in this district. From these surveys, it was determined that 68.2% of them receive e-mail notices about school activities and announcements. 35.5% of the parents who responded indicated that they access school communication using technology on at least a weekly basis. When asked if the Sidney School system is doing an adequate job of providing technology and training for students, 84.8% of them responded positively.

Comments from parents on the survey include the following to support positive outcomes from the grant:

- "I am very pleased with Sidney's commitment to technology. It is very important with today's job market that our students stay current on the advances in technology. Thank you for recognizing the importance of this aspect of education."
- "I receive e-mails from school everyday. I feel it is a great way to communicate and keep me updated on daily happenings at school."
- "I feel that the school is doing their best to provide computer access to parents."
- Thanks for all the time and effort that your staff has taken to learn all the new technology that the grant has helped bring to our district. Keep up the great work with my kids!"

Additional results of the technology survey completed by parents are available in the appendix.

The number of "hits"on the school's JMC parent access page were collected. Our data indicates that we have seen an increase of 25% in number of hits on the parent access page form November 7, 2006 to May 20, 2007 (see appendix).

Student Achievement
We continue to compile data from standardized tests, including the ITBS and ITED, but at this point we feel that the data from these are inconclusive in regard to the grant's impact.

Conclusion
Lessons learned: As we designed the professional development with Apple professionals this year, we grouped the staff according to grade level, K-6 and 7-12. While this was effective in that some of the staff who was more proficient with technology could assist others, we have decided that next year is will be more beneficial to provide "ability grouped" instruction. Those staff members who are proficient will be grouped together to move at a more accelerated pace through the training. Those who are still at the frustration level will be able to move at a less intense rate. Following the training from Apple, we will again rely on those more proficient teachers to become mentors as the teachers work in study teams to implement and integrate technology.

We have discussed the sustainability of the work from this grant and believe we have in place several items for that purpose. First of all, the AEA will provide two days of professional development in this district on the use of iMovie we have again contracted with Apple for technology training from their facilitators. We have two dates in August and two in November contracted with them. Secondly, we have made arrangements to update the elementary computer lab with Apple computers that will have more capabilities for this project. Thirdly, we have entered into a leasing agreement with Apple to allow us to purchase twenty-four additional iBooks to expand the number of mobile labs in the district to six. Lastly, we will continue to provide staff with the time to collaborate together in study teams with a weekly late start devoted to professional development.

Time and funding can be stumbling blocks to sustaiing this ype of project. The Sidney CSD is talking the following measures to insure that adequate time and funding will be provided for 2007-2008 and future years:

- The District is allocating funding from Rural Education Achievement Program (REAP) grant to provide funding for professional development, hardware and software needs. Sidney's past REAP awards have ranged from $25,000-$29,000.
- The District is allocating time for professional development in the school calendar. All district teachers will receive four days of professional development in 2007-2008 from Apple Professional Development Trainers. The District will continue to allocate time for professional development in school calendar in subsequent years.
- The District is allocating $15,000 per year in Local Option Sales Tax revenue for hardware purchases to support the ILTC project.

From the staff and student surveys, we can conclude that the following are priority areas for professional development focus next year:

Staff Priorities for Training:

- Training on production of podcasts and vodcasts
- Training on creation of multi media projects
- Training for application of AEA resources
- Training on web-based video materials

Student Priorities for Training:

- Training on the application of iMovie
- Training on the production of podcasts and vodcasts
- Training on the application of iPhoto
- Training on the understanding for both computer software and hardware

APPENDIX F
Sioux Central (Middle and High School)

Sioux Central Community School District
ILTC Evaluation Report
Date: - July 18, 2007

1. **Executive Summary**

   The long term science goal for the Sioux Central Community School District is to improve student utilization of the scientific method. In order to achieve this long range goal, Sioux Central applied for the Project INNOvATE (Incorporating New Opportunities via Advanced Technology in Education) grant. The goal for this project was to integrate technology with teacher training and curriculum development to establish successful research-based instructional methods in science and to show improvement towards our long range science goal.

   The proposed original grant funds requested was $53,810 with matching funds of $14,827. The amount of grant funds that was received was $37,567.68 with matching funds of $9,391.92 for a total of $46,959.60. Sioux Central spent additional money beyond the matching funds on professional development and hardware (server, projectors, etc.) in order to implement this project.

