Introduction

Rachel Freeman School of Engineering is one of the twenty-four elementary schools within the New Hanover County School system. Beginning in the school year 2007-2008, it will become a magnet school. Magnet schools are open enrollment institutions that offer innovative courses to attract students from a broad urban area. The goal of a magnet school is to bring about desegregation.

By partnering with General Electric, The University of North Carolina Wilmington, and North Carolina State University, Rachel Freeman, will become a school of engineering. The engineering focus has been chosen for many reasons. For example, most children are fascinated with building and taking things apart to see how they work. Also, problem solving skills that are essential to successful adult living will be honed. Through specific engineering projects, students will apply their knowledge to design, create, and improve possible solutions in all subject areas. Lastly, students' awareness of scientific and technical careers will be increased.

The goals of this technology plan include:
- Students will actively engage in classroom activities that will enhance 21st century skills.
- Students will develop into active problem solvers.
- Teachers will be able to develop learning activities and lesson plans related to interactive classroom use.
- Teachers will record student progress with the aide of technology.
- Teachers will utilize instructional technology daily and seamlessly into their other pedagogical best practices.
- Appropriate hardware/software will be available to implement engineering focus seamlessly throughout each classroom.

*For a full list of technology requests, please see Appendix A

The technology change team includes staff members of Rachel Freeman School of Engineering, representatives from New Hanover County Schools, and several outside vendors such as General Electric, The University of North Carolina Wilmington, and North Carolina State University. The focus of the MIT team is to create the technology plan for 26 "interactive" classrooms. Phase one of the plan focuses on the implementation of the instructional technology part of the magnet school plan. Equipment will be clustered based on locality, not necessarily one per grade level. Phase two will be to set up regular staff development throughout the year. During this time, equipment will be shared among teachers who have not yet had the technological upgrade. It is the hope of the technology team at Rachel Freeman to have all 26 classroom outfitted at the end of three years. Phase three will consist of evaluation of the technology change. Observation and staff surveys will be used for monitoring.

Mission Statement of Technology Plan

Teachers of Rachel Freeman School of Engineering will engage in and enjoy the use of interactive classrooms to engage and assess student's knowledge and interests. The use of the interactive classrooms among other technologies used will aide in the implementation of an engineering focus.

Mission Statement of Rachel Freeman School of Engineering

To develop responsible, respectful students who will become productive, lifelong learners.

Vision Statement

All children at Rachel Freeman School of Engineering can learn and the implementation of an engineering focus will improve problem-solving skills in all subject areas. We will use math, science, and technology to solve problems. We will encourage students to work in groups to design and build objects that answer a question or solve a problem. These projects will match the science topics that students will study. Students will apply reading, science, math, technology, and problem solving skills to design, create and improve the world around them.

Literature Supporting the Use of Personal Digital Assistants (PDA's) Within Each Classroom at Rachel Freeman School of Engineering

One can find much literature supporting the use of technology in the classroom. Many studies find that test scores do improve, when technology is used for quick feedback, and when it continuously measures the skills of the student. One example of technology that will be implemented within Rachel Freeman School of Engineering is the PDA. In one study, University High School in California gave each of their students a PDA for testing and quizzing. http://www.thejournal.com/articles/15759 The school noticed a positive change almost immediately. The following quote from a teacher summarizes the benefits of this particular technology in the classroom.

> *The time I normally spend on data entry and grading has been significantly reduced, allowing more time for analysis, adjustment and the ability to focus on students who need more help. I can also use the feedback to determine whether the lessons I'm delivering are at the optimal level for the most number of students. I can run instant reports indicating raw percentage scores that can be immediately analyzed through a number of methods, including mean, median and standard deviation; item analysis; point-by-serial; and most-missed question. Then, I can export results to my grade book system or a text file. I can even copy quizzes from course to course, and tag those to be retaken by students.*

Research findings from The Challenge Project Grant for the Northshore School District in WA found that:

> *…the presence and use of the equipment has positively changed teachers' instructional practices" and "the presence and use of the equipment has positively changed the rate and quality of student learning.*

Implementation Plan

The technology change plan at Rachel Freeman School of Engineering will be implemented in three phases. The first phase will focus on clustering the installation of equipment based on locality, rather than per grade level. It is imperative to outfit each Interactive classroom completely so that teachers will have the opportunity to develop awareness and the skills necessary for successfully incorporating components of an Interactive classroom into the curriculum. **The reason being is that studies such as _____ show that the combined use of all the equipment together is what generates the desired impact in a classroom.**

The use of collaborative classroom equipment will allow teachers to present instructional material in a manner more aligned with how students learn. Research findings from The Challenge Project Grant for the Northshore School District in Washington found that: "the presence and use of the equipment has positively changed teachers' instructional practices" and "the presence and use of the equipment has positively changed the rate and quality of student learning." **Furthermore, numerous studies have shown a positive correlation between Interactive classrooms and a reduction in discipline problems, such as _____ and _____.** The goal is to have 8-9 classrooms outfitted per year, and all 26 classrooms outfitted at the end of three years.

