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Increasing Education through Technology

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## Problem Statement

As the 21<sup>st</sup> century continues, the need for technology and technological literacy becomes a necessity. Students in the Rochelle Park School District need the proper tools to enable them to excel in high school, college, and in the global work place. In addition, technology, once purchased, needs to be periodically updated to ensure that students and staff have access to appropriate hardware and software. According to the goals set forth from the New Jersey Department of Education in their technology plan for New Jersey, there are four goals with benchmarks that each school district must meet. Currently, the Rochelle Park School District needs to make improvements with the following:

Benchmark 1.4—All students will have equitable and easy access to effective and engaging software, CD ROMs and online resources for content delivery as an integral part of every school curriculum. Content materials will meet universal design standards to assure access for students with disabilities. (State of New Jersey Department of Education, 2006).

In order for all our students to achieve this benchmark and to achieve proficiency in all content areas of the NJCCCS, the level of technology at Midland School must increase. Many teachers are currently not using computers in their classrooms for a variety of different reasons. In some classrooms there is not enough age appropriate, effective and engaging software, while other classrooms have outdated or broken computers with inadequate Internet access. The majority of staff at Midland School feels that they would integrate technology into their curriculum if adequate hardware and software were available. The Rochelle Park School District currently has a program for language delayed three year old children. The staff involved with these students feels they would benefit tremendously from additional hardware and software that

meet the special needs of their students. They indicate that if they had touch screens on computers and more multi-sensory software, they would integrate technology into their curriculum and the students would benefit from both the increased use of technology and the use of clinically proven software.

The Rochelle Park School District also needs to improve upon Benchmark 3.1:

Benchmark 3.1—All students and educators will have regular and equitable access to technology equipment (both desktop and portable) when needed in all learning environments. This includes access to technologies with universal design features or other design modifications to assure access for students with educational disabilities. (State of New Jersey Department of Education, 2006).

In order for the students, teachers, and administrators in Rochelle Park to have access to educational technology in all learning environments, the district should start integrating laptops into Midland School. Midland School's student to computer ratio is 3.4 to 1 as listed on the New Jersey Department of Education's 2005-2006 School Report Card. (State of New Jersey Department of Education, 2006). Each instructional classroom as a minimum of two computers connected to the Internet. It is difficult to use computers to their full advantage when there are only two or three available for a class of 16 students. By purchasing a portable laptop cart and 20 laptop computers, teachers can have greater flexibility with technology. Teachers can have laptops brought into their classroom for specific lessons. This would enable a teacher to have an adequate number of computers to put technology to good use. Computers and technology will become a true learning tool in Midland School rather than a statistic showing that technology is in place. Having laptop computers would assure a more equitable use of technology; computers could then be used in every class throughout the school regardless of age or subject.

The next areas of improvement are benchmarks 4.1 and 4.3:

Benchmark 4.1—All school districts will obtain and maintain broadband, high-speed networks and reliable Internet access that enables students and educators to support their curricula activities.

Benchmark 4.3—All schools will maintain quality hardware/software with adequate capacity and capability to support successful learning in classrooms, media centers and throughout the learning environment. (State of New Jersey Department of Education, 2006).

Currently Midland School has a high-speed T1 network in place for classrooms and offices which enables staff, teachers, and students to access the Internet efficiently. In order to move to the future and use laptops throughout the school, a wireless access point needs to be added to the network. A wireless environment would enable Midland School to use technology to its fullest in all curricula.

Classroom computers need to be periodically evaluated for both software and hardware in order to ensure successful learning. Computers need to have the capacity to run quality programs based upon the individual needs of each classroom. Midland School has a need for increased hardware and software for students with disabilities. In order to successfully prepare students for high school, there is also a need for increased software in the science lab.

### Background Information

#### *The Benefits of Laptops*

In the study, “Evaluation of a Laptop Program: Successes and Recommendations,” (Lowther, et. al., 2001) the effectiveness of using laptops with 5<sup>th</sup> and 6<sup>th</sup> graders was assessed. The classrooms in the study were equipped with wireless Internet and printers. Three questions were going to be answered by the study: (1) Is teaching different in a laptop classroom? (2) Do

students behave differently in a laptop classroom? and (3) Do students achieve differently in a laptop classroom? The research found that there were significant increases in project-based learning and independent inquiry/research. Teachers used computers more for instructional use and felt that the computer was used as a learning tool in the classroom. The students participating in the study felt that their overall computer skills increased by having laptops in the classroom. Students were appreciative of having laptops and felt they were taking advantage of their use despite some reoccurring technical difficulties. Students felt that they had a closer relationship with their teacher and their parents through the use of the laptop program; there was more of a partnership with school work. From the teachers' standpoint, they all agreed that the greatest benefit of the program was the increased access to Internet resources and technology. They felt better equipped to prepare lessons that incorporated technology. They also noted an increase in communication with parents. They were concerned, though, by the ability of the students to tamper with computer settings and programs and the amount of technical support available. Teaching changed in the laptop classes; the teacher acted more as a facilitator to learning. The students became more involved in self-assessments than when computers were not used. Learning became more meaningful.

