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Integrating technology into the mathematics curriculum

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Integrating Technology Into the Mathematics Curriculum

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Abstract

This is a Graduate Review of the actual work being implemented by a group of six math teachers at Lakeview Elementary. The initiative began because of an on-going problem of students receiving low-test scores in mathematics. Students also had a difficult time retaining the mathematics concepts and skills being taught. Through discussions and surveys, a possible solution was found. A Literacy Technology Challenge Grant from the Department of Education was awarded to help teachers learn to integrate technology within the math curriculum. Teachers are also learning new strategies that will allow students to actually grasp the concept and meaning of rational numbers by using these technologies.

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Introduction

The Centerville School District teachers and staff have been working diligently for the past several years on aligning standards and benchmarks within the math curriculum for consistency and continuity. The alignment has examined all mathematics classes from kindergarten through *trigonometry and pre-calculus* in high school. By doing this, administrators and teachers have been able to find the skills within the math curriculum that really are being taught year after year and skills that are being neglected. Alignment of math standards and benchmarks enables teachers to articulate their curriculum and allow them to concentrate on building new math skills upon the prior knowledge of students. In addition, the district has provided extensive inservice for staff on effective instructional methods, including the use of math manipulatives to build concept skills in students.

Beginning with a comparison of 1995-96 and 1996-97 school years' Iowa Test of Basic Skills data for the total mathematics scores, the school district started using the goal: "Every student shall meet or exceed the standardized test gains made by comparable students within the national normative population." In other words, a student at the 20th percentile in third grade is expected to be at or above the 20th percentile in fourth grade, and a student at the 80th percentile in sixth grade are expected to be at or above the 80th percentile in 7th grade. Student progress for the district is measured in terms of standard scale growth. The Iowa

Test of Basic Skills' standard scale is a continuous scale for each subject area from third grade through twelfth.

Table 1 shows the progress for students who consistently achieve 99%, 100%, and 101% of their target standard scale scores from grades 3 through 12. Note the change in the percentile rank from the 3rd grade through the 12th grade for each level of performance for students beginning at the 30th and 70th percentiles. If every student in the district can achieve 100% or more of their targeted growth every year, the district's achievement will clearly improve. Note that by graduation the student beginning at the 30th percentile and consistently achieving 101% of the target will catch the 70th percentile student who consistently achieves 99% of the target.

Table 1: Comparison of Scale Score Progress over time at various levels of Performance

3rd Grade Percentile	% Of Target Score Attained	Grade and Season (F=Fall, M=Midyear, S=Spring) of test										12th Grade Percentile
		3M	4S	5S	6S	7F	8F	9F	10F	11F	12F	
30th	99%	169	186	195	202	202	208	215	220	223	224	13th
30th	100%	169	188	199	209	212	220	232	239	245	250	30th
30th	101%	169	190	204	215	216	227	241	252	263	271	46th
70th	99%	190	212	227	239	240	250	260	265	270	271	46th
70th	100%	190	214	231	246	249	264	277	286	294	301	70th
70th	101%	190	216	235	252	258	276	292	304	316	327	88th

Table 2 shows the two-year data the Lakeview Elementary staff began collecting and analyzing for the 1996 vs. 1997 testing through 1998 vs. 1999 years.

Table 2: Average Percent of Target Attained by Various Subgroups of Students

Grade Level:	Category	4th	5th	6th
Class of 2008	Total	100.50%		
Class of 2008	Females	100.50%		
Class of 2008	Males	100.50%		
Class of 2008	Low Income	100.50%		
Class of 2008	Moderate +	100.50%		
Class of 2008	General Ed.	100.50%		
Class of 2008	Special Ed.	100.50%		
Class of 2007	Total	100.50%	100.20%	
Class of 2007	Females	100.50%	100.20%	
Class of 2007	Males	100.50%	100.20%	
Class of 2007	Low Income	100.50%	100.20%	
Class of 2007	Moderate +	100.50%	100.20%	
Class of 2007	General Ed.	100.50%	100.20%	
Class of 2007	Special Ed.	100.50%	100.20%	
Class of 2006	Total	100.50%	100.20%	101.00%
Class of 2006	Females	100.50%	100.20%	101.00%
Class of 2006	Males	100.50%	100.20%	101.00%
Class of 2006	Low Income	100.50%	100.20%	101.00%
Class of 2006	Moderate +	100.50%	100.20%	101.00%
Class of 2006	General Ed.	100.50%	100.20%	101.00%
Class of 2006	Special Ed.	100.50%	100.20%	101.00%
Class of 2005	Total		99.10%	101.00%
Class of 2005	Females		99.10%	101.00%
Class of 2005	Males		99.10%	101.00%
Class of 2005	Low Income		99.10%	101.00%
Class of 2005	Moderate +		99.10%	101.00%
Class of 2005	General Ed.		99.10%	101.00%
Class of 2005	Special Ed.		99.10%	101.00%
Class of 2004	Total			101.00%
Class of 2004	Females			101.00%
Class of 2004	Males			101.00%
Class of 2004	Low Income			101.00%
Class of 2004	Moderate +			101.00%
Class of 2004	General Ed.			101.00%
Class of 2004	Special Ed.			101.00%

This project was initiated to find a solution to the problem of low math scores, but the curriculum alignment was not enough to resolve the low score issue. Research from the school district found that our students were scoring low in the mathematics area on the Iowa Test of Basic Skills test. Some may argue that these tests are not a valid indicator of student success, but even daily and math test scores given within the district did not show improvement in retaining math concepts across the board (Appendix 1).

The Centerville School District consists of five buildings housing Kindergarten through third grade, a single building, called Lakeview Elementary, housing grades four through six, a junior high school building with grades seven and eight, and grades nine through twelve in one high school building. The math teachers at Lakeview Elementary felt the need to do something to improve mathematics capabilities of their students.

Initially the problem was overwhelming. How could Lakeview teachers improve the overall low math scores? Our team of concerned math teachers decided it was necessary to narrow down the problem. Why were students not improving or achieving well in mathematics? And most importantly, how were teachers going to change this situation to help students achieve?

After much discussion, it was realized that students were not retaining the math skills that were being taught. Each year teachers find themselves having to reteach skills that were taught the year before and sometimes, even the year before last. This was found to be true in classroom after classroom. Sadly, it even was

found true that students had not really grasped concepts that were taught within the current school year. It was as if students memorized what they needed to know for the unit currently being taught, then forgot the information and moved on to the next unit. It was important for the team of teachers and administrators to find a solution and help students actually understand the concepts being taught in order to stop the pattern and reach the higher level of learning at which they are capable.

The main problem was discussed and identified in January of 1999. Now it was crucial for the math team to answer the question of how to change the situation so that students would achieve higher math scores on their tests.

Burns (1998) stated:

> Even in the face of widespread failure in learning mathematics, we seem to want to cling to educational methods with a nostalgia for them that has long outlasted their usefulness and has perpetuated failure. The way we've traditionally been taught mathematics has created a recurring cycle of math phobia, generation to generation, that has been difficult to break. (p.x)

Methodology

With several factors in mind, the team of Lakeview Elementary math teachers, the principal, and the curriculum director began to look for new strategies for teaching math. What Lakeview teachers were currently doing was not working well. The curriculum director was able to give valuable input concerning recent research in the area of teaching methodology. As a group it was decided to look

into ways of integrating technology into the math curriculum. Also, allowing math to really involve the students, make learning math real for the students.

The first step in planning was to make sure the changes were what the students, parents, teachers, and community wanted. What were the needs of these groups? The students, parents, teachers, community, and administrators completed surveys asking questions about their skills of technology, and what skills were thought to be necessary for students to learn (Appendix 2, 3 and 4). It was important to have an understanding of the needs to all involved and gather support with integrating technology into the curriculum. It was also useful to find the prior knowledge of students, teachers, parents, and community members when using computers and multi-media equipment. Were there experts in our community willing to help students and teachers?

