



# **How Should We Educate ADHD Children?**

**Prepared for  
ED 230: Managing Computer Applications**

**Prepared by  
Mark S. Barnett**

**May 5, 1999**

# *Table of Contents*

<b>Introduction</b> .....	<b>1</b>
Problem Statement .....	<b>1</b>
Significance of Study .....	<b>1</b>
Internet Research .....	<b>3</b>
<b>Section One: BACKGROUND RESEARCH</b> .....	<b>4</b>
<b>Understanding ADHD Children</b>	
History of ADHD .....	<b>4</b>
Current Thought on ADHD Children .....	<b>5</b>
ADHD as a Negative: Brain Defect .....	<b>5</b>
ADHD as Neutral: A Natural Condition .....	<b>6</b>
ADHD as a Positive: Gifted and Creative .....	<b>10</b>
Summary for Section One .....	<b>11</b>
<b>Section Two: PROPOSED SOLUTION</b> .....	<b>14</b>
<b>Remarkable Computer Software Accessed Via the Internet</b>	
Re-addressing the Problem for ADHD Students .....	<b>14</b>
The Computer Project .....	<b>15</b>
Description of Activity .....	<b>15</b>
The Solution .....	<b>16</b>
Technology and the Teacher's Role .....	<b>17</b>
Background Research .....	<b>18</b>
Educational Websites .....	<b>19</b>
Summary .....	<b>20</b>
<b>References</b> .....	<b>22</b>

## INTRODUCTION

All children are special! They are resourceful, energetic, and challenging. But perhaps the most perplexing of all children are ADHD (*Attention Deficit Hyperactivity Disorder*) syndrome kids.

The special needs of an ADHD child are something my wife and I have had daily consciousness for the last 13-years, for that is how old our ADHD son is. Now in Middle School, he is beginning to get farther and farther behind academically because of boredom, inability to stay on task, and in-and-out-of-school suspensions. Yet, the sad part is, he is an extremely smart and bright young person who has been greatly stifled in the public school system.

**Problem Statement.** The central question this paper seeks to answer is, “HOW SHOULD WE BEST EDUCATE ADHD CHILDREN?” This is a very serious issue because it is very obvious the schools are not set up to handle the behavior and academic requirements of ADHD kids like our son and others like him.

The purpose of this Research Paper is to better understand the educational problems facing ADHD students, and to provide idealistic solutions to their scholastic dilemma. Regarding the latter, on the basis of my research and personal observation, it is my conviction that the personal computer, equipped with remarkable interactive software along with fairly unlimited access to the Internet, is perhaps the best educational answer for ADHD students.

**Significance of Study.** Difficulty staying focused, the primary symptom of ADHD, affects about 5 (Subtle Brain Circuit Abnormalities, 1996) to 10% (Hyperactivity) of school age children. Taking *hyperactive* out, ADD affects another 20-25% of students (Newman, 1998, p. 4). In addition, many children who have ADD without hyperactivity go unrecognized and unassisted because they are less disruptive than children with ADHD.

Failure and expulsion rates for ADD/ADHD children are three times that of other children. Even ADD/ADHD children with normal to superior intelligence show “chronic and severe underachievement,” and 35% of them eventually drop out of school. Only 5% ever complete college. About 50% repeat a grade. By age 11, 80% are at least two years behind in reading, writing, spelling, and math. Their expulsion and dropout rates are alarming: 46% are suspended and 11% are expelled—50% willingly or involuntarily leave school, further compromising achievement and completion (Newman).

A shocking 50-70% of ADHD children develop oppositional defiant behavior, and 20-40% develop the more serious conduct disorder. Studies of ADHD children reveal that 23-45% have juvenile convictions. Though difficult to confirm, it is estimated that 70% of juvenile offenders have ADHD, as do 40% of adult prisoners (Newman).

In regards to academia, this problem is magnified because less than half of the school population learn best from traditional teacher initiated, direct-dialogue and textbook instruction (Gallagher). This half of the student body learn better from intuitive teaching methods.

Two of the main attributes which typify ADHD children are their high creativity level and their *drive* for self-exploration. Hence, it can be harmful and damaging to put ADHD students in a traditional educational setting. Traditional classroom teaching methods greatly discriminate against ADHD students. Studies demonstrate that the ability to concentrate and focus is a better predictor of academic success than other measures of academic ability (Newman), i.e. intelligence, creativity, exploration skills.

ADHD kids demand a more natural learning environment which has far fewer restraints and limitations to their learning potential and abilities. Though still needing guidance and structure, ADHD children have a compulsion to take the lead in directing their own learning process. In this type of environment they can not only excel in fantastic ways, it can also do wonders in building up their self-esteem as well—versus being viewed as *bad kids* which is usually the case for ADHD students in traditional school environments because of their eccentric behavior!

Should ADHD students be punished, penalized, and castigated simply because they find it nearly impossible to excel and stay-on-task in school environments that practice traditional teaching methods? This creates a anti-tolerant attitude for ADHD kids because the learning environment is so slow and consequently boring (lifeless) to them.

Therefore, the only stimulation for them in this setting is to *act out* in order to cope with the dullness in their classrooms. Anyone who has been around an ADHD kid knows that it is practically impossible for them to sit still very long at a time because of their *Attention Deficit Hyperactive Disorder!*

**Internet Research.** During my extensive Internet research on this subject this semester, I have discovered that even though there is a lot of information relating to the distinguishing characteristics and distinctive needs of ADHD children, the subject of educational solutions specific to their unique personalities are greatly lacking. However, I have found extensive educational software and Internet scholastic applications currently available which can be used for designing a fantastic learning environment for ADHD students.

