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TECHNOLOGY AND ATTENTION DISORDERS



An Interactive Qualifying Project Report

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WORCESTER POLYTECHNIC INSTITUTE

in partial fulfillment of the requirements for the

Degree of Bachelor of Science

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We would like to give special thanks to all those who contributed to the success and completion of our project. We would first like to thank the staff and faculty of Seven Hills Charter School (SHCS) – Krista Osborn, Cheryl Hollocher, Nilda Rodriguez, Jen Arnold, Steve Colorio, Matthew Jewett, Allison Martins, and Melissa Sharrock – for supporting and contributing valuable comments to the project. And also, we would like to thank the students at SHCS for enduring our gruesome interviews. Most importantly, we would like to extend thanks to our advisor, Professor Eleanor Loiacono-Mello, for her support and guidance throughout the project.

Abstract

Students with attention disorders often have a difficult time keeping up with the pace of classroom activities. Seven Hills Charter School (SHCS) has taken the initiative to help these students by sponsoring a Worcester Polytechnic Institute (WPI) Interactive Qualifying Project (IQP) team that will help determine technologies to support classroom activities for Seven Hills students with attention disorders. Together with the help of SHCS, an IQP team was set up at WPI to address this issue and try to come up with a solution. The team studied how students with ADD currently interact in the classroom and the technology they use to stay organized. They then presented potential technology that would further enhance student learning and potentially reduce the need of a full time special education aide to follow each student throughout the school day. The proposal presents, in detail, the four steps that were taken to complete the project: how the study was conducted, the analysis that was performed, the resulting data, and ultimately the recommendations that the IQP team suggested.

Executive Summary

This Interactive Qualifying Project (IQP) was based on the Attention Deficit Disorder (ADD) problem at Seven Hills Charter School. Students with ADD were having a difficult time keeping up with the pace of learning in and out of the classroom. Distractions were causing them to lose focus, forget assignments, and overall deter them from actual school work. Our group was focused on finding technological ways to make the conditions easier or at least fairer for these students.

The team met with project liaisons Krista Osborn (Principal) and Cheryl Hollocher (Special Education Coordinator) along with project advisor Professor Eleanor Loiacono-Mello to plan out the IQP. We made a presentation to the teachers at the school on exactly what we were going to do and had them fill out some surveys for some preliminary information regarding their experience with ADD. Based on the surveys we met with the teachers to interview them and find out about their thoughts and opinions regarding the project and the ADD situation in Seven Hills.

We also met with actual students at the school in an effort to understand their stance on the situation. We asked them what they were having to most difficulty with as well as got a strong feeling of what could be done to help them.

After collected all of these surveys, interviews, and other data, we sat down and brainstormed/researched different technological solutions that could be used. After narrowing down the field we decided on four proposed solutions. One was *HearIt*, a device which allowed the teacher (with a microphone) to talk directly to the students (wearing an earphone), diffusing all auditory distractions in the classroom. Another solution was *Personal Digital Assistant (PDA)*. These devices have a variety of use

including scheduling, alarms, as well as many other educational tools. Our final two solutions were *Assistive Technology* and *Lesson Supplementing Software*. The *Assistive Technology* included special word processors that would allow for spelling errors and would help students learn typing and writing. These programs come in a variety of different lessons and tools. The *Lesson Supplementing Software* are educational games that could be used as a learning tool in addition to the classroom lessons. Games included subjects such as business math, English, writing, and many other educational lessons. These games could be used at the school in addition to the actual teacher lessons.

The team's proposed solutions were organized into the following rating system:

	<i>HearIt</i>	<i>PDA</i>	Assistive Technology	Lesson Supplementing Software
Cost (25%)	2 * .25	1 * .25	3 * .25	4 * .25
Effectiveness (25%)	1 * .25	4 * .25	2 * .25	3 * .25
Comfort (16%)	1 * .16	2 * .16	3 * .16	4 * .16
Student Support (16%)	1 * .16	3 * .16	2 * .16	4 * .16
Teacher Support (9%)	1 * .09	2 * .09	3 * .09	4 * .09
Misuse (9%)	2 * .09	1 * .09	3 * .09	4 * .09
Solution Total	1.34	2.32	2.59	3.75

It is clear that *Lesson Supplementing Software* was considered the best solution, ranking as one of the best in all areas. Using this rating system, the team was able to propose the solutions and rank them accordingly. The ultimate goal of this project is for the IQP team to help SHCS by offering them information on the solution and how exactly to implement them into the school.

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1.0 Introduction

Children today are being exposed to more technology at early ages. For most of these students, the technological advances in society are aiding their education in great leaps. Spell checkers and palm pilots are two such technologies that help students with their school work. But what about those students who lack the ability or fundamental understanding of how to use today's ever growing technology.

For some students, especially those with disabilities, hi-tech devices present an unopened door to a world that many take for granted. Some advances have already been made in helping the physically disabled communicate and relate to current technology. This includes captioning on television for the deaf as well as special phone systems. It is unfortunate, however, that technological studies in "mental challenges," such as Attention Deficit Disorder (ADD), are few in number. ADD is not even considered a disability by some but rather a different way of life. "ADD is not an all-or-nothing diagnosis...There appears to be a curve of behaviors and personality types, ranging from extremely-non-ADD to extremely-ADD" (Hartman, 1997, p.5). Perhaps the lack of sufficient research and adequate treatment of ADD is a direct result of this hard to diagnose disorder. With this in mind, it is obvious that a research or study must be done to better understand this issue. IQPs at WPI are perfect for this task because they integrate technology and community.

The IQP is one of two major projects at WPI that all students must complete. It "... challenges students to identify, investigate, and report on a topic examining how science or technology interacts with societal structures and values" (<http://www.wpi.edu/Academics/Projects/intro.html>). The project, in general, has WPI

students go out into the “real world” to integrate what they have learned in the classroom into investigating and solving “real world” problems. The main focus of this IQP was to examine how the members of SHCS and students with attention disorders relate and how, using technology, the student’s academic lives can be made more efficient. The end product of this project would determine where there are areas of improvement in the school and recommend technical solutions. This could be in the classroom, at home, or any combination of the two. A large portion of our research for this project was finished on-site, at Seven Hills Charter School, in Worcester, MA. With the assistance of school liaisons Krista Osborn (Principal), Cheryl Hollocher (Special Education Coordinator), and Nilda Rodriguez (Community Resource Director), as well as the faculty, staff, students, and administration we studied how individual children and teachers use their given technology to improve a student’s academic life.

The proposal is divided into three general sections; introduction, literature review, and methodology. The introduction discusses/sets up the project by introducing IQPs, SHCS, and ADD in more general terms. The literature review deals with past and present literature pertaining to this project. Included in this section are the laws pertaining to ADD and charter schools, a thorough description of ADD, as well as a more detailed look at charter schools and how they relate to ADD children. The methodology includes steps taken to accomplish this project’s goals, as well as the necessary research, surveys, interviews and other tools that are used to come to a detailed and thorough conclusion.

2.0 Literature Review

In order to provide background information of our study of Seven Hills Charter School and students with Attention Deficit Disorder and Hyperactive Disorder (ADHD), we have reviewed existing information and provided a brief summary of each piece of information required to understanding the problem with ADHD at SHSC.

Section 2.1 presents detailed background on ADD/ADHD, a disorder characterized by the inability to sustain focused attention. Section 2.2 provides some available adaptive technology in assisting students with ADHD. Section 2.3 gives some general concepts of what a charter school is and its advantages in helping students with ADD/ADHD. Following subsections offer specific information about SHCS such as academic structure and operations. Section 2.4 covers regulations and laws related to disability and special education. Finally, section 2.5 presents the guidelines for our research methods, surveying and interviewing.

2.1 Attention Disorders

Attention deficit disorder (ADD) is defined as a mental disorder, with onset in childhood, characterized by developmentally inappropriate inattention, impulsiveness, and varying hyperactivity (www.hyperdictionary.com). One with ADD often experiences the feelings of restlessness, impatience, poor listening skills, or difficulty doing boring jobs. Although many people can exhibit these traits, they are much more common in actual ADD cases. However, it is important to note that ADD

“...can be very hard to diagnose since it shares many of the same symptoms as other disorders...The hallmark symptoms of ADD – distractibility, impulsivity, and high activity — are so commonly

associated with children in general that the diagnosis is often not considered... How can we tell a spoiled child from an ADD child?" (DeGrandpre, 1999, p.131)

In fact, six to twenty million Americans have ADD. The number gap is because many people never even realize that they have it (Hartmann, 1997, p.2-12).

Although there is no dead giveaway sign of ADD, there are a few obvious hints. Probably one of the most clear signs is one being easily distracted with a short attention span. A short attention span is not clearly defined; this could be as short as twenty seconds. Because of their short attention span and easy distraction, those with ADD frequently change priorities and often abandon one project for another leaving the previous project unfinished. This disorganization results in great mental and physical chaos. They are overwhelmed and cannot keep up with the fast pace of life.

Disorganization is a big indicator of ADD. This can be characterized by a messy room, poorly organized files, and sometimes just plain carelessness. Difficulty following directions is another problem for an individual with ADD. Being easily distracted, one with ADD has trouble even putting up with someone giving them directions. As a result of this, without fully understanding all of the directions when given, they tend to drift off and have difficulty focusing on something that appears dull or uninteresting. When they have a task at hand, someone with ADD tends to rush through it to get it done while it is still interesting. This usually leads to sloppy work and poor performance. On the other hand when they have nothing to do, they will get extremely bored and very often exaggerate just how long they have been bored (Hartmann, 1997).

ADHD is a variation of ADD that tends to deal with people who are much more hyper and compulsive. While there is no definite diagnosis of ADHD, many classify it as

an extreme case of ADD, exhibiting many traits of an ADD individual. Traits of ADHD include:

1. When required to remain seated, a person has difficulty doing so.
2. Stimuli extraneous to the task at hand are easily distracting.
3. Holding attention to a single task or play activity is difficult.
4. Frequently will hop from one activity to another without completing the first.
5. Fidgets or squirms.
6. Does not want to or cannot wait for their turn when it comes to group activities.
7. Before a question is completely asked, will often interrupt the questioner with an answer.
8. Has problems with job or chore follow through, and this difficulty doesn't stem from some other learning disability or defined behavior.
9. Can't play quietly without difficulty.
10. Impulsively jumps into dangerous activities without weighing the consequences.
11. Easily loses things such as pencils, tools, papers, etc., which may be necessary to complete school or other work.
12. Interrupts others inappropriately, butting in when not invited.
13. Talks impulsively or excessively.
14. Others report that the person doesn't seem to be listening when spoken to. (Hartmann, 1997, p.11-12).

The predefined characteristics are for anyone with ADHD, but what about children specifically, which is this project's focus? "One of the most common diagnosed disorders in children, ADD affects three percent to five percent of all kids, reports the National Institute of Health (Colin and Goldschmidt, 2003)." In order to ease an ADHD child's difficulty in the classroom, sticking to these specific guidelines have been found most efficient. Children should have weekly performance templates of goals that should be followed while an adult checks up on their progress. Special extra credit type projects should often be assigned to stimulate interest in material and provide an opportunity to keep grades up as they may be lacking due to other boring tasks that were assigned. With this technique, ADHD students are still learning the required material but it is presented in a much more interesting way. These students should never be labeled as "disabled" or

with any negative description. Labeling a child with a disorder is often considered destructive as it will cause problems because now that child can use their “disorder” as a scapegoat for failure. Any special programs for the disorder should be carefully designed. When designing the programs, they should be more oriented to field trips and hands-on projects and less on just sitting and listening as ADD children tend to get bored. Medication is also an option, but by parents and not schools. Medication is one option that can affect a child’s behavior (DeGrandpre, 1999). However this shouldn’t always just be the solution. Is there a way to get away from medication or at least use it in a combination with technology? Is there any technology today that can be used to facilitate an ADD child’s struggles in the classroom?

2.2 Disability Technology

Adaptive technology refers to a myriad of computers and electronic devices that help children compensate in weaker areas such as spelling, math, or problems with reading or writing. The following technologies are available to assist students with ADHD to overcome the difficulties in focusing and organizing.

Alphasmart is a computer companion that enables the user to type, edit and save text. In newer models, there is also a calculator and a few other functions built into the program. Students complete assignments using their *Alphasmarts* and submit the work to classroom desktop computers electronically. They can also receive information from desktop computers. The cost for an *Alphasmart* ranges from \$179 to \$199 (<http://www.alphasmart.com>).

Speech Recognition refers to computer software programs which are programmed to recognize spoken words. Students can dictate the designated text into a microphone

which the computer then stores as a speech file. When they want to write, students would then talk into a microphone in either a slightly halted manner or a natural speaking voice. The computer then types out the student's words as text using correct spelling. While the technology is not perfect, in that it can "mishear" words, it is a great help to those who have problems with writing because of spelling problems, processing problems, or who just cannot master typing. A side benefit of speech recognition is that it appears to be teaching children to spell and write better (Fulton, 2002). Pricing ranges from \$30 to \$499, the latter price offers integration with other portable electric devices. However, the \$30-version is more than adequate for the average user (<http://www.scansoft.com/-naturallyspeaking/>).

Optical Character Recognition (OCR) (common cost varies around \$279) is the opposite of speech recognition. The computer takes written text and turns it into spoken language. In other words, it reads back to what s/he has typed. Unfortunately, it is also much more expensive and requires a lot more technology than just a computer, sound card, and a microphone. One would need a scanner, computer and software program, which needs to have a large store of speech files. It is a perfect technology for the very slow reader (<http://www.scansoft.com/omnipage/>).

Computer Flow Charts (price varies from \$69 to \$199) turns ideas into a picture or flow chart, referred to as mapping. Programs which do mapping provide a great tool for visual learners who are having trouble outlining or organizing their ideas for presentations or for writing. It enables them to add ideas and then move them around or change topics to which they are linked (<http://www.smarttech.com>).

Spelling Checkers have been around for quite some time. There is a whole range of pocket version available in different languages. Spell checkers are also common in the integration with word processing software such as Microsoft Office. Word processing programs with spell checking, such as OpenOffice.org, can be found online for free.

2.3 Seven Hills Charter School Structure

This IQP focused on SHCS and its management of students with ADD. Specifically we studied the ways in which technology can be used as part of the SHCS system to assist students who have difficulties, specifically ADD, with organization and attention. The following sections provide a general background on the charter school system and later concentrate on the main subject, SHCS.

2.3.1 Defining Charter Schools

Charter schools are independent public school by choice designed and operated by teachers, parents, community organizations and businesses. Charter schools are freed from local and state regulations, that is, they do not adhere to the mandated curriculum but rather, they are able to design their own teaching methodology in order to stimulate educating students. As public schools, they are not allowed to charge tuition and pick and choose their students; however, they are funded by the same per-student fund package that traditional public schools receive. In essence, charter schools operate from three principles: accountability, autonomy and choice (Nathan, 1999). They are held accountable to achieving results, that is, no less than the state-mandated standards for all public schools. In return, they operate autonomously through exemptions that free them from regulations that form the traditional public school. Further, they have total control

over their resources; they are free to allocate the resources to better serve their schools – the number of teachers to hire, what textbooks to buy, what activities to develop, etc (Department of Education, 2001). Through these three principles, they are able to devise their own curriculum to benefit their students. Teaching models may vary by states, communities, etc. However, this freedom from bureaucracy is not without a cost.

2.3.2 An Outline of the Application Process for Charter Schools

The application process for a charter school is vigorous. Charter school initiators must prepare an application for charter, that application is submitted to the board of education for approval. In this application, the school's missions are clearly defined. Upon approval of the charter, the team of initiators finalizes their contract with local district, determine school site, hire employees, and enroll students. The term of charter ranges from three to five years. Each year, the schools have to submit annual fiscal report to local and state legislatures for assessment. Students' performance on state's standard assessment is measure and compared against those of traditional public schools. Despite of the hardship in obtaining a charter, the founders gain independence to make the school more flexible and beneficial for education.

2.3.3 Overall advantages of Charter Schools

Charter schools have greater flexibility and autonomy comparing to their public school counterparts. Charter schools are mission-driven schools. The schools operate based on specific mission and philosophy of their establishers; these people are often educators themselves. Uniformity is not a requirement for charter schools; they vary from each other in terms of school size, student demographics, educational purpose, and other

characteristics such as instructional approach (Education Commission of the States, 1995). Charter schools function relative to their communities, this freedom of choice creates a sense of belonging and ownership, thus enables stronger ties between families and administrators.

In term of accountability, charter schools and conventional public schools are held accountable very differently. Figure 1 contrasts this difference between the two types of accountability. In both Figure 1 and Figure 2, thick lines represent the strong reciprocal accountability. Narrow lines represent relationships that are important to the school but less important to the other party. And the dotted lines represent weak accountability relationships in which both parties have real but relatively unimportant, stakes. Figure 1 illustrates the complication of public school accountability. The school must answer to many masters, including the school board, superintendent, and many separate central office units. Many other actors also deal with schools indirectly through the school board and central office since individual schools have little freedom of action.

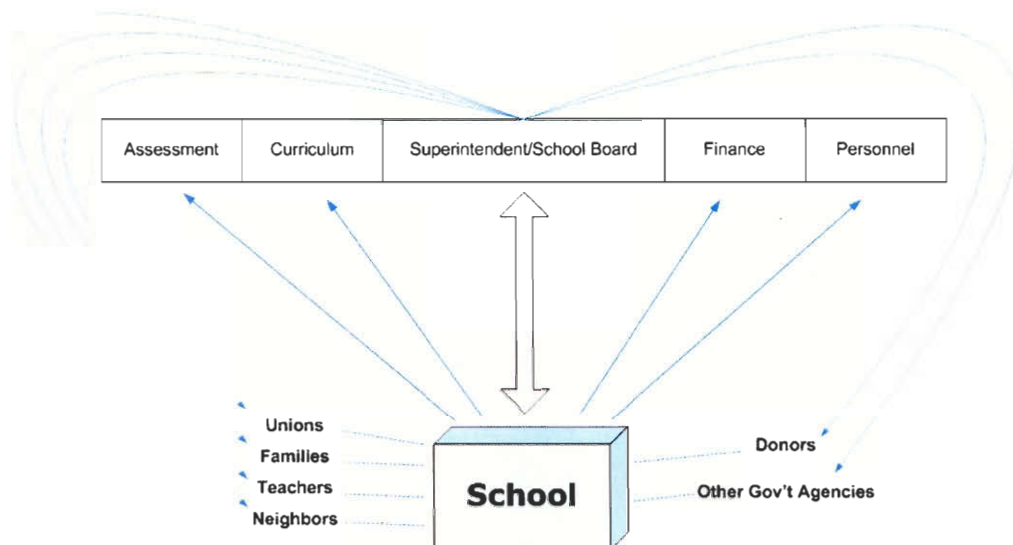


Figure 1: Model school accountability in conventional public education (Department of Education, 2001)

Figure 2 illustrates the accountability of charter schools. They have strong reciprocal accountability relationships with their authorizers, whether they are school district boards or other public agencies. These relationships are defined in each school's charter and they focus on student learning results. They also have many direct accountability relationships; with the teachers whom they hire but on whose performance the schools depend; with families whom the schools must attract and satisfy but on whom the schools can also impose some requirements; and with unions, which represent teachers at the schools.