This needs assessment demonstrated the students who did have computers at home, were primarily using them to play games. All parties were very interested in computers and more technology being available to use at school. Lakeview Elementary previously had Apple IIE computers in a lab. A few Macintosh computers were accessible in classrooms, but were not Internet ready. Students and teachers primarily for word-processing and drill-and-practice programs used the few computers that were in the classrooms. With one Internet accessible computer available in the media center, it was also suggested on the completed surveys that the Internet should be in all classrooms. Basically, all

groups surveyed agreed that more technology was needed at Lakeview Elementary.

Teachers, students, and parents wanted to learn how to use computers proficiently and be able to access the Internet. A few families were using technology at home, but the demographics of Centerville show more families without Internet access than with access. Schools were considered the place for learning how to use technology. The surveys also identified a handful of people in the schools and community who were knowledgeable about using technology and would be willing to volunteer time to help teach others. This was a positive finding that really connected the community and school.

Ultimately, raising math scores was the main concern and would be the primary focus of this project, but through implementing technology all curriculum areas could benefit. Now, to find the available funding to provide for this wanted and needed hardware and software.

The Centerville curriculum director has played a vital role finding funding for this initiative. Based upon the special needs, the curriculum director was able to locate a grant that would meet the district's needs. The Department of Education Technology Literacy Challenge Grant allowed Lakeview Elementary to focus on math in the middle grades (Appendix 5 and 6). The initiative within this grant was named "Every Student Counts." Collaboration for writing this grant involved the Centerville curriculum director, the Lakeview principal, and a team of five math teachers from Lakeview, led by sixth grade teacher, Jolonda Parrett.

Lakeview Elementary was the only school building in Centerville that applied for the Literacy Challenge Grant. It was decided that if Lakeview was selected for the Literacy Challenge Grant that two-thirds of the $50,000 would go to purchasing hardware for the school, the main addition would be new computers. Also, included in this would be funding for software and accessories needed for a successful integration of technology. One-third of the money was to be used for staff and teacher training, which is vital for successful integration of technology.

As part of the Literacy Challenge Grant, it was necessary for a large collaboration of administrators, an AEA consultant, teachers, and community members to be involved. All groups would be well attended for this initiative, especially an involved group of parents and community members.

As the team learned about being accepted for the Literacy Challenge Grant, "Every Student Counts," a renewed excitement and encouragement also grew. The team was ready for the challenge of training and helping students succeed in mathematics by also integrating technology into the curriculum. As outlined by the Iowa Department of Education, guidelines would expect the math team to "...commit to approximately 12 days of Department-sponsored training and at least 2 hours bi-weekly of self-directed training using software, audiovisual, and print materials available form the Department" (Iowa Department of Education, 1999, p.2).

The guidelines from the Iowa Department of Education continued under the heading, "Engage in action research in the area of mathematics.

1. Selection of an area of focus for the team's collective inquiry, in this case, mathematics.
2. Collection, organization, analysis, and interpretation of data about student learning and the learning environment.
3. Collection, organization, analysis, and interpretation of information from the professional literature about learners, learning environment, and research-based practices in mathematics for collective inquiry to identify most promising actions.
4. Integration of information from data analysis of student learning and learning environment with information gained from professional literature to identify best options-practices.
5. Development of short and long term action plans to implement best options-practices.
6. Implementation of best options-practices with ongoing assessment of effects.
7. Ongoing collection, organization, analysis, and interpretation of assessment data about effects of options-practices.
8. Selection of "new" options-practices or another area for collective inquiry" (Iowa Department of Education, 1999, p.3).

With these guidelines established, the math team initiated their plan to tackle the problem of low math scores and students retaining the concepts taught while integrating technology into the math curriculum.

Analysis and Discussion

The Centerville math team began attending the 'Every Student Counts' training meetings and the members were very pleased that the initial focus of learning new math strategies was still the main focus for the leaders of the meetings. The experts who served as trainers are professors of mathematics from the University of Northern Iowa, the University of Iowa, the Department of Education, and various schools throughout Iowa. Each school that was awarded through the Literacy Technology Grant was also assigned two mentors from these institutions. The mentors are there to answer questions, guide teachers, and visit classrooms.

Starting with the first meeting, experts relayed their experiences with using technology and curriculum. Although, all leaders of the session were advocates of using technology in the classroom, they all had advice when using technology. It was expressed that the main focus was to help students understand math and that the technology should be used as a cognitive tool. Any technology that is used should have a purpose and be used to get students thinking and problem solving. Just adding technology is not going to increase math scores, a whole new way to teaching needs to be also integrated. Research and opinions are everywhere in support of this.

Schrum (2000) suggested:

> As educators, we were unfamiliar with the technology and uncertain about its possibilities. So we stepped back and let software developers, hardware

> vendors, and other technicians define not only what we could buy but also how those products would be used. In many ways, the technology drove the educational process. And guess what? It didn't work very well. (p.1)

Burns (1998) proposed that the calculator can be a useful tool for children to learn to use when appropriate. Children should not depend on calculator, but rather should learn to think, reason, and solve mathematical problems.

From another point of view, Tapscott (1999) supports the notion that computers in schools does not ensure learning takes place. "It won't help to throw computers at the wall, hoping something will stick. I've seen lots of computers sitting unused in classrooms" (Tapscott, 1999, p. 2). Computers alone will not do the trick. Computers are necessary but are not sufficient alone for moving our schools to new heights of effectiveness. Teachers still need to learn how best to use this technology (Tapscott, 1999).

> Latham believes: the bottom line appears to be that computers can indeed enhance student outcomes, but before we rush to put computers in every classroom, we need to figure out the most effective way to allocate limited resources. Clearly, teacher training needs support across all school environments. And although drill and practice is popular for computer instruction, it does not have a large positive effect on student achievement, as do approaches that focus on higher-order thinking skills. (p. 2)

The National Educational Technology Standards for Students-Connecting Curriculum and Technology book is an excellent resource for guidance on

integrating technology (International Society for Technology Education, 2000). The underlying philosophy of the standards for students is the belief that the world is changing in ways that require learning environments to change in ways to prepare students to meet the challenges of the future. Students must be able to work with an expanding wealth of information has changed the focus of classroom instruction. Instruction must build on basic skills so that students learn how to find, access, and assess information to address issues.

Technology can come in many forms. Many times when the word technology is used in conversation, it is usually assumed that technology means computers. At the 'Every Student Counts' meetings, the discussion of technology was broadened beyond the computer to include calculators and hands-on manipulatives, such as fraction strips, geo-boards, or Cuisenaire rods. During the staff development sessions, strategies were developed based on the core mathematics areas of the middle school grades, including fractions, decimals, and percents. Teachers learn ways for students to grasp the actual understanding of what a fraction represents. What does a decimal represent? A percent? To help students understand these concepts, the use of technology is integrated into the curriculum, but the overall objective of the math concept is the purpose of the instruction. The technology is not the focus of the instruction . An example of an activity presented at an 'Every Student Counts' session is called *Target X*. This is played with a calculator and two students play this together. The object of this activity is to come within 10 (or some other range) of a predetermined target using

multiplication as the only mathematical operation. A student is not allowed to clear the screen on the calculator and start again. The first person to come with in the range is the winner. This activity is a good way to practice estimation skills, mental arithmetic, and decimal number sense.

An important aspect of this mathematics curriculum improvement initiative is to also incorporate writing skills, which could be done on a computer or in a journal using the more mature technology of paper and pencil. As an educator, questions to evaluate student understanding of *Target X* might include: *What I liked or didn't like about Target X, What I learned, and What problems I had with the activity Target X.*

The math teachers on the team were presented several activities at the monthly 'Every Student Counts' meetings and were assigned to try at least one new activity per week with their students. Along with teaching the activities, teachers were to collect student work for the action research of the grant, evaluate the strategies students used in their work, and teachers finally were to reflect on their own teaching and lessons presented. Teachers were expected to complete reflection sheets. The forms gave guidance for discussions and also what worked well and what might be changed with activities presented (Appendix 7, 8 and 9). Collaboration and support from other teachers and staff was important for the initiative to be effective. A large amount of information was presented to teachers and questions were sure to be asked once back in the classroom.