The study, "Connecting across Many Divides: Digital, Racial, and Socio-Economic," (Hinson & Daniel, 2001) found that there is a digital divide, and this divide is directly related to income levels of families. Increasing Internet access to low income and ethnic households has many positive effects. Students were excited about learning, their self esteem and behavior changed for the better, their technical skills improved, and the quality of school work improved. The students in this study became more active learners. With computers available, parents became more involved with their children's education.

Midland School is hoping for the same success as these two studies by purchasing 20 laptop computers with a mobile cart. Having a portable laptop lab will assure that all students in the Rochelle Park School District will have equitable and easy access to technology. This will make technology a real part of the school's curriculum. In order for the laptop program to be a success, though, the district will have to upgrade its Internet technology. A wireless access point needs to be purchased so the laptop lab could be used in all classrooms in the school.

According to the latest U.S. Census data for Rochelle Park, there are 217 families (15.7%) whose family income is less than \$35,000 per year. According to the New Jersey School Report Card for 2005-2006, 13% of Midland School's families have a primary language other than English. There is also a 5.3% mobility rate in town. (State of New Jersey Department of Education, 2006). Midland School hopes that by implementing a wireless laptop lab all students, especially those who do not have the ability to have computers and quality Internet access in their homes, will increase their proficiency in using technology and not be left behind as the digital divide widens. By implementing a wireless laptop program with high speed Internet access, Midland School will be able to achieve benchmarks 1.4, 3.1 and 4.1.

#### *The Benefits of High Quality, Engaging Software*

The study, "Simulations in the Learning Cycle: A Case Study Involving *Exploring the Nardoo*," (Dwyer & Lopez, 2001) used simulation software throughout all phases of the learning cycle to examine the effects of computer-based learning. There were 31 participants in the study ranging in age from 9 to 13 years old. One of the students in the study had Asperger's Syndrome and six others had various other disabilities/disorders. After using the simulation, the following results were noted:

1. Students' attitudes about learning improved.

2. The teacher was better able to bridge student understanding from print materials to real-world experiences.

Midland School hopes to achieve same success as this study by supplementing the laptop program with science specific software. The science department at Midland School indicated that using the simulation software in areas such as dissection and chemistry students will have a greater understanding of science concepts. Students will learn about dissection virtually without the controversy or mess that would occur with real dissections by using “The Tree Frog 2.” A bundle of three chemistry simulations that would benefit the students of Midland School are “The Atom Builder,” “Ionic Bonding,” and “Covalent Bonding.” Using simulation software is a safe, affordable way to teach and reinforce science concepts while integrating technology into the curriculum. Midland School would fulfill Benchmarks 1.4 and 4.3 by obtaining effective, high quality science software.

#### *The Benefits of Assistive Technology*

In the study, “Computer Talk: Helping Young Handicapped Children Communicate,” (Schery, et, al., 1993) the effects of computer-based language intervention was examined. This was a three part study which assessed the growth in language for developmentally delayed or multi-handicapped children, ages 3-12, using computer-based language intervention. Eight toddlers were used in the first phase of the study. Half used Apple IIe microcomputers with pressure sensitive keyboards and software designed for developmentally delayed children; the second half met with a language pathologist. All students had the same growth in language at the end of the study, but the group using the computer had an increased attention span. Midland School’s speech pathologists indicate that the three year old children enrolled in the Pre K Plus program would benefit from having the clinically approved speech program “Earobics Step 1

Clinic Version” in conjunction with touch screen monitors. Students will benefit from using proven intervention software and will start to gain computer skills while increasing attention span. Even though the study used touch keyboards, Midland School is hoping for the same success using touch screens. Magic Touch Add On touch screens will be purchased because they will add the flexibility that Midland School students need. The touch screens will work with any mouse-driven program and requires no special software. The screens can be used on classroom computers and easily be brought to the computer lab each week. As the student becomes more comfortable with the use of the computer, the touch screen can be removed. Benchmark 3.1 will be reached by using this combination of hardware and software products.