Because one cannot present a solution to a problem without first understanding the particular setting of their subject, the first section of this paper is dedicated to comprehending the personality and specific educational problems which face ADHD students. The second section deals with educational solutions for these special youth.

## **Section One: BACKGROUND RESEARCH**

### *Understanding ADHD Children*

**History of ADHD.** Researchers have experienced difficulty tracing, defining, and accurately diagnosing ADHD (Crammond, 1995). Some even go as far as saying that the cause of hyperactivity is not known and may be a combination of both inherited and environmental factors (Hyperactivity). Nonetheless, hyperactivity can be historically documented at least for the last century.

George Still, a British doctor, in a 20-series lecture in 1902, was perhaps the first researcher to describe what is today known as ADHD. According to his studies, these kind of children displayed a major, chronic “defect in moral control” (Seay). A couple of decades later and an ocean away, numerous papers were written describing the children who survived the encephalitis epidemic of 1917-1918 as impaired in attention, regulation of activity, and impulse control.

As a result, these kids were termed *Brain Damaged*. But it was later observed that other children who had not been exposed to the outbreak also exhibited some of the same symptoms. So the diagnosis moved to a more gentler term, *Minimal Brain Damage* (MBD).

Another important event in the era of MDB was the discovery in 1937 that amphetamines (stimulant medication) reduced disruptive behavior in many of these children—especially in those who were hyperactive and/or impulsive. *Hyperactivity* was first described by Laufer and Denhoff (1957) and Stella Chess (1960). This description came to be generally accepted by the psychological community as the correct name for the disorder (Seay, p. 2).

While this new term certainly had validity for those who had symptoms of what would later on be called ADHD, it still seemed to ignore the fact that many children exhibited attention deficits without any signs of hyperactivity. This category, *Attention-Deficit Disorder Without Hyperactivity* (ADD/WO), was later added and even revised as *Undifferentiated Attention-Deficit Disorder* (UADD).

By the 70’s, over 2,000 studies were published on hyperactivity. The defining features were overactivity, impulsivity, short attention span, low frustration tolerance, distractibility, and aggressiveness. Overactivity was thought to be the primary feature (Seay, p. 4))

**Current Thought on ADHD Children.** Today, the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., DSM-IV; American Psychiatric Association [APA], 1994) defines hyperactivity in three subtypes:

- Attention Deficit/Hyperactivity Disorder, Predominantly Inattentive Type

- Attention Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type
- Attention-Deficit/Hyperactivity Disorder, Combined Type

In the 1980's thousands of new research studies on ADHD were published, making it perhaps the most studied subject ever for childhood psychiatric disorders. Yet, in my extended Internet search on this topic, a decade later we still find the following conflicting debates regarding the attributes of ADHD children:

- **Negative View.** Brain defect. Abnormality or disorder
- **Neutral View.** Fitting a certain temperament or natural condition
- **Positive View.** Shared characteristics with gifted, Edison Trait and creative kids

**ADHD as a Negative: Brain Defect.** In 1996, F. Xavier Castellanos, a M.D. at the National Institute of Mental Health (NIMH), and his colleagues reported on their research findings obtained from the first comprehensive brain imaging study on ADHD children (Barchas, 1996). In this study they found that there are subtle structural abnormalities in the brain circuit that inhibits thoughts apropos ADHD children (Subtle Brain Circuit Abnormalities).

Using anatomic brain Magnetic Resonance Imaging (MRI) for 57 boys with ADHD and 55 healthy matched controls, NIMH researchers found that the entire right cerebral hemispheres in boys with ADHD were, on the average, 4.7% smaller than those of controls (Barchas). The right side of the brain in boys is normally larger than the left. In their study, the ADHD children, as a group, had abnormal symmetrical brains.

The NIMH researchers also studied 12 subcortical and cortical regions and their symmetries and measured to determine if those structures best distinguished ADHD. They found that three structures in the affected circuit on the right side of the brain—prefrontal cortex, caudate nucleus and globus pallidus—were smaller than normal in the boys with ADHD, when examined as a group.

The prefrontal cortex, located in the frontal lobe just behind the forehead, is believed to serve as the brain's command center. The caudate nucleus and globus pallidus, located near the middle of the brain, translate the commands into action. "If the prefrontal cortex is the steering wheel, the caudate and globus are the accelerator and brakes," explained Castellanos. "And it's this braking or inhibitory function that is likely impaired in ADHD" (Barchas).

Even though this newly confirmed marker may provide clues about the causes of ADHD, because of normal genetic variation in brain structure, MRI scans cannot be used to definitely diagnose the disorder in any given individual.

According to this study, the analysis by the NIMH researchers is consistent with the supposition which postulates the brain in ADHD children as having a defect or disorder. It follows that this medical group would concur that ADHD is a handicap.

Dr. Siegfried Othmer, Ph.D., one of the pioneers in the field of EEG Biofeedback, states that any condition adversely affecting cognitive function is a sign of “disorder” in the brain. There can be “observable differences in serotonin, norepinephrine and dopamine function,” he notes, “but these may be effects rather than causes . . . we must look at the brain as a control-and-feedback mechanism ” (Portable Computing, 1998).

This group sees the ADHD abnormality as having the brain waves operating at too high a frequency—a.k.a. *wired!* Their goal is to retrain the ADHD patient’s brain-wave activity to operate at levels that maximize its ability to overcome or moderate the effects of the condition (Portable Computing).

This treatment appears to have but a few positive testimonies. There seems little support over the Internet for this remedy, and it is greatly lacking in specific results. They will, however, take your money if you want to spend about 20-25 sessions to *reprogram* the brain waves of your ADHD child.