The leaders of the 'Every Student Counts' initiative were very successful at bringing in other experts to help with training. A professional from Texas Instruments led a couple of meetings to help teachers learn to use new graphing calculators, which were actually like a hand-held computer, able to be connected with a computer, printer, and multi-media projector. Experts were brought in to review software that might be used as a supplement to the rational number concepts. Discussions related to great World Wide Web sites were always shared for student and teacher use. Each meeting allowed a chance for new ideas to be shared integrating technology into the math curriculum to help students understand the concepts with using rational numbers and real-world problem solving.

The Centerville Community School District has also purchased site licenses and software for an integrated learning system called Computer Curriculum Corporation (CCC). At Lakeview Elementary, the program was installed in January. Since January, students from fourth, fifth, and sixth grades have used the software, which teaches math concepts at all grade levels. The first five months of using the CCC software have allowed teachers to collect baseline data for the skills that students are mastering within their levels of each skill. The district will be able to use this baseline to see whether or not skills are improving through the use of technology being used in the classroom and the CCC software. With continuing staff development and a change in the way students learn mathematics by

integrating technology into the learning process, it is encouraging to see improvements in the overall math skills and scores of students.

The International Society for Technology in Education (ISTE) joins the Department of Education, Professors from state universities in Iowa and educators across the state of Iowa in the belief that:

> Technology is an important resource for teaching and learning mathematics. Calculators, computers, and the World Wide Web are invaluable for students and teachers in the classroom. Technology can play a role in enhancing mathematical thinking, student and teacher discourse, and higher-order thinking by providing the tools for exploring and discovering mathematics. Technology allows students to reflect on their activities and promotes reflective cognitive processes in their problem solving that go below the surface *and* connect with the real world. (ISTE, 2000, page 96)

Conclusions and Recommendations

The Lakeview math team has continued working with the technology and with the opportunities and resources that the Literacy Challenge Grant, 'Every Student Counts.' The teachers ended the 1999-2000 school year on a positive note. Administrators informed teachers of increases in student math scores. With this encouragement and hard work, the curriculum director and team of teachers did successfully reapply for a continuation grant for this math initiative. The focus for the 2000-2001 will continue to be integrating technology into the math curriculum within the middle school grades, although the concepts will be

probability and geometry skills instead of rational numbers (fractions, decimals and percents.) The Lakeview math team has purchased class sets of graphing calculators, software, and manipulatives to continue helping students understand and grasp the concepts taught in mathematics.

Recommendations for future work with the Literacy Challenge Grant would be to expand the role of the teachers in the action research part of the grant. Several baselines have been established from the first year of work with this program, but it is important to collect, analyze, and improve upon the work that has been done.

Another recommendation would be to include all math teachers at Lakeview Elementary. The current team includes six math teachers and could be extended to ten with special education teachers on board. Helping teachers to guide students to use the new learning strategies would help with retaining information from one school year to the next and also from one classroom to the next.

The past two years, the entire Centerville School District has been teaching teachers and staff, including substitutes to use all available technology in the classroom. It is vital for teachers and staff to feel confident and have basic knowledge of using technology otherwise the possibility occurs that computers and hardware will sit unused in the corner and collect dust. This demonstrates when technology does not work well is supporting the teaching and learning process.

This has been a positive experience for all teachers, students, and parents involved. By using technology to enhance the learning of mathematics skills,

students are able to feel success when solving problems not only in the classroom, but also outside of the classroom in the real world.

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Appendix 1

Table 1a: Average Percentage Increase for each student on the Math Total 2 year Comparison								
	Classes of:	2008	2007	2006	2005	2004	2003	2002
	Test Times:	3M ->4S	3M ->4S	3M ->4S	3M ->4F	3M ->4F		
Grade 3 to 4	Total	102.8%	102.5%	99.9%	103.9%	102.3%		
Grade 3 to 4	Females	101.9%	103.5%	100.9%	104.3%	102.2%		
Grade 3 to 4	Males	103.8%	101.6%	98.9%	103.5%	102.4%		
Grade 3 to 4	Low Income	103.0%	103.3%	100.2%	103.4%	102.6%		
Grade 3 to 4	Moderate +	102.7%	101.1%	99.6%	104.3%	101.9%		
Grade 3 to 4	General Ed.	102.7%	101.2%	99.6%	103.0%	101.5%		
Grade 3 to 4	Special Ed.	103.0%	107.6%	102.2%	109.4%	105.4%		
	Classes of:	2007	2006	2005	2004	2003	2002	2001
	Test Times:	4S ->5S	4S ->5S	4F ->5S	4F ->5F	4F ->5F		
Grade 4 to 5	Total	97.9%	98.2%	96.6%	101.0%	98.2%		
Grade 4 to 5	Females	99.2%	97.8%	97.3%	100.4%	98.9%		
Grade 4 to 5	Males	96.9%	98.7%	95.9%	101.4%	97.6%		
Grade 4 to 5	Low Income	96.9%	98.9%	95.9%	100.6%	98.3%		
Grade 4 to 5	Moderate +	99.8%	97.5%	97.2%	101.6%	98.2%		
Grade 4 to 5	General Ed.	98.7%	98.1%	97.6%	101.1%	98.4%		
Grade 4 to 5	Special Ed.	96.0%	98.6%	90.9%	100.7%	97.6%		
	Classes of:	2006	2005	2004	2003	2002	2001	2000
	Test Times:	5S ->6S	5S ->6S	5F ->6S	5F ->6F	N/A		
Grade 5 to 6	Total	100.2%	100.8%	96.9%	98.6%	N/A		
Grade 5 to 6	Females	101.4%	99.6%	98.2%	98.6%	N/A		
Grade 5 to 6	Males	98.9%	102.0%	95.7%	98.5%	N/A		
Grade 5 to 6	Low Income	99.3%	100.3%	96.5%	99.1%	N/A		
Grade 5 to 6	Moderate +	101.1%	101.3%	97.5%	98.0%	N/A		
Grade 5 to 6	General Ed.	100.5%	100.1%	96.9%	98.1%	N/A		
Grade 5 to 6	Special Ed.	99.2%	105.4%	97.0%	100.5%	N/A		
	Classes of:	2005	2004	2003	2002	2001	2000	1999
	Test Times:							
Grade 6 to 7	Total							
Grade 6 to 7	Females							
Grade 6 to 7	Males							
Grade 6 to 7	Low Income							
Grade 6 to 7	Moderate +							
Grade 6 to 7	General Ed.							
Grade 6 to 7	Special Ed.							
	Classes of:	2004	2003	2002	2001	2000	1999	1998

Table 1b: Average Percentage Increase for each student on the Math Total 2 year Comparison