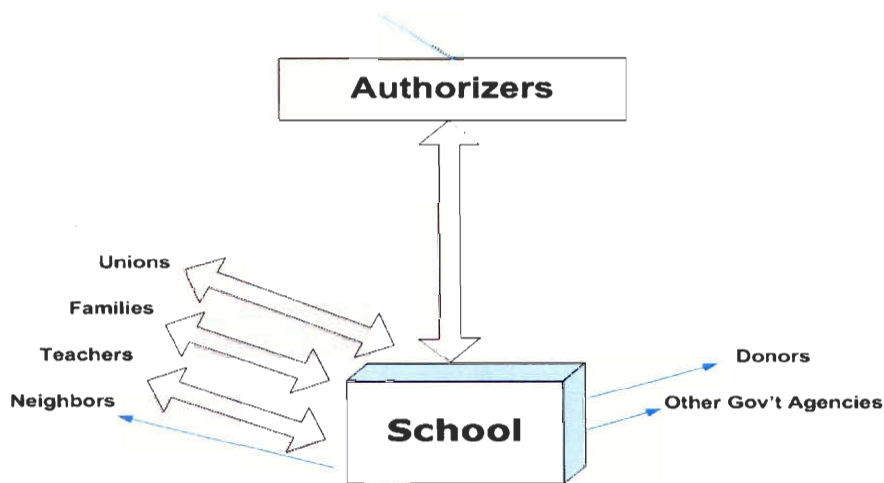


Figure 1: The theory of charter school accountability (Department of Education, 2001).

2.3.4 Seven Hills Charter School

SHCS was founded in 1996 as the result of a partnership between a group of Worcester's business, community, education leaders and the Edison Project – a research-based system that integrates interactive professional development and the use of technology to raise student academic achievement. The school's mission is to organize a diverse cross section of Worcester children for success as students, workers, and citizens by providing outstanding quality education.

As a partner of Edison Project, the school mirrors its success through research-based models designed to provide well-grounded education in seven areas: reading and language arts, history and social science, fine arts, mathematics and science, character and ethics education, health and physical education, and practical art and skills.

Students emerged from SHCS are equipped with the ability to read, write, speak, and calculate with clarity and precision and the ability to participate passionately and responsibly in life's environment. SHCS enables students to become literate, self-motivated, lifelong learners by providing a multi-cultural, student-centered environment in which all students held to high academic and behavioral standards. These valuable accomplishments are achieved through the combination of cooperative project-based learning, such as Success for All and Chicago Math models (Appendix A), and individual, small group, and large group instructions.

With an emphasis on the Arts, which are seen as a vital part of the school community, all students are required to participate in classes in music, drama, and visual arts. For example, students learn singing, music history, instruments, playwriting, directing, lighting, costume design, and other skills that help them to put on productions

which reflect history events or literary works. Technology was introduced and played a crucial part in arts study at SHCS (SHCS Annual Report, 2000).

Students attend these programs on a daily basis. The core philosophy of SHCS in the better facilitation of education is the integration of educators and families. Parents are strongly encouraged to be involved in preparing their children for the world.

2.3.5 Academic operation

The school is divided into smaller academies according to grade level and ability of the students. The Elementary Academy ranges its level from grade 3 through 5, and the Junior Academy includes students from grade 6 through 8. Each academy is organized into smaller units called Houses. For instance, there is a Green House which contains approximately 110-120 students of mixed ages. A team of four teachers leads each house, staying with the same students for the two or three years they are in the academy. Because they are together for years, students and teachers are able to build strong relationships with each other. This method of organization effectively helps students easier to study and more open since they are always in a familiar environment with closed friends.

The multi-age academy structure allows for individual differences in learning pace and style, because children can receive instruction in mixed age or ability groups, depending on the project. Indeed, the very structure of the academy is attentive to each child's unique character and capacities. Students who need extra help receive additional assistance from teacher and tutors.

As one of the Edison's team structure, SHCS gives teachers the freedom to organize classes in the formats best suited to the material at hand. For instance, while one

teacher is giving a prepared talk to large group of students on one subject, other teachers can meet with small groups of students to provide direct, individualized guidance on special projects. Learning takes place in large groups, small groups, with partners, and while students are working individually.

The school also provides cooperative learning which involves placing students of different ability levels together in small groups and assigning them a specific task. Each group member is responsible for filling in the completing of the activity. Although individual accountability is built in and is a important component of the success of cooperative learning, students also are judged by the work the group produces. Therefore, all members have a stake in helping each group member perform at his or her highest level.

The school educational design is altered corresponding to research and development project that included a careful look at educational innovations worldwide and surveys. The design is developed by an experienced staff of teachers, and other educators, social scientists, curriculum experts, and technology specialists, together with outside consultants from all educational fields. Also frequent conferences between the staff and parents play a very important part in development of the educational system.

2.3.6 Learning through technology

The impact of technology is visible in the curriculum of SHCS. Students use a variety of new technologies extensively at school and at home. After mastering certain computer basics, all students in first grade and beyond have personal computers installed in their home, connected with the school via an electronic network we call the Common. Students can work on assignments, then hand in their work electronically; communicate

with teachers and other students in their class, house, or academy; collaborate on projects with students in other partnership schools; participate in experiments and share their data on-line. Students have access to databases and libraries, including a student-built reference library.

Besides being introduced to school computer networks, the students also have a chance to study some other useful software, such as packages by Microsoft, that eventually can help them in future work. Other powerful tools are also installed in school and home computers in order to aid the students with thinking, writing and problem-solving.

Delivery of the computers is staggered throughout the year, as each student is required to meet certain benchmarks outlined in the technology curriculum. Both students and their parents have to learn how to properly set up, operate, and care for the computers before they take it home. Although the degree of autonomy in charter school system is greater than its public school counterpart, SHCS still have to abide by the same federal and state laws regarding disability that govern many other schools.

2.4 Laws to follow when working with people with disabilities

The state of Massachusetts and the Federal government have many laws in place in order to support and protect students who have disabilities, handicaps, or learning related problems. In general, these laws are used to protect the rights of the students and their parents. Both federal and state special education laws are focused around six major principles:

1. Parent and Student Participation
2. Free and Appropriate Public Education (FAPE)

3. Appropriate Evaluation
4. Individualized Education Program (IEP)
5. Least Restrictive Environment
6. Procedural Safeguards
(Parents Handbook, 1999).

These six main points give a broad overview of the rights mandated by law of special education students, and their parents. Principle 1 is in place in order to make sure that the parents and even the student have the ability to participate in the meetings scheduled in order to discuss and plan for the child's education. Once a child reaches the age of 14 he is entitled to the same level of participation as the parents, even though it is allowed for him to participate before he/she reaches this age.

Principle 2 mandates that all special education students must be given a proper education, at no cost to the parents. The students are entitled to individually tailored educational programs that fit their needs, and requires the school district to pay for all such programs. Likewise, Principle 3 states that all students are entitled to a comprehensive evaluation in order to determine if they in fact have a disability and if eligible, to receive all appropriate special education services that may be necessary.

Principle 4 requires each special education department to develop an Individualized Education Program (IEP) that, in writing, states what problems the student has, and how they will be addressed. Parental permission will always be requested prior to IEP evaluation. Principle 5 guarantees that all students who require special education services should have these services tailored to them in a general education environment. A student can not be removed from the general population unless the nature or severity of their needs require it. Lastly, Principle 6 ensures the rights of parents and students

involved in the special education process. This includes ensuring services are properly rendered, documentation is adequately provided, and that parents have the right to agree or disagree with the different proposals that the school makes regarding their child, and to also make their own proposals. We, as a group, will be abiding by any and all laws and wishes that SHCS asks us to. Within the bounds of these laws we will be gathering information from the students and other important personnel. The proper methods for gathering this information are important, so that the information be pertinent and relevant.

2.5 How to Conduct Interviews/Surveys/Observations

The art of data collection has served researchers needs since the advent of speech. Beginning as a single question in order to receive an answer, methods have since evolved. Perhaps the two most popular methods, surveys and interviews, will be used in this project. The next two sections provide information on how to conduct these methods, and what we can do to ensure their success.

2.5.1 Surveys

A survey, in its simplest form, is a series of questions designed to gain certain information from a participant, or group of participants, answering the questions. These questions are designed by the author to best extract the certain facts or opinions that they wish to gather from the participant. The first mistake most surveyors make, however, is improperly designing their set of questions.

The questions that are used must be written so that the information gathered is in no way prejudiced or unclear. First, the questions must be valid in that they must assess

what the researchers intend them to. Second, they must be reliable. Reliable questions would give similar results given under different samples, or at different times. Last, they must be unbiased. Biased questions are those that lead participants into making certain choices, or do not provide equal ability to answer questions in any manner (Doyle, 2003).

These biased questions are the most apparent in the average survey. The questionnaire will ask you to rate something, usually an opinion, and the options you have to choose from are: Excellent, Good, Average, and Poor. The problem with this type of question is that it is biased towards a positive answer. The first three choices are all non-negative answers. By asking for an answer in this manner, the researcher will not receive the proper information. A better, yet similar, set of choices would be: Excellent, Good, Average, Below Average, and Poor. What makes this list of choices more preferable is that it is balanced. It has two positive, two negative, and one neutral answer. By forming unbiased questions the researcher is able to ensure that the results he gets will be the closest possible to the participants true feelings, thereby giving him the most accurate information possible.

Other common mistakes made in creating surveys include having too few questions, having poorly worded questions, asking too many open-ended questions, and asking too many opinionated, rather than fact based, questions. In general, a single question can misrepresent a person's actual information if any of these mistakes are made when creating the survey. If a researcher is trying to gauge a participant's intelligence, they may ask for an SAT score. But what if the participant did not take them, or took a different test? The best way to determine the participant's intelligence would be a series of questions that, as a whole, will give an idea of their knowledge. Poorly worded

questions can also have a negative affect. This is mostly due to the fact that they can confuse a participant, and once confused a good answer is not usually given. Open ended questions, while often appropriate, sometimes allow too much leeway in answers. If the researcher is looking for something specific, just ask it in a close-ended form. Likewise, opinionated questions sometime lead to lengthy or off topic answers where a simple fact based question would gather the same information. An example would be the question “Do you like the Red Sox?” A participant could answer this question any number of ways, but in order to obtain this information it would be much simpler to ask the question “How many Red Sox games did you watch this season?” (Doyle, 2003).

Another important aspect of a survey that a researcher must keep in mind is the survey’s sample. A sample is a sub-group of the target population that is being studied, that is given the survey, in order to obtain information about the target population. The most common sampling method is simple random sampling, which each potential participant has the same chance of being chosen for the survey.

The main principle behind sampling is to keep the survey cost effective. By choosing a small portion of the target population to serve as the participants, researchers are able to keep from having to survey every single member of the population. The extreme opposite example of this is the U.S. Census. They gather information by surveying every citizen, to have the most exact information possible. Surveying methods, mainly choosing a group that best represents the target population, have been refined to an amazing point.

“Professional polling organizations, for example, are now consistently able to predict how more than 100 million people will vote in national elections with a margin of

error of just a few percentage points by surveying fewer than 2000 individuals!” (Doyle, 2003).

A large problem that occurs when a bad sample is chosen is a non-response error. A non-response error occurs in surveys where selected participants are unable or unwilling to complete the questionnaire. This, in turn, creates two problems. The sample size will be reduced by the number of uncompleted questionnaires. This results in a bad sample, because the population sampled becomes only the part of the target sample willing to respond (Petruccelli, 1999).

This problem creates an uncertainty in the researcher’s results. They can not assume that the unresponsive section of the sample feels the same way as the responsive section. An example of something like this would be if a company was to send a mail survey asking if you have ever used their product. How many people that have never used a company’s product would take the time to respond to one of their surveys? In all likelihood the company will not only get a response from people who have used their product, but will probably only get replies from those customers who enjoy the product, or use it quite often. An important goal for researchers when determining a sample then becomes finding a way to get a high response rate. The main way to do so is to create an easily comprehensible questionnaire, and make sure the participants are fully aware of what it is, and how important the results will be. The only other thing a researcher can do is to try and get non-respondents to eventually complete the survey by sending/giving it to them multiple times. In general, these techniques can be expected to induce a response rate of at least 60 percent (Doyle, 2003). Creating a functional and responsive questionnaire is, however, not easy.

In order to make a questionnaire as attractive and comprehensible as possible a large amount of time must go into its creation. First, all surveys should have a well formed introduction. Explaining to the participant why they should take time to help with the research is very important to increasing the response rate. An estimate of the time the survey will take to complete should be included, as well as a promise that all responses will be kept confidential. Another strategy often employed by surveyors is offering incentives for participating with the survey. Free food, gift certificates, and other small enticements encourage more people to readily partake in the survey. The layout of the questionnaire is also very important.

Participants must be able to follow the flow of the document in a simple manner in order to reduce the number of response errors based on confusion. The questions themselves should not be random. They should be grouped together so that the participant will not be confused by rapidly changing topics. The groupings themselves are also important. The questionnaire should begin with the most important grouping of questions, and wind its way down from there. This is to ensure good answers on the most important questions, and also to grab the attention of the participant right away. Leading with boring or trivial questions will result in a lack of interest, and will contribute greatly to the non-response error (Doyle, 2003).

Surveys are a great way to reach many people with a given set of questions, but are not always appropriate. For example, if the information needed must be obtained from a relatively small group, or needs to be extremely accurate on an individual level, a survey probably will not yield the best results. Instead a researcher should look to another data collection method: interviewing.

2.5.2 Interviews

Although it may seem to many people that interviews are simply a type of conversation, they are in fact quite different. Interviews can be very structured, almost like verbal, and more personal, surveys, or they can be more of a way for a researcher to get very in depth information from their participant. The rest of this section will discuss the proper ways to conduct such a procedure.

First, like a survey, the initial step in conducting a proper interview is to send a letter to potential participants. This letter should include the researcher's reason for conducting the interview, and why they are interested in the participant's opinions and experiences. It should also include how long the interview should take, where it will take place, and that all information will be kept strictly confidential. Lastly the letter should include a way for a second contact to be made if the potential participant is willing to be interviewed. This second contact allows the researcher to determine if the participant is right for their study, and for the participant to become familiar with the researcher. At this contact the researcher should be prepared to answer any and all questions the participant might have (Doyle, 2003).

The next step is determining how many interviews to do. Since interviews of this type are mostly formed by open-ended questions they tend to take up more time, and therefore not nearly as many can be conducted. The only real way to determine if a researcher has done enough interviews is if no new information is learned from the last few participants. Researchers must also be prepared for each interview. The open-ended nature of the interview does not allow for exact questions to be predetermined, but rather demands simply a list of predefined topics. The main reason a researcher should do such

is so that they do not forget to cover any important information that they might need (Doyle, 2003).

Once the actual interview is to take place the researcher conducting the interview must act in a strictly professional manner, while not being overly formal. Acting and dressing in a professional manner lets the participant know that the researcher is not wasting their time, and that they know what they are doing. The researcher must be paying strict attention to whatever the participant is talking about, but must not seem too formal. If viewed in such a manner, the participant may be reluctant to open up, so the researcher must maintain a balance of professionalism and casualty (Doyle, 2003).

It is also important for the person conducting the interview to keep the flow of the participant's conversation going in the right direction. Simple yes or no questions will not suffice, and interrupting the participant should be avoided at all costs. Allow them time to think before they answer, but keep them on track with what the researcher wishes to discuss. The interviewer should also relay to the participant just how in depth they wish their answers to be. This creates less confusion between the two parties, and allows for a better stream of answers. Lastly, the interview should be concluded at an appropriate time, usually before the conversation grows stagnant (Doyle, 2003).

3.0 Methodology

The methodology specifies the exact steps taken to achieve completion of the project as well as the intermediate goals building up to the final goal of project completion. The following methodology describes the process taken to complete the project. To facilitate the process and time goals we have set, we started with a Gantt Chart (Appendix B); the methodology provides more detail to the Gantt chart.

3.1 Time Layout

The IQP will be completed over a period of 21 weeks (Table 1). During A-term (August 28 – October 16, 2003) is when the project proposal will be developed. In addition, the planning of the project will be thoroughly thought out and steps will be taken to move into the tasks required of B-term. A final proposal will be the result of the A-term work and will be presented to the staff at SHCS before the next phase in the project.

Table 1: Twenty-One Week Project Breakdown

Phase:	Term:
Proposal (including Planning)	A-term (August 28, 2003 – October 16, 2003)
Data Collection	B-term (October 28, 2003 – December 18, 2003)
Project Write-up	C-term (January 15, 2004 – March 4, 2004)

During B-term (October 28 – December 18, 2003) we concentrated on the data collection from Seven Hills Charter School. This term will require a lot of time on site at SHCS to get the necessary data to complete the project write-up. The beginning of the term will be used for surveys of parents, teachers, and the target students and observations of the students. After collecting data from observations and surveys, the later part of the term will be used for more in-depth interviews of parents, teachers and

students as needed once data from surveys and observations have been completed. All necessary data required for project completion will be the end result of B-term.

The C-term time frame (January 15 – March 4, 2004) will be used to write the actual report. Once the data has been collected, there will be many meetings with the group to discuss and interpret the data that has been collected and use this data to find solutions that will be included in the project write-up.

3.2 Proposal (A-Term)

The proposal is crucial to the purpose of the project as it explains in full detail our purpose for the project, background and out plan to complete the project. The first necessary step in the writing of the proposal is to plan out the project's course over the twenty-one weeks.

Careful planning is the first and most critical step for the success of the project. In the planning of this project, we had two preliminary meetings with staff members of SHCS. The staff members included Krista Osborn (Principal/Superintendent), Cheryl Hollocher (Special Education Coordinator) and Nilda Rodriguez (Community Resource Director). These meetings, where both sides of the project were given the opportunity to meet, were question and answer sessions in which we were able to establish our project objectives from and they were able to learn what this IQP project would work towards in their school. We divided the project into several intermediate goals and set realistic time frames to have each completed. We also scheduled weekly meetings with our project Advisor, Professor Loiacono-Mello (see Appendix C). Meetings throughout the term between the group and with SHCS were scheduled as needed based off the current work

and objectives to be completed. After the planning was completed we were able to begin the actual project proposal write-up.

The proposal process began with researching the Handbook for IQP Advisors and Students. Here we found, “writing a good proposal is a very important tool for organizing time and resources to complete a project which fully realizes its objectives” (Schachterle IQP Handbook). This is a crucial part of the project as it summarizes and researches every aspect of the project as well as a detailed description of how to succeed. The proposal also includes the information necessary to understand the project and provide the information to the group necessary for good data interpretations and write ups. Included in the proposal are the Introduction, Literature Review, and Methodology. The introduction is the brief background that states the what, where, and why of our project. The literature review is the enhanced background including all information the reader should know prior to ready the project. The methodology is the project approach.

3.2.1 Background

The proposal began with the Literature Review, containing all research and background information pertinent to the project. Our group met in the beginning weeks of the project to discuss what information would need to be known by the reader if they were to read this project. We all decided the most critical topics to discuss are Background on Attention Disorder (Attention Deficit Disorder [ADD] and Hyperactive Disorder [ADHD]), Current Technology designed for facilitation of the SHCS Structure, Laws Concerning Disabled in Schools and How to properly conduct interviews, surveys and observations. The breakdown of how the work was performed is given in Table 2.

Table 2: Literature Review Breakdown

Topic:	Assigned To:
Attention Disorder	Michael Flynn & David Roscoe
Current Technology	Vu Lam & Quan Do
SHCS Structure	Vu Lam & Quan Do
Laws Concerning Disabled	Corey Ireland
How to Conduct Interviews/Obs/Surveys	Corey Ireland

We broke down the writing assignments and scheduled when to meet to discuss the literature review in more depth and piece the individual pieces together. Each individual was responsible for library and Internet research as well as sources from the school to write a research paper on their topic. When each topic was finished, we submitted a copy of it to our project advisor for editing. When we received the edited copy back, the person with the original assignment would fix any corrections and it was set aside submitted into the first draft of our completed proposal to be handed in the week before the term ended for editing. The literature review began work after the September 9th project advisor meeting and was completed for hand in on the September 23rd meeting. With the completion of the topics, we had clear objectives established as well as much knowledge to move ahead and state what our project was about and how we would approach it in the next sections of the proposal.