Another group sees the ADHD disorder as a problem with their diet. An immunologist, Robert Sinaiko, M.D., says, “The research connecting diet and behavior often goes unread. For two decades, the scientific literature which notes that certain synthetic, petroleum-based food additives act like drugs on certain children, impairing learning and triggering symptoms which look exactly like ADD and ADHD” (KidSource Online, 1996). Like Othmer, Sinaiko sees ADHD as a negative *effect*, and not *caused* by a physical body defect.

In support of this, another group reports that “one double blind, placebo-controlled study of children with ADHD, who also had signs of allergy, showed that 73% responded favorably to treatment with a multiple-item elimination diet (Murphy). After a favorable response, certain foods and medications were added back into the diet one at a time, noting any reactions. In this way they were able to find the foods and medications which were causing the ADHD abnormality.

Although diet-control is another course parents of ADHD children might want to pursue, there isn’t a lot of information on the Internet to support this type of treatment. Though this idea should not be dismissed, it does not appear a significant number of ADHD children have been helped by this treatment either. However, I do support the idea that it should be tried. If it helps, great!

Even though ADHD certainly reveals itself in unfavorable and even negative behavior at times, there are others who see this demeanor in a quite different light.

**ADHD as Neutral: A Natural Condition.** Not happy with the negative *brain-defect* term which so typifies ADHD kids, a “growing number of experts believe that

much of what we call Attention Deficit Disorder is a natural condition related to temperamental differences” (Gallagher, Born to Explore).

A pioneer in this ADHD philosophy is Teresa Gallagher. She has an entire website dedicated to support this viewpoint and has written a number of very good articles advocating the same. In her homepage, she writes, “Much of the problem behavior so typical of ADD children is a perfectly rational expression of extreme boredom and frustration with an incompatible environment and unrealistic expectations ” (Gallagher). She even likens exhibited traits of ADHD with the great inventors Thomas Edison (who flunked out of school), Nikola Tesla, and Benjamin Franklin.

Gallagher has detected many ADD types over the Internet, and categorizes them into four of the sixteen possible common personality temperaments of the Myers-Briggs Type Indicator (MBTI)—a self-report personality inventory measured by Jungian psychological-type preferences (Gallagher, Temperament Quotes). Most of her Personality Trait quotes are from the book, *Nurture by Nurture—Understanding Your Child’s Personality Type—And Becoming a Better Parent*, by Paul D. Tieger & Barbara Barron-Tieger:

### ***INTERNET ADD/ADHD TEMPERMENT TYPES***

<b>TEMPERAMENTS</b>	<b>PERSONALITY TRAITS</b>
<b>ENTP</b>	Energetic, Creative, Adventurous, Fun, Problem Solvers, Exhausting for others around them-both physically and intellectually, Active Babies, Talkers, Quick Minds, Strong-Willed, Independent, Flamboyant
<ul style="list-style-type: none"> <li>• Extravert</li> <li>• <b>Intuitive</b></li> <li>• Thinking</li> <li>• Perceiving</li> </ul>	
<b>INTP</b>	Creative, Original Thinkers, Able to see possibilities and patterns all around them, Strongly Individualistic, Fiercely Autonomous, Easily Distracted, Needing Plenty of Freedom, Challenging, Always Learning New Things, Distracted, Forgetful of Mundane Chores, Quickly Bored, Attention wanderers-rarely finishing many interesting projects started
<ul style="list-style-type: none"> <li>• Introverted</li> <li>• Intuitive</li> <li>• <b>Thinking</b></li> <li>• Perceiving</li> </ul>	
<b>ENFP</b>	Eager to Learn and Experience, High Energy Level, Imaginative, Unintentionally Defiant and Disrespectful, Highly Curious, Interactive, Original Thinkers, Energized by Interaction with Others, Cleanup a Battle, Inability to Stay on Task, Non-conventional, Playful Spirit, Lack of Self-Discipline, Concerned about the Welfare of Others
<ul style="list-style-type: none"> <li>• Extroverted</li> <li>• <b>Intuitive</b></li> <li>• Feeling</li> <li>• Perceiving</li> </ul>	

<b>INFP</b>	Dreamers, Richly Imaginative, Happy, Explorers, Easily Bored, Passionate, Visionary, Empathetic, Negotiators, Creators, Questioners, Private, Internally Focused, Forgetful, Alternative Thinkers
<ul style="list-style-type: none"> <li>• Introverted</li> <li>• Intuitive</li> <li>• <b>Feeling</b></li> <li>• Perceiving</li> </ul>	

The problem I see with this type of categorization is the difficulty in making specific individual connections to ADHD children. Although every ADHD child has several of the personality traits Gallagher classifies, the same can be said for many non-ADHD kids as well.

What I do like, however, is her objective observations which questions what many call *normal* temperaments, i.e. behavior. Who is to say that children exhibiting ADHD personalities are to be viewed in a negative light simply because they have different temperaments than others? We should never lose sight of this discerning wisdom!