		3->4	4->5	5->6	6->7	7->8	8->9	9->10
	Test Times:	M ->S						
Class of 2008	Total	102.8%						
Class of 2008	Females	101.9%						
Class of 2008	Males	103.8%						
Class of 2008	Low Income	103.0%						
Class of 2008	Moderate +	102.7%						
Class of 2008	General Ed.	102.7%						
Class of 2008	Special Ed.	103.0%						
	Test Times:	M ->S	S ->S					
Class of 2007	Total	102.5%	97.9%					
Class of 2007	Females	103.5%	99.2%					
Class of 2007	Males	101.6%	96.9%					
Class of 2007	Low Income	103.3%	96.9%					
Class of 2007	Moderate +	101.1%	99.8%					
Class of 2007	General Ed.	101.2%	98.7%					
Class of 2007	Special Ed.	107.6%	96.0%					
	Test Times:	M ->S	S ->S	S ->S				
Class of 2006	Total	99.9%	98.2%	100.2%				
Class of 2006	Females	100.9%	97.8%	101.4%				
Class of 2006	Males	98.9%	98.7%	98.9%				
Class of 2006	Low Income	100.2%	98.9%	99.3%				
Class of 2006	Moderate +	99.6%	97.5%	101.1%				
Class of 2006	General Ed.	99.6%	98.1%	100.5%				
Class of 2006	Special Ed.	102.2%	98.6%	99.2%				
	Test Times:	M ->F	F ->S	S ->S				
Class of 2005	Total	103.9%	96.6%	100.8%				
Class of 2005	Females	104.3%	97.3%	99.6%				
Class of 2005	Males	103.5%	95.9%	102.0%				
Class of 2005	Low Income	103.4%	95.9%	100.3%				
Class of 2005	Moderate +	104.3%	97.2%	101.3%				
Class of 2005	General Ed.	103.0%	97.6%	100.1%				
Class of 2005	Special Ed.	109.4%	90.9%	105.4%				
	Test Times:	M ->F	F ->F	F ->S				
Class of 2004	Total	102.3%	101.0%	96.9%				
Class of 2004	Females	102.2%	100.4%	98.2%				
Class of 2004	Males	102.4%	101.4%	95.7%				

Class of 2004	Low Income	102.6%	100.6%	96.5%				
Class of 2004	Moderate +	101.9%	101.6%	97.5%				
Class of 2004	General Ed.	101.5%	101.1%	96.9%				
Class of 2004	Special Ed.	105.4%	100.7%	97.0%				
	Test Times:	M ->F	4F ->5F	5F ->6F				
Class of 2003	Total		98.2%	98.6%				
Class of 2003	Females		98.9%	98.6%				
Class of 2003	Males		97.6%	98.5%				
Class of 2003	Low Income		98.3%	99.1%				
Class of 2003	Moderate +		98.2%	98.0%				
Class of 2003	General Ed.		98.4%	98.1%				
Class of 2003	Special Ed.		97.6%	100.5%				

Table 2: Average Pre Standard Scale Score				
		3->4	4->5	5->6
	Test Times:	MidYear		
Class of 2008	Total	179.7		
Class of 2008	Females	181.7		
Class of 2008	Males	177.8		
Class of 2008	Low Income	174.3		
Class of 2008	Moderate +	186.6		
Class of 2008	General Ed.	185.2		
Class of 2008	Special Ed.	158.4		
	Test Times:	MidYear	Spring	
Class of 2007	Total	180.0	205.8	
Class of 2007	Females	176.1	202.7	
Class of 2007	Males	183.7	208.3	
Class of 2007	Low Income	177.5	203.3	
Class of 2007	Moderate +	184.5	209.9	
Class of 2007	General Ed.	186.5	212.6	
Class of 2007	Special Ed.	156.1	188.7	
	Test Times:	MidYear	Spring	Spring
Class of 2006	Total	186.0	207.5	216.5
Class of 2006	Females	184.8	206.4	216.0
Class of 2006	Males	187.5	208.8	217.0
Class of 2006	Low Income	182.4	201.9	211.1
Class of 2006	Moderate +	190.4	213.8	221.9
Class of 2006	General Ed.	188.5	213.6	223.2
Class of 2006	Special Ed.	168.0	182.4	190.8
	Test Times:	MidYear	Fall	Spring
Class of 2005	Total	181.5	197.7	217.8
Class of 2005	Females	180.7	199.4	220.7
Class of 2005	Males	182.1	196.0	215.0
Class of 2005	Low Income	178.5	191.6	208.6
Class of 2005	Moderate +	184.0	202.8	225.8
Class of 2005	General Ed.	184.5	201.2	224.0
Class of 2005	Special Ed.	163.1	177.4	180.2
	Test Times:	MidYear	Fall	Fall
Class of 2004	Total	178.8	191.8	209.3
Class of 2004	Females	177.9	190.7	207.4
Class of 2004	Males	179.6	192.7	211.1

Class of 2004	Low Income	176.9	188.4	203.2
Class of 2004	Moderate +	181.6	196.8	217.6
Class of 2004	General Ed.	184.1	198.3	216.9
Class of 2004	Special Ed.	157.0	168.6	177.3
	Test Times:	MidYear	Fall	Fall
Class of 2003	Total		196.9	210.4
Class of 2003	Females		195.8	208.8
Class of 2003	Males		198.0	221.9
Class of 2003	Low Income		190.1	205.1
Class of 2003	Moderate +		203.8	216.4
Class of 2003	General Ed.		202.3	216.2
Class of 2003	Special Ed.		176.4	186.3

Class of 2004	Low Income	190.7	204.0	218.1				
Class of 2004	Moderate +	194.4	216.2	237.6				
Class of 2004	General Ed.	196.9	217.0	235.2				
Class of 2004	Special Ed.	172.8	180.6	189.3				
	Test Times:	Fall	Fall	Fall				
Class of 2003	Total		209.1	221.1				
Class of 2003	Females		209.2	219.1				
Class of 2003	Males		209.0	223.1				
Class of 2003	Low Income		201.2	216.1				
Class of 2003	Moderate +		217.0	226.9				
Class of 2003	General Ed.		215.6	226.9				
Class of 2003	Special Ed.		184.0	197.2				

Table 4: Number of Students in Paired Group on the Math Total 2 year Comparison

		3->4	4->5	5->6
	Test Times:	M ->S		
Class of 2008	Total	98		
Class of 2008	Females	49		
Class of 2008	Males	49		
Class of 2008	Low Income	54		
Class of 2008	Moderate +	43		
Class of 2008	General Ed.	78		
Class of 2008	Special Ed.	20		
	Test Times:	M ->S	S ->S	
Class of 2007	Total	102	104	
Class of 2007	Females	50	47	
Class of 2007	Males	52	57	
Class of 2007	Low Income	66	66	
Class of 2007	Moderate +	36	38	
Class of 2007	General Ed.	80	74	
Class of 2007	Special Ed.	22	30	
	Test Times:	M ->S	S ->S	S ->S
Class of 2006	Total	102	107	116
Class of 2006	Females	54	58	62
Class of 2006	Males	48	49	54
Class of 2006	Low Income	56	57	58
Class of 2006	Moderate +	46	50	58
Class of 2006	General Ed.	90	86	92
Class of 2006	Special Ed.	12	21	24
	Test Times:	M ->F	F ->S	S ->S
Class of 2005	Total	105	108	112
Class of 2005	Females	50	54	54
Class of 2005	Males	55	54	58
Class of 2005	Low Income	49	49	52
Class of 2005	Moderate +	56	59	60
Class of 2005	General Ed.	90	92	96
Class of 2005	Special Ed.	15	16	16
	Test Times:	M ->F	F ->F	F ->S
Class of 2004	Total	117	114	114
Class of 2004	Females	53	53	56
Class of 2004	Males	64	61	58

Class of 2004	Low Income	69	69	66				
Class of 2004	Moderate +	48	45	48				
Class of 2004	General Ed.	94	88	92				
Class of 2004	Special Ed.	23	25	22				
	Test Times:	M ->F	4F ->5F	5F ->6F				
Class of 2003	Total		126	133				
Class of 2003	Females		62	65				
Class of 2003	Males		64	68				
Class of 2003	Low Income		63	71				
Class of 2003	Moderate +		63	62				
Class of 2003	General Ed.		100	107				
Class of 2003	Special Ed.		26	26				