Phase two involves designing, planning, and scheduling regular staff development opportunities throughout the year to train users to make the most of the Interactive classroom. Training classes will be scheduled on a master training calendar for teachers, prioritized by the timeline for outfitting their classrooms.

In addition to the Interactive classroom equipment, several hardware and software tools are being brought in, specific to an engineering focus. Teachers will need training for new products, and this training should be built into the master training calendar.

Another consideration in Phase Two involves existing faculty and new faculty. With the transition from a traditional elementary school to an engineering magnet school, some faculty may leave because it's not the best fit for them. In this case, training needs to be available to new hires as part of orientation. This also would be a good time to survey the current staff. Many staff members are uncomfortable with existing technology equipment, and need extra support. It would be best to reinforce their confidence with existing technology before exposing them to new technology. Otherwise we may lose fabulous teachers who simply needed a little extra support in the transition to incorporating new technology in the classroom.

Phase three consists of evaluating the technology change. Observation and staff surveys will be used for monitoring. The goal is for teachers to utilize instructional technology daily and seamlessly into their other pedagogical best practices.

Communication Plan

Information currently is distributed within Rachel Freeman School of Engineering through weekly staff meetings, e-mails and direct communication. Teachers and students are informed of school announcements by a daily, student-produced broadcast to classroom televisions. Parents receive information by direct mail from the school and by parent- teacher communication via email, phone, and notes sent through the student. Parents have a further opportunity to receive information by attending a monthly PTA meeting. A communication plan has been developed in order to smoothly integrate the technology change plan at Rachel Freeman School of Engineering.

The Coalition Team at Rachel Freeman School of Engineering will lead the change management team. Coalition Team members include: The Principal, the Vice Principal, the Computer Resource Teacher, the PTA President, and the Magnet School Marketing Director. This team also will be responsible for disseminating information during all phases of the technology implementation to all stakeholders. In addition to the change management team, other stakeholders include: the NHC Central office, all Rachel Freeman teachers, parents, students, and any potential funding resources.

Marketing Strategy

"Communication is everything. For parents to make an informed decision we need to be able to constantly be getting the information out there," says Al Lerch, Dirstict assistant superintendent for student support services.

"A staff of less than 10 people can't bear the brunt of marketing three, possibly six, magnet school themes," says Karin Cox, the district's executive director of public relations.

In careful consideration, a small percentage of the Federal Grant Funding request is designated to support a comprehensive three-year marketing plan to reach numerous communities and improve the district's chance of reducing high, isolated minority populations in schools.

The plan includes a full-time marketing coordinator, radio, television, and print advertising, and the part-time distribution of information at an Independence Mall kiosk during after-school hours and on weekends. These strategies will be employed to advertise new programs at Freeman, Snipes and Gregory elementary school, and potentially three other sites. The plan includes a strategy for revising the web site as well as details for a series of direct mailing campaigns to parents.

Evaluation Plan

A portion of grant monies is requested to fund evaluation activities. New Hanover County Schools will hire professionals from UNCW to evaluate how successful new magnet schools are in meeting specialized curriculum goals and reducing high minority populations.

The funds will cover university personnel, services and technology, including a project evaluator, consultants, Web developers, laptops and printers and software development.

The Organizational Structure for Change as listed in Appendix B provides the breakdown of teams and team members.

Design of the Infrastructure

Existing Use of Technology

Rachel Freeman utilizes a Netware server, which allows all computers to connect to the Internet and access all software placed on the network. High speed Internet is accessible for all teachers and students; they use a username and password to log into any computer in the building. Within the 26 classrooms, each have five to six computers, however, one is specifically for the teacher to use for lessons, checking email that is done through Groupwise, and logging into NC Wise (North Carolina Window of Information on Student Education). This database is used by teacher for monitoring attendance, tardiness, and grades. The other computers that are in the classrooms are for students to utilize for:

- Online Library Catalogue
- Accelerated Math, Reading, and Vocabulary
- STAR (standardized Testing and Reporting)
- Harcourt Math
- Study Island for grades 3-5
- Network Version of Phonics
- Word processing and Excel Spreadsheets