Dr. David Keirse groups the sixteen different MBTI temperaments into four broad categories—Guardians, Artisans, Rationals, and Idealists (Gallagher, *The Exploratory Learner*, pp. 1-8):

<b>FUNDAMENTAL TEMPERAMENTS</b>	<b>PERSONALITY TRAITS</b>
<p style="text-align: center;"><b>Guardians (SJ-Sensory/Judging)</b></p> <p style="text-align: center;"><b>40-45% of Population</b></p> <p>Most teachers, principals, active PTA members, and Board of Education members fit into this category</p>	<p>Convergent thinkers (“get it done”); focuses on the sensory and concrete (avoid abstractions); assume all good, responsible people share their values and learning styles—people who do not are usually considered bad, lazy, or stupid; thrive on clerical methods of teaching—workbook completion, repetition, drill, recitation, and answering rhetorical questions by teacher; loves to please the teacher</p>
<p style="text-align: center;"><b>Artisans (SP-Sensory/Perceiving)</b></p> <p style="text-align: center;"><b>40-45% of Population</b></p> <p>Do better once graduate from school because they can find employment which satisfies their need for action</p>	<p>Divergent &amp; flexible thinkers; focus on what is experienced by the senses (touched, seen, heard); action-oriented, easily restless, jittery, bored, and engaged in random action; possible to get over-stimulated &amp; roused-up; needs space &amp; frequent change; self-initiated; lives for today; loves activity</p>
<p style="text-align: center;"><b>Rationals (NT-Intuition/Thinking)</b></p> <p style="text-align: center;"><b>8% of Population</b></p> <p>Perform better in alternative type schools, where they are able to teach themselves</p>	<p>Intuitive/Conceptual thinkers; strong desire to be logical; divergent thinkers; appear spacey &amp; disorganized; knowledge-seeking, self-motivated, self-Learners; vivid imagination, full of questions; very energetic; sensitive to outside judgment;</p>

once people get out of their way	independent; non-conformist; curious, experimental, self-Inspirational
<p><b>Idealists (NF-Intuition/Feeling)</b></p> <p><b>8% of Population</b></p> <p>Seldom troublemakers in school, attracted to cooperative and democratic types of classrooms with lengthy discussions</p>	<p>Prefers feelings/values over logic; intuitive thinkers; identity searcher; hypersensitive to feelings of others; divergent thinkers; vivid imaginations; underachievers; love lengthy discussions; vivid daydreamers; progressive-minded; people-oriented; emotion &amp; feeling sensitivity</p>

Obviously, ADHD children fit into either the Artisan or Rational temperament classification.

Using these four groupings, Gallagher looks at ADHD in the classroom with a much more pragmatic distinction (Gallagher, *The Exploratory Learner*). She considers a common classroom of 30-students, which might look like this (with probably one or two ADHD students):

- 13 Students (6 boys/7 girls) - SJ **Guardians**, *Achievement Oriented*
- 12 Students (6 boys/6 girls) - SP **Artisans**, *Action Oriented*
- 2 Students (2 boys) - NT **Rationals**, *Knowledge Seeking*
- 3 Students (1 boy/2 girls) - NF **Idealists**, *Searching for Identity*
  
- Teacher - SJ **Guardian**
- Teacher's Aid - NF **Idealist**
- Principal - SJ **Guardian**

SJ=Sensory/Judging; SP=Sensory/Perceiving; NT=Intuition/Thinking;  
NF=Intuition/Feeling

By dividing up the possible personalities in this way, Gallagher makes it easier to comprehend why less than half of the school population learn best from traditional teaching methods—not just ADHD students! As she points out, schools were designed by and for *Guardians* (Gallagher, *The Exploratory Learner*). The implication here is traditional school leadership and teaching methods are authoritarian and dictatorial.

Our son in Kindergarten came home from school shortly after last Christmas break with a note from his teacher. Her letter disclosed a chilling declaration that all students (including her Kindergarten class) were going to be spending most of their school days preparing for standardized academic tests at the end of that semester. That meant that one-half of our child's first formal year in public school was going to be dictated by a singular method of instruction set up by state-directed learning.

In 1981, kids ages 6-8 spent an average of 9 minutes a day on homework in the U.S. By 1997, homework had nearly tripled to 25 minutes a day—more than at any other

time in America's history (Gallagher, *Modern Grade-School Pressures*). At the same time, schools have been eliminating recess and creative classes like art to make more time for kids to learn "the basics."

I applaud Gallagher who single-handedly seems to be bringing a more rational and natural supposition in considering the educational needs of ADHD children. I conclude this segment by re-quoting what I consider her best explanation of ADHD when contrasted with all the other different temperaments:

Much of the problem behavior so typical of ADD children is a perfectly rational expression of extreme boredom and frustration with an incompatible environment and unrealistic expectations (Gallagher, *Born to Explore*).

**ADHD as a Positive: Gifted and Creative.** The revised edition of the Diagnostic and Statistical Manual of Mental Disorder of the American Psychiatric Association lists 14 characteristics that may be found in children diagnosed as having ADHD (DSM-III-R, 1987). In order to be diagnosed as ADHD, at least 8 of those characteristics must be present, the onset must be before age 7, and they must be present for at least six months. Almost all of these behaviors, however, might be found in bright, talented, creative, and gifted children (Webb, 1993).

Hyperactive is a word often used to describe gifted children as well as those with ADHD. A large proportion of both gifted and ADHD children have a high activity level and may require less sleep. As with ADHD children, gifted children may actively question rules, customs and traditions, and sometimes create complex rules which they expect others to respect or obey. Some engage in power struggles, causing discomfort for parents, teachers, and peers (Webb, p. 3).

One characteristic of ADHD that does not have a counterpart in children who are gifted is variability in task performance. In almost every setting, children with ADHD tend to be highly inconsistent in the quality of their performance (i.e., grades, chores) and the amount of time used to accomplish tasks. But gifted children, even though perhaps intellectually unchallenged and faced with dull tasks, seem to be able to stay focused long enough to produce their assignments (Webb).

Another classification which shares many characteristics with ADHD children are *Edison trait* (as in Thomas Edison) kids. One in five children have been defined as having this trait, identified best by their divergent thinking—in diametrical opposition to convergent thinkers. The personalities of these kids exhibit the qualities that make innovative leaders, inventors, and explorers. Yet they often have a hard time in school where their personality traits may be seen as weak or negative.