3.2.2 Introduction

The next step of our project was the Introduction. Knowing the background information and our objectives, the task of writing the Introduction was given to Michael Flynn and Corey Ireland to give a brief introduction to the proposal, where the reader would be able to identify the project thesis, our goals and objectives and the contents and importance of the proposal. Upon completion, the first draft was given to the advisor at

the next weekly meeting for editing then submitted into the first draft of the complete proposal. The introduction was worked on the week before and handed in on the September 23 meeting with our project advisor. The next step in for completing the proposal was summing up the approach in the methodology.

3.2.3 Methodology

The methodology is important to illustrate exactly how we proceeded and were able to achieve our intermediate goals in the time frames set in the first few group meetings. The methodology was written by David Roscoe. As time went on, he thoroughly described the steps already taken to achieve what had already been achieved. Since this was began in A-term, not much of the project had been achieved, so the Gantt chart provided much help in visualizing what we needed to be done and when and group discussion that detailed the steps, similar to the ones that had already been taken, that would be needed to complete the varying tasks. The methodology began September 23 with the completion of the Introduction and was completed and submitted for revision on October 4. With the methodology submitted for editing to the advisor at the weekly meeting, revised and submitted into the first draft of the Proposal, the only task to complete the proposal were the piecing together and organizing.

3.2.4 Finishing the Proposal

With completion of the major topics for the proposal, the last step was organizing all the individual works together for the first proposal submission on October 4, 2003. After the meeting on September 29, we assigned Michael Flynn the task of writing the abstract and references sections of the proposal. The group also worked together to fill in

introductions to the sections and determined a structure. All final revised copies of all the papers that had been worked on to the previous point were submitted to David Roscoe who organized them into a single paper with chapters and created the table of contents. The first draft was submitted on October 4, received back for revising on October 6, and the group met to finish all last revisions for a completed A-term proposal ready for presentation to the staff of SHCS schedule early B-term.

3.3 Data Collection & Analysis (B-Term)

The Data Collection & Analysis Phase of the project was when all data was collected by the group through methods of surveying and interviewing (Table 3).

Table 3: Data Collection & Analysis Phase

Week	Date	Task
1B	Oct 28 – Nov 2	Seven Hills Charter School Proposal Presentation
2B	Nov 3 – Nov 9	Meet targets, Survey Handed Out
3B	Nov 10 – Nov 16	Survey Collected & Interview Preparation
4B	Nov 17 – Nov 23	Student/Teacher Interviews
5B	Nov 24 – Nov 30	Student/Teacher Interviews
6B	Dec 1 – Dec 7	Student/Teacher Interviews
7B	Dec 8 – 14	Interpretations and finishing of Data Collection
8B	Dec 15 – Dec 21	Data Write up and Setup for C-term Phase

Week 1B (October 28 – November 2, 2003), the group concentrated on completing the proposal presentation for SHCS and scheduling the date for the actual presentation to the teachers. Giving this meeting was a preliminary step in the data collection process as we felt by giving the teachers an overview of the project, we would get better responses during interviews. For the proposal presentation, the group met and created a power point presentation that explained to the teachers what an IQP is, what our IQP focus is, how we plan on completing the IQP and what we would like to accomplish.

The proposal presentation is provided in Appendix D. The proposal presentation which was scheduled for an occurred November 13 was also used to answer any questions the teacher had.

Week 1B, we also prepared the surveys for the teachers and students. The survey for the teachers, Appendix E, was designed so our group can identify which teachers had the most experience with the students with attention disorder and those who had major concerns, and interview these teachers to get the best feedback Appendix F. The student surveys, Appendix G, were designed to accomplish the same thing. Due to complexity and lack of time, the student surveys were never given to the students. The sample of students was chosen by Cheryl Hollocher.

Week 2B (November 3 – November 9 2003), the group went to Seven Hills charter school to give the proposal presentation to Cheryl Hollocher and drop off the surveys for the first phase of our data collection. The teacher surveys were given to teachers that Cheryl Hollocher felt has most experience with the students, teachers she felt would provide the best feedback.

Week 3B (November 10 – November 16 2003) we received the surveys and began the interview phase of the data collection process and gave some of the staff at SHCS the proposal presentation. Early in the week we received four surveys back from the teachers (Appendix H). The team typed up the survey results and determined which teachers would be best for interviews. We then designed specific interview questions for each teacher that we felt addressed the teacher's survey response. During the proposal presentation, we met many of the teachers and handed out more surveys to those who had not received them. The surveys were returned to us this week via e-mail. Once the

interviews were decided, we schedule interview dates for the teachers and student through Cheryl Hollocher for the next 3 weeks.

Weeks 4B - 6B (November 17 – December 14, 2003), were our primary interviewing phases. It was necessary to allow three weeks to meet with the teachers schedules and to allow for repeat trips should they be necessary. We also felt it necessary at this point to break the team into two groups to focus on the two groups (students & teachers). Vu and Quan handled student interviews, Michael, Corey and David handled teacher interviews. Results from the three weeks of interviews can be found in Appendix I (Student Interview Results) and Appendix J (Teacher Interview Results).

Week 7B – 8B (December 8 – 21, 2003) were used to gather all data collected over the course of the term and using the collected data to begin setting up for C-term, the project write up. All interviews were typed up to be inserted into the write-up. After reading over the interviews, we determined several possible solutions. Each solution possibility was assigned to a different group member to research and write a paper on during Winter Break that would become our basis of our solution when doing the write-up C-term.

3.4 Project Write Up (C-Term)

C-term was the final phase of the project, the development of a solution and the write-up of the final report. Weekly meetings with the project advisor were held every Wednesday at 1PM. The breakup of the term's goals is organized into Table 4.

Table 4: Project Write-Up Phase – C-term

Week	Date	Task
1C	Jan 19 – Jan 23	<ul style="list-style-type: none"> • Acquire testable samples to solutions • Create timeline • Schedule interviews with teachers/students for week 3 to test solutions and gather feedback
2C	Jan 26 – Jan 30	<ul style="list-style-type: none"> • 1/28: Hand in timeline • 1/30: Meet to Organize what we have for samples and make representations for each solution • Keep acquiring samples to proposed solutions
3C	Feb 2 – Feb 6	<ul style="list-style-type: none"> • Teacher/Student meetings to test and acquire feedback for our proposed solutions • 2/6: Meet to organize feedback/observation results on tests into charts: (Student Reaction, Teacher Feedback, Pros, Cons)
4C	Feb 9 – Feb 13	<ul style="list-style-type: none"> • Organize Charts and solution research into rough draft to be handed in sometime in the week
5C	Feb 16 – Feb 20	<ul style="list-style-type: none"> • Prepare SHCS Solution presentation • Revise proposal • 2/16: Hand in final revision draft #1 • 2/18 get feedback from revision draft #1
6C	Feb 23 – Feb 27	<ul style="list-style-type: none"> • Prepare SHCS Solution presentation • Revise proposal • 2/23: Hand in final revision draft #2 • 2/25 get feedback from revision draft #2
7C	Feb 1 – March 1	<ul style="list-style-type: none"> • SHCS Solution Presentation • 3/4: Final Draft Handed in

Week 1C (Jan 19 – 23) had three goals. The first was to develop a timeline of how we would complete the term to finish the project on time. The group met together to discuss the goals of the term and the dates of which they would be accomplished. Also, during the first weekly meeting, it was determined in order to develop a solution, the teacher and student’s feedback on what we had researched would help us to determine how to integrate the technology we researched into SHCS. Each group member tried to find samples or demonstrations of the solution they researched over Winter Break to bring with us to the interviews. The last goal of week 1C was to begin contacting and

scheduling the second interviews with all the teachers and students we interviewed term B.

Week 2C (January 26 – January 30 2004) three things were accomplished. The timeline for the remainder of the project was handed in and approved by the project advisor at the weekly meeting. Also, we were to keep acquiring samples and demonstrations of the solutions we had each researched. It was difficult obtaining these samples so, in order to keep on track for week 3C, the interviews, we each began putting together presentations that represented the solution to show the teachers and students, the best thing next to the actual demonstration (Appendix K). With these goals accomplished, we were set up for the interviews scheduled to begin late in week 3C.

Week 3C (February 2 – February 6) was primarily for finalizing preparation for and begin conducting interviews. The group decided it would be best to follow a template to get the teachers positive and negative feedback as well as any other recommendations they had into an interview template, Appendix L. During week three, the teachers and students provided us with valuable feedback on each proposed solution (see Appendices M and N).

Week 4C (February 9 – February 13, 2004) we used to finish up any remaining interviews we had and start with the assembly of the first rough draft due on February 20. Not all interviews were completed week three due to school cancellations. They were rescheduled for the next possible time this week and completed. Upon arriving for the teacher interviews, we were able to randomly grab Krista Osborn to have her feedback on the solution samples we had prepared. With enough data to begin designing our final recommendation for the school, we all met to prepare what we need for the first rough

draft. The methodology was also updated up to this week to be inserted into the rough draft.

Week 5C (February 16 – Feb 20, 2004), each group member worked on a particular section of the rough draft. Each piece was submitted to myWPI, an online Content Management System that was allocated for this IQP, and when all sections were there, they were pieced together into the correct format. The first rough draft was given to Professor Loiacono-Mello for the first revision on February 20 and a meeting was scheduled to go over the first rough draft revisions on February 23.

Week 5C was also designated for the preliminary stages of the project presentation of SHCS on top of the edits. The group met together to prepare the final presentation that would be given to SHCS when the project was completed. Each group member made several slides for each solution idea and inserted them into the presentation at this meeting.

Week 6C (Feb 23 – Feb 27, 2004) was used to prepare rough draft two. The weekly advisor meeting was held on February 23 and we received feedback and what needed to be done for rough draft two, the project in its entirety, to be handed in on February 27. Additions during this week included the sign-off sheet for SHCS and project recommendation. The recommendation presentation was completed and also inserted into the project for edits (Appendix O). The revisions for rough draft two were discussed at the next weekly advisor meeting.

Week 7C (Mar 1 – Mar 4, 2004) the final revisions were made to the project as discussed during the meeting held March 3. The final project was then pieced together

and submitted to professor Loiacono-Mello. With the project completed, the final recommendation presentation was scheduled with SHCS.

4.0 Recommendations

This chapter proposes possible solutions to assist students with attention disorders both in and out of class. Based on the teachers' feedbacks from the first set of interviews, we arrived at the following technologies: *HearIt*, *Personal Digital Assistant*, *Assistive Technology*, and *Lesson Supplementing Software*.

The breakdown for chapter four is as follows. Section 4.1 presents the solutions – product descriptions and uses. Section 4.2 offers an explanation of the evaluating scheme we used to rank each solution according to our own scale and feedbacks from the second set of teachers/students interviews. The last section of chapter four, Section 4.3, proposes implementation plan to integrate the technologies into Seven Hills Charter School's curriculum.

4.1 Research

4.1.1 HearIt

HearIt can reduce the amount of audio distractions in a room so a student with an attention disorder can keep focused and pay more attention on one person, particularly the teacher giving lessons or assignment instruction. An ongoing concern with several teachers at SHCS, Matthew Jewett in particular, is that there are too many distractions in the classroom. They suggested us to research for a good way to use technology to keep students focused as well as control all the distractions in a classroom. We recommend using the *HearIt* tool as it has proven to “increase sustained attention, comprehension and

phonologic awareness and to reduce distractibility which results in optimal academic performance” (<http://www.hearitllc.com>).

There are several different models of *HearIt* (Figure 3) but all of them are made up of a microphone and headset. The microphone picks up and amplifies the teacher’s voice and will reduce the sound of other voices outside the speaking audio frequency and other conversation going on throughout the room. What is transmitted to the headphones is the amplified voice of who the student should be focusing on and no other audio distractions.

HearIt products differ from past products that singled out the student resulting in embarrassment and ultimately the lack of use of the product, though beneficial. Several teachers expressed concern with the trend of kids using such devices to be the subject of bullying and peer humiliation. Though *HearIt* is still something that the attention disordered student must use that the other students do not, *HearIt* addresses that concern with the *HearIt Perfect* model (Figure 3).



Figure 3: *HearIt Original* (left) and *HearIt Perfect* (right) Models

The headphones model that of tiny walkman/disc man headphones. Many kids today listen to music with headphones similar to *HearIt*'s and can be seen all around the school among many students. This should draw minimal attention to the student required to wear them. With the *HearIt Perfect* product, the child can get aid while avoid embarrassment among their peers.

We believe this to be an important to for SHCS because the teachers seemed to be very concerned with the lack of attention they get from the students when giving instructions or lessons. One particular concern address by such teachers as Melissa Sharrock was the students simply do not listen during instruction for an assignment. The problem that resulted from this, the students do not know what to do after the instruction and they have to work with them and explain again, rearrange seating and find way for them to pay attention and complete the assignment. By using the *HearIt* tool, during the time of instruction, the student hears nothing but the voice of the teacher. This stops him from being distracted by any audio distraction in the room. With this tool helping them keep focused it will increase academic proficiency of a student with an attention disorder. Case studies of classroom environments have shown *HearIt* to be an effective too with students who have attention disorders. In SHCS, it will help eliminate the need for a special education program such as FASS at SHCS. As several teachers said, students have more trouble paying attention in reading and writing classes. *HearIt* in SHCS classrooms can allow a student to concentrate on reading and writing more by allowing them to tune out all audio distractions which can result in improvement among reading and writing comprehension. Using *HearIt* to eliminate audio distractions in the classroom can have great benefits for the students with attention disorders at SHCS.

HearIt products start at \$500. The recommended model the *HearIt Perfect* can be purchased for \$875. Investing a one time expense for several of the systems for the school's ownership may be valuable to all students with severe disorders with audio distractions. Seven Hills Charter School may also be available for funding to help pay for the costs of *HearIt* products. At *HearIt's* webpage, <http://www.hearitllc.com>, there are links to applications for funding as well as to the Massachusetts's department of education which provides funding to schools for *HearIt* products in some cases.

4.1.2 Personal Digital Assistant

Personal Digital Assistants (*PDA*) are electronic organizers; they are small enough to be comfortably held in the hand (they are sometimes referred to as handhelds). *PDA*s vary in terms of functionality and price. Some *PDA*s offer only basic functionality, address book and calendar, while others in the higher price range resemble a fully functional computer (Figure 4).



Figure 4: Basic *PDA* (left) and fully loaded *PDA*s (middle and right)

*PDA*s are useful to students with attention disorders in that they make information highly accessible. During our student interviews and research, we observed that students

with attention disorders are easily distracted by their surroundings. By assigning each student with a handheld for use throughout the day, s/he would have something to focus on and explore at the same time.

There are numerous tools available for education in conjunction with *PDA*s. In writing, for example, there are *WordSmith* - a word processor that includes a spellchecker and thesaurus, *Noah Lite* - a dictionary with over 100,000 words and *PiCo Map* - a concept mapping application. Teachers can use *Palm E-book Studio* to create electronic notes and checklists on the six writing traits, transition words, and writing examples. Having these resources available at their fingertips, students will find writing easier and a lot more fun. Students can also use the handhelds to take notes and write up their report, set reminders, download assignments, etc. The *PDA* can also act as a visual aid. Students can draw animations of concepts with *Sketchy*, create visual representations of different concepts in class. The teachers then can help reinforce the concepts through visual quizzes on the *PDA*s. Sample screenshots for the above software are presented in Figure 5.

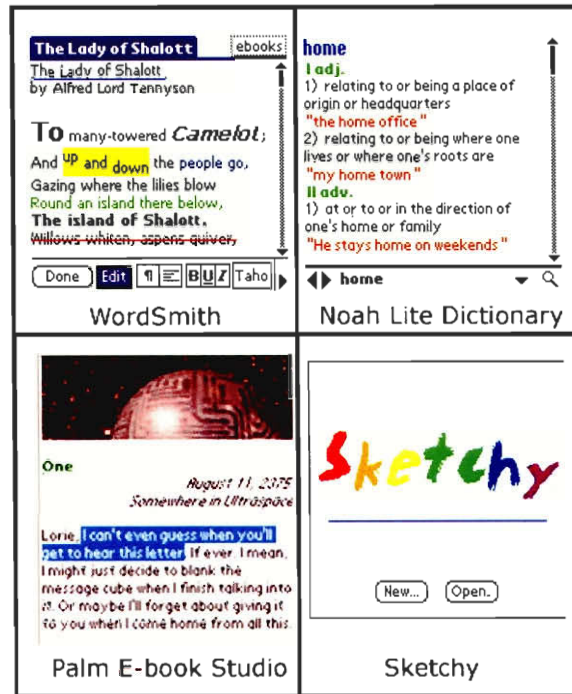


Figure 5: Screenshots for WordSmith (upper left), Noah Lite (upper right), Palm E-book Studio (lower left), and Sketch (lower right).

*PDA*s are extremely useful for both students and teachers if use correctly. Teachers can track students' progress, beam electronic notes, send reminders. Students with attention disorder can focus and learn visually. They would be more confident in knowing that they can rely on themselves to perform a particular task. As they grow, the *PDA*s will grow with them.

4.1.3 Assistive Technology

Some of the most readily available resources for aiding our target students are software programs specifically designed with children in mind. These programs can aid students in many different aspects of their curriculum. The different aspects include early

reading and phonics, advanced reading, writing, word study, math, and some are even designed to aid children with physical disabilities.

One of the most prevalent companies that deliver such programs is Don Johnston Inc. Don Johnston has software to cover all the aforementioned topics, as well as multiple different types of programs for each one. One of the problems the teachers repeatedly run into is keeping students focused on less interactive types of learning, largely reading from text books. In an interview with SHCS Teacher Allison Martins, she stated that one of her main problems was keeping kids focused on text books, and that giving them something more to interact with would greatly assist them. Don Johnston's *CAST eReader* helps with both of these issues by providing speech and visual highlighting to any text that can be accessed electronically. The incrimination and speed of highlighting can be adjusted to each student's needs, and the program even allows for note taking. Using such a program would allow students to view text in an interesting and specialized manner at their own pace, greatly increasing the chances of them absorbing the material presented.

For the subject of math, Don Johnston has a program called *Blocks In Motion* (Figure 6). This software provides multiple geometric and sequence based games that are fun for the student, and help build better problem solving and critical thinking skills. Students will be able to interact and enjoy this program, while strengthening their abilities. A program package like this could be used as a reward to generate interest or even as a break during a more difficult topic to insure attentiveness.

One of the more impressive writing assistant software options, Johnston's *Co Writer 4000* (Figure 6) is a program designed to help students who are unable to form

good sentences to convey their ideas. As the student is typing, the program displays different possibilities for each word, helping the student with spelling and grammar along the way. The program also boasts a collection of curriculum-specific dictionaries. These vocabulary groupings can be targeted to a certain student, class, or even assignment. Basic typing errors, such as capitalization and spelling are also corrected, and speech and color options also may help the student.

Another writing support program is Crick Software's *Clicker* (Figure 6). *Clicker* is an extensive word processor that allows students to enter words through the keyboard, with speech, or with the aid of photographs. The speech recognition allows students to hear words before they enter them, and even reads back what they have written. When coupled with another Crick program the package can also act as a word predictor. Crick Software also provides hands-on or booklet training programs for both teachers and students to familiarize them with the use of the software package. Writing software, such as *Clicker* and *Co Writer 4000* allows students to concentrate on getting their ideas across more than basic sentence structure. With use, the structure itself will become more natural to the students as they grow less and less dependant upon the software.