2. **Description of Project**:

   This grant was written in the 2005-2006 school year. During the summer of 2006, the former elementary principal/curriculum director who wrote the grant resigned from his position. The district also had a change in superintendent positions. The superintendent under whom the grant was written also resigned in July 2006. So, it was not until fall 2006 that the new elementary principal and new superintendent was brought on board for this project. Therefore, the initial implementation efforts for this project were slow.

   The original grant application was for students in grades 4-12. Project INNOvATE would be implemented in the science classrooms. As we began the implementation of this project in the fall of 2006, we realized that full implementation would not be possible in such a grand scale of all grades 4-12. We refocused our goals as well as grade levels and determined this project would be implemented in the following grades: 1) grade 8 (Earth Science), 2) grade 9 (Physical Science) and 3) grade 10 (Biology).

   The biggest problem with this project was the lack of funds in the grant for additional training on the usage of the probeware and laptop computers. The grant provided one day of training on September 18, 2007 with the use of the probeware. No additional funds were available for training throughout the year. Therefore, teachers were left on their own to experiment with the probeware implementation as well as how to utilize inquiry learning with laptop computers.

   The business partners for this project included Gateway where the portable wireless lab and server were purchased. PASCO Science provided the software/probware for the project.

One of our teachers also utilized material as part of prior training from the National Aeronautics and Space Administration (NASA). Document and LCD projectors were also utilized in this project.

In regards to professional development, Rod Haenke from Instructional Designs, Inc. was hired in the summer of 2006 to provide two days of professional development training on using science inquiry with technology. One day of training was provided in September 2007 on how to use the probware. During the year, teachers began to revise their lesson plans to include inquiry learning into the curriculum. Teachers also began the expansion of the use of scientific equipment and labs as part of the instruction in inquiry learning.

3. **Description and documentation for identified outputs and outcomes.** Supporting data is found in the Appendix.

   We can not state that one particular intervention worked with the implementation of this project. There have been some changes as a result of our participation with this project and the use of the probeware. There may also be other factors that led to these changes. The data suggests that we are moving in the right direction. Our goals have been established and modified along the way.

   3a. Student Engagement: The goal was to use the number of failures to do assignments in the Earth Science (8th grade) class as a measure of increased student engagement.The number of Failure to Do Assignments (FDA's) in the 8th grade science class decreased from 35 FDA's in 1st quarter to 18 FDA's in 3rd quarter. The 4th quarter saw an increase to 27 FDA's.

   Comparing the science data according to semesters, there was a decrease from 67 FDA's in the first semester to 45 FDA's in the second semester. The ACE science points decreased from 28 in the first semester to 19 in the second semester.

   3b. Disciplinary Problems: The intent was to demonstrate a decrease in disciplinary problems by increasing student engagement with computers. These data would also come from an existing system element involving the use of computer use records. Our student management system, PowerSchool, is not currently set up to track discipline referrals by teacher and/or course. Therefore, it is difficult to show the correlation between discipline referrals and engagement with computers and/or use of inquiry-based lessons.

   The total discipline referrals (grades 8, 9 and 10) to the office increased from 48 referrals in the first semester to 53 referrals in the second semester.

   3c. Increased Use of Computers: This indicator would be measured by the collection of computer log data from the science teachers. Over the progression of

the year, we hoped to see an increase in the use of computers in the science classrooms.
The data shows an increase of computer usage in the Earth Science class from 7 times during the first semester to 25 times in the second semester. Computer usage decreased in the Physical Science class from 14 in the first semester to 7 in the second semester. Computer usage in the Biology class increased from 11 in the first semester to 32 in the second semester. The overall computer usage (grades 8, 9, 10) increased from 37 in the first semester to 64 in the 2nd semester.

3d. Movement Toward Student-centered Classrooms: This indicator would be measured by an increase in the use of inquiry based lessons at the start of the 2006-2007 school year compared to the end of the year.

The number of estimated inquiry based lessons remained about the same from first semester to second semester. Additional efforts will need to be made in 2007-2008 to do a better job of collecting lesson plans to get an accurate count.

3e. Increased parental involvement: These data will be collected using PowerSchool (this is a school wide data based system that monitors student attendance, grades and student demographics). Increased parental involvement will be determined by parental hit rate (visiting web page), increase in monthly basis throughout the school year.

The middle school data shows the total accesses by parents to the PowerSchool system increased from 1182 in the first semester to 1322 in the second semester.