#### Needs Assessment

The Rochelle Park School District is comprised of one school, Midland School #1, which serves students in grades Pre K through grade 8. The current student enrollment is 470 students with a teaching staff of 46 teachers. Over the past several years, the district has provided teachers with in-service workshops dealing with various aspects of technology and has encouraged each teacher to take off site technology workshops. Each staff member has been required to include at least one technology item in his/her yearly PIP and to maintain a webpage for student and parent use that is updated at least weekly. Midland School employs a full time technology coordinator who is available for questions about hardware and software. The technology coordinator is also responsible for all staff training regarding technology and handling all computer repairs throughout the building.

Midland School has student to computer ratio of 3.4 to 1. Each instructional classroom has a minimum of two computers connected to the Internet with high speed access. Many classrooms have more than two computers, but they are older computers and do not have Internet

access. In a recent survey at Midland School, 90% of the teachers indicated that they would include more technology into their lessons if they had access to more computers in their classrooms. The computer lab is equipped with 27 computers and the media center has 15. The computer lab is open one period a day in which teachers can bring classes in to access the Internet and use computers. There is more flexibility for bringing classes to the media center, but for most classes, going to the media center is not a viable solution. Midland School has an average class size of 15.2 students. Actual class sizes for the 2006-2007 school year range from 4 to 28 students depending upon subject and grade level. A lot of times the media center is too cramped for their needs. There are also library classes going on at the same time, so teachers can give minimal instruction while in the media center.

The following software programs are installed on every computer in the district: KidPix, Kidspiration, Inspiration, HyperStudio, Print Shop Ensemble III, Word, Excel, and PowerPoint. The following programs are in selected classrooms: Sibelius 4 (Music and Instrumental Band classrooms) and Publisher (Media Center).

Currently there is no special software in the science lab for grades 6-8. The science teacher would like to have access to more science software and educational web sites that would enhance teacher instruction and student learning. The Pre K Plus classroom has no computer hardware or software for children with disabilities. Both the teacher and speech therapist feel that their students deserve to have hardware and software that better meets their individual needs.

All of the students in Midland School would benefit tremendously from increased technology. By implementing a portable laptop lab with wireless Internet access, teachers would be able to use technology more effectively. For instance, if a science class is studying a unit on atomic bonding the teacher could sign up to have the laptop cart delivered for that class rather

than hoping that the computer lab will be free during that period. If a literature class needed to type an essay, all students would have access to computers to complete the assignment. Some students at Midland School do not have computers at home; the increased availability of computers would benefit them tremendously. They could hand in typewritten work (rather than handwritten) just like the rest of their classmates. Students would have more exposure to technology because teachers would be using it more during the course of the day.

Currently there are 5 students enrolled in the Pre K Plus class. These students can be as young as 3 years old and, in addition to being language delayed, have difficulty using a standard mouse and keyboard. The Magic Touch Add On Touch Screen would be extremely helpful for them. The Magic Touch Screen required no special installation and can be used with any mouse driven program. The screen can easily be removed, so they can be used with laptop or desktop computers anytime they are needed.

#### Proposal Timeline and Participant Responsibilities

The successful implementation of a laptop program, the use of assistive technology, and the integration of engaging software depend upon the support of the entire Rochelle Park School District.

The technology coordinator will be responsible for ordering all necessary hardware and be in charge of its day-to-day maintenance. The technology coordinator will also present an in-service workshop to all staff to give them all the necessary proficiency to include laptops in their instruction. The technology coordinator will also give a presentation demonstrating the laptop lab to the Board of Education. All staff will be required to utilize the laptop lab at least once during the school year. Students will receive instruction on laptop care and use from the computer teacher as part of their regularly scheduled computer class. Pre K Plus class will be

given special instruction on using touch screens during computer class. The administration will conduct two assessments of the laptop program; one mid-year and the other in June. A detailed timeline listing responsibilities and participants can be found in Appendix A.

### Budget

The total expenditure for the Rochelle Park School District's technology proposal is \$27,088.76. This cost is broken down in the following manner: \$4,283.88 for effective and engaging software, \$20,435 for hardware to ensure that every student in Midland School has access to technology and \$2,369.88 for equipment necessary for implementing a wireless computer lab. No money is budgeted for training; all training on the use of laptops and touch screens will be conducted by Midland School staff. Appendix B provides a more detailed breakdown of all expenses.

### Evaluation

The Rochelle Park School District will use a variety of surveys to assess the effectiveness of new technology. Appendix C is a rubric that will enable administrators to monitor the level of technology used by teachers in the district. This rubric can be used mid year and at the end of the year to see the growth of technology usage in classrooms. Appendix D is a teacher survey to be given to all teachers in the district in June. The purpose of this survey will be to pinpoint technical issues, scheduling conflicts, and the overall effectiveness of the laptop program. Appendix E is a survey specifically to assess the use of new software for the science department. Appendix F is a survey specifically to assess the use and effectiveness of touch screens and language software for Pre K Plus students.