One interesting option that combines computer learning with teacher interaction is the *Quick Start* series by Quick Mind Print (Figure 6). This series contains teacher training guides, flip charts, computer learning templates, and classroom activities that all come with a CD-ROM. The different types of material are mostly geared towards helping students to learn how to use the computers, and to familiarize them with common software. The different software options include: Appleworks, Microsoft Word, Microsoft Access, Microsoft Excel, Microsoft PowerPoint, Alpha Smart, and many

others, as well as general internet training guides. Including these different options into the curriculum may help our target students learn to use these programs, thereby increasing their odds of being able to use them to the best of their abilities down the road.

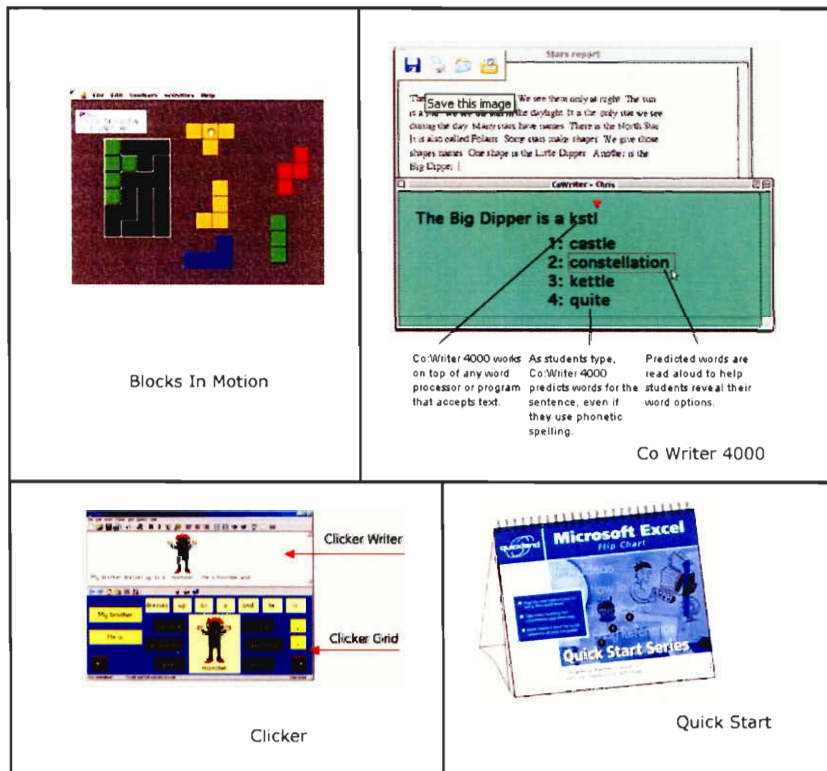


Figure 6: Assistive technologies

4.1.4 Lesson Supplementing Software

Many teachers have been wondering why it is that the same students who sit listlessly in the classroom will go home and spend upwards of eight hours engaged in frustrating videogame play (Gee, 2003). Videogames are not the frustrating and mindless entertainment one may think. They are actually quite intricate learning experiences that have a great deal to teach us about learning. In his book, Paul Gee argues that there are

important learning principles built into videogames, principles strongly supported by current research on human learning in cognitive science such as:

- How one forms an identify
- How one connects different sign systems such as words, symbols, artifacts, etc.
- How one chooses between different ways of solving a problem
- How one learns from non-verbal cues
- How one transfers abilities learn while doing one task to doing another.

The same principles not only apply to students with attention disorder but students in general. Videogames could be a learning tool used in addition to the classroom. With graphics, competition, and fun introduced to them, students will have a much easier time passing the time during the day, and will have fun while learning.

Many companies actually deal solely with these educational games. Sunburst Technology is a company that sells all different kinds of software focusing on various subjects and age groups. Because Sunburst designs, creates, and sells their own games, buyers can be confident that they are receiving quality products. These games are not going from producer to wholesaler to retailers. They are being programmed, and ultimately sold within Sunburst. Sunburst also sells other games that are very popular with teachers and their students. They have the Knowledge Adventure series of games available for purchase as well as their own games. Clearly it is easy for teachers to go to Sunburst's website and find the games that they are looking for.

One example of videogames that would enhance the learning experience is *Hot Dog Stand* made by Sunburst (Figure 7):

“Students improve math, problem-solving, and communication skills in this ‘real- life’ business simulation where they manage a

busy concession stand in a big-city stadium. Students interpret information, keep records, determine prices, and plan marketing strategies...Different levels of difficulty, a variety of random events, and a wide range of situations and options provide students with a new scenario each time they run Hot Dog Stand: The Works Includes detailed Teacher's Guide with activities. (www.sunburst.com)”

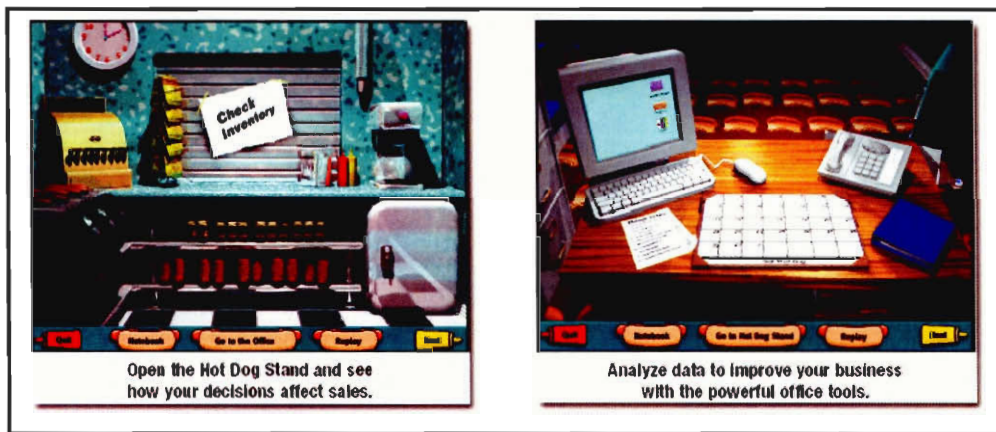


Figure 7: *Hot Dog Stand* screenshots

A classic game that has been around for many years is *Number Munchers* (Figure 8). This game has more of a self-teaching principle. With not much instruction, this game based its teaching on a trial and error base. The player was told to “eat” prime numbers. If they didn’t know what number was prime, they would eat it and be told by the game that it is not. But doing this through repetition, they would know what a prime number was and what was not on sight. The game included different levels such as multiples, factors, prime numbers, inequalities and others. A very affordable game, *Number Munchers* does not have the outstanding graphics and teaching capabilities of some other expensive games but still seems to get the ideas across to the player.



Figure 8: *Number Munchers* screenshot

There are many games available for purchase that have great educational value. Without a doubt, these games would keep students with attention disorders focused and occupied. Playing games is what a child does best. Because students with ADD have the most trouble staying focused towards the later part of the day, it would be appropriate for them to have some time to play the games then. As long as the game coincided with the teacher’s lesson plan for the time, the student would be getting out of the game comparably the same as what they would get out of the teacher lecture. This option as a possible solution to the ADD problem should definitely be addressed. With the variety of subjects available, teachers could pick and choose games that would go along with different lessons.

4.2 Arriving at the Recommendation

How we determined which solution areas would be most critical and effective for use in SHCS and how to integrate them into them into the school curriculum was a key step in our recommendation. Through research and follow up interviews we were able to determine which of the solutions were most suitable for SHCS and which may be more

difficult to integrate into SHCS. Upon follow up interviews with the teachers and students to review the researched ideas, we found positives to each solutions as well as negatives for each idea. As a group we met to determine a ranking system to decide based off teacher and student recommendations as well as our research which solutions would be most suitable for SHCS which was later verified with Cheryl Hollocher, Special Education Coordinator, assure that our ranking system correlated to the schools.

Upon completion of the interviews, our group found there were six factors that determined whether or not the solution would be compatible for SHCS. These six factors are the cost, comfort, effectiveness, misuse ability, teacher support and student support of the solution. Each of these factors was assigned a weight of how critical a factor it was in introducing it into SHCS. The two most important factors would receive a weight of twenty-five percent of the total decision, the two next important would receive a weight of sixteen percent, and the two least important factors would receive a weight of nine percent. The weights would be determined from the staff and student interviews, as it was there feedback that reflected the SHCS. Within each category, each of the four solutions were ranked from one through four on which proved to be the best for each category. The best each category received a rank of four while the worst received a rank of one. Ranks were once again based off the feedback received from the interviews of the staff and students at SHCS that reflected SHCS structure. To determine which solution would be best for the school, each solution rank was multiplied by the category weighting. All the numbers were added for each result and the highest score was the best solution for SHCS while the lowest score was given lowest priority for introduction into SHCS. Table 5 shows the results from the category rankings (weights for each category

following the category in parenthesis. The weighting and ranking determined by the group is discussed in the following paragraphs.

Table 5: Solution Category Ranks

	<i>HearIt</i>	<i>PDA</i>	Assistive Technology	Lesson Supplementing Software
Cost (25%)	2 *.25	1 * .25	3 * .25	4 * .25
Effectiveness (25%)	1 *.25	4 *.25	2 *.25	3 *.25
Comfort (16%)	1 *.16	2 *.16	3 *.16	4 *.16
Student Support (16%)	1 *.16	3 *.16	2 *.16	4 *.16
Teacher Support (9%)	1 *.09	2 *.09	3 *.09	4 *.09
Misuse (9%)	2 *.09	1 *.09	3 *.09	4 *.09
Solution Total	1.34	2.32	2.59	3.75

Cost seemed to be a primary concern of the staff of SHCS. The group felt that if the school was unable to afford it, no other factor would matter so it received twenty-five percent of the decision weighting. However, we could not eliminate solutions strictly based upon cost as based off the interviews; some past experiments have been costly but have proven to be very effective. For these reasons, *Lesson Supplementing Software* received the highest ranking being the cheapest. *Assistive technology* is not much more expensive therefore it received a rank of three. *HearIt* was ranked two. It was shown to be the most expensive of all the solutions, however, funding is available and if the kids had a great enough need for it, they may be able to be picked up at much lower than quoted prices. The group felt *PDA*s would be ranked last in the cost category as funding for such a device that has not been used for this purpose before may be difficult to acquire.

Effectiveness was also as important as cost. We felt there is no reason to consider a solution that has proved inefficient in the classroom therefore it too received twenty-five percent of the decision weighting. Rankings for this were determined from

case studies on the item and just the functionality that shows certain things would aid much more than others. For these reasons, *PDA*s were ranked as the most effective technological tool for students with attention disorder. The programs we propose with the *PDA* could prove to be the most effective and efficient device for students who have trouble paying attention and then forget items and are unable to complete work. With a *PDA*, they have a constant reminder and the teachers are able to post reminders and instruction right to the individual student. *Lesson Supplementing Software* has shown to be very effective as students will find it fun and want to learn it. *Assistive technology* has also shown to be very effective, though not as fun as games and computer programs used for kids' enjoyment. The *HearIt* has shown the most effective of all, as it only eliminates one distraction from the room and the kids are still highly over-attracted to all other distractions. Also, the technology would be case dependent, and may not prove effective on mild cases of attention disorders or those who simply need more time to process what the teacher is saying.

Comfort we found was of the next importance of the category weighting. Comfort included how comfortable a student would be in using in the classroom or home environment so we valued it at sixteen percent of the weighting. This included strictly how it fit to the student if it was a worn device, embarrassment the solution can cause among other students, whether it not it confused or stressed out student more than helped, and any other factors that can influence the students comfort level with the solution. For those factors, the *Lesson Supplementing Software* and *Assistive technology* were found most comfortable as both items were to be used by all students, not singling anyone out, and not requiring anything worn and held onto. *PDA*s were found to rank second among

comfort as it would need to be carried around by the student, can single out the student among others, and may be a little complex at first for the student to use causing frustration. *HearIt* was ranked the lowest as it is a worn device that students may find uncomfortable as well as the fact that is a visibly worn object that will single out the student.

Student Support was also ranked with comfort as if the student showed no support, they would not utilize the technological device and it would prove ineffective so it also received sixteen percent of the decision weighting. These ranks were based strictly off the student interviews. The students favored the *Lesson Supplementing Software* most as they were games. This shows they would certainly get used and the students would definitely be willing to use them to their full capacity eliminating the fear of not being used. *PDA*s also showed to be favored by the students as it was something they can handle and it could be used for such things as games, something that interests them in life outside of school. Next was the *Assistive technology*. Students agreed that some can be frustrating and boring and were certainly not as exciting as games. *HearIt* ranked last as most students would not want to wear them and found they would not work for them as well as the other solutions would.

Teacher support, we felt, should receive the lower ranking as the other factors took precedence over this factor, so we assigned it nine percent of the decision weighting. We felt that should the student support it, feel comfortable with it, it would surely be used. Also, if it was very effective with the students, that should be weighted over the teacher support. Also, cost just outweighed this like it had everything else because without the money it just wasn't feasible. We felt if was effective and the student

supported it and was a comfortable tool in the classroom, the teachers would not have support for it. Rankings for these were determined strictly off the teacher interviews. The *Lesson Supplementing Software* and *Assistive technology* got most support from the teacher as they would love to adapt them into centers and rotate groups into them. *PDA*s were very exciting but new to them so they did not receive as much support as the top rankings. The teachers did not seem to think the *HearIt* would be too efficient and may only work with several students pending on each case so it got the lowest support giving it the lowest ranking.

Misuse was also weighted low at nine percent of the decision weighting. The misuse categories ranked how difficult it would be for the student to misuse, including use for wrong purposes, lose, break, etc. It received low ranking as many of concerns for misuse can be address and the groups can find ways limit use on the device as to not allow for misuse. For those factors, the *Lesson Supplementing Software* was ranked at the top. There is very little way to mess-up on these games or misuse as they are already fun and amusing. Being on school computers, they couldn't be broken or lost. The same reasons gave *Assistive technology* the next ranking. *HearIt* received a rank of two out of the four as they can be lost or broken. *PDA*s received the lowest rank as they are small and fragile and in the hands of a kid can easily be broken or lost. Also, *PDA*s give the student plenty of opportunity for misuse if not limited.

With this weighting system we were able to determine which solutions would be best for use in SHCS. The weighting system took in all factors for each influence and ranked how they would interact in SHCS allowing us to design the best recommendation for SHCS to utilize current technology to assist students with attention disorders.

4.3 Final Recommendations

Through the model of calculating the scores for recommended solutions, the most suitable solution is the *Lesson Supplementing Software*. This solution satisfies both issues of cost and effective usage. Second ranked solution is the in-class interaction technology since it is more expensive than the first solution. *PDA* and *HearIt* are both high cost, therefore they come as our third and fourth recommended solutions. However, the use of *PDA* proves itself to be more effective than the use of *HearIt*, so this solution is better even it is still at high cost. The purpose of this ranking in proposed solutions is to make it easier for the school to select and decide which of our solutions can be most beneficial to apply.

With ranks aside, this section presents implementation plan for each recommendation. The plan includes management and acceptable-use policies, and funding method if applicable.

4.3.1 HearIt in SHCS

HearIt would be most effective in SHCS if several of the *HearIt Perfect* models were purchased. It would have to be case dependent, as not many of the students with attention disorders would find this device helpful, only those with an extreme attention disorder especially someone who finds it difficult to concentrate with the noises in the room. Due to the low numbers of students who would require *HearIt*, we would recommend purchasing no more than ten units to have for the schools possession, for students use only in the classroom; they would not leave the school.

The device would be assigned to the selected student who shows need and would become a shared responsibility of both the student and the teacher. Students who have a

disorder severe enough to require special attention or education could be eligible for the *HearIt* device. If the student shows they can benefit from the device and accepts to wear it, the school could assign that student the device. The student would pick it up when they arrived to school in the morning from the morning teacher and left with the last period teacher when school gets out. The teacher would share the responsibility of making sure they student picked it up and dropped it off at the start and close of each school day. The teacher would also have to share the responsibility of making sure the student transports it to each class. The student would be assigned it for one school year, and at the beginning of each year, eligible students would be assessed to see if they should be assigned the *HearIt* tool.

Acquiring and paying for the *HearIt* tool could be done over the company's webpage. The company's webpage is <http://www.hearitllc.com>. Funding for the units would have to come from the school though additional funds can be granted by applying for grants on the webpage. Funding forms are available at <http://www.hearitllc.com/forms.htm>.

Our group believes this would be the best way to integrate *HearIt* into SHCS. If used correctly in this manner, it is believe this will produce the best results among those students with attention disorders.

4.3.2 Personal Digital Assistant in SHCS

The main usage of *PDA*s in the classroom is to provide students with attention disorders a tool in organizing their studies. Integrated in each *PDA* is the numerous amount of varying software that not only aids them with their work at school and at home, but also gives them an interest to study with enthusiasm. Because of the myriad of

uses a *PDA* has, the issue of how and what to implement it into the school curriculum is very important. A good implementation plan not only prevents the students from misusing but guides them to more proficient use of the *PDA*s as well.

Implementation of *PDA* into the school curriculum should take into consideration the following issues:

- Ownership of *PDA*s (the school or the students?)
- Should the students be allowed to take the *PDA*s home?
- Issues regarding the loss or damage of *PDA*s.
- Written policy of use and handling

The first issue addresses whether the school or the students should own the *PDA*s. If the school is going to take ownership then it has to implant policies to answer the latter two issues. If students are directed to purchase their own *PDA*s, it is important for the school to provide purchasing guidelines that include information such as requirements for the operating system, minimum memory, expansion, and software.

Allowing the *PDA*s to be taken home would be most beneficial for the students. Having the *PDA*s at home would provide the students the time to explore the features and functionalities available the device offers, so that they would be more fluent using the tool at school and in the future. Learning how to take care of the *PDA*s would entrust them with more responsibility. However, the side-effect of this policy would result that the student might misuse the *PDA*s (playing games, for example); or they might lose or forget to bring the *PDA*s to school. Therefore, the best policy is for the school to be selective about the take-home process. Students who have shown high responsibility should be allowed to bring the *PDA*s home.

Another way to handle loss and damage issues of *PDA*s is through insurances. Most *PDA*s come with a one-year warranty that covers most hardware issues except screen breakage, which is most common. It is possible to purchase additional warranty coverage that covers a longer period of time and screen breakage; third party insurance can also be purchased. Because there are likely to be some problems with *PDA*s, it is recommended that the school has a few extras available to be used as replacement units. If *PDA*s are going to be transported frequently, used in outdoor environments, or otherwise used in a potentially rough manner, cases are recommended.

Two of the most common written policies that you may want to put in place are financial responsibility agreements and acceptable use policies. Financial responsibility is used when school loans the *PDA*s to the students. The agreement is signed by the parents agree to return the *PDA*s in reasonable condition or pay replacement if any damages incurred. Last but not least, acceptable agreement should address acceptable use of *PDA*s.

Once utilization policy has been implemented, the school can develop management strategy to distribute and keep track of the *PDA*s. There are a variety of methods to distribute *PDA*s in classroom:

- 1:1 Ratio: Each student has a *PDA*. This is the ideal configuration, because it gives students maximum access. In many cases, a 1:1 ratio is the most advantageous model even if not all students in the school can participate in the *PDA* program. Advantages of this model are access and few classroom management issues. The main disadvantage is the cost.
- 1:2 Ratio: Each pair of students has a *PDA* which they share. Advantages are access and few classroom management issues. Disadvantages include lack of

data privacy and issues regarding how students will share the handheld (especially for home use).