The high school data shows the total accesses by parents to the PowerSchool system decreased from 4659 in the first semester to 4624 in the second semester.

3f. Improved vendor and other business relationships: This was not measured this year. Plans are to develop a business partner for 2007-2008.

3g. Increased student achievement: As indicated, ITBS/ITED data will be compared from the 2005-2006 testing to the 2006-2007 testing. The data indicates an increase in science achievement in both 8th and 10th grade and a decrease in 9th grade. The overall average (in grades 8, 9 and 10) increased from 78% in 2005-2006 to 80% in 2006-2007. This was an increase of 2%.

3h. Other: Increased attendance: Additional data will be collected that reflect increased attendance and decreased tardiness. This system is in place and data can be collected reflecting the entire school year. Data from the 2005-2006 school year will be compared grade by grade with the 2006-2007 school year data. The total average of daily attendance decreased from 93% in 2005-2006 to 89% in 2006- 2007.

It is the intention of Sioux Central to continue to implement this project within the next school year. We will look at the data (lesson plans, computer use logs, ITBS/ITED, etc.) at the end of the second and third year to see if trends change and were impacted by the use of the material.

4. **Conclusions:**
In regards to recommendations to others about how to be successful with similar projects, we recommend that in similar situations where the principal and/or superintendent is new to the school at the start of a project and where no prior knowledge had occurred about the grant that serious consideration be given to delay funding of the grant for 1 year until everyone is on board and had an opportunity to become more familiar with the grant.

Since we have the equipment and have begun to implement the probeware, we will continue to do our own in-house professional development and continue to collect data. We will add to this report at the end of the second year (2007-2008 school year) as well as at the end of the third year (2008-2009).

Sioux Central
Project Goals and Data

Increased Student Engagement: Sioux Central will use the number of failures to do assignments in the Earth Science (8th grade class).

Assignment Completion and Citizenship by 7th Graders in 2005-06:
Yearly Summary

FDA total	730
ACE total	154

We are not able to pull out what the Science totals were in 2005-06.
We are using a different method of recording and a different definition and implementation of ACE/FDA in 2006-07 than what was used in 2005-06. That may account for differences in totals and trends. A more accurate data collection will be in the next few years.

FDA= Failure to Do Assignment. Incomplete, lost, not completed, left at home,
ACE= inappropriate behaviors, disrespect, office referrals, bullying, etc.

Assignment completion and citizenship by 8th Graders 2006-07: (same group of students)

1st Quarter 2006-07

FDA total	207
FDA Science	35
ACE total	179
ACE Science	25

2nd Quarter 2006-07

FDA total	230
FDA Science	32
ACE Total	172
ACE Science	3

First Semester Summary 2006-07

FDA total	437
FDA Science	67
ACE Total	351
ACE Science	28

3rd Quarter 2006-07

FDA total	227
FDA Science	18
ACE Total	77
ACE Science	10

4th Quarter 2006-07

FDA total	143
FDA Science	27
ACE Total	87
ACE Science	9

Second Semester Summary 2006-2007

FDA total	370
FDA science total	45
ACE total	164
ACE Science	19

2006-2007 Yearly Summary

FDA total	730
FDA science total	112
ACE total	154
ACE Science	47

Data Summary for Increased Student Engagement:
The Yearly Summary data from 2005-2006 to 2006-2007 can not be compared. Sioux Central used a different method of recording and a different definition and implementation of ACE and FDA from one year to the next.

During 2006-2007, the number of Failure to Do Assignments (FDA's) in the 8th grade science class decreased from 35 FDA's in 1st quarter to 18 FDA's in 3rd quarter. The 4th quarter saw an increase to 27 FDA's.

The ACE science points decreased from 25 points in the 1st quarter to 3 points in the 2nd quarter. There was an increase of ACE points in the 3rd quarter to 10 points. The ACE points remained about the same in the 4th quarter with 9 points.

Comparing the science data according to semesters, there was a decrease from 67 FDA's in the first semester to 45 FDA's in the second semester. The ACE science points decreased from 28 in the first semester to 19 in the second semester.

Decreased Disciplinary Problems: The intent is to demonstrate a decrease in disciplinary problems by increasing student engagement with computers. These data will also come from an existing system element involving the use of computer use records.

Note: PowerSchool is not currently set up to track discipline referrals by teacher and/or course. Therefore, it is difficult to show the correlation between discipline referrals and engagement with computers and/or use of inquiry-based lessons. The data below shows the total discipline referrals by grade level.