Table 5: Median percentile rank of the post group on the Math Total 2 year Comparison								
		3->4	4->5	5->6				
	Test Times:	Spring						
Class of 2008	Total	60.0						
Class of 2008	Females	60.0						
Class of 2008	Males	61.0						
Class of 2008	Low Income	53.0						
Class of 2008	Moderate +	74.0						
Class of 2008	General Ed.	65.0						
Class of 2008	Special Ed.	13.0						
	Test Times:	Spring	Spring					
Class of 2007	Total	60.0	49.0					
Class of 2007	Females	59.0	52.0					
Class of 2007	Males	62.0	47.0					
Class of 2007	Low Income	53.0	44.0					
Class of 2007	Moderate +	65.0	67.0					
Class of 2007	General Ed.	65.0	61.0					
Class of 2007	Special Ed.	20.0	14.5					
	Test Times:	Spring	Spring	Spring				
Class of 2006	Total	58.0	52.0	50.0				
Class of 2006	Females	60.5	52.0	52.0				
Class of 2006	Males	55.5	56.0	48.0				
Class of 2006	Low Income	55.5	47.0	37.5				
Class of 2006	Moderate +	68.0	60.5	60.0				
Class of 2006	General Ed.	63.0	60.5	56.0				
Class of 2006	Special Ed.	34.5	19.0	15.0				
	Test Times:	Fall	Spring	Spring				
Class of 2005	Total	62.0	53.0	49.0				
Class of 2005	Females	63.0	54.5	50.5				
Class of 2005	Males	62.0	48.5	49.0				
Class of 2005	Low Income	54.0	41.0	34.0				
Class of 2005	Moderate +	72.0	65.0	68.0				
Class of 2005	General Ed.	67.0	59.5	59.0				
Class of 2005	Special Ed.	45.0	8.5	19.0				
	Test Times:	Fall	Fall	Spring				
Class of 2004	Total	55.0	60.0	49.0				
Class of 2004	Females	45.0	57.0	52.0				
Class of 2004	Males	57.0	60.0	46.5				

Class of 2004	Low Income	54.0	49.0	39.5
Class of 2004	Moderate +	55.0	70.0	62.5
Class of 2004	General Ed.	65.0	68.5	60.5
Class of 2004	Special Ed.	16.0	17.0	9.5
	Test Times:	Fall	Fall	Fall
Class of 2003	Total		60.0	54.0
Class of 2003	Females		65.0	51.0
Class of 2003	Males		57.5	58.0
Class of 2003	Low Income		48.0	50.0
Class of 2003	Moderate +		73.0	60.0
Class of 2003	General Ed.		69.0	59.0
Class of 2003	Special Ed.		18.5	21.0

Appendix 2

Student Technology Survey

1. Do you have a computer at home?
   Yes _____ No _____

2. If yes, what kind of computer?
   IBM Compatible _____ Word Processor Only _____
   Macintosh _____ Other _____

3. Do you have Internet access at home?
   Yes _____ No _____

4. How often do you use your computer at home?
   Daily _____ Monthly _____
   Weekly _____ None _____

5. What types of things do you use your computer for?
   Play games _____ Type papers _____
   Find Information _____ E-mail _____
   Other _____

6. How often do you use the computer at school?
   Daily _____ Monthly _____
   Weekly _____ None _____

7. How often would you like to use the computer at school?
   Daily _____ Monthly _____
   Weekly _____ None _____

8. Do you like the computer software/ programs at school?
   Yes _____ No _____

9. Using technology, what activities would you like to do at school?

10. What computer programs would you like at school?

Thank you for your participation! It is greatly appreciated!

Appendix 3

Teacher Technology Survey

Please provide the following information.

Name of building: _____

1. What grade level do you teach? (Please check all that apply.)

K ___	3 ___	6 ___	9 ___	12 ___
1 ___	4 ___	7 ___	10 ___	Other ___
2 ___	5 ___	8 ___	11 ___	

2. What subject areas do you teach? (Please check all that apply.)
   ___ Elementary education (all subject areas)
   ___ Mathematics
   ___ Social Studies
   ___ Science
   ___ Language Arts
   ___ Fine Arts (Music, Art, Drama)
   ___ Second Languages
   ___ Vocational Education
   ___ Computer/Business
   ___ Physical Education/Health
   ___ Special Education
   ___ Other (please specify _____)

3. How do you classify your main assignment at the school?
   ___ Regular full-time teacher
   ___ Regular part-time teacher
   ___ Itinerant (you teach at more than one school)
   ___ Long-term substitute
   ___ Other (please specify _____)

4. As of the end of the last school year, how many years had you been teaching?
   _____ year(s)

5. How many total students do you teach each week? _____

6. What is your average class size? _____

7. Do you have a computer in your classroom? (If you use more than one classroom, think about the one you spend the most time with for this and all other questions.)
   ___ Yes, one ___ Yes, more than one
   ___ I don't have a computer in my room.

8. Do you have any computers in your classroom that are connected to the Internet?
   ___ Yes, one ___ Yes, more than one
   ___ I don't have a computer in my room.

9. If you have computers in your room, how many hours does your average student spend on the computer at school in an average week? _____

10. How many hours does your average student spend using the Internet at school in an average week? _____ (does not have to be a computer with Internet in your room.

11. Approximately how often do you use each of these applications with your students?

	Daily	Weekly	Once or twice a year	Never	Not available
Computers in general					
Word processing					
Spreadsheets					
Databases					
Graphical applications					
Presentation software (e.g. Power Point)					
Desktop Publishing					
Any Internet activity					
Hypermedia/ Multimedia (e.g. CD-ROMs)					
Integrated Learning Systems (e.g. CCC, Jostens)					
Simulation Programs					
Drill/Practice Programs, Tutorials					

12. How do students use computers in your classes? (check all that apply)
- ☐ To organize and store information
- ☐ To collect data and perform measurement
- ☐ To manipulate/analyze/interpret data
- ☐ To communicate information as the result of investigations
- ☐ To create visual displays of data/information (e.g., graphs, charts, maps)
- ☐ To plan, draft, proofread, revise and publish written text
- ☐ To create graphics or visuals of non-data products (e.g., diagrams, pictures, figures)
- ☐ To create visual presentations
- ☐ To create models
- ☐ To perform calculations
- ☐ To support individualized learning
- ☐ For remediation for basic skills
- ☐ To compensate for a disability or limitation
- ☐ Other (please specify _____)

13. How do you use the Internet in your classes? (Check all that apply.)
    - ❑ To gather information from a variety of sources
    - ❑ To communicate with others outside of school
    - ❑ Other (please specify _____)

14. In an average week, you may take on a variety of roles. What percentage of time do you think you act in each of the following roles:

    Lecturer _____%

    Coach _____%

    Mediator _____%

    Facilitator _____%

    Total _____100___%

15. Have you received any professional staff development in the use of technology during the past year. (Please check one)

    _____ Yes _____ No

    If yes, what types of technology professional development did you receive?

16. How do you believe that technology has changed or determined the way you teach your classes? (please check one)

    ____ Greatly ____ Somewhat ____ Not at all

17. List three types of professional develop in technology would you like to see offered in our school district?

    1) _____

    2) _____

    3) _____

Thank you for your participation in this survey. Your input is greatly appreciated.

Appendix 4

Centerville School and Community Technology Skills and Interests Needs Assessme

Directions: Please circle your answer.

Background

1. I **have / do not have** a computer at home.

   If you marked "have" please complete the following.
   a. I use that computer
      often **once in a while** **seldom** **never**

   b. My home computer(s) is/are
      IBM (or compatible) **Mac** **Other**

2. I **have/ do not have** regular access to a computer at work.

   If you marked "have" please complete the following.
   a. I use that computer
      often **once in a while** **seldom** **never**

   b. My work computer(s) is/are
      IBM (or compatible) **Mac** **Other**

3. My relationship with the schools could best be described as:

   Community Member **Secretary/Aide** **Parent** **Teacher** **Administrator**

4. I learned most things that I know about technology from

   formal courses **personal, informal study** **colleagues** **other**

Comment or explanation:_____

5. I **would / would not** be interested in serving on a school district technology committee.

General Skills and Interests Inventory

In the first column below, please indicate your SKILLS using 3=high, 2=medium, 1=low, and 0=none
In the second column, indicate your INTEREST IN LEARNING using 3=high, 2=medium, 1=low, and 0=none

Skills	Interest	
_____	_____	1 Operating a computer.
_____	_____	2 Managing computer files.
_____	_____	3 Using word processing.
_____	_____	4 Using spreadsheets.
_____	_____	5 Using databases.
_____	_____	6 Using computer graphics.
_____	_____	7 Using presentation software such as HyperCard or PowerPoint.
_____	_____	8 Using Internet as a professional resource.
_____	_____	9 Using student instructional software.
_____	_____	10 Using software in ethical and legal ways.