- Classroom set: A set of about five or ten *PDA*s are available for different students to use. Advantages of this model are lower cost and some access to all students. Disadvantages include file management issues, lack of availability of the devices for personal use, and issues regarding how students will share the handheld.
- Mobile lab: A set of about thirty *PDA*s are available for different classes to check out. Advantages include lower cost. Disadvantages include scheduling difficulties, “ownership” issues, management issues, and lack of availability of the devices for personal use.

As part of management strategy the school should consider how to keep track and maintain these devices. Areas to consider include:

- Labeling the devices: The school should permanently label the devices with the school's name, ID codes, and possibly bar codes.
- Naming the devices: Each *PDA* should be assigned a unique user name.
- Charging the devices: *PDA*s will need to be fully charged before initial use. Failure to fully charge the devices may negatively affect the on-going battery life.

Professional development for the faculty and staff is also a critical component to a successful *PDA* management strategy. This professional development should include not only the basics of operating the devices and training on the applications being used, but also in the areas of classroom management and curriculum integration.

4.3.3 Lesson Supplementing Software Implementation

Most new technologies that are entered into the classroom are geared solely towards the student. This creates a separation in process between the teacher and the new device. Software, however, is geared to create an environment where the teacher controls all aspects of the learning process.

All of our suggestions in this area are intended to aid the teacher in controlling the student's environment while still keeping the student learning on their own. Typifying this are the two word processing software solutions. *Clicker* and *Co Writer 4000* both aid students in putting their ideas down into sentences, while allowing the teacher to supervise their paper as a whole. The student interacts with the program to create a report or essay, while the teacher helps the student come up with the ideas and views needed. Combining these two helpful agents will help the students immensely, allowing them to receive both the technical help they need writing, and the direction they need from the teachers.

The one suggestion that does not involve much teacher interaction is the *eReader*. This program is simply geared towards helping the students focus on plain text. This technology would be better used as a study guide. Allowing students to use the software while studying will greatly aid in their comprehension process.

The *Quick Start* series is a teacher controlled system for teaching students to use computers, the internet, and common software programs. Using these tools will help students learn to interact with everyday technology, paving the way for use of new and different programs. These activities, charts, templates, and training guides will give the students the basic knowledge needed to succeed in our technologically evolving world.

4.3.4 Assistive Technology

There are a few different ways that the educational games can be introduced to Seven Hills. The easiest way would be to buy a copy or two and have the kids test them out. Judging by their reactions the game could be accepted or declined. The other alternative is to send away for a free demo of different games from Sunburst. A risk free trial of the game could be the best method.

The problem with sending away for the game is this will take a little while. After asking Sunburst for the appropriate way to send away for a free demo, they responded with the following:

“Schools can preview up to 5 Sunburst published programs for 30 days. Please fax your request on school letterhead to 888-800-3028. We send the single user copy for the preview, and the school pays for shipping to return, please include the correct shipping and billing address information with the fax.” (Appendix P)

This will probably be the best method. When the games arrive, students can test them out and teachers can gauge the games’ effect on them. If a particular game is proven to significantly aid a student with a subject, the game can be purchased and installed in the computer labs. One game, Hot Dog Stand: The Works focuses on math skills for 5-8 grades. Prices for this game (which are comparable for most games) are found below.

Prices	
Mac/Win CD	6949DH
Single	\$99.95
10 Computers	\$119.95 \$99.95
Unlimited/Network	\$999.95 \$699.95

Figure 9: Manufacturer’s licensing fees for *Hot Dog Stand* education game.

The computer games were supported greatly by the different teachers during the interviews. They believe that the games will complement the classroom lessons very well. They also provide students with ADD a chance to get away from the normal everyday lecture and give them something more attention grabbing. The combination of fun and education will prove the games to be very effective.

The games can be either used during a lesson to complement it, or in addition to the lesson (after class). Either way students will be very willing to play them. Steve Colorio made the point that if a student was faced with a choice of these games or any other video games like Playstation 2, the games probably wouldn't be chosen. Because of this, it's important for the games to be available during the school day. Although it would be a great use of time, it is unlikely that the educational games would be even touched at home by the students.

In all, although the games would be a great tool at home or outside of the classroom, the fact remains that the only time the kids would play them is at school. If the games are installed on the computers in school, teachers can have students use them whenever they want during the day. These games are a great learning tool if they are utilized correctly.

4.3.5 Proposed Integration Timeline

To accompany all of our suggestions in this report we are also including a timeline to give our opinions on what the most logical progression of integrating our proposals would be. Executing changes of this magnitude will take time, money, and a basic strategy to keep the students, teachers, and the budget from becoming inundated

with too much at once. Simply purchasing everything at once would lead to confusion and put a large dent in any sized budget.

Taking into account the two most influential factors of our suggestions (cost and effectiveness) a logical progression presents itself. Starting with a combination of the least expensive solutions will allow SHCS to get the most bang for its buck. The *Assistive Technology* and *Lesson Supplementing Software* solutions are the most cost effective solutions proposed. They are the two cheapest, and second and third most effective of our proposed solutions, and integrating a combination of the two as the first step will allow students and teachers to be slowly introduced to new methods of aid, while not burdening the school with more costs than it can handle.

The more expensive solutions (*HearIt* and *PDA*) would be better implemented after the aforementioned ones, when the costs of the software and technologies are already sunk costs. Proceeding in this order allows the implementer to gauge just how effective the other solutions are, and decide whether more drastic, and expensive, measures are needed.

Employing this method of dual implementation will allow for a better overall change period. SHCS will have direct control over how much exposure the students get to each proposed solution, and will be able to delegate costs as they see fit. Meanwhile the students and teachers will slowly be introduced to each new method of assistance, allowing them to decide which they think works best without being exposed to too much at once.

5.0 Conclusion

This IQP is not a general summary, but rather an entire culmination of seven months of work. This group was so thorough with their research that even though it was targeted at Seven Hills, any school could benefit from it. Ultimately it would be nice to see other schools follow Seven Hills' lead and take more action to make things easier for ADD students.

It is unfortunate that students with ADD will always be at a struggle in the classroom. Finding it hard to concentrate, having difficulty in following instructions, there are many signs of frustration from them. This project accomplished many goals relating to those signs. First we researched about school's policy with ADD, we looked at what exactly ADD is, and we also looked at what is already being done to aid ADD students. Next we went ahead and toured Seven Hills and met with the contacts there. After interviews with teachers and students we were able to evaluate the different areas of concern and have a better idea of what "problem" we needed to solve. A few sessions of brainstorming allowed our team to come up with a bunch of different solution ideas. We made presentations on each and introduced them to the teachers and students for feedback. Based on the feedback we organized a chart to show which solutions would be the best idea, second best, and so on. Seven Hills will greatly benefit from the work of this IQP. Many teachers have already thanked us for our time and genuinely appreciate what we are doing. Ideally once we submit our final project to them they will be able to take the necessary steps to see these solutions through. The students with ADD will be brought up to speed and their disadvantage will be lessened.

We detailed the steps that the school should take in order to successfully implement the different solutions. Hopefully they will use different ideas and give the students a variety of tools. Different games and hardware tools can be used to focus on different student's problem areas.

Other schools, and any institution for that matter, can take our work and use it to aid their own ADD problem. People with ADD don't just suffer at school but can be at a disadvantage anywhere. The beauty of this project is that it lays out the way to implement solutions to resolve the problem. Anyone can read our work and introduce it in their organization. With this, people with ADD will be aided everywhere. It is actually very simple for people to do this. Whether it be a school and games, or a company with ADD employees using *HearIts*, it is only fair for the people with ADD to be given everything possible to give them a fair shot.

Our project with SHCS was an overall success. We accomplished everything we as a group set out to do with teamwork, preparation, and good attitudes. As with every major project we ran into some roadblocks, but working through them is part of the process. Taking into consideration the long period of time that this project encompassed our focus and ability to stay on schedule led to a great experience. There was plenty of work, but minimal stress.

The varying levels of expertise among our group members gave us an advantage in this IQP. Most of this project would be researching and analyzing software and technology solutions and we had two Computer Science majors, two Management Information Systems majors, and a Mechanical Engineering major. We were primed and excited about this opportunity to work with Seven Hills.

The Seven Hills staff was also very excited about the project. We received an excellent response from the teachers, providing us with valuable information about the problem we were dealing with. The teachers were also able to give us insight about what technologies had been tried and what new things they thought might work. Their opinions were widely varied, but this variance was important for us. We needed to look at this project from as many different angles as we could, and the staff was a great help in this respect.

One problem that derived from our inexperience in this environment was our communication with the school, and our contacts there. We did not account for the hectic schedules that the administration had to deal with. We should have set aside a time each week, or every other week, to meet with our connections and discuss our progress. Without this connection being established it was difficult to coordinate our schedules with theirs.

Another difficulty we ran into was an inability to give the students and teachers hands on trials with our suggestions. None of us owned *PDA's* and the *Hear Its* were too expensive to purchase. Trials for a few of the software programs were available, but would have taken weeks to get due to permissary problems and shipping.

As a group we enjoyed this project, and feel that we put forth our best effort to produce something that can be truly useful. We hope that our results will prove beneficial to the staff and students of Seven Hills, and we thank them for their enthusiasm and support.

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Appendix A: Success for All/Chicago Math Models

- Success for All is a structured whole school reform model focusing on students in grades pre- kindergarten through grade six. The model is designed to raise the achievement of students in low- performing schools. The idea behind Success for All is to use everything known from research on effective instruction for students in low-performing schools to prevent and intervene in the development of learning problems in the early years. A principle thrust is to ensure that every child in the school succeeds in learning to read at grade level by the end of the third grade. In addition to reading programs, Success for All provides one-to-one tutoring for primary-aged children struggling in reading, family support services, and other elements. A bilingual Spanish version of the program, called Lee Conmigo, has been developed.

(Department of education. (April 1998). *Success for All* [On-line]. Available:

<http://www.ed.gov/pubs/ToolsforSchools/sfa.html>)

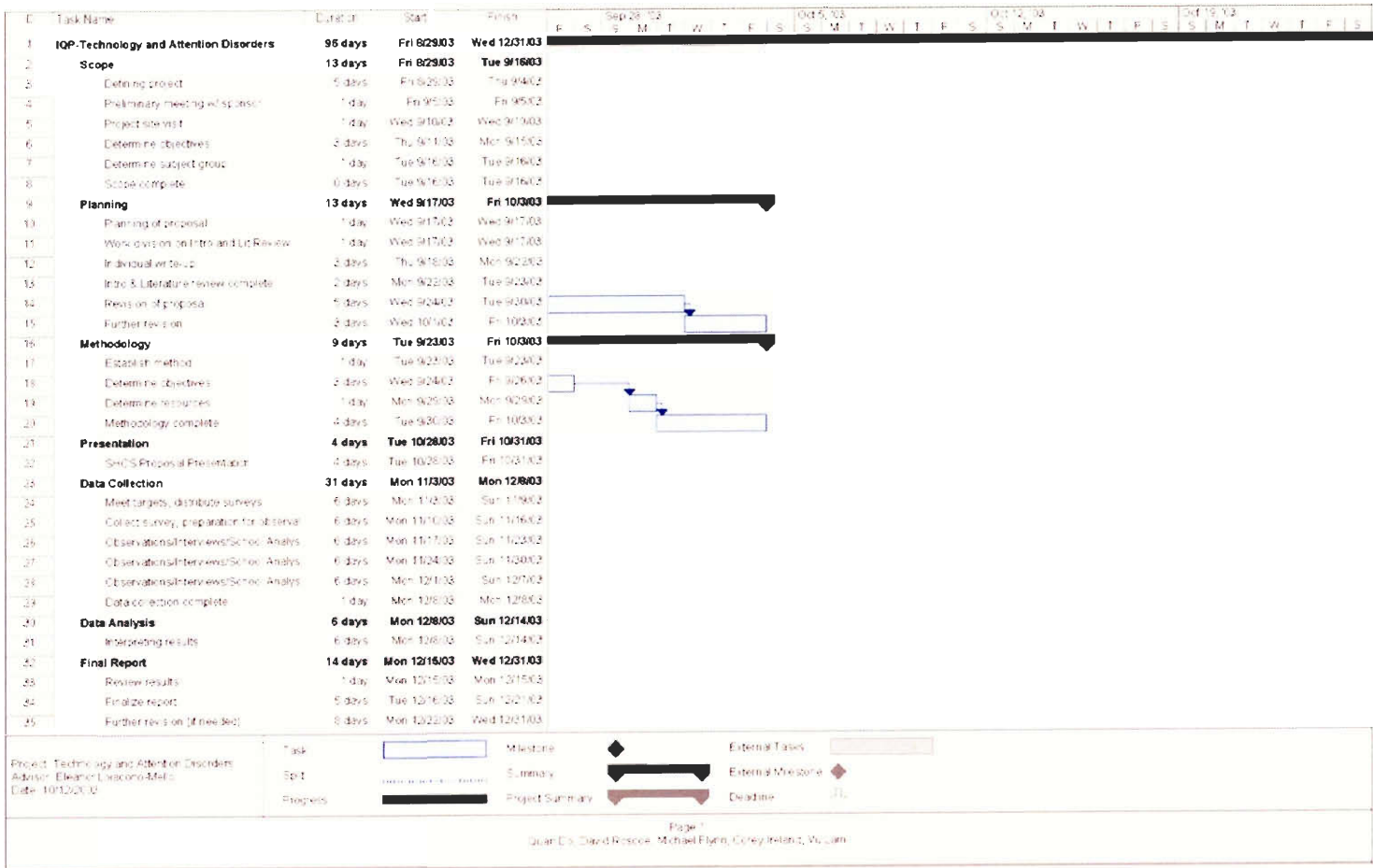
- Chicago Math is a project of the University of Chicago School Mathematics. It creates a curriculum for students from kindergarten all the way through 12th grade. The educational materials provided by Chicago Math bring the real world into the classroom. They emphasize reading, problem-solving, everyday applications, and the use of calculators, computers, and other technologies.

(The University of Chicago School Mathematics Project [Online] Available: <http://social-sciences.uchicago.edu/ucsmp/>)

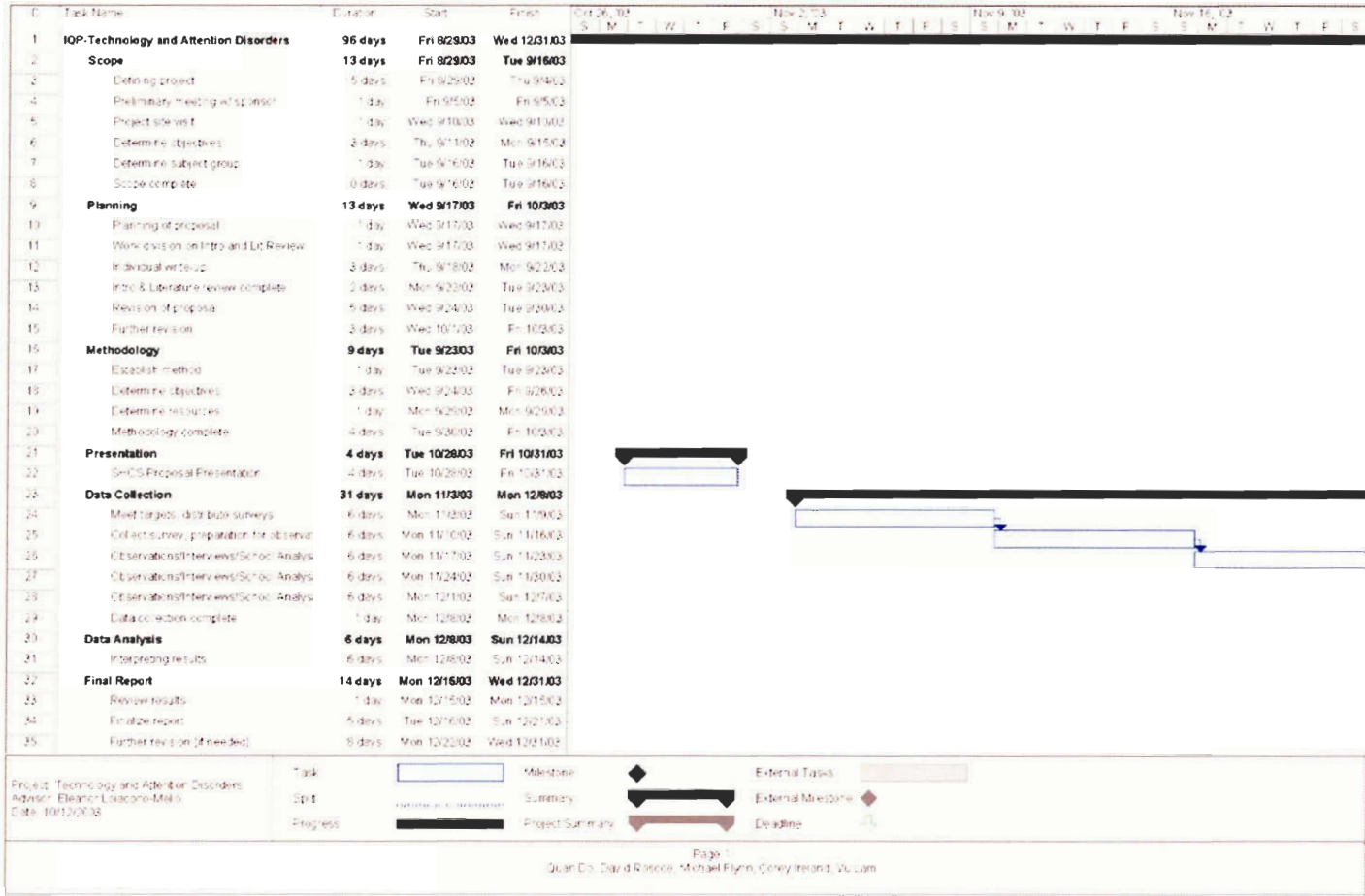
Appendix B: Gantt Chart



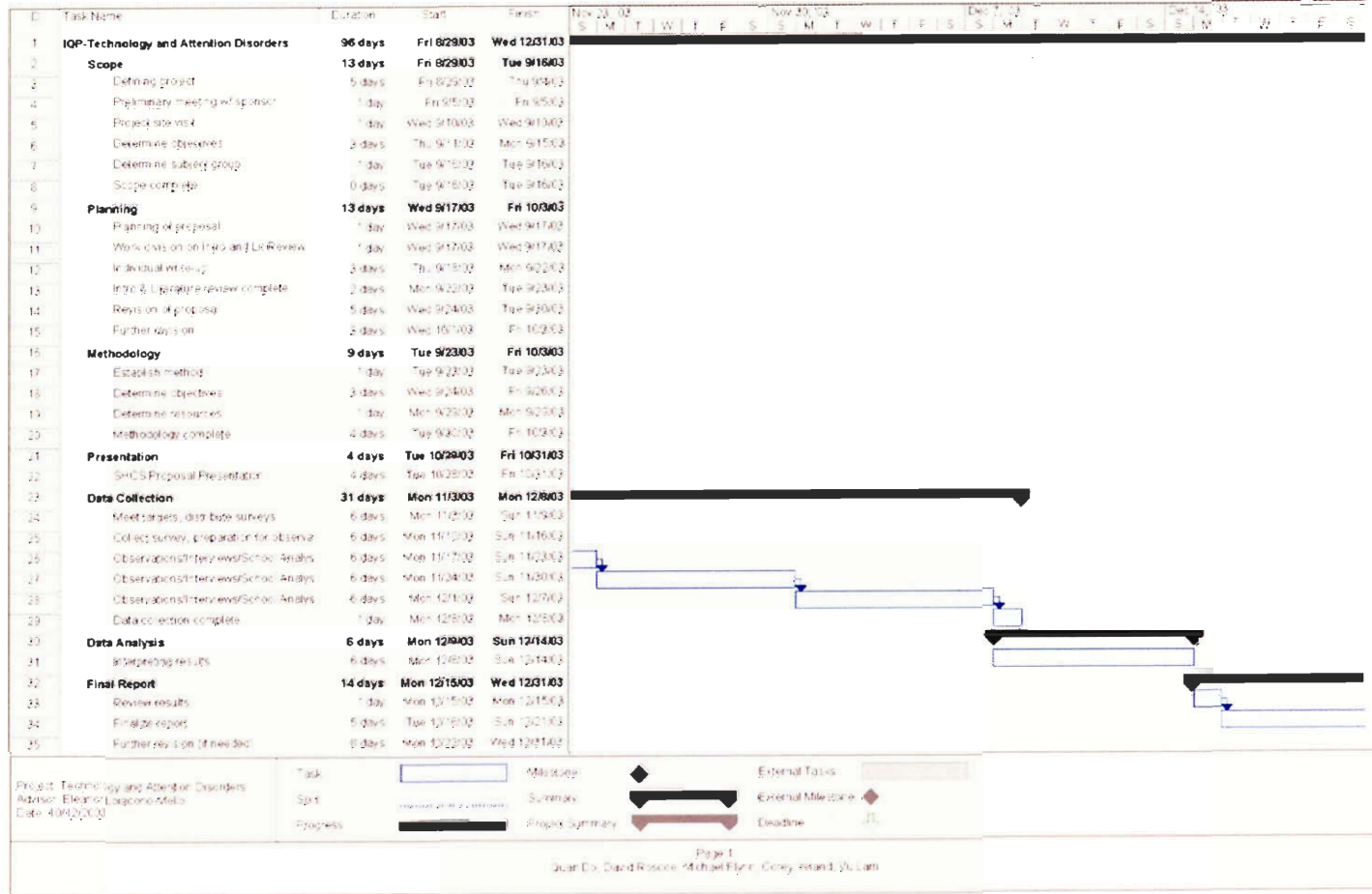
Appendix B: Gantt Chart (cont.)