Lucy Jo Palladino, Ph.D., describes the Edison attribute as dazzling intelligence, an active imagination, a free-spirited approach to life, and the ability to drive everyone around them crazy (Palladino, 1997).

She goes on to say they have the raw talent to succeed in our fast-paced, information-rich, techno-magic world. But unbridled, their talent also brings conflict into their lives. *Edison trait* kids excel at thinking divergently, brimming over with one idea after another. However—in contrast—schools, organized activities, and routines of daily living reward convergent thinkers, who seek to focus on one idea at a time.

Just like ADHD children, *Edison trait* kids are distinguished and described by three main representations (Palladino):

- Dreamers who live in their own world, following no one’s schedule but their own
- Discoverers who insist on learning about and experiencing the world firsthand
- Dynamos who are full of energy, with a flair for surprises, power, and speed

Both ADHD children and *Edison trait* kids have the ability to be more successful in a world of accelerated change. But as with any strong personality, each child in both camps must learn to minimize their deficits.

Researching the Internet I found one final striking similarity between the behavioral manifestations of ADHD and another personality attribute: that resemblance is with kids having remarkable *creativity*. The defining characteristics of ADHD—inattention, hyperactivity, and impulsivity—are also key descriptors in biographies of highly creative individuals (Cramond, 1995). Interestingly, creativity is almost always listed as one of the greatest positives in ADHD children.

**Summary.** It is interesting to note that every article and book which examines *gifted* children, *Edison trait* kids, and individuals demonstrating remarkable creative gifts—have as their main intent to “distinguish and separate” these kids from ADHD children. The implication is—ADHD kids are *bad*, but these gifted kids, though different, are *good* and should be viewed in a positive light. The sad part about this is, their insinuations still leave ADHD children in that dreaded, negative castigated camp of common and popular opinion.

However, it should be readily observed, that even though *gifted* children, *Edison trait* kids, and *creative* gifted individuals share many of the exact same “so-called” *negative* personality and characteristic traits as do ADHD kids. Yet, on the reverse side, the fact is ADHD kids share a majority of the same *positive* personality characteristics with this “elite” gifted group as well:

Negative Traits	Positive Traits
Hyperactive	Divergent thinkers
High activity level	Dazzling intelligence
Very brief attention span	Free-spirited approach to life
Oppositional defiance	Active imagination
Ability to drive everyone around them crazy	Remarkable creativity

Be that as it may, one of the biggest setbacks for ADHD kids, when compared to other gifted children, is their inability to adjust to the monotonous methods of teaching provided in our traditional educational institutions. This just about guarantees failure for ADHD children who are highly inconsistent in the quality of their classroom performance. Staying with assigned tasks is usually too much for them to realistically accomplish. In a more structured environment which maximizes technology and focuses upon the special needs of ADHD kids, we may find out that many in this unique group of students will jump to the top of their class academically.

What can be done to correct the educational problems facing ADHD students? ADHD students tend to learn much more rapidly when the topics are of their own choosing, and when they are allowed to advance at their own pace—just like exploration. This is the proposition that I address in the next section.

## Section Two: PROPOSED SOLUTION

### *Remarkable Computer Software Accessed Via the Internet*

#### **Re-addressing the Problem for ADHD Students.** HOW SHOULD WE BEST EDUCATE ADHD CHILDREN?

First, following is a review of what we do know about the difficulties which ADHD kids experience in a traditional classroom setting:

- very short attention span
- overactivity level
- impulsivity
- low frustration tolerance
- distractibility
- aggressiveness

As a result of these behavior characteristics many complications follow for them in classrooms that are primarily teacher-directed with a heavy concentration on completing assigned tasks.

Yet, what is being done educationally to help create positive, healthy, fruitful, and fulfilling ADHD graduates? NOT ENOUGH! Consider all their positive attributes that are acutely suppressed in traditional classrooms:

#### **Positive Personality Characteristics of ADHD Kids**

• Creative Creators	• Explorers	• Self-Directed
• Independent	• Intelligent	• Problem Solvers
• Energetic	• Inquisitive	• Divergent Thinkers
• Non-Conventional	• Imaginative	• Learners by Doing
• Leadership Skills	• Dreamers	• Original Thinkers
• Visionaries	• Discovers	• Free Spirits
• People-Oriented	• Internally Focused	• Investigators

Yes, ADHD children have enormous positives about them! Unfortunately, for the most part, they are so silenced for not fitting into the established educational system, it causes dejection, confusion, and at times enormous depression in their young lives. Educators have to obviously share their part of the blame for this, because *they* have constructed only *one* primary pedagogical setting to learn in. This must not just be modified, it must be radically changed!

A new educational framework for ADHD students must be created which allows them great freedom to follow trails of self-interest; to make connections on their own; to reformulate ideas; to reach unique conclusions—even if they are non-conventional and non-conforming; to explore and discover new territories of thinking; to question without

fear of reprisal; to reshape and transform ideas; and internalize information according to their needs and desires.

How can this best be attained?

**The Computer Project.** In observing our 13-year old ADHD child, I have noticed that even though he finds it impossible to stay-on-task at school, *he is* able to sit at the computer and stay focused for hours upon end, being actively involved with computer game challenges.

Since our ADHD son is unable to stay focused in the classroom, he often *acts out* and becomes a behavior problem for his teachers and his classmates. He then gets sent to a separate room to serve an in-school suspension; and if his behavior is really bad, he gets expelled from school for a day or more. Assignments are obviously missed during this time, but he never seems to be able to make them up, producing low and flunking grades. This pattern has been going on since he began school, resulting in years of missed educational opportunities to learn and grow academically.