Please circle any of the above topics you would like to learn and teach to school staff members.

Specific Skills and Interests Inventory

In the first column below, please indicate your SKILLS using 3=high, 2=medium, 1=low, and 0=none
In the second column, indicate your INTEREST IN LEARNING using 3=high, 2=medium, 1=low, and 0=none

Skills	Interest	
_____	_____	11 Using drafting or CAD software.
_____	_____	12 Manually taping a TV program off air/cable using a timer.
_____	_____	13 Using computers to control electronic equipment such as lathes, lasers, or robots.
_____	_____	14 Using a camcorder to tape an event.
_____	_____	15 Editing multiple tapes into a new product.
_____	_____	16 Participating with interactive video conferencing in the ICN classroom.
_____	_____	17 Inserting images from camcorder or digital graphics camera into computer applications.
_____	_____	18 Editing images from camcorder or digital graphics camera in computer applications.
_____	_____	19 Using an electronic grade-book and assessment software to monitor student progress.
_____	_____	20 Creating and printing documents with a word processor.
_____	_____	21 Creating and sorting databases to display needed information.
_____	_____	22 Searching a database and transferring or printing specific information.
_____	_____	23 Creating and using formulas and queries in a database .
_____	_____	24 Merging a form letter with a database to create individualized letters.
_____	_____	25 Create a spreadsheet using various column widths, contents, and formulas.
_____	_____	26 Creating newsletter with desktop publishing.
_____	_____	27 Using graphics software to create and/or modify pictures.
_____	_____	28 Using a scanner to import photos and/or text.
_____	_____	29 Importing and modifying clipart into text or desktop publishing.
_____	_____	30 Troubleshooting malfunctioning computers or printers.
_____	_____	31 Formatting disks and copy/move/backup/delete files.
_____	_____	32 Installing and deleting programs on computers.
_____	_____	33 Accessing information on a CD-ROM.
_____	_____	34 Run/installing software from a CD-ROM.
_____	_____	35 Identifying and using quality instructional software for teaching reading.
_____	_____	36 Identifying and using quality instructional software for teaching language arts and writing.
_____	_____	37 Identifying and using quality instructional software for teaching mathematics.
_____	_____	38 Identifying and using quality instructional software for teaching science concepts.
_____	_____	39 Identifying and using quality instructional software for teaching social studies.
_____	_____	40 Identifying and using instructional software for teaching: _____
_____	_____	41 Creating a HyperCard or PowerPoint presentation or stack.
_____	_____	42 Using a computer-based portfolio assessment system.
_____	_____	43 Using a laser video disk to show information.
_____	_____	44 Using a computer to control a laser disk or other remote system.
_____	_____	45 Accessing and send e-mail within buildings and through Internet.
_____	_____	46 Attaching application files to e-mail and read from other's e-mail attachments.
_____	_____	47 Browsing the Internet and upload/download specific information and files.
_____	_____	48 Creating a web-page on the WWW (Internet).
_____	_____	49 Using the Iowa Communications Network classrooms and equipment to teach others.
_____	_____	50 Other technological skills that might help students learn: (please specify)

Inservice Planning Inventory

I. List the technological skills students should have when they graduate from high school.

II. State the best time(s) for you to learn **OR** teach about technology.

Comments or Suggestions:

Appendix 5

TECHNOLOGY LITERACY CHALLENGE FUND
GRANT PROPOSAL NARRATIVE SCORING RUBRICS
(Page 1 of 2)

	N/A	Level 1	Level 2	Level 3	Level 4
Action Research	**(0 pts)**	Project provides little evidence of need. Limited presentation of methodology, No data to support need. There is no analysis of the data. Little evidence that building technology, learning goals and priorities are linked to the District's School Improvement Plan. **(for 3 points)**	Need is indicated but not supported. Limited presentation of methodology, Limited data to support need. Evidence of some linkage of building technology, learning goals and priorities to the District's School Improvement Plan. **(6 points)**	Need is present; gaps and barriers are described. Adequate presentation of methodology, There is adequate analysis of the data provided Evidence of much linkage of building technology, learning goals and priorities to the School Improvement Plan. **(10 points)**	There is a clear and convincing description of the gaps or barriers. A through presentation of methodology. There is through analysis of data. Evidence that building technology and learning goals are comprehensively linked to the District's School Improvement Plan. **(15 points)**
Proposed Initiative	**(0 pts)**	Proposal does not explain or present a commitment to integrating technology into the curriculum. This project will result in little impact on the integration of technology into the curriculum or in student achievement. There is no clear connection to district standards and benchmarks. The four pillars are only nominally addressed. **(for 7 points)**	Limited integration of technology into the curriculum but there is adequate presentation of the viability of the proposed project. The project will result in some impact on the integration of technology into the curriculum or in student achievement. Unclear whether impact is sustainable The four pillars are adequately addressed. **(for 15 points)**	There is technology integration and a connection to the applicant's curriculum standards and technology plans. This project shows potential for having a strong, sustainable impact on the integration of technology into the curriculum or in student achievement. The four pillars are integrated into proposal. **(for 20 points)**	There is strong technology integration and a strong connection with the applicant's technology plan and curriculum standards. This project will clearly have a strong sustainable impact on the integration of technology into the curriculum or in student achievement. The four pillars are integrated into proposal. **(for 25 points)**
Impact on Student Learning	**(0 pts)**	Project does not relate to educational or learning objectives or to the access of information from learning. **(for 3 points)**	Project objectives have minimal relationship to learning standards-based curriculum, or access to information for learning. **(for 6 points)**	Project objectives relate to learning, standards-based curriculum, or access to information for learning. **(for 10 points)**	Objectives are strongly linked to learning, standards-based curriculum, or access to information for learning. **(for 15 points)**
Professional Development	**(0 pts)**	Specified training planned for a few teachers. No formal support mechanism. Professional development not linked to state initiatives. **(for 2 points)**	Specified training planned for many teachers and staff. Ongoing support provided at building level. Professional development only marginally linked to state initiatives. **(for 5 points)**	Specified training dealing with integration and application of learning planned by site with most teachers and staff participating. Ongoing support provided at building level. **(for 8 points)**	Formal and as-needed training and support planned at all levels of the learning community. Clearly addresses the needs of all students and teachers in the building. **(for 10 points)**
Community Involvement	**(0 pts)**	The project did not involve a wide range of community members in the development of the application. No partnership exist or they are not realistic or genuine. There is no indication that private schools have been included in the planning of the proposal. **(for 1 points)**	The project involved some community groups in the development of the proposal but they did nor reflect the needs of the entire community. Partnerships seem more for convenience than genuine cooperation toward common goals. Private schools participated in the development of this proposal have been minimal. **(for 2 points)**	The project involved multiple community groups in the development of this proposal. They reflect some of the community needs and desires. Partnerships are realistic and contribute toward the project's goals. Private school have participated in the development of this proposal OR an explanation of the discussions which took place between/among the project participants and private schools is included. **(for 3 points)**	The project involved a wide range of community members in the development of the application. They reflect the needs of the entire school community. Partners proposed contribution to the implementation of the project is a high level of commitment. Private school are participating on an equal basis with public schools. **(for 5 points)**