### Conclusion

As technology increases in the Rochelle Park School District, the quality of education will increase also. This monetary investment of \$4,283.88 for this grant will substantially assist the Rochelle Park School District's goal for the future. A portable laptop lab and high quality software will enable teachers to incorporate technology into their lessons in a more seamless fashion. Teaching will not be interrupted by sending students to other classrooms in the school to use computers; computers will be available when and where they are needed.

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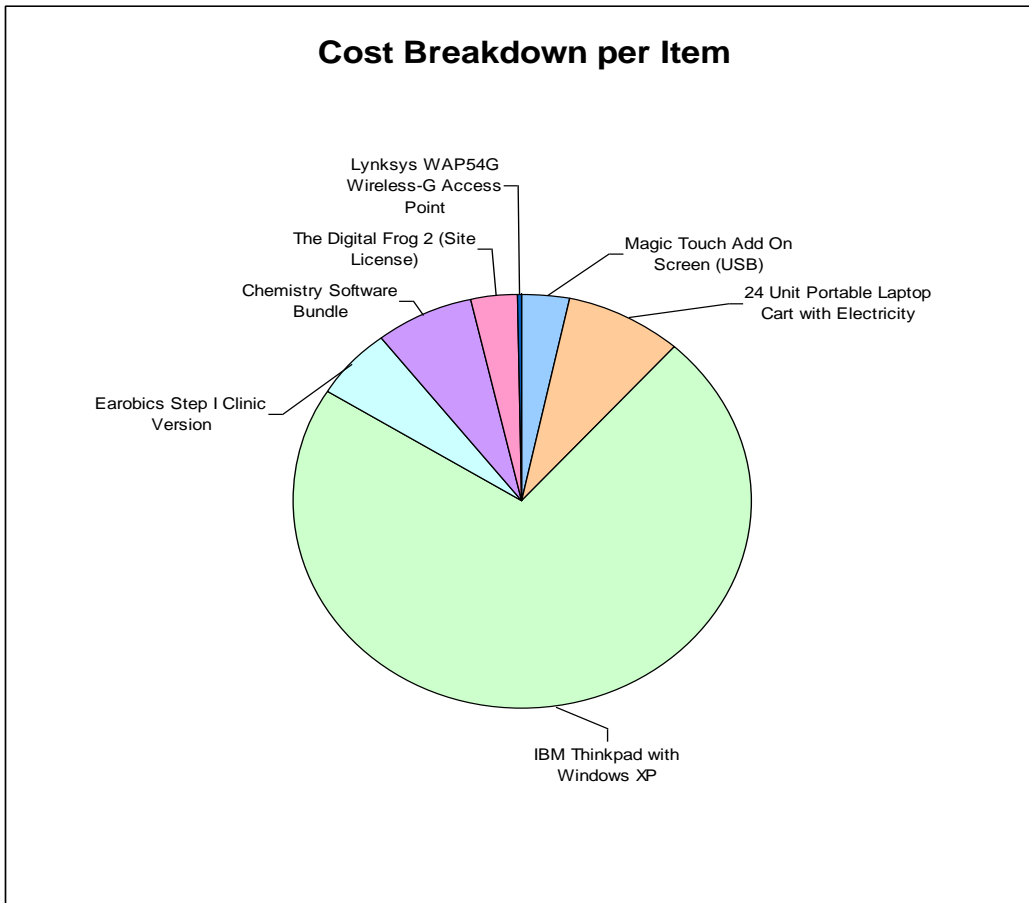
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Appendix A—Timeline with Participant Responsibilities

	June	August	September	October	November	December	March	May	June
Faculty				Attend workshop on portable laptop lab. This training session will last 1.5 hours and will take place the first Tuesday in October from 1:30 – 3:00		Complete survey on laptop workshop		Provide lesson plan for one lesson utilizing laptop lab	Provide feedback on laptop lab
Computer Teacher	Order all software and touch screens		Present instruction of touch screens to Pre K class	Present instruction to students on using laptops during regular classes					
Students			In class instruction on use of Touch Magic screens	In class instruction on using and caring for laptops					
Administration					Distribute feedback survey to staff on laptop workshop				Assess the use of laptop program
Technology Coordinator	Order laptops and portable laptop cart and wireless assess point	Upgrade network for wireless connection		Present workshop for faculty on laptop lab. This training session will last 1.5 hours and will take place the first Tuesday in October from 1:30 – 3:00	Maintain laptops (on going throughout year)		Present laptop demonstration at Board of Education meeting		