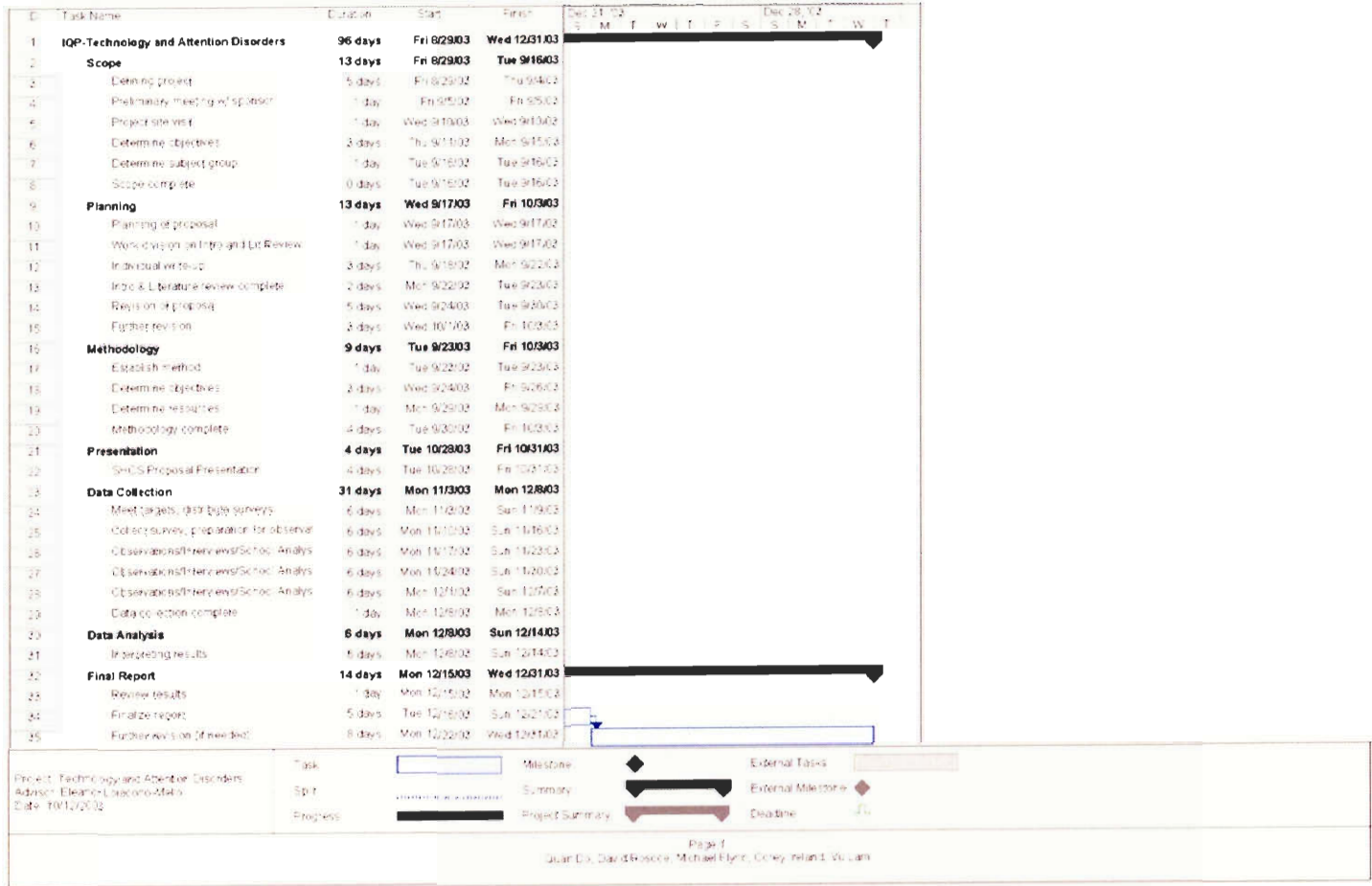
Appendix B: Gantt Chart (cont.)



Appendix B: Gantt Chart (cont.)



Appendix B: Gantt Chart (cont.)



Appendix C: Sample Agenda for Meeting with Advisor

Meeting Agenda

Meeting Subject:

IQP - 0303

Meeting Organizer:

Professor Loiacono-Mello

Start Date:

9/30/2003

Start Time:

3:00 PM

Location:

End Date:

10/30/2003

End Time:

Objective

Project proposal revision

Agenda Items

1 Deliverables

1. Revised Introduction
2. Revised Methodology
3. Gantt Chart

2 Discussion

- Feedback on Deliverables
- References for planning/conducting interviews/surveys
- Further revision of proposal:
 - More info on ADHD section?
 - Bibliography or annotated bibliography
 - Additional items on proposal?

3 Plan of action

- Rough draft of proposal submitted
- Work on interview/survey format

Attendee Information

David Roscoe

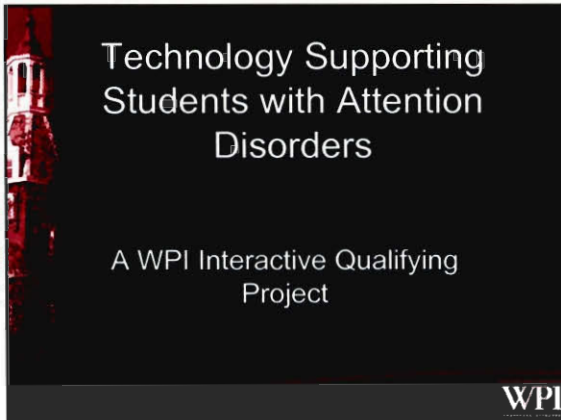
Michael Flynn

Quan Do

Corey Ireland

Vu Lam

Appendix D: Proposal Presentation at SHCS



Technology Supporting
Students with Attention
Disorders

A WPI Interactive Qualifying
Project

WPI



Team Members

- Quan Do – Computer Science 2005
- Michael Flynn – Management Information Systems 2005
- Corey Ireland – Management Information Systems 2005
- Vu Lam – Computer Science 2005
- David Roscoe – Mechanical Engineering (Aero) 2005

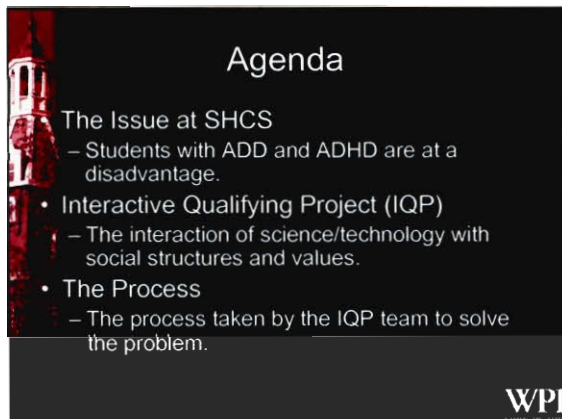
Project Sponsors/Liaisons

- Krista Osborn – Principal of SHCS
- Cheryl Hollocher – Special Education Coordinator (SHCS)
- Nilda Rodriguez – Community Resource Director (SHCS)

Project Advisor

- Eleanor Loiacono-Mello – WPI MIS Professor

WPI



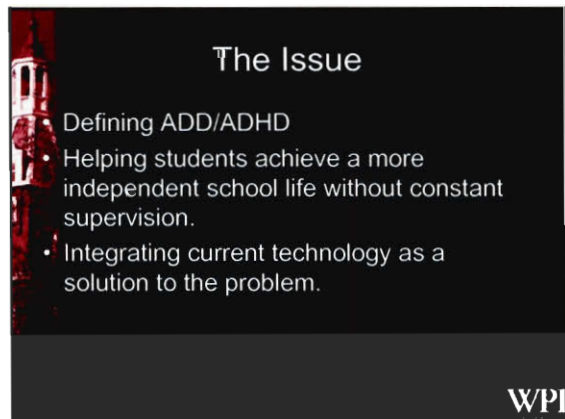
Agenda

The Issue at SHCS

- Students with ADD and ADHD are at a disadvantage.

- Interactive Qualifying Project (IQP)
 - The interaction of science/technology with social structures and values.
- The Process
 - The process taken by the IQP team to solve the problem.

WPI




The Issue

Defining ADD/ADHD

- Helping students achieve a more independent school life without constant supervision.
- Integrating current technology as a solution to the problem.

WPI


Appendix D: Proposal Presentation at SHCS (cont.)



Interactive Qualifying Project (IQP)

“The IQP enables WPI students to understand, as citizens and as professionals, how their careers will affect the larger society of which they are a part.”
(www.wpi.edu)


WPI



Why an IQP?

- How does a WPI IQP relate to this problem?
- The main focus of this IQP will be examining how students with varying levels of attention disorders interact with current technology in the classroom and at home.

WPI




Methodology

3 Phases of this project

1. Proposal
2. Data Collection & Analysis
3. Final write-up / Solution

WPI



Planning & Proposal

Term A: August 28 – October 16 2003

- Introduction
- Literature Review
- Methodology

• Deliverable: Proposal & this Presentation

WPI

Appendix D: Proposal Presentation at SHCS (cont.)

Data Collection & Analysis

- Term B: November 3 – December 18 2003
- Surveys
- Interviews
- Observations
- Interpretations
- Data Write-up / Finalizing

WPI

Data Analysis & Project Write-up

- C Term: January 15 – February 14 2004
- Final Report
- Proposed Solutions

- Deliverable: Completed Project Write-up with Recommendations

WPI

Conclusion

Final Objective

- Through this IQP, we plan to observe and research the behavior of students with attention disorders.
- Upon data analysis, we will propose possible solutions to assist students with their everyday problem.
- Through this IQP, the problem with attention disorders at SHCS will be greatly reduced.

WPI

Questions?

WPI

Appendix E: Sample Survey for Teachers

Please answer the following questions on a scale of 1 to 7, 1 being not very, and 7 being very.

1. How big of a problem is ADHD with your student/students?

1 2 3 4 5 6 7

2. How big of a problem is ADHD in the entire school?

1 2 3 4 5 6 7

3. How much experience do you personally have in dealing with ADHD?

1 2 3 4 5 6 7

4. How important is the use of the school's intranet system to those students with ADHD?

1 2 3 4 5 6 7

In order to help us better understand any problems; please answer the following questions with a sentence or two.

5. Do you feel the students with ADHD are being properly aided with their studies?

6. Is there anything you think could be done to better aid students with ADHD?

7. Any additional comments:

Appendix G: Interview Guidelines

After analyzing the results of the surveys, we will prepare interviews to further investigate *the problems* emphasized in the surveys.

Objectives

To obtain an in-depth analytical description of *the problem*.

To explore current measures used to solve *the problem*.

Guidelines for Interviews

Ask the collaborating teacher if you can spend about twenty minutes to one-half hour interviewing her/him. Inform the teacher of the objectives wished to obtain. The interview should contain the following key questions. If, during the answer to any of the questions, the teacher raises an issue or topic worthy to pursue, follow the key question with a divergent question. Once the divergent issue has been addressed, proceed on to the next key question.

Key questions to use as a guide:

Question #1: How is *the problem* currently affecting the school?

Question #2: What measures are taken to address *the problem*?

Question #3: Are they effective? What are the positives and negatives? Any improvements that you may suggest?

Appendix G: Sample Survey for Students

Please answer the following questions on a scale of 1 to 7, 1 being not very, and 7 being very.

1. How important is the in-class aid's assistance with your day to day work?

1 2 3 4 5 6 7

2. How important are your classroom teachers to your learning experience?

1 2 3 4 5 6 7

In order to help us better understand any problems; please answer the following questions with a sentence or two.

3. Do you think you could achieve the same level of learning you do now without the assistance of in class aids?

4. Do you think the teachers themselves could lend more assistance in helping with your individual needs?

5. Any additional comments:

Appendix H: Teacher Survey Result

Name: Matthew Jewett, OTR/L

Position in School: Occupational Therapist

Please answer the following questions on a scale of 1 to 5, 1 being completely irrelevant, and 5 being of the utmost importance.

How big of a problem is ADHD with your student/students? **4**

How big of a problem is ADHD in the entire school? **3**

How much experience do you personally have in dealing with ADHD?

- **I work with students on a daily basis who have attention deficits, across the grade levels.**

How important is the use of the school's intranet system to those students with ADHD?

- **3 - They use the computer network as much as the rest of the students do.**

In order to help us better understand any problems; please answer the following questions with a sentence or two.

Do you feel the students with ADHD are being properly aided with their studies?

- **From a special education standpoint, yes. When a student has ADD/ADHD (or any other disability that negatively affects their access to the general curriculum) and is placed on an IEP or Section 504 accommodation plan, certain services and accommodations/modifications are put in place to allow the child to access the general curriculum, in the least restrictive environment—I think our school does a good job of following through on this.**
- **From a technology standpoint, I'm not sure if we've done the best job for our attention deficit kids. I think this sometimes gets lost in the 'business of life' here at SHCS.**

Is there anything you think could be done to better aid these students (e.g. using technology, more teacher assistance, etc.)?

- **The best way to address school dysfunction of any kind is to approach it from a team perspective. This happens when educators, special educators, parents and school specialists (Occupational therapy, physical therapy, speech/language pathology, counseling, psychologist, etc.) come together**

from differing perspectives under the umbrella of “school functioning”, to address what areas of the curriculum the child is not currently able to access, or has difficulty accessing, and for what reason(s). The level of accommodation/modification, and service delivery above and beyond the general curriculum for these kids has been beneficial. More teacher assistance in terms of added staff to work with smaller groups of kids is always a good idea, but budget constraints don’t often allow for this. Using technology may or may not be beneficial—dependent on individual cases and individual classroom environments. More specific (technology) options would be beneficial for working with these kids.

In what particular areas of everyday school functioning do you find kids with attention disorders have most difficulty?

- **Organizational skills, in general, and in specific instances. Everything from organizing a desk workspace, to organizing thoughts to write, to organizing written items on a page or worksheet, etc. Focus and attention-to-task is too short to finish tasks, especially without direct adult support.**

How do students with attention disorders work with computers and other technologies in comparison with those who do not?

- **There is no real difference in the way kids with or without attention deficits use computers at SHCS. All students (2-8) work with computers at SHCS in a variety of capacities. One is a monthly, computerized test in specific content areas (Reading, English Language Arts, etc.) in the computer lab. Periodically, whole classes of students use the computers to type papers and reports, or to perform research for projects. Each classroom has at least 3 or 4 desktop computers, which are used periodically.**

Any additional comments:

- **As an occupational therapist, I have some training in adaptive equipment/assistive technology for persons with a variety of disabilities. If I can help out in any way, please let me know. Some things (in terms of assistive technology) have been tried already with kids who have attention deficits, on a case-by-case basis.**

Appendix I: Student Interview Results

Student 1 – 6th grader

Do you use computers to study?

- Computer is available at home and laptop is given in school
- No internet access at home.
- Videogames are not allowed.

How do you keep track of your tasks?

- Needs to be reminded to do homework and certain things
- Records assignments into agenda but needs to be reminded to look
- Sometimes forget/don't understand.

Tell me about some of your classes.

- Hardest classes: math, science.
- Parents help with homework at home
- Favorite subject: phys ed., social studies, health.

Any difficulties in talking with your friends or teachers?

- No problem communicating with friends/teachers

How do you communicate with your friends?

- Group work is supervised by parent/adult
- Uses internet at school to sometimes email friend (external email account) when allowed

What do you use to keep track of things you have to do?

- Assignments are required to be recorded into the agenda (Intranet between home and school is no longer available)

How does the in-class aide help you?

- In-class aide is important – explains difficult material visually

Appendix I: Student Interview Results (cont.)

Student 2 – 6th grader

Do you use computers to study?

- Has computer at home and laptop in school
- Absolutely need computer to study:
 - Uses audio books/programs to read back material
 - Uses reading pen (a pen that scans text and read it outloud)

How do you keep track of your tasks?

- Assignments are recorded into agenda (parents sometimes remind)

Tell me about some of your classes.

- Hardest classes: math, science, reading
- Favorite classes: social studies, study skills, health
 - *why?* Teachers teach class visually with diagrams, pictures, stories

How do you communicate with your friends?

- No problems communicating with friends/teachers

How does the in-class aide help you?

- In-class aid is needed to do well in math, science, reading
- Allowed to use laptop in class for reading

Appendix I: Student Interview Results (cont.)

Student 3 – 8th grader

Do you use computers to study?

- Computer is available at home and laptop is given in school
- No internet access at home.
- Don't spend much time using school website or computer for homework

How do you keep track of your tasks?

- Usually reminded by parents
- Sometimes forget/don't understand.

Tell me about some of your classes.

- Hardest classes: english, writing.
- Parents help with homework at home
- Favorite subject: math, science.

Any difficulties in talking with your friends or teachers?

- No problem communicating with friends/teachers

How do you communicate with your friends?

- Group work is held at school
- Uses phone to contact with friends

What do you use to keep track of things you have to do?

- Assignments are required to be recorded into the agenda
(Intranet between home and school is no longer available)

How does the in-class aide help you?

- In-class aide is important

Appendix J: Teacher Interview Results

Interview with Melissa Sharrock (Lead Teacher JA) (6th Grade Reading + Writing Teacher)

Why are students not always being properly aided?

What areas are lacking?

- **Focus for specific instruction: gives 2 min instruction, they don't pay attention, must work with them, and move around after.**
- **Aids cannot help students listen: need something to help them listen on their own**
- **Making them independent learners.**

When aid is needed, what is actually done?

- **Help children reach IEP**
- **Help get there and complete assignments – leads to children being dependant on aids.**
- **Technology to help aids**

Elaborate on what you said in the survey, “they don't feel they have to adhere to the same expectations.”

- **Follow the same directions**
- **Feel with disorder gives entitlement to require help**
- **“I don't have to listen”**
- **Makes them rely on extra help**

What do you think can be done? To help make them listen and respect direction?