Within each classroom there is a Network printer. Also, there is a television in every classroom, which is wired for announcements. Although there is a computer lab with 31 computers, teachers may use the mobile lab with 20 wireless lap tops. Also, each classroom has an overhead projector and a CD player and the majority of classrooms have wireless headsets which sound can be amplified through computer speakers. Each grade level has a digital camera and itinerant teachers are provided with a digital camera. There are currently 6–8 flat bed scanners and 3-4 camcorders that may be shared within the school. Other equipment that teachers may utilize is the Interactive white board and data projector, however, there is currently one white board and 3 data projectors. All Kindergarten through third grade teachers have Palm Pilots which they use to record reading data of their students using the Reading First program software. Currently, the

school has a subscription to United Streaming and a video retrieval system. (See Appendix A).

Needed Hardware/Software

As stated before, the majority of classrooms have wireless headsets these can be amplified through existing computer speakers. However, 26 sets of equipment for an Interactive classroom are needed: white board, mounted data projector, sounds amplification system with wireless teaching tools and interactive devices for students. There are currently no portable projectors; portable projectors are needed for presentations that may be outside of the classroom. Due to the low number of existing digital camcorders, more camcorders and camera bags are needed. There is no color 3-dimensional printer, which will be necessary for various engineering projects.

There are many software and hardware options that will assist with the engineering program; however, a survey needs to be constructed for certified staff members. This survey will assist in finding out what types of programs teachers want and what hardware they would find most useful. This survey would also help give teachers a voice in the process and it may help them become more enthusiastic about the overall program. From the survey results a decision can be made to determine which vendors could be brought in to demonstrate their software and hardware options. Also, the staff can reexamine if software they are currently using is useful and if it should be continued. Many teachers may not be aware of what options they have or why certain software is effective in the classroom. Also, these demos may help answer their questions. By surveying the staff and bringing in vendors based on their needs, money can go towards the software and hardware they want and find most effective.

Benchmarks

1. Review existing use of technology
2. Create survey for assessing usage of software/hardware and what software/hardware they may be interested in
3. Analyze survey results
4. Contact vendors
5. Schedule demonstration
6. Create interest survey – what vendors did they like most/what did they find most useful for their classroom
7. Analyze interest survey
8. Reassess existing hardware/software
9. Adjust budget accordingly
10. Monitor usage of new software when the 2007-2008 school year begins

Staff Development Plan

A professional development plan is needed in order to implement the interactive classrooms described in this plan. The staff development goals for this technology plan include:

- Teachers will create lesson plans that integrate technology daily.
- Teachers will learn skills on the proper use and benefits of the software and hardware needed.

The development model used for this plan is the Three Levels and Small Group Training model. According to this model, technology integration requires three distinct levels.

Level 1
- Teachers actually use and become familiar with the particular piece of technology.

Level 2
- Teachers must be trained to evaluate the selected technology for their particular classroom use.

Level 3
- Teachers must discuss how to integrate technology into their curriculum and how they are to change what they are doing in their classrooms.

The Three Levels and Small Group Training model states that "one time" training is ineffective, and that training must be progressive and on going. Teachers need longer times in order to thoroughly absorb the information and incorporate it into their classrooms. The model also states that technology training is required and not voluntary. Therefore, principals, superintendents and other administrators should participate in the technology training along with the teachers implementing the information

The staff development will be taught in a workshop setting. The workshop setting promotes discussion and sharing of ideas among teachers. The initial training will be conducted by a subject matter expert who already utilizes an interactive classroom on a daily basis. This initial training will be delivered first to the change management team, who will then train and promote the remaining staff to implement the hardware and software into their classrooms. All staff will receive continuing education units, upon filling out a survey describing their experience in the training.

Technology Support Services

Training will be provided for teachers so that they can implement the interactive classrooms. On-site additional support will be offered for staff members at the school. New Hanover County Schools has provided a technology resource instructor and a media specialist who give ongoing support for teachers utilizing technology. The implementation team will offer additional reviews and support to teachers as they implement the interactive classrooms. Furthermore, the Central Technology Office for New Hanover County Schools provides a Help Desk, which is telephone support system

that helps employees who have technology issues or concerns. This Help Desk may be reached anytime during the working hours of the school day.

Project Budgets and Timeline

The majority of the expense for this technology change plan consists of the purchase of the needed hardware and software to construct an interactive classroom.   Additional funding will be needed for guest presenters and various workshops, though a dollar amount has not been approved yet. The Magnet Schools Assistance Program Grant will provide four million dollars per year for three years to be dispersed among selected schools participating in the grant. All hardware and software expenses are listed in Appendix A.