TECHNOLOGY LITERACY CHALLENGE FUND
GRANT PROPOSAL NARRATIVE SCORING RUBRICS
(Page 2 of 2)

	N/A	Level 1	Level 2	Level 3	Level 4
Community Involvement	**(0 pts)**	The project did not involve a wide range of community members in the development of the application. No partnership exist or they are not realistic or genuine. There is no indication that private schools have been included in the planning of the proposal. **(for 1 points)**	The project involved some community groups in the development of the proposal but they did nor reflect the needs of the entire community. Partnerships seem more for convenience than genuine cooperation toward common goals. Private schools participated in the development of this proposal have been minimal. **(for 2 points)**	The project involved multiple community groups in the development of this proposal. They reflect some of the community needs and desires. Partnerships are realistic and contribute toward the project's goals. Private school have participated in the development of this proposal OR an explanation of the discussions which took place between/among the project participants and private schools is included. **(for 3 points)**	The project involved a wide range of community members in the development of the application. They reflect the needs of the entire school community. Partners proposed contribution to the implementation of the project is a high level of commitment. Private school are participating on an equal basis with public schools. **(for 5 points)**
Plan of Action	**(0 pts)**	There is little relationship between need and objectives/project results. Project objectives/results are not measurable. Time frame for the activities is not clearly defined. Activities and timeline are sketchy or unrealistic. Project is technically confusing, uses outdated technology, is not technically feasible or is not well explained. **(for 2 points)**	The relationship between the need and the project objectives/results is presented but not convincing. Project objectives are barely measurable, mainly by completion of activities. Time frame for the activities is defined but is not well related to activities. Activities and timeline are vague. Project technology lacks clarity. **(for 5 points)**	There is a reasonable connection between the need and the project objectives/results. Objectives and project results relate to need and objectives and are somewhat measurable beyond simply completing activities. Time frame for the activities is defined and seems reasonable. Activities and timeline are appropriate. Technology is appropriate for project and will accomplish stated goals and objectives. **(for 8 points)**	The project objectives are directly linked to the demonstrated need. Project objectives are very specific and are clearly measurable beyond simply completing activities. Time frame for the activities is clearly defined and relates well to the activities and their completion. Activities/timelines are appropriate and doable in the time frame presented. Project is technology feasible and uses relevant, modern technology that is interoperable. **(for 10 points)**
Equity & Access	**(0 pts)**	There is little provision for the access for teachers, parents, and students to the best practices and curriculum. **(for 1 points)**	Proposal makes some provision for equity of access and favors teachers incorporating best practices but does not support it. **(for 2 points)**	There is reasonable provision for equity and encourages some change in teacher pedagogy. **(for 3 points)**	Proposal provide for equity and promotes access to best teaching practices and curriculum. **(for 5 points)**
Management, Evaluation and Dissemination	**(0 pts)**	Role of key staff is unclear or is not sufficiently qualified to implement the project. Evaluation very lacking with no plans to disseminate. **(for 5 points)**	Key staff are indicated but their qualifications may be questionable to implement the project Evaluation plan loosely tied to project goals. Limited strategies for dissemination of evaluation results. **(for 8 points)**	Key staff are adequate to accomplish the project. Evaluation will be tied closely to building, project goals. Reporting of outcomes will be consistent with the requirements of the district and the DE. (i.e. 280.18) **(for 11 points)**	Key staff are exemplary and can clearly accomplished the project. Comprehensive evaluation ties back to district technology goals. Plan for dissemination is broad based. **(for 15 points)**
TLCF Funding Will Be Used In Conjunction With Other Funding Sources	**(0 pts)**	Little evidence of a plan to use TLCF funding with other funding sources available to the building or district. **(for 2 points)**	Evidence of some planning to use TLCF funding with other funding sources available to the building or district. **(for 5 points)**	Evidence of TLCF funding being used in conjunction with other technology funding sources available tot he building and district. **(for 8 points)**	Evidence of extensive planning for thee use of TLCF funding in conjunction with other funding sources available to the building and district. **(for 10 points)**

Appendix 6

Due: May 14th, 1999

TECHNOLOGY LITERACY CHALLENGE FUND GRANT REQUIREMENT CHECKLIST

ESEA SECTION 3135

Local applicants does **NOT HAVE** an approved technology plan (check if applicable) _____

On the line next to each TLCF requirement below write the page number of the district technology plan where the requirement is addressed OR write "supplement" to indicate that supplemental materials are attached to the district technology plan explaining how the TLCF requirement will be addressed.	
	(1) include a strategic, long - range (three to five - year), plan that includes--
	(A) a description of the type of technologies to be acquired, including specific provisions for inter-operability among components of such technologies and , to the extent practicable, with existing technologies;
	(B) an explanation of how the acquired technologies will be integrated into the curriculum to help the local educational agency enhance teaching
	(C) an explanation of how programs will be developed in collaboration with existing adult literacy service providers (ex. Higher education, AEA's community colleges) to maximize the use of such technologies;
	(D) staff training and support:
	(i) a description of how the local educational agency will ensure ongoing, sustained professional development for teachers, administrators, and school library media personnel served by the local educational agency to further the use of technology in the classroom or library media center; and
	(ii) a list of the source or sources of ongoing training and technical assistance available to schools , teachers and administrators served by the local educational agency, such as State technology offices, intermediate educational support units, regional educational laboratories or institutions of higher education;
	(E) a description of the supporting resources, such as services, software and print resources, which will be acquired to ensure successful and effective use of technologies acquired to ensure successful and effective use of technologies acquired under this section;
	(F) the projected timetable for implementing such plan in schools;
	(G) the projected cost of technologies to be acquired and related expenses needed to implement such plan, and
	(H) a description of how the local educational agency will coordinate the technology provided pursuant to this subpart with other grant funds available for technology form State and local sources;
	(2) describe how the local educational agency will involve parents, public libraries, business leaders and community leaders in the development of such plan;
	(3) describe how the acquired instructionally based technologies will help the local educational agency:
	(A) promote equity in education in order to support State content standards and State student performance standards that may be developed: and
	(B) provide access for teachers, parents and students to the best teaching practices and curriculum resources through technology; and
	(4) describe a process for the ongoing evaluation of how technologies acquired under this section:
	(A) will be integrated into the school curriculum; and
	(B) will affect student achievement and progress toward meeting the National Education Goals and any challenging State content standards and State student performance standards that may be developed.

NOTE: Readers will primarily use your District Technology Plan as a reference during the rating process.

Due: May 14th 1999

STaR Chart

: The CEO Forum has developed the School Technology and Readiness Chart (STaR Chart) to provide a clear framework for assessing how prepared American schools are to meet the education challenges of the 21st Century. The STaR Chart describes technology presence, use and integration in a typical school in four profiles ranging from the "Low Technology" to the "Target Technology. The STaR Chart also highlights the potential educational benefits each level of technology integration offers. Together, this information can help a school identify its current educational technology profile and, based on the educational outcomes it values, target it future profile.

STaR Chart Self-Diagnostic Tool

Instructions: The STaR Chart Self-Diagnostic Tool is a questionnaire designed to help education leaders assess the progress of their school in integrating technology into the curriculum. Applicants are required to complete the Self-Diagnostic Tool. Please use the provided answer sheet that is on page 22. After you finish this page. The answer point key is located on page 23. The SUMMARY result of the STaR Chart survey, which is located on page 24, MUST be submitted as part of the application demographic sheet. Please note that this questionnaire provides only general guidance - many schools are likely to have unique features that are beyond the scope of this broad assessment tool.