- **Went to alpha smart, assignment already listed**
- **Make things more interesting**
- **Computer programs**
- **NCS (help on MCATS) mentor, smart boards**

What problems exist with quiet minutes?

- **Can't get them to be quiet for 2 minutes, they become distracted, tapping**
- **Directions: keep engaged in directions**
- **Felt properly aided, have the aid.**
- **Transition from playtime to serious**
- **Can't get student to stand still**

Appendix J: Teacher Interview Results (cont.)

Interview with Steve (Dean of Students)

Are the students being properly aided?

- **Yes, if not they have the fast program where board meets discussing issue and what needs to be done.**
- **Assesses situation with kid, finds recommendations.**
- **Distinguishes special Ed, attention, counseling, etc.**
- **Find issue, dissect it and try solutions**
- **Trial and error**
- **Puts teachers on same level as student**

Is there always a solution for the kids?

- **Sometimes the answer is pulling the kid aside, not always in the book.**
- **Stop passes, leave to alleviate or disrupt class.**

There is a big problem in home life: daily life

- **How can homework be done when the home situation is not pleasant, tough situations**
- **After-school program**
- **Only so much you can do at SHCS**

Observation tips

- **Watch for body language**
- **Think outside the box**
- **Best answers are in between the lines**

Appendix J: Teacher Interview Results (cont.)

Interview with Allison Martins (Special Ed Teacher)

You rated ADHD as a big problem in the school, what are the actual problems you see in SHCS with ADHD students?

- **Inattentiveness in class, teachers not knowing what to do**
- **Get hung up helping them, slows rest of class**
- **Given text, too much at once, lose focus, give up**

You feel sufficient assistance exists in class, does the problem exist more in the transition between school and home?

- **At times there is enough, focus on them, not enough concrete ways to get the ADD students focused.**
- **Need small focus groups, smaller class size**
- **Not enough structure, not proper medical assistance.**

Which technologies can you see aiding students with ADHD?

- **Technology would be a good thing but would have to be tailored to individual students.**
- **Integrate learning style**
- **Will it separate them from others, can't single them out**

You said students with attention disorders have most difficulty in certain subjects. Do the problems exist more with the actual subjects or is it teacher interaction problems, social problems, or anything else?

- **Subjects: Science, SS, reading, too much focus on reading which is boring. Bring in more hands on type things, tape players with reading. More to pay attention to -> better chance, experiment in middle.**
- **People teach the way they learn, introduce supplement aiding the students learning style.**
- **They become social problems, turn to neighbor and distract everyone -> smaller classes**

What is currently being done to aid attention disordered students? Has the program changed, anything tried or failed?

- **Education plans have adaptive technology, alpha smarts, computers, drag and speak, etc.**
- **Intranet**

Would you, as well as the rest of the faculty, be willing to learn new technology that may resolve these problems?

- **In general: 50:50: some still in old mindset.**

Appendix J: Teacher Interview Results (cont.)

Interview with Jen Arnold (5th Grade Elementary Ed Teacher)

Are students properly aided?

- **More special ed. than regular education**
- **Class size is too big...**

What areas of student aid are lacking?

- **Population has little support at home; not organized at home, parents may have ADD, not proper education at home**
- **Class size: can't give enough attention**
- **Nature of difficulties**
- **Medicine, parents refuse, too expense**

Particular areas in school day where you see attention disordered students need most help, have least cooperation.

- **Bigger groups**
- **After lunch**

Anything you would like to see done?

- **Get to the point where students throw off whole class that time should be used to put students on computers etc.**
- **Are they acting up just to use computers?**
- **Take away that constant help from a person**
- **Reward was to use computers**

Good things to watch if we were to do observations?

- **After lunchtime**

Additional comments

- **Making it worth-while**
- **Individualize per class.**

Appendix J: Teacher Interview Results (cont.)

Interview for Matthew Jewett (Occupational Therapist)

1. *You rated ADHD as being somewhat of a problem with your students, could you please elaborate.*
 - Organizational skills: thoughts and writing projects, organizing ideas into project
 - Maintaining desk/work area, keeping desk straight, copying homework and assignments into notebook
 - Cannot complete tasks without 1 on 1 assistance from aids, etc.
2. *You say they use the computer network as much as any other students, do you think utilizing computers would benefit the students with attention disorders?*
 - Anything that distracts from other students to focus
 - 3 or 4 computers to each class, but they do not face teacher or board
 - Use depends on how much teacher integrates into lesson plan/teaching style
3. *What services does the special ed program provide that aid the students with attention disorders? How successful do you believe this program is in providing the aid they need?*
 - Services directly relate to grades and helping the student keep up to task
 - Successful in keeping student up to date in assignments
 - No focus on getting student to become more independent, being able to complete work for themselves, trying to make them efficient without help
4. *You said using technology may or may not be beneficial, dependent on individual cases and classroom environments, can you please elaborate on those situations where you can see it being beneficial and others where it may fail to be beneficial.*
 - Depends on the physical setup of the room, age groups, limiting distractions in the classroom (visually may be difficult, auditory, movement)
 - Different expectations of the different age groups
 - Writing on computers in class distracts other students, other students will want to use computer also
 - Implement more daily computer use into the lesson plan for all students, same assignments, provide different software for those with attention disorders
5. *You say there is no real difference in the way kids with or without attention disorders use computers, does this mean kids with the disorder function just as*

well as kids without it when using computers? Do computers grab their attention and help them focus on particular tasks.

- Do grab attention better than other kids
 - *On organizing thoughts to write, organizing written items, would computer programs (Word, etc.) help them keep focus in the organization? What types of programs would?*
 - Limiting distractions around him would be focus here
6. What assistive technology has already been tried, anything you can recommend?
- Nothing really tried targeting students with attention disorders
 - Word Prediction: Clicker 4.0 and Co-Writer 4000: Word prediction software provides pictures you click on and it will give word just by typing in first few letters, helps spelling, etc, also suggests common words just from first few typed letters, and may grab attention better, can work just as well as Word.
 - Hear-It: headphones/earphones: teacher has microphone, filters out extra noise so student hears teacher only, decreases auditory distractions
 - Write-Out-Loud: Talking word processor
7. *Observation areas, additional comments.*
- Observations:
 - i. Watch for in-seat behavior
 - ii. Jay Defalco's class (407)
 - iii. Writing Class
 - Concerns with Speech Recognition Software
 - i. Requires extensive learning
 - ii. Low-reading abilities and lack of attention make this bad
 - iii. However it eliminates steps in-between and would greatly aid in organizing thoughts/ideas completing project
 - Budget and teacher learning usually only allows for low technology vs. high technology.
 - No specific aids for attention:
 - i. Uses balance ball vs chair so student focuses on balance and helps them focus more
 - ii. Weighted lap pads give heavy feeling to students and stop them from getting up and moving, limiting movements helps grab attention
 - iii. Reduced hyperactivity = more productivity
 - iv. Find seating alternatives: teachers who group in circles of several students result in greater distraction
 - v. Different types of chairs can reduce activity

Appendix K: Presentation of Recommendations at SHCS

Heart Auditory Tools

Increase sustained attention, comprehension and phonologic awareness and to reduce distractibility which results in optimal academic performance

Heart Original



Durable, lightweight, battery-powered amplifier with a built-in directional microphone to which a custom sturdy headset is connected. A special AGC "loud sound shield" feature protects the user from sudden loud noises. Heart Original is used to reduce distractibility and to increase phonological awareness and speech discrimination. Heart Original is used for mild difficulties and early intervention difficulties such as speech discrimination, speech delay, articulation, otitis media and stuttering.

Heart Perfect



Powerful assessment auditory tool designed for children and adults experiencing more severe attention and hearing difficulties. The Heart Perfect has twice the noise frequency cut-off of Heart Original and is used with students with "big time" distractibility problems such as ADD, ADHD, Dyslexia, Auditory Processing problems, and TBI.

Case Studies

Since I have had a very positive experience with Heart SE, I would like to share these outcomes with you. I evaluated two students that are regularly in therapy who were diagnosed with severe speech delay. Their progress in therapy, prior to using Heart SE, was slow and irregular. Heart SE made their remedial learning more efficient and has benefited their reading and writing skills. One ADD student, in particular, has been able to attend concentration and focus to stay on task longer.

I recently purchased 10 Heart SE's for my Special Education instructors and we tested the instruments on our students of various ages. Their difficulties include reading, writing and listening. We also used Heart SE with our immigrant bilingual population to correct Swedish-English articulation errors.

We are holding an evaluation meeting for Heart SE in January and I will relay more feedback at that time. Our students enjoy using Heart SE, and the real benefit is their increased attention span and focus during their learning tasks.

Your Heart device was of great assistance to a student in my behaviorally disordered group. This boy had been born with no ear on one side and so missed much of what was happening in the class. Following instructions was very difficult for the boy. I found that I could give directions from anywhere in our classroom and the child responded when wearing the HEART. It was a joy to be able, as a teacher, to speak to this child without the worry of "am I on the correct side?" A more relaxed classroom atmosphere means a great deal to children who suffer from a disability which sets them apart from others. Your device helped my student "sit in" instead of "fly out" to focus, despite his ADHD. Thank you for allowing us the chance to see the good results we could get for a student using this device!

The "Heart" was loaned to one of our 8th grade students with a history of ADHD and behavior. Recently his mother reported that she often needs to talk to him which seems to help his concentration and comprehension. This student stated that he felt the Heart helped him in self-reading as it drew out extraneous noises and increased his concentration on his reading, therefore increasing his comprehension. The family is interested in purchasing a Heart to purchase a Heart for home use. We thank you for the loan of the product and look forward to possibly offering some for our district.

Appendix K: Presentation of Recommendations at SHCS (cont.)

Cost

HearIt/Voice-It Original	\$500.00
HearIt Perfect	\$875.00

*Although HearIt Auditory Tools are reasonably priced, clinicians often face limited budgets. However, if the clinician performs an evaluation assessing the student's difficulty and how HearIt can benefit, there are various funding options.

PDA (Personal Digital Assistant)



- Providing the ultimate solution in portability.
- Adaptive software for educational needs.
- E.g., reference library, language, mathematics, reminder, etc.

PDA (cont)



- Fully functional computer in disguise
 - OS
 - RAM
 - CPU
 - Expansion ports
 - Software installation
 - Add-on hardwares

PDA (cont)



- Administrative application
 - Keep your schedule
 - Track your students' progress on specific skill
 - Store and access lessons' plans
 - Take note
 - Organize your reading list

Appendix K: Presentation of Recommendations at SHCS (cont.)

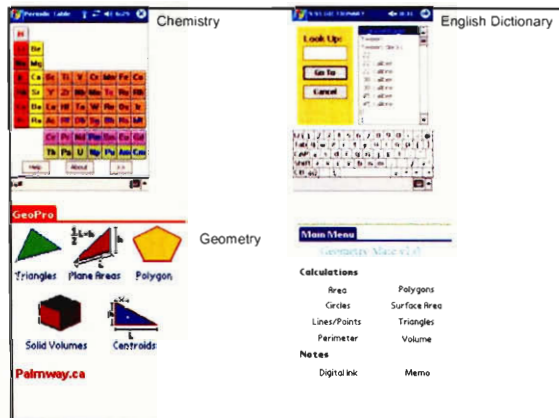
PDA (cont)



- Communication applications
 - Using graphic organizer
 - Exchange information
 - Send and sync assignments
 - Turn in assignments
 - Record voice notes
 - Access to reference materials online
 - Provide supplement materials during lectures

PDA (cont)

- Teaching/learning applications
 - Make spreadsheet
 - Draw concept map
 - Form, Visualize, and Solve problems
 - Increase content accessibility
 - Use tutorials for self study



Appendix K: Presentation of Recommendations at SHCS (cont.)



Lesson Supplementing Software

A learning tool to be used in addition to the class room.

Sunburst



Because Sunburst designs, creates, and sells their own games, buyers can be confident that they are receiving quality products. These games are not going from producer to wholesaler to retailers. They are being programmed, and ultimately sold within Sunburst. Sunburst also sells other games that are very popular with teachers and their students. They have the Knowledge Adventure series of games available for purchase as well as their own games.

Hot Dog Stand



Open the Hot Dog Stand and use your own decisions about your



Develop skills to improve your business with the provided software tools.

"Students improve math, problem-solving, and communication skills in this 'real-life' business simulation where they manage a busy concession stand in a big-city stadium. Students interpret information, keep records, determine prices, and plan marketing strategies. . . Different levels of difficulty, a variety of random events, and a wide range of situations and options provide students with a new scenario each time they run Hot Dog Stand. The Works includes detailed Teacher's Guide with activities.
www.sunburst.com/"

Appendix K: Presentation of Recommendations at SHCS (cont.)

Overview

Sunburst has many different games all with similar educational and grade focuses. With affordable prices to buy single copies, lab packs of 10 copies, and network and unlimited copies, Sunburst is always focused on making a teacher, and school's, purchasing experience easy.

Item Name	Quantity	Price
10 Pack	10	\$19.95
Lab Pack	10	\$19.95
Network	10	\$19.95
Unlimited	10	\$19.95

Classic Educational Games

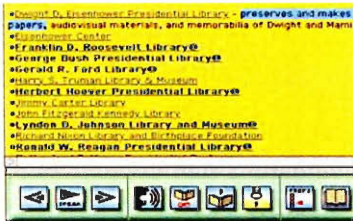
A classic game that has been around for many years is Number Munchers. This game has more of a self-teaching principle. With not much instruction, this game based its teaching on a trial and error base. The player was told to "eat" prime numbers. If they didn't know what number was prime, they would eat it and be told by the game that it is not



But doing this through repetition, they would know what a prime number was and what was not on sight. The game included different levels such as multiples, factors, prime numbers, inequalities and others. A very affordable game, Number Munchers does not have the outstanding graphics and teaching capabilities of some other expensive games but still seems to get the ideas across to the player

Cast eReader

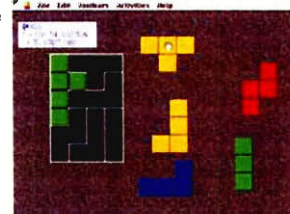
Provides speech and visual highlighting to any text that can be accessed electronically. The incrimination and speed of highlighting can be adjusted to each student's needs, and the program even allows for note taking. Using such a program would allow students to view text in an interesting and specialized manner at their own pace, greatly increasing the chances of them absorbing the material presented.



	MAC	WIN	Price
CAST eReader	J95WB	J95WVB	\$199.00

Blocks In Motion

- This software provides multiple geometric and sequence based games that are fun for the student, and help build better problem solving and critical thinking skills. Students will be able to interact and enjoy this program, while strengthening their abilities. A program package like this could be used as a reward to generate interest or even as a break during a more difficult topic to insure attentiveness.

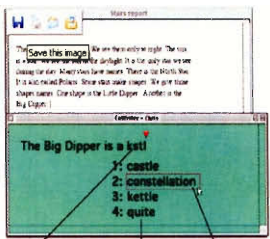


	MAC	Price	Options
Single User	P42WB	\$79.00	
With Learning Materials	P42WB	\$99.00	
5 - User *	P42WB	276.50	\$55.00
10 - User *	P42WB	423.50	\$23.00
50 - User *	P42WB	1271.00	\$7.00
100 - User *	P42WB	2424.00	\$7.00
1000 - User *	P42WB	3470.00	\$7.00

Appendix K: Presentation of Recommendations at SHCS (cont.)

Co Writer 4000

This is a program designed to help students who are unable to form good sentences to convey their ideas. As the student is typing, the program displays different possibilities for each word, helping the student with spelling and grammar along the way.

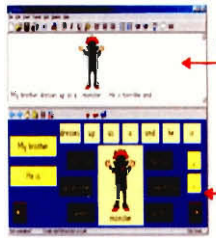


The screenshot shows a window titled 'Notes request' with a text area containing the sentence 'The Big Dipper is a kettl'. Below the text area, a list of predicted words is shown: 1: castle, 2: constellation, 3: kettle, 4: quite. Arrows point from the text 'kettl' to the list of words.

Co Writer 4000 works on top of any word processor or program that accepts text. As students type, Co Writer 4000 predicts words for the sentence, even if they use phonetic spelling. Predicted words are read aloud to help students reveal their word options.

Crick's Clicker

This is an extensive word processor that allows students to enter words through the keyboard, with speech, or with the aid of photographs. The speech recognition allows students to hear words before they enter them, and even reads back what they have written.



The screenshot shows the Crick's Clicker interface with a character and a grid of icons. Red arrows point to the character and the grid, labeled 'Clicker Writer' and 'Clicker Grid' respectively.

Cost:

Single User	\$199
Multi User (5)	\$399
Multi User (30)	\$899

Quick Start



The image shows four CD-ROM cases for the Quick Start series. The cases are for Microsoft Excel, Microsoft PowerPoint, Microsoft Access, and Microsoft Word. Each case features a blue and white design with the software name and a small image of the software interface.

Quick Start

- This series contains teacher training guides, flip charts, computer learning templates, and classroom activities that all come with a CD-ROM. The different types of material are mostly geared towards helping students to learn how to use the computers, and to familiarize them with common software. The different software options include: Appleworks, Microsoft Word, Microsoft Access, Microsoft Excel, Microsoft PowerPoint, Alpha Smart, and many others, as well as general internet training guides. Including these different options into the curriculum may help our target students learn to use these programs, thereby increasing their odds of being able to use them to the best of their abilities down the road.

Appendix L: Template for 2nd Set of Interviews

Solution Review Interview

Teacher Name: _____

Date: _____

Solution Idea:	Pros	Cons
HearIt		
PDA		
In-Class Software Aide:		
Out of Class Software Aide:		

Additional Comments:

Appendix M: Teacher 2nd Set of Interview Results

Solution Review Interview

Teacher Name: Krista Osborn

Date: 2/11/04

Solution Idea:	Pros	Cons
HearIt	<ul style="list-style-type: none"> - would definitely help - prove good in extreme cases - only target audience can use them, others may be embarrassed, not be distracted just by audio, etc. 	<ul style="list-style-type: none"> - over-attracted: visual, smell, many other distractions - only work with those with audio attention disorders - Student may have trouble understanding what teacher is saying, hear-it would not solve this problem - would help if student requires more processing time
PDA	<ul style="list-style-type: none"> - like reminders and checklist a real lot (outlook interface) 	<ul style="list-style-type: none"> - may be additional distraction - maybe too difficult to understand - more time to put info in then to receive
In-Class Software Aide:		
Out of Class Software Aide:	<ul style="list-style-type: none"> - have certain centers designated for this type of stuff, break class into groups, rotate through centers. - reinforces work in class - structured program for everyone - remote controls for gaming allow students to interact more and pay more attention 	<ul style="list-style-type: none"> - sets up kids to be different - other kids would be jealous if only some were able to use it - careful to not dumb down lesson, lesson cannot be based off games, games should supplement lesson

Additional Comments:

Appendix M: Teacher 2nd Set of Interview Results (cont.)

Solution Review Interview

Teacher Name: Jen Arnold

Date: 2/11/04

Solution Idea:	Pros	Cons
HearIt	<ul style="list-style-type: none"> - Great idea - Would be great as school has many audio distractions (even the heater is distracting to her) - Smaller headphones are culturally accepted, would not separate student from the rest 	<ul style="list-style-type: none"> -small concern about being separated from rest of students
PDA	<ul style="list-style-type: none"> - help organize - help self-esteem - make them feel more on track and confident - great b/c kids do not have good recall, wouldn't need it with PDA 	<ul style="list-style-type: none"> - cost (good for price though. Said alpha smarts were expensive but worth it) - May be used inappropriate or at wrong times
In-Class Software Aide:	<ul style="list-style-type: none"> - great as kids cannot spell or need to hear words. - kids can put in gibberish and produce correct words - engaged on smart-boards - PowerPoint would be excellent for kids to work on making presentations, kids love it, better than quiz or other assessment - remotes to interact in class – anything that is a gimmick, can be held will help them to focus - centers: would be willing to make one center a tech center 	<ul style="list-style-type: none"> - power point gets boring for teachers use, so teachers may not want to teach off them, better for student use.