First Semester 2006-2007

Grade Level	Discipline Problems/Referrals
8	21
9	20
10	7
Total	**48**

Second Semester 2006-2007

Grade Level	Discipline Problems/Referrals
8	16
9	26
10	11
Total	**53**

Data Summary for Discipline Problems:
The data shows a decrease in discipline referrals in 8th grade from 21 the first semester to 16 the second semester. There was an increase in the 9th grade discipline referrals from 20 in the first semester to 26 in the second semester. The data indicates an increase in the 10th grade discipline referrals from 7 in the first semester to 11 in the second semester. The total discipline referrals in grades 8, 9, and 10 shows an increase in discipline referrals from 48 in the first semester to 53 in the second semester.

Increased use of computers: Data will be collected using the current recording system (use of computer logs). This data includes only the use of the middle school wireless lab. The science teachers also used the computer labs and the high school wireless lab but documentation was not kept.

Number of days computers are used in each class by month

	Earth Science (8th)	Physical Science (9th)	Biology (10th)
August 2006	3	0	0
September 2006	0	0	2
October 2006	2	4	4
November 2006	0	0	5
December 2006	2	10	0
First Semester	**7 Total**	**14 Total**	**11 Total**
January 2007	4	1	8
February 2007	5	2	7
March 2007	6	1	7
April 2007	6	1	3
May 2007	4	2	7
Second Semester	**25 Total**	**7 Total**	**32 Total**

Data Summary for Increased Computer Usage:
The data shows an increase of computer usage in the Earth Science class from 7 times during the first semester to 25 times in the second semester. Computer usage decreased in the Physical Science class from 14 in the first semester to 7 in the second semester. Computer usage in the Biology class increased from 11 in the first semester to 32 in the

second semester. The overall computer usage (grades 8, 9, 10) increased from 37 in the first semester to 64 in the 2nd semester.

Movement towards student-centered classrooms: This indicator will be measured by an increase in the use of inquiry based lessons in the aforementioned classes. Data from 2005-2006 school year will serve as a baseline for 2006-2007 school year. 2005-2006: No data available. Some inquiry lessons were done but no records were kept.

Revised Goal: Since no data was available for 2005-2006, there has been a revision of this goal. Sioux Central will compare the number of inquiry based lessons from the beginning of the year to the number of lessons at the end of the year.

2006-2007: Number of estimated inquiry based lessons

	Earth Science (8th)	**Physical Science (9th)**	**Biology (10th)**
First Semester	36	24	36
Second Semester	37	22	34

Data Summary for Student-centered Classrooms:
The number of estimated inquiry based lessons remained about the same from first semester to second semester. Additional efforts will need to be made in 2007-2008 to do a better job of collecting lesson plans to get an accurate count.

Increased parental involvement: These data will be collected using PowerSchool (this is a school wide data based system that monitors student attendance, grades and student demographics). Increased parental involvement will be determined by parental hit rate (visiting web page), increase in monthly basis throughout the school year.

Middle School Hits on Web Page to Check Grades: First Semester 2006-2007

Total Accesses by parents to the PowerSchool system	1182
Total Accesses by students to the PowerSchool system	1042
Number of students whose records were accessed	99/130 (76.1%)
Average length of Parent web site visit	10.0
Average length of Student web site visit	10.3
Average # of Parent accesses per day	7.9
Average # of Student accesses per day	7
# of parents signed up to receive progress reports via email	18 (13.8%)

Middle School Hits on Web Page to Check Grades: Second Semester 2006-2007

Total Accesses by parents to the PowerSchool system	1322
Total Accesses by students to the PowerSchool system	996
Number of students whose records were accessed	96/126 (76.1%)
Average length of Parent web site visit	9.2
Average length of Student web site visit	10.7
Average # of Parent accesses per day	7.7
Average # of Student accesses per day	6.0
# of parents signed up to receive progress reports via email	20 (15.8%)

(Increased Parental Involvement Continued)

High School Hits on Web Page to Check Grades: First Semester 2006-2007

Total Accesses by parents to the PowerSchool system	4659
Total Accesses by students to the PowerSchool system	8351
Number of students whose records were accessed	234/260 (90%)
Average length of Parent web site visit	9.7
Average length of Student web site visit	11.2
Average # of Parent accesses per day	31.1
Average # of Student accesses per day	56
# of parents signed up to receive progress reports via email	36 (13.8%)