**Appendix B  
Budget Breakdown**

Item	Cost per Unit	Quantity	Total Cost
Magic Touch Add On Screen (USB)	175.00	5	\$875.00
24 Unit Portable Laptop Cart with Electricity	2,295.00	1	\$2,295.00
IBM ThinkPad with Windows XP	978.00	20	\$19,560.00
Earobics Step I Clinic Version	299.00	5	\$1,495.00
Chemistry Software Bundle	95.00	20	\$1,900.00
The Digital Frog 2 (Site License)	888.88	1	\$888.88
Lynksys WAP54G Wireless-G Access Point	74.88	1	\$74.88
			<u>\$27,088.76</u>



Appendix C  
Levels of Laptop Integration

<b>Category</b>	<b>Description</b>	<b>Classroom Examples</b>
<b>Nonuse</b>	No visible evidence of laptop lab being accessed in the classroom	No laptop lesson was implemented during the course of the school year
<b>Awareness</b>	Limited laptop use	Computers are used as a productivity tool by the teacher and to aid instruction. Computers are used by students as a reward.
<b>Exploration</b>	Laptops are used as a lesson extension for enrichment exercises	Projects emphasize lower cognitive skills
<b>Infusion</b>	Instruction has been adapted to include laptops	Projects involve higher order thinking skills, i.e. use of Web Quets
<b>Integration</b>	Laptops are an important part of instructional unit and focus on academic goals	Students are actively seeking ways to incorporate technology into activities
<b>Expansion</b>	Laptops are used for collaborative learning	Students are using technology to communicate knowledge outside their classroom

Resource:

The Levels of Technology Implementation, Dr. Christopher Moersch, 1994

Appendix D  
Teacher Survey

1. What is your subject area(s)? \_\_\_\_\_

2. What grade(s) do you teach? \_\_\_\_\_

3. How many times did you request laptops in your classroom? \_\_\_\_\_

4. Did you experience any technical problems with the laptops or the wireless network? If yes, explain problem and frequency.

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5. Did you encounter scheduling conflicts when signing up for the portable lab? If yes, how was the conflict handled.

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6. What programs did your students use on the laptops?

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7. Please list some projects completed in your classrooms using technology.

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8. How did using laptops benefit student learning?

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9. Do you anticipate using laptops more or less next year? \_\_\_\_\_

10. What additional programs do you feel are needed on the laptops?

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11. What is your overall feeling on the use of laptops at Midland School?

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12. Should additional laptops be purchased in future years? Yes \_\_\_\_\_ No \_\_\_\_\_

Appendix E  
Science Survey

1. What grade(s) do you teach? \_\_\_\_\_

2. How many times did you request laptops in your classroom? \_\_\_\_\_

3. Did you use The Digital Frog 2 in your classroom? Yes \_\_\_\_\_ No \_\_\_\_\_

4. If yes, how did it benefit student learning?

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5. Would you use The Digital Frog 2 next year? Yes \_\_\_\_\_ No \_\_\_\_\_

6. Did you use The Atom Builder in your classroom? Yes \_\_\_\_\_ No \_\_\_\_\_

7. If yes, how did it benefit student learning?

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8. Would you use The Atom Builder next year? Yes \_\_\_\_\_ No \_\_\_\_\_

9. Did you use Ionic Bonding in your classroom? Yes \_\_\_\_\_ No \_\_\_\_\_

10. If yes, how did it benefit student learning?

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11. Would you use Ionic Bonding next year? Yes \_\_\_\_\_ No \_\_\_\_\_

12. Did you use Covalent Bonding in your classroom? Yes \_\_\_\_\_ No \_\_\_\_\_

13. If yes, how did it benefit student learning?

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14. Would you use Covalent Bonding next year? Yes \_\_\_\_\_ No \_\_\_\_\_

15. Other than the above software, what other programs did your students use on the laptops?

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16. Please list some projects completed in your classrooms using technology.

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17. What science software would be beneficial to your students next year?

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Appendix F  
Computer Use in Pre K Plus

1. How many students are enrolled in Pre K Plus? \_\_\_\_\_

2. Were touch screens helpful to your students? Yes \_\_\_\_\_ No \_\_\_\_\_

3. Did you use touch screens in your classroom or in the computer lab?

\_\_\_\_\_

4. Did you use Earobics software with your students? Yes \_\_\_\_\_ No \_\_\_\_\_

5. What additional software would benefit the language development of your students?

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