The timeline described within the Implementation Plan will take place over the three year period in which the grant monies will be provided. The goal for staff at Rachel Freeman School of Engineering is to be able to sustain the engineering focus after the three year period.

Resource Gap Analysis
Rachel Freeman Elementary School

	Current Resources	Required Resources for Change	Quantity Needed
Technology	▪ 1 Interactive white board ▪ 3 data projectors ▪ Majority of classrooms have wireless headsets whereby sound is amplified thorough computer speakers ▪ Each classroom has overhead projector and a CD player	26 sets of equipment to Interactive classroom: including white board, mounted data projector, sound amplification system with wireless teacher tools and interactive devices for students	26 classroom sets 26 x $7,500 $195,000
	▪ No displays with mounts	Mounted flat screen plasma displays for critical viewing areas in the school	12 displays with mounts 12 x $1600 $19,200
	▪ No portable projectors	Large room Projector	4 portable projectors $10,000
	▪ Each grade level has a digital camera ▪ Art teacher, principal and itinerant teachers have a digital camera ▪ 3-4 camcorders	Digital camcorders	7 camcorders 7 camera bags $3500
	▪ 6-8 flat bed scanners	Document camera	26 presenters $39,000
	▪ Network printer within each classroom ▪ No Color 3D printer	Color 3D printer	1 printer with supplies

			$30,000
	▪ One Mobile lab with 20 wireless lap tops	Mobile Laptop carts – 20 laptops with wireless technology	One per 3-5 grade level Approx. $84,000
	▪ TV in every classroom ▪ TV's wired for announcements	TV Production equipment including camera, mixer, microphones, teleprompter, computer	$12,000
	▪ 1 computer out of 5-6 computers in every classroom is designated for teacher use	Laptop for every teacher with wireless connectivity throughout the school	26 x $2,000 $10,000 $62,000
	▪ 1 Classroom Performance System (CPS) ▪ All K-3 teachers have a Palm Pilot	Learner Profile assessment management software	1 complete package including a site license of desktop and handheld software $2800
	▪ No TEBBS	TEBBS	1 license TEBBS software 1 Time Sync module 1 computer $3500
	▪ No Fly School Wide	Fly School Wide implementation bundle	Grade level bundle of the fly and accompany software $72,600
	▪ United Streaming subscription to expire at year's end	Subscription renewal for United Streaming	1 subscription 3 x $1495

			$4485
	- Online Library Catalogue - NCWISE Online Student Records - Set of 10,000 LEGO Mind Storms plus software - Accelerated Math, Reader, and Vocabulary for each classroom - Harcourt Math - Study Island for grades 3-5 - STAR (Standardized Testing and Reporting - Network Version of Phonics	Math and Science software to supplement curriculum as needed Engineering Is Elementary (EIE) curriculum kits from the Museum of Science in Boston to integrate science, technology, and math	$25,000 Approx. $30,000
ADR	Severe and profound class has ADR switch and touch screen in the classroom	Planners must be prepared to generate additional "mini" technology plans as needed to address ADA accessibility for special needs students as they enroll.	NA
Network	- Every computer hooked to internet via T1 - Stable network - Video Retrieval System – centrally located rack with VCR and DVD players can to computer to operate	NA	NA
Human Resources	**Certified Teachers** 5 Kindergarten 4 First grade 4 Second grade	Full time Technical Coordinator Magnet Lead Teacher/Coordinator	**Freeman School** Two New Staff Positions

	3 Third grade 2 Fourth grade 3 Fifth grade 1 Art 1 Music 1 Physical Education 1 Instructional Technology Specialist (computer lab) 1 IBS (intensive behavior support 2 IAS (intensive academic support) 2 EC resource 1 Media Specialist 1 Reading Coach 1 GES (gifted education specialist) 1 Severe and Profound Special Education 1 English as a Second Language **Non-certified staff** 5 Kindergarten Teach assistants (TA) 4 First grade TA 4 Second grade TA 1 Technology Assistant 1 IBS 1 Media Assistant 1 Reading Intervention Tutor 4 Severe and Profound Special Education TA 2 Remediation Tutors **Other Staff** 1 Principal 1 Assistant Principal	Teachers to fill the positions of existing staff who opt out of teaching engineering Project Officer/Supervisor Project Manager Program Specialist	Replacement Staff TBD **New Hanover County** Three New Staff Positions **Cost TBD**