There have been many times I have personally sat down with him to help him complete his homework assignments. What should be completed in 10-minutes often takes him 1-2 hours to finish. By that time both of us are so frustrated we just want to strangle each other.

Having long believed that the computer is the ultimate educational instrument for ADHD students, I recently challenged our ADHD son to take on an extensive *PowerPoint* multimedia presentation project. He agreed. Although I had an idea of what the slide show should look like, I gave him total freedom in its theme and design.

**Description of Activity.** The objective of the project was to stimulate our ADHD son in learning extensive, *hands-on* hardware and software applications on the computer. The project's goal was to not only familiarize him with sweeping ways of utilizing the computer and its peripherals, but also to incite his self-interest in using it for several educational activities, including a lot of Internet research.

*PowerPoint* was chosen as the main software application because of its ability to combine text, word processing, spreadsheets, desktop publishing, graphs, charts, audio, video, wave recording, pictures, clip art, word art, scanned objects, narration, colors, background, shapes, fonts, Internet links, etc. In addition, several supporting software packages were to be used in order to acquaint him with in-depth computer programs.

In regards to teacher assistance, every day I personally demonstrated how to accomplish each part of the suggested format for the project. Thereafter, I only made myself available to answer any questions he had.

The final form of his project was an impressive 18-slide *PowerPoint* multimedia presentation full of color, action, humor, and drama. The outcome was a grand

achievement, exceeding my expectations! Over a two-week period, he spent a total of 35-hours on the project outside of school! One day I came home from work late and found that he had spent over 8-hours straight on the project that same day!

What surprised me the most was the scant supervision he required on the activity. He seemed to be able to quickly find his way around all the toolbars with little direction. He had meddled around with *PowerPoint* on his own before, but this was his first real experience with it. In addition, as a result of this project, he now knows how to do thorough research on the Web, having bookmarked a couple-dozen search engines in his Browser.

As I had anticipated, our ADHD son responded to the challenge of this project by using his creativity and artistry in remarkable fashion. To me this demonstrates that the computer has the ability to be the best scholastic prescription for *ADHD* students. With their active imaginations, creative and adventuresome energy, intellectual stimulation, exploring minds, and need for structure, challenging computer applications seem to bring out the best in *ADHD* students!

This trial computer application project demonstrates that ADHD children *are able* to stay-on-task for long periods of time on a computer—if the software is interactive, challenging, and interesting to them.

**The Solution.** Imagine that you are an ADHD student and you have just entered into your first classroom at school. You joke and kid around with your classmates for a few minutes until the first bell rings. When that happens you don't wait for the teacher to tell you to sit down and open your textbook to so-and-so page. Instead, you walk over and sit down at your own personalized computer that you have nicknamed, *The Hummer*. You then type in (or speak) your password, log onto the Internet, and proceed to your highly interactive chemistry lesson plan at [www.bigeducationalsoftware.com/chemistry5/lab/](http://www.bigeducationalsoftware.com/chemistry5/lab/).

It is lab day and you have chosen your own specific chemical solutions for mixture. It is very dangerous because you are trying to make gasoline. Even though everything is simulated, you still put on your white lab coat to feel the part. Today, you only blow yourself and your class up twice as a result of mixing wrong solutions together. Oh well, it was better than last week. And you did learn what *not* to do next time, although you are starting to have more empathy for Tim the Tool-Man Taylor.

Your next class is history. Again, you go to your personalized computer workstation when the bell rings. Today, you decide that you want to learn more about the Civil War, so you log onto [www.bigeducationalsoftware.com/battleofgettysburg/](http://www.bigeducationalsoftware.com/battleofgettysburg/). You have decided to visit this site because the Battle of Gettysburg has just been released in Virtual Reality.

To gain more from this learning experience, you have brought army clothes and boots from home which you have put on during the 10-minute class break. You have noticed some other students planning to go to the same Website that day are wearing the

same. But desiring a more realistic educational experience, you have planned ahead so that your fatigues have the smell of gunpowder on them.

After putting on your headset, you begin your Virtual Reality session—but you quickly become very mournful because of the sadness of so much unnecessary killing. You can only stand 15-minutes of the battle because the reality of war is so real. You fast forward to President Lincoln’s Gettysburg Address. When he finishes his speech you realize that you are crying and are deeply stirred emotionally. Being a little embarrassed, you try to hide your tears. After class you seek out the school counselor and discuss the experience you just had.

This type of interactive, self-learning encounters continue for the rest of the school day in similar fashion. Thus, this model creates the kind of *positive* environment that can accelerate the education process for ADHD students!

What if you get sick, or are suspended from school for a few days? Will you get behind on your studies? No way. You simply log on the Internet at home (or from a local library), type in your password for educational access, and attend school as though in the classroom. No more going back to school depressed by all the piled-high homework needing to be made up.

Would this type of self-directed educational setting be to the liking of an ADHD student? Without a doubt. Since they are so good at exploring and discovering places no one else has been, they would probably be constantly sought out by fellow-classmates and asked, “How did you do that? How did you find out about that site?” In this environment all the gifts of ADHD children—creativity, exploration, imagination, investigative pursuits, inquisitive nature, intelligence, problem solving—are freely allowed to be used as they desire. Instead of being the *bad kid* in class who can’t keep his/her behavior in check, he/she is now considered the *smart one*. What a turnaround!

**Technology and Teachers' Role.** So what is the solution to the question, HOW SHOULD WE BEST EDUCATE ADHD CHILDREN? Answer. Change the *role* of the instructor from teacher-directed to student-directed with heavy use of the computer and the Internet—where the teacher is the guide, mentor, and coach. As much as possible, allow the student the freedom to direct their own path of learning based upon their own interest.