A. Hardware

1. What is your current student-to-computer ratio (all computers should be counted)?
   - A. no computer in school
   - B. greater than 25:1
   - C. between 25:1 and 10:1
   - D. between 9:1 and 5:1
   - E. lower than 5:1

2. What is your current student-to-multimedia computer ratio?
   - A. no multi-media computers in school
   - B. greater than 50:1
   - C. between 50:1 and 17:1
   - D. between 16:1 and 7:1
   - E. lower than 7:1

3. What is your current student-to-CD-ROM ratio?
   - A. no CD-ROMs in the school
   - B. greater than 200:1
   - C. between 200:1 and 50:1
   - D. lower than 50:1

4. What kind of printers are available in your school?
   - A. no printers in the school
   - B. dot-matrix printer in the classroom or inkjet laser printer in the computer lab
   - C. most classrooms have an inkjet or laser printer

5. How does your school/district deal with the technical maintenance and/or technical support of hardware?
   - A. no official maintenance plan in place; done piecemeal by teachers and students on their own time
   - B. district level technical support staff services several schools
   - C. full-time, in-school technical support

B. Connectivity

1. What percent of your classrooms are connected to the Internet?
   A. no Internet access in the school
   B. Internet access available in the library or computer lab
   C. less than 50% of classrooms are connected to the Internet
   D. more than 50% of classrooms are connected to the Internet

2. How are the majority of users gaining access to the Internet?
   A. not applicable / no Internet connection
   B. individual modem
   C. LAN (local area network)
   D. WAN (wide area network)

3. What type of Internet connection do the majority of your computers have?
   A. not applicable / no Internet connection
   B. dial-up access
   C. dedicated line
   D. high-speed dedicated line (e.g. ISDN, T1, T2, Cable)

4. What percent of your students have an e-mail address provided by the school?
   A. 0-30%
   B. 30-80%
   C. over 80%

5. What percent of your teachers have an e-mail address provided by the school?
   A. 0-30%
   B. 30-80%
   C. Over 80%

C. Content

1. Do most of your student use ***drill and practice programs*** (i.e. educational software that engages students in multiple choice, true and false, or "worksheet" type of questions) on a regular basis as part of the curriculum?
   A. Yes
   B. No

2. Do most of your students use ***basic authoring applications*** such as word processors, spreadsheets, and drawing programs (i.e. KidPix) on a regular basis as part of the curriculum?
   A. Yes
   B. No

3. Do most of your students use ***advanced authoring applications*** such as web publishing software, presentation software (i.e. PowerPoint , HyperStudio) and/or collaborative groupware on a regular basis as part of the curriculum?
   A. Yes
   B. No

4. Do most of your students use ***simulation software*** (i.e. SimCity, A.D.A.M., etc.) on a regular basis as part of the curriculum?
   A. Yes
   B. No

5. Do most of your students use ***CD-ROM research resources*** (i.e. CD ROM encyclopedias) on a regular basis as part of the curriculum?
   A. Yes
   B. No

6. Do most of your students use the ***World Wide Web*** on a regular basis as part of the curriculum?
   A. Yes
   B. No

7. Do most of your students make use of ***networked communications*** (i.e. e-mail bulletin boards, list serves, etc. to contact resources outside the classroom) on a regular basis as part of the curriculum?
   A. Yes
   B. No

D. Professional Development

1. How many technology-related professional development hours have the majority of teachers completed?
   A. 0-30 hours
   B 1-50 hours
   C 1-70 hours
   D. over 70 hours

2. How long have the majority of teachers been frequent users of technology?
   A. 0-3 months
   B. 3 months - 2 years
   C. 2 - 3 years
   D. over three years

3. Does your school provide teachers with regular out-of-class preparation time for learning and integrating technology into the curriculum?
   A. Yes
   B. No

4. Instructor Skill Levels:
   a. Are the majority of your teachers at the **"Entry and Adoption"** skill stage of technology use? (i.e. Teachers are just beginning to learn how to use basic applications such as word processors and drill and practice software)

      A. Yes
      B. No

   b. Are the majority of your teachers at the **"Adaptation"** skill stage of technology use? (i.e. Teachers are familiar with a variety of applications and often require students to use technology to complete assignments)

      A. Yes
      B. No

   c. Are the majority of your teachers at the **"Appropriation"** skill stage of technology use? (i.e. Teachers regularly use technology for collaboration, communication, and research and integrate these processes into the curriculum)

      A. Yes
      B. No

   d. Are the majority of your teachers at the **"Invention"** skill stage of technology use? (i.e. Teachers leverage technology as a tool to craft new curriculum and new teaching and learning techniques)

      A. Yes
      B. No

5. What type of technology-related professional development do you provide to your teachers?
   A. basic introduction to hardware / word processor applications
   B. multi-day courses run by public or private technology training organizations
   C. on-site visits to technology-using classrooms
   D. on-line distance learning professional development courses
   E. in-school one-on-one professional mentoring on a consistent or just-in-time basis
   F. collaborative team-teaching opportunities with technology proficient instructors

E. Use

1. What pattern of ***student technology*** use best describes the majority of classrooms in your school/district?
   A. **Irregular, individual use** (i.e. computers are in labs and libraries)
   B. **Regular individual use** for **some** students (i.e. as a reward for students who complete in-classroom work)
   C. **Irregular group use** for short collaborative activities and/or **regular individual use** for most students (students use digital resources to supplement classroom work)
   D. **Regular individual and group use** of technology as communication and research tools as needed (students leverage technology to engage in authentic project-based learning)

2. What percent of your students use a computer at school daily?
   A. 0-30%
   B. 30-80%
   C. over 80%

3. What percent of your teachers use a computer at school daily?
   A. 0-30%
   B. 30-80%
   C. over 80%

Appendix 7

Every Student Counts
Teacher Implementation Log
March, 2000

Reminder: Do at least one rational number task each week. Log the task below.

School: _____ Name: _____

Grade level: _____ Dates covered: _____to _____

Description of classes (grade levels, # students, special needs)

Mathematical Tasks:

A. What rational number tasks did you do with your students?

B. Describe the mathematics in the task. What criteria did students need to meet to be successful with the task?

C. What thinking strategies did students use to solve the tasks?

D. What differences did you note in the ways in which your high, average, and low students dealt with the task?

Gender	H,M,L	Strategy	Fully Successful	Partially Successful	Not successful

As you analyze the information, what insights or questions does it prompt?

How might you use the information to guide your instruction?

Sample(s) of student work:

You may want to simply attach samples of student work to the implementation log. Be sure to take samples of student work, when they are available, to your team meetings. It is probably best to concentrate on the six students you are more formally monitoring.

Comments and Reflections:

Questions:

Reminder: Take this implementation log with you to your team meeting to promote the learning community.

Appendix 8

Structured Response Sheet

Title of Document or Videotape_____

Author(s) or Presenter(s)_____

1. What does this author say to us about content? About what we teach? (What knowledge, skill, and processes in the focus area need to be a part of daily/yearly curriculum?)

2. What does this author say to us about instruction? About what we teach? (What recommendations are made or can be directly inferred about the design of instruction or presentation of content?)

3. What does this author say to us about assessing student learning? (Are there suggestions about how to diagnose students' knowledge, skill, or transfer of knowledge/skill?)

Appendix 9

Every Student Counts

Implementation Log – Team Summary
March, 2000

School: _____

_____ 1. Number of team members

_____ 2. Total number of rational number tasks used by teachers.
Least number of tasks used_____ Greatest number of tasks used_____

# tasks completed	0	1	2	3	4	5
# teachers						

_____ 3. Number of times the team met to discuss tasks and/or plan lessons

4) What kinds of data have you gathered?

5) In what ways have you organized the data?

6) What interpretations have you made about your students and their mathematical thinking?

7) As a team, what next steps have you decided to take?

Team leaders, please attach a copy of this summary to the set of implementation logs. Please remember to include the logs of district office and aea staff.

Number of implementation logs included: _____

Bring to the April 4 professional development session.

Every Student Counts

Teacher Calculator Use Log

Week of _____

Number of times the calculator was used for instruction or problem solving.

_____

For what purposes was the calculator used?

What key strokes, functions, or applications were used?