	1 Guidance Counselor 1 Social Worker 1 School Psychologist – housed at Freeman, we share the position w/ other schools 1 Translator – housed at Freeman 1 Speech Therapist 1 School Information Operator (NC WISE) 1 School Treasurer 1 School Secretary 1 School Nurse		
Facilities	26 Classrooms 1 Computer lab with 31 computers 1 Media center 1 Multipurpose room 1 Art room 1 Music room	NA	NA

Appendix B

Organizational Structure for Magnet School Change

Coalition Team	Change Management Team		Additional Stakeholders
- Principal - Vice Principal - Computer Resource Teacher - PTA President - Magnet School Marketing Director (TBD)	**Planning/Advisory**	- Administrator of School - Carrie Hammer- Instructional Technology Consultant - Pamela Federline Grants Coordinator of NHCS, Team Leader/Facilitator - Karen Cox, NHC School District's Executive Director of Public Relations - One teacher per grade level. - Sage Instructor - MIT team	- Central NHC Office - Rachel Freeman Teachers - Parents - Students - Potential Funding Resources

	Implementation	- Instructional Technology Consultant - One teacher per grade level. - Lead Teacher - Elizabeth Miars-Administrator - Lizette Day-Certified Technician Assistant - Media Specialist - One to two parent(s). - Parent who has a special needs child.	
	Evaluation	- Elizabeth Miars-Principal - County Representative - Carrie Hammer-Instructional Technology Consultant - NC State University School of Engineering training representative	

Appendix C

Communication Strategy

Stage and Objective of the Communication	Responsible Party	Stakeholder Group	Format	Venue
Mission Statement Vision Statement *Communicate Mission and Vision to the Stakeholders* **Goal Setting** *Communicate goals of the project*	**Coalition Team**	Change Management Team	Verbal, Written, Electronic	Presentation, Information Packet, Email, Website
		Central NHC Office	Verbal, Written, Electronic	Presentation, Information Packet, Email, Website
		Teachers	Verbal, Written, Electronic	Presentation, Information Packet, Email, Website
		Parents	Verbal, Written, Electronic	PTA Discussion, One-on one, Letter, Newsletter, Website
		Students	Verbal, Written	Presentation with Discussion, Preview Flyers
		Potential funding sources	Written, Verbal, Electronic	Grant Applications, Attachments, Information Packets, Presentation, Website, Email
Planning *Communicate program plans; provide objectives, timelines and*	**Change Management Team**	Coalition Team	Verbal, Written, Electronic	Presentation, Information Packet, Email, Website

reinforce mission statement				
		Central NHC Office	Verbal, Written, Electronic	Presentation, Information Packet, Email, Website
		Teachers	Verbal, Written, Electronic	Presentation, Information Packet, Email, Website
		Parents	Verbal, Written, Electronic	PTA Discussion, One-on one, Letter, Newsletter, Website
		Students	Verbal, Written	Presentation with Discussion, Preview Flyers
		Potential funding sources	Written, Verbal, Electronic	Grant Applications, Attachments, Information Packets, Presentation, Website, Email
Implementation Communicate the processes involved with implementation	**Change Management Team**	Coalition Team	Verbal, Written, Electronic	Presentation with Discussion, Detailed Report, sent as a hard copy and as an email attachment
		Central NHC Office	Electronic	Report, sent as an email attachment
		Teachers	Verbal, Written	Change Management Meetings, Online Forum

		Parents	Verbal, Written	One-on-one, PTA Discussion; Newsletter
		Students	Verbal, Written, Electronic	Classroom announcements with Discussion, Handout, Classroom Broadcasts
		Potential Funding Sources	Written, Verbal, Electronic	Grant Applications, Attachments, Reports (hard copy and digital), Information Packets, Presentation, Website, Email, Internet Postings
Data Collection	**Change Management Team**	Teachers	Verbal, Written, Electronic	Interviews, Teachers submit a Quarterly Report, On-line survey
		Parents	Electronic	On-line survey
		Students	Verbal, Written	Classroom Focus Group, Paper Survey
Ongoing Progress Reports	**Change Management Team**	Coalition Team	Verbal, Written, Electronic	Quarterly Meeting, Detailed "hard copy" report, Detailed report, sent as an email attachment

Communicate the current situation at 3-6-9-12 month increments		Central NHC Office	Electronic	Report, sent as an email attachment
		Teachers	Verbal, Written, Electronic	Quarterly Reports
		Parents	Verbal, Written, Internet	One-on-one; PTA presentations, Newsletter, Website
		Students	Written, Verbal, Electronic	Handouts; Classroom Discussion, Classroom Broadcasts, Website