Instead of using CD-ROM’s or DVD-ROM’s for software, use Internet sites (as they become available) loaded with educational software having vital links everywhere around the globe.

However, if classrooms are equipped with a computer at every desk with Internet access, teachers shouldn't wait for educational software companies to develop lesson plans for them. They should formulate their own Web-based courses. For example, under the leadership of educational technology specialists, selected 4<sup>th</sup> grade teachers in a certain school district could divide up the tasks of writing flexible and multiple-faceted

lesson plans on a particular subject. A technology specialist could then convert all their work into a Web page, and place it on one of the school's server in the district, accessible for classrooms in their district. Then, after the students try these lesson plans, the teachers can edit and perfect them accordingly.

Grading should be done on a qualitative (conceptualization) basis versus quantitative (number of *right* answers to *wrong* answers). The learning process should be subjective (student constructed) versus objective (object of learning teacher constructed). Here it is in chart form for more clarity:

<b>Traditional Teaching Method</b>	<b>Suggested ADHD Learning Method</b>
Textbooks	Computer [on-line]
Teacher-directed	Student-directed
Teacher-led	Software-guided
Complete specific tasks	Construct learning process based on self-interest
Limited time frame for task completion	Structured time frame—cautious minimum and unlimited maximum amount of learning required
Objectively graded by third party ranked by right and wrong answers	Subjectively graded by self-directed efforts and accomplishments

To make a very clear distinction, I am not suggesting schools completely disband the traditional method of teaching. Many students will perhaps continue to learn better using conventional techniques for teaching/learning. However, for the majority of students who learn better by self-direction and intuition, we must create an educational environment similar to the one I have proposed above.

**Background Research.** Restating what I have cited on pages 2 and 3—“During my extensive Internet research on this subject this semester, I have discovered that even though there is a lot of information relating to the distinguishing characteristics and distinctive needs of ADHD children, the subject of educational solutions specific to their unique personalities is greatly lacking. However, I have found extensive educational software and Internet learning applications currently available which can be used for designing a fantastic learning environment for ADHD students.”

Earlier this semester I requested from the local school counselor the biography of every 7<sup>th</sup> and 8<sup>th</sup> grade classroom textbook used in the school where our ADHD son attends. Upon investigation I discovered the publishers of their textbooks for these two grades were: [Prentice-Hall, Inc](#); [Holt, Rinehart, and Winston, Inc.](#); [D.C. Heath and Company](#) (a division of Houghton Mifflin Company); [McGraw-Hill](#); and [Glencoe McGraw-Hill](#).

I then e-mailed a request to the customer service/sales section of each of these educational publishers, as well as to another of the largest in the international educational

market—[Addison Wesley Longman](#).<sup>1</sup> I inquired if any of them had 100% interactive software available, either in CD-ROM, DVD-ROM, or via the Internet that could *take the place of* classroom textbooks. I was very surprised to find out by their replies that few of them did.

Addison Wesley Longman directed me to their Internet site that listed all of their educational software available. There I found several *supporting* educational titles available, but *none* that could replace their current classroom textbooks with 100% interactive software.

Glencoe McGraw Hill had so much educational software available that they had to send me their *Media Technology* magazine in the mail. After examining it cover to cover, in my excitement I realized that I might have finally found a company which had such a broad array of interactive educational software available, a student could literally get a 6-12 grade education without ever leaving the computer. Not only did they offer software in all the core subjects (science, mathematics, social studies/history, language arts, health), they also offered supporting titles in foreign language, art, computer education, business education, family and consumer sciences, career education, consumer education, and adult learning.

Of all the major educational publishers mentioned, these two companies were the only ones to offer exemplary software for classroom consideration. However, all the software each company had currently available was only obtainable on CD-ROM, and not yet accessible via the Internet.

**Educational Websites.** It appears there are now dozens of Websites which provide teacher assistance for supplementing their lesson plans with Internet learning experiences. One of the best, in my opinion, is *Teaching With the Internet: Make Your Lessons Memorable Learning Experiences* (Teaching with the Internet). This site provides step-by-step Internet lesson plans which are subject-specific by grade level, complete with student handouts, on-line projects, and classroom group activities. Needing little preparation or planning, all the classroom teacher has to do is “follow the instructions.”

One of the better comprehensive Internet educational supplements for teachers is *NewsDEN in the Classroom* which comes out of British Columbia. *NewsDEN* has eight basic teaching aims for students (A Teacher's Guide to Using NewsDEN in the Classroom):

1. To expose students to current events at the international, national and local levels
2. To encourage comprehension of news stories
3. To expand vocabulary

---

<sup>1</sup> Both Addison Wesley Longman and Prentice Hall are now divisions of the huge International media conglomerate Pearson PLC in England. Homepage: <http://www.pearson.com/>

4. To improve online researching skills
5. To expand analytical skills and critical thinking abilities
6. To expand communication skills and the ability to consider various points of view
7. To improve map-reading skills
8. To use computers and the Internet to support the objectives of the 1996 Information Technology curriculum [of British Columbia]

*NewsDEN* also offers many other subject-specific sites such as *WritingDEN* (Improve your English with WritingDEN) and *MathDEN* (MathDEN). *NewsDEN* sites offer perhaps the closest online educational software I found which fits my educational solution proposition for ADHD students. Not only are these sites colorful and informative, they also have challenging interactive questions. The related Internet links they provide are also perhaps the most extensive I have run across in my research.

Another Internet supplemental aide for teachers which *NewsDEN* provides is their *TestDEN* (TestDEN). For a fee of \$69, *TestDEN TOEFL Trainer* allows you two-months of unlimited access of test training on any subject which is given by the Educational Testing Service (ETS).