High School Hits on Web Page to Check Grades: Second Semester 2006-2007

Total Accesses by parents to the PowerSchool system	4624
Total Accesses by students to the PowerSchool system	10624
Number of students whose records were accessed	235/257 (91.4%)
Average length of Parent web site visit	9.7
Average length of Student web site visit	11.2
Average # of Parent accesses per day	27
Average # of Student accesses per day	62
# of parents signed up to receive progress reports via email	36 (14.0%)

Parents Night Out: Sioux Central held a Parent's Night Out on November 14, 2006. There were approximately 156 parents (grades K-12) in attendance.

Parent/Teacher Conferences 2006-2007: Attendance at Fall Parent/Teacher Conferences for Middle/High School (grades 7-12) was 60%. As we learn more about the capabilities of PowerSchool and online technology, we are able to communicate with parents on a regular (if not daily) basis. Therefore, we predict a decrease in attendance at future conference since parents can check grades, attendance, etc. online.

Spring Parent/Teacher Conferences 2006-2007: Attendance at Spring Parent/Teacher Conferences for Middle/High School (grades 7-12) was 51%. As predicted, this was a decrease from the first semester. Parents are checking their child's grades more frequently online via PowerSchool.

Data Summary for Increased Parental Involvement: Data for parental involvement was collected according to semester rather than by month as previously indicated in our goal.

Middle School Data: The middle school data shows the total accesses by parents to the PowerSchool system increased from 1182 first semester to 1322 second semester. The average length of parent web site visit stayed relatively the same with 10 minutes first semester and 9 minutes second semester. The average number of parent accesses per day stayed the same with 7.9 in the first semester and 7.7 in the second semester. The number of parents signed up to receive progress reports via email increased from 18 in the first semester to 20 in the second semester.

High School Data: The high school data shows the total accesses by parents to the PowerSchool system decreased from 4659 in the first semester to 4624 in the second semester. The average length of parent web site visit stayed the same with 9.7 minutes first semester and 9.7 minutes second semester. The average number of parent accesses per day decreased from 31 in the first semester to 27 in the second semester. The number of parents signed up to receive progress reports via email stayed the same with 36 reported for both semesters.

Increased student achievement: As indicated, ITBS/ITED data will be compared from the 2005-2006 testing to the 2006-2007 testing.

2005-2006 ITBS/ITED Science

Grade	# of Students	Not-Proficient	Proficient
7	62	18%	82%
8	61	20%	80%
9	61	28%	72%
			Average 78%

2006-2007 ITBS/ITED Science

Grade	# of Students	Not-Proficient	Proficient
8	61	16%	84%
9	62	26%	74%
10	60	18%	82%
			Average 80%

Data Summary for Student Achievement:
The 8th grade data shows that the students increased in science proficiency from 82% in 2005-2006 (7th grade) to 84% (8th grade) in 2006-2007. The 9th grade data shows that the students decreased in science proficiency from 80% in 2005-2006 (8th grade) to 74% (9th grade) in 2006-2007. The 10th grade data indicates that the students increased in science proficiency from 72% in 2005-2006 (9th grade) to 82% (10th grade) in 2006-2007. The average total proficient increased from 78% in 2005-2006 to 80% in 2006-2007. This was an increase of 2%.

Additional data: Additional data will be collected that reflect increased attendance and decreased tardiness. This system is in place and data can be collected reflecting the entire school year. Data from the 2005-2006 school year will be compared grade by grade with the 2006-2007 school year data.

2005-2006 Attendance

Grade Level	# of Students	Average Daily Attendance
7	65	94%
8	66	95%
9	64	89%
		Total Average 93%

2005-2006 Tardies
We were not able to pull tardy information off the server.

2006-2007 Attendance

Grade Level	# of Students	Average Daily Attendance
8	62	94%
9	63	88%
10	62	85%
		Total Average 89%

Data Summary for Attendance:
The attendance data shows the average daily attendance from 7th grade to 8th grade stayed the same at 94%. The average daily attendance from 8th grade to 9th grade decreased from 95% in 2005-2006 to 88% in 2006-2007. The average daily attendance from 9th grade to 10th grade decreased from 89% in 2005-2006 to 85% in 2006-2007. The total average of daily attendance decreased from 93% in 2005-2006 to 89% in 2006-2007.