<p>Out of Class Software Aide:</p>	<ul style="list-style-type: none"> - would use games as a center once again - tricks them into learning - can be used for at home homework assignments - use on whole class thing, not just individual students 	<ul style="list-style-type: none"> - monitoring - anger other students if only a few got to use the games
------------------------------------	---	---

Additional Comments:

Appendix M: Teacher 2nd Set of Interview Results (cont.)

Solution Review Interview

Teacher Name: Steve Colorio

Date: 2/11/04

Solution Idea:	Pros	Cons
HearIt	<ul style="list-style-type: none"> - would be good as there are lots of distractions (sneezing, alarms, etc) - more personal, hits them more - definitely would like to see it 	<ul style="list-style-type: none"> - make it as not obvious as possible - cost - higher grades may be tougher to get to use (5 and 6 are rough grades) - students would have to make choice of whether or not to wear it
PDA	<ul style="list-style-type: none"> - good idea, can prove to be very efficient if used appropriately 	<ul style="list-style-type: none"> - may just be a \$200 agenda - they would get lost - the bad can outweigh the good with age
In-Class Software Aide:	<ul style="list-style-type: none"> - kids spell how they sound, so the program would aid them in that - helps self-esteem, kids can do work right - gets away from whiteboard, reducing boredom factors 	<ul style="list-style-type: none"> -complexity
Out of Class Software Aide:	<ul style="list-style-type: none"> - classes missing the fun, this would help that - anything fun will be contagious, kids will want it and will learn it well - nice way to supplement lessons if integrated correctly - home use would be good id actually used - whole classroom can use and benefit from it - no way for student to mess-up 	<ul style="list-style-type: none"> - if used outside classroom (home) must contend with all other games (Playstation), and would not work

Additional Comments:

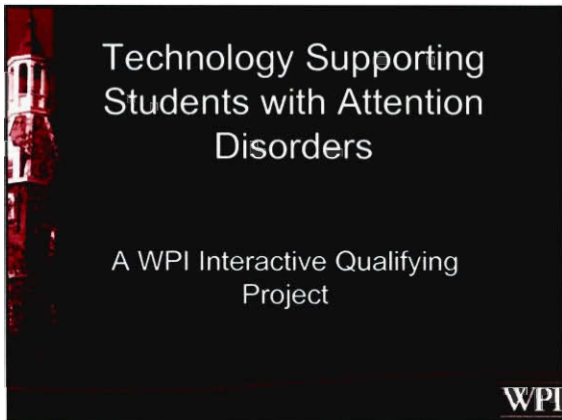
Appendix N: Student Observations

We presented to the students the recommendations in Appendix K. We observed their actions and behavior as they tried out different types of headphones that would come with *HearIt*, emulated PDA hardware and software on a laptop computer. The following table summarizes what we have observed.

Date: 02/12/2004

Solution Idea:	Pros	Cons
HearIt	Students agreed to wearing the non-intrusive headphone	They rejected the headphones with frames around the head because they are uncomfortable.
PDA	Students were enthused when presented with the idea of PDA for use in class. One student even suggested to us a preferred model.	Has many potential misuses. Students are observed to be “curious” when presented with a simulated PDA.
In-Class Software Aide	They have used some of the programs in school. However, they preferred something more interactive and colorful such as games.	Potential difficulties in using new software may arise. Teachers may not be able to teach the class but rather running around answering questions.
Out-of-class Software Aide	Same as in-class software, they have to be fun in order for the students to use at home.	Cooperation from parents in monitoring what their kids play. Potential competition with console games.

Appendix O: Final Project Presentation at SHCS



Technology Supporting
Students with Attention
Disorders

A WPI Interactive Qualifying
Project

WPI



Team Members

- Quan Do – Computer Science 2005
- Michael Flynn – Management Information Systems 2005
- Corey Ireland – Management Information Systems 2005
- Vu Lam – Computer Science 2005
- David Roscoe – Mechanical Engineering (Aero) 2005


Project Sponsors/Liaisons

- Krista Osborn – Principal of SHCS
- Cheryl Hollocher – Special Education Coordinator (SHCS)
- Nilda Rodriguez – Community Resource Director (SHCS)

Project Advisor

- Eleanor Loiacono-Mello – WPI MIS Professor

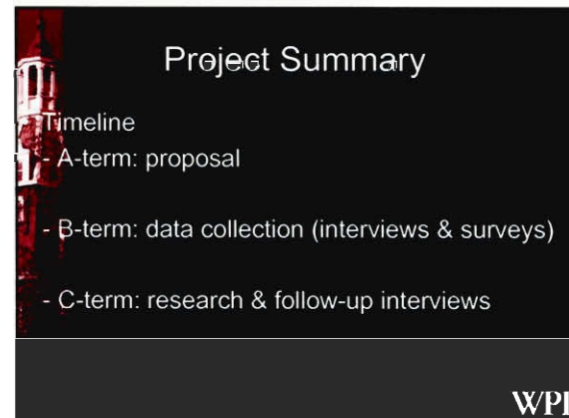
WPI



Agenda

- Summary of project
 - Data collection & analysis
- Arriving at Solutions
 - Method(s) used to obtain most suitable solutions for students with attention disorders
- Solutions & their implementations
 - Presentation of solutions and how to integrate them into school's curriculum

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Project Summary

Timeline

- A-term: proposal
- B-term: data collection (interviews & surveys)
- C-term: research & follow-up interviews

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Appendix O: Final Project Presentation at SHCS (cont.)

Arriving at Solutions

	Hear-It	PDA	In-Class interactive technology	Out-of-Class Assistive Software
Cost (3)	2	1	3	4
Effectiveness (3)	1	4	2	3
Comfort (2)	1	2	3	4
Student Support (2)	1	3	2	4
Teacher Support (1)	1	2	3	4
Misuse (1)	2	1	3	4
Solution Total	16	28	31	45

WPI


- ### Solutions & Implementations
1. Lesson supplementing software
 2. Assistive technology
 3. Personal Digital Assistant
 4. HearIt
- WPI

Educational Computer Games

A learning tool to be used in addition to the class room.

WPI

Sunburst

 sunburst.com

Because Sunburst designs, creates, and sells their own games, buyers can be confident that they are receiving quality products. These games are not going from producer to wholesaler to retailers. They are being programmed, and ultimately sold within Sunburst. Sunburst also sells other games that are very popular with teachers and their students. They have the Knowledge Adventure series of games available for purchase as well as their own games.

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Appendix O: Final Project Presentation at SHCS (cont.)

Hot Dog Stand

Open the Hot Dog Stand and see how your decisions affect sales.

Analyze data to improve your business with the potential of the food.

Students improve math, problem-solving, and communication skills in this "real-life" business simulation where they manage a busy concession stand in a big-city stadium. Students interpret information, keep records, determine prices, and plan marketing strategies. Different levels of difficulty, a variety of random events, and a wide range of situations and options provide students with a new scenario each time they run Hot Dog Stand. The Works Includes detailed Teacher's Guide with activities.

Overview

Sunburst has many different games all with similar educational and grade focuses. With affordable prices to buy single copies, lab packs of 10 copies, and network and unlimited copies, Sunburst is always focused on making a teacher, and school's, purchasing experience easy.

Prices	
Lab Pack (10)	\$19.95
Single Copy	\$2.99
Network License	\$199.95
Unlimited License	\$499.95

Game Implementation

Games are rather affordable and can be purchased in bulk.

- They can be installed in the computer lab for all students to play.
- Group of 10 Games is roughly \$100 at Sunburst

Methods of Ordering


- 1. Ordering online**
E-mail school purchase orders to
Web - open 24 hrs
- 2. Ordering by phone**
Office hours: 8:00 am - 6:30 pm EST Monday - Friday
 - Software Products: 1-800-321-7511
- 3. Ordering by fax**
 - U.S. Fax Orders: 1-888-800-7028
- 4. Ordering by mail**
 - US Payments & Mail Orders

Sunburst Technology
1850 Executive Drive
Ft. Mill, SC 29504

Appendix O: Final Project Presentation at SHCS (cont.)

Classic Educational Games

A classic game that has been around for many years is Number Munchers. This game has more of a self-teaching principle. With not much instruction, this game based its teaching on a trial and error base. The player was told to "eat" prime numbers. If they didn't know what number was prime, they would eat it and be told by the game that it is not.



Level 1 Multiples of 5

10	5	10	15	20
15	20	25	30	35
20	25	30	35	40
25	30	35	40	45
30	35	40	45	50

Score: 00

But doing this through repetition, they would know what a prime number was and what was not on sight. The game included different levels such as multiples, factors, prime numbers, inequalities and others. A very affordable game, Number Munchers does not have the outstanding graphics and teaching capabilities of some other expensive games but still seems to get the ideas across to the player.

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Classic/Other Game Orders

- Can be done by contacting the manufacturer.
- Can be purchased at any tech store (Circuit City, Best Buy)

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Solution 2 – Assistive Technology


Technology geared towards helping today's students.

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Cast eReader

Provides speech and visual highlighting to any text that can be accessed electronically.

This software requires little teacher interaction. It is designed to aid students who have a hard time studying from text books or other conventional reading materials.



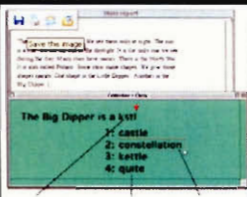
	MAC	WIN	Price
CAST eReader	J95WB	J95WB	\$199.00

WPI

Appendix O: Final Project Presentation at SHCS (cont.)

Co Writer 4000

This is a program designed to help students who are unable to form good sentences to convey their ideas. As the student is typing, the program displays different possibilities for each word, helping the student with spelling and grammar along the way.




The Big Dipper is a **1: syst**
2: constellati
3: kettle
4: quate

Co Writer 4000	MAC	Price	Cost/Use
Single User	F41.00E	\$325.00	
5-User*	F42015.00E	1187.50	\$237.50
10-User*	F42015.00E	2375.00	237.50
50-User*	F42015.00E	4750.00	95.00
100-User*	F42015.00E	9500.00	95.00
1000-User*	F42015.00E	9750.00	97.50

WPI

Crick's Clicker

This is an extensive word processor that allows students to enter words through the keyboard, with speech, or with the aid of photographs. The speech recognition allows students to hear words before they enter them, and even reads back what they have written.



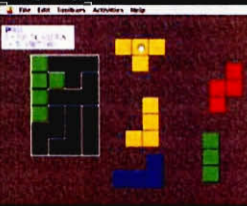
Clicker Writer
Clicker Grid

Agreement	Cost
Single	\$199
Multi(5)	\$399
Multi(30)	\$899

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Blocks in Motion


This software provides multiple geometric and sequence based games that are fun for the student, and help build better problem solving and critical thinking skills. Students will be able to interact and enjoy this program, while strengthening their abilities. A program package like this could be used as a reward to generate interest or even as a break during a more difficult topic to insure attentiveness.



Blocks in Motion	MAC	Price	Cost/Use
Single User	F4200E	\$79.00	
With Learning Materials	F42000E	\$99.00	
5-User*	F42010.00E	279.50	\$55.90
10-User*	F42010.00E	559.00	55.90
50-User*	F42010.00E	2795.00	27.95
100-User*	F42010.00E	4795.00	23.97
1000-User*	F42010.00E	18750.00	18.75

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Quick Start



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Appendix O: Final Project Presentation at SHCS (cont.)

Quick Start

This series contains teacher training guides, flip charts, computer learning templates, and classroom activities that all come with a CD-ROM. The different types of material are mostly geared towards helping students to learn how to use the computers, and to familiarize them with common software. The different software options include: Appleworks, Microsoft Word, Microsoft Access, Microsoft Excel, Microsoft PowerPoint, Alpha Smart, and many others, as well as general internet training guides. Including these different options into the curriculum may help students learn to use these programs, thereby increasing their odds of being able to use them to the best of their abilities in the future.

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Ordering

Cast eReader, Co Writer 4000, and Blocks In Motion available from Don Johnston Inc:

<http://www.donjohnston.com>

Crick's Clicker available at Crick Software:

<http://www.cricksoftware.com>

Quick Start available from Sunburst at: www.sunburst.com

WPI

Solution 3 – PDA (Personal Digital Assistant)



- Providing the ultimate solution in portability.
- Adaptive software for educational needs.
- E.g., reference library, language, mathematics, reminder, etc.

WPI

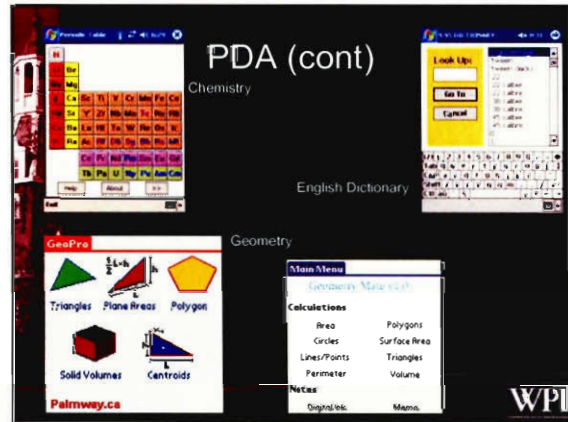
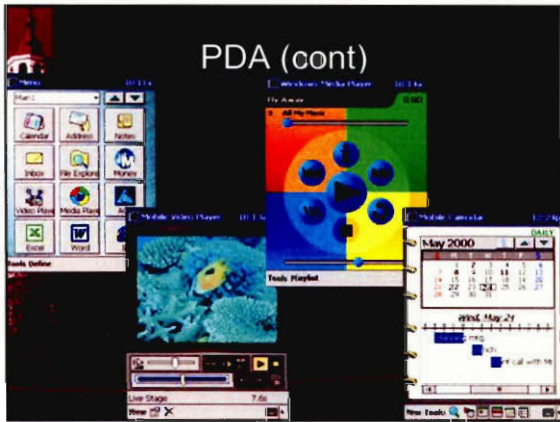
PDA (cont)

Fully functional computer in disguise (OS, RAM, CPU, etc.)

- Administrative application (scheduling, organizing reading list, etc.)
- Communication applications (record voice note, online references, etc.)
- Teaching/learning applications (make spreadsheet, tutorials for self study, etc.)

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Appendix O: Final Project Presentation at SHCS (cont.)




PDA Integration


- Ownership of PDAs (the school or the students?)
 - The school should implant policies if taking the ownership
 - The school should provide guidelines if PDAs are purchased by students
- Should the students be allowed to take the PDAs home?
 - Allowing PDAs to be taken home would be most beneficial for the students
- Issues regarding the loss or damage of PDAs
 - Insurances
- Management strategies
 - PDAs distribution among students
 - Maintaining of device

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Solution 4 – HearIt



Hear-It Original
\$500.00



Hear-It Perfect
\$875.00

Hear-It Auditory Tools amplify the frequencies in the voice/speech range to improve speech discrimination for individuals with undetected or slight hearing loss, language learning disabilities and ADD/ADHD. Hear-It has been proven to increase sustained attention, comprehension and phonology awareness, and to reduce distractibility which results in optimal academic performance. Hear-It is utilized and recommended by many Special Educators, Speech Language Pathologists and F-11. <http://www.hearitc.com>

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Appendix O: Final Project Presentation at SHCS (cont.)

Rank	Integration into SHCS
1st	<ul style="list-style-type: none"> •Purchase 5 units for school ownership •Students selected based on special need who would show improvement with HearIt
2nd	<ul style="list-style-type: none"> •Student assigned HearIt for a school year
3rd	<ul style="list-style-type: none"> •Student picks up HearIt at beginning of day from first class teacher
4th	<ul style="list-style-type: none"> •Student transports between classes
5th	<ul style="list-style-type: none"> •Student drops it off to last class teacher of the day
6th	<ul style="list-style-type: none"> •Teacher shares responsibility to make sure student picks up, transports, and drops off device
7th	<ul style="list-style-type: none"> •Student wears in class with too much audio distraction

Funding for HearIt

- Application available at webpage
- Massachusetts State Department of Education Grants Page

WPI

Questions?
Thanks for attending.

WPI

Appendix P: Sunburst's Evaluation Policy

From: "Tammy Ludvik" <tludvik@sunburst.com>
Subject: Re: Public Relations
Date: January 23, 2004
To: "Michael Flynn" <mjflynn@WPI.EDU>

Schools can preview up to 5 Sunburst published programs for 30 days. Please fax your request on school letterhead to 888-800-3028. We send the single user copy for the preview, and the school pays for shipping to return, please include the correct shipping and billing address information with the fax.

From: "Michael Flynn" <mjflynn@WPI.EDU>
Subject: Public Relations
Date: January 21, 2004
To: tludvik@sunburst.com

Hello,

I am a student at WPI and we just did a project assessing a local charter school's problem with ADD students. We found that educational computer games may be helpful and appropriate. When researching such games I ran across your website. I'm wondering if you can send some samples or demo versions of your games so that we can show the teachers and have the students test them out. The faculty at the charter school will strongly consider buying multiple copies of some games but I doubt this will happen without being able to try some of them out. Please respond with your thoughts and ideas. Any help that you can give will be greatly appreciated.

Thanks for your time,
Michael Flynn

Glossary

Adaptive technology: devices that are used to maintain, increase or improve the functional capabilities of individuals with disabilities.

Alphasmart: a portable computer companion that allows the user to enter and edit text, then send it to any computer for formatting or directly to a printer.

Attention Deficit Disorder (ADD): a syndrome of disordered learning and disruptive behavior that is not caused by any serious underlying physical or mental disorder.

Attention Deficit Hyperactive Disorder (ADHD): a subtype of ADD characterized primarily by hyperactivity and impulsive behavior.

Autonomy: a self-governing body.

Chicago Math: a school model that emphasizes reading, problem-solving, everyday applications, and the use of calculators, computers, and other technologies.

Computer Flow Chart: a visually appealing diagram that represents the user's ideas and thought process.

Free and Appropriate Public Education (FAPE): Federal Public Law (102-119) mandating that all disabled children receive a free appropriate public education, a school district must provide special education and related services at no cost to the child or her/his parents.

Gantt chart: a graphical representation of the duration of tasks against the progression of time.

Individualized Education Program (IEP): states that all public schools who have special education and receive related services must provide each disabled student with individualized program.

Optical Character Recognition (OCR): computer program that takes written text and turns them into spoken words.

Speech recognition: computer program that recognizes spoken words and translates them into text.

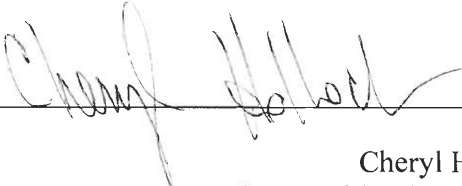
Spelling checker: computer program that scan for any spelling errors in a text file.

Stimulus: something that rouses or incites to activity.

Success for All: a school reform model designed to raise the achievement of students in low- performing schools. The idea behind Success for All is to use everything known from research on effective instruction for students in low-performing schools to prevent and intervene in the development of learning problems in the early years.

Supplement A: Project Sign-off Form

This document certifies that the undersigned project sponsor agrees that the WPI IQP team completed this Seven Hills Charter School ADD project as expected. All areas of the project were included according to original specifications.



Cheryl Hollocher
Seven Hills Charter School
Special Education Coordinator