Another great Website for supplemental educational software which is subject-specific comes out of Tasmania, Australia. As with British Columbia, these are both sites where distance between schools and homes are far apart. Tasmania's state library (State Library of Tasmania), supported by Tasmania's Department of Education, offers several full curriculum subjects for distance students.

A site with numerous Internet Lesson Plans for teachers, and which is also subject-specific, is *Classroom Connect* (Classroom Connect). I downloaded several of their free lesson plans and found them to be very simple to use as well as superb learning opportunities for students.

Perhaps the largest Educational Software site on the Internet is *BizWeb Category: Educational* (BizWeb Category). They list and link literally hundreds of addresses for educational software companies. Though not as exhaustive, *Suite101.com* also gives some beneficial educational software links with companies (Suite101.com).

What if you want to learn more about the computer, computer-programming, business software, networks or servers? Where do you go? Do you go to some local university? Ziff Davis University offers over 100 instructor-led courses and over 150 self-study courses over the Internet for the High School and Post High-School learner (ZDU).

**Summary.** One of the goals for this research paper was to make distinctly apparent the failure the traditional school system has been for ADHD students, both now and in the past. Change is usually very difficult to make, especially on a grand scale.

But the time is now here whereby change *must happen* in regards to newer instructional methods for ADHD children!

Another goal of this paper was to identify the educational problems which exist for ADHD students. This was necessary before I could come up with a proposal for a solution to my problem statement.

And finally, as mentioned, my primary goal was to provide an idealistic and obtainable solution which answers the question, “HOW SHOULD WE BEST EDUCATE ADHD CHILDREN?” By virtue of my experience with my own ADHD child, I believe the answer is two-fold: first, change the method of instruction from being teacher-directed to student-directed; secondly, maximize technology by using Internet-accessed computers with remarkable interactive educational software. This method of instruction has the remarkable ability to greatly diminish the negatives usually associated with ADHD children by highlighting and magnifying their strengths. With this proposed method, who knows—maybe ADHD kids will be our brightest students of tomorrow!

Still, none of this will take place unless two things happen. First, educational entrepreneurs or educational software companies must provide a complete set of K-12 highly-interactive educational software which can be 100% substituted in lieu of current textbooks. And they need to offer this via the Internet for obvious logistic problems associated with CD-ROM's, etc. Secondly, schools must provide every student with a Internet-accessed computer, and must activate this model very soon. If they don't, then alternate schools, such as Charter, Private, or Home Schools, will and are already doing so.

Though the computer and the Internet, equipped with outstanding interactive educational software, won't solve all of the problems for ADHD students, it will, at the very least, provide for them greater hope and higher self-esteem than they have ever experienced before in traditional classrooms.

## REFERENCES

Barchas, Jack D., Ed. (1996). *Quantitative Brain Magnetic Resonance Imaging in Attention-Deficit Hyperactivity Disorder*. Archives of General Psychiatry Abstracts: AMA (53:607-616). Available Online:  
<[http://www.ama-assn.org/sci-pubs/journals/archive/psyc/vol\\_53/no\\_7/oa5129a.htm](http://www.ama-assn.org/sci-pubs/journals/archive/psyc/vol_53/no_7/oa5129a.htm)>.

BizWeb Category: Educational. Available Online:  
<<http://www.bizweb.com/keylists/educational.html>>.

Classroom Connect: Interactive Curriculum. Available Online:  
<<http://www.classroom.net/onlinecatalog/curriculum.asp>>.

Crammond, Bonnie (1995). *The Coincidence of Attention Deficit Hyperactivity Disorder and Creativity* (RBDM 9508). Storrs, CT: The National Research Center on the Gifted and Talented, University of Connecticut. Available Online.  
<<http://www.ucc.uconn.edu/~wwwgt./cramond.html>>.

DSM-III-R Diagnostic Criteria for Attention-Deficit Hyperactivity Disorder (1987). *Diagnostic and Statistical Manual of Mental Disorders*, 3<sup>rd</sup> ed., Revised. Washington, DC: American Psychiatric Association. Available Online:  
<<http://ericps.ed.uiuc.edu/npin/respar/texts/special/adhd.html>>.

Gallagher, Teresa. *Born to Explore! Home*. Connecticut, USA: Born to Explore! The Other Side of ADD. Available Online:  
<<http://borntoexplore.org/index.html>>.

Gallagher, Teresa. *Modern Grade-School Pressures: Too Much Homework, Too Little Freeplay*. Connecticut, USA: Born to Explore! The Other Side of ADD. Available Online: <<http://borntoexplore.org/homework.htm>>.

Gallagher, Teresa. *Temperament Quotes*. Connecticut, USA: Born to Explore! The Other Side of ADD. Available Online: <<http://borntoexplore.org/tempquotes.htm>>.

Gallagher, Teresa. *The Exploratory Learner: Temperaments in the Classroom*. Connecticut, USA: Born to Explore! The Other Side of ADD. Available Online:  
<<http://borntoexplore.org/addlearn.htm>>.

Hyperactivity. Encyclopedia Britannica Online. Available Online:  
<<http://search.eb.com/bol/topic?eu=42727&sctn=1>>.

Improve your English with WritingDEN!. Act360 Media Ltd. Available Online:  
<[http://www2.actden.com/writ\\_den/index.htm](http://www2.actden.com/writ_den/index.htm)>.

KidsSource Online. *Diet Therapy For Attention Deficit Hyperactivity Disorder Gains Support By Doctors, Researchers And Parents*. From PR Newswire: Riverhead,

NY, 1996. Available Online:

<[http://www.kidsource.com/kidsource/content/news/Diet\\_ADD\\_article.html](http://www.kidsource.com/kidsource/content/news/Diet_ADD_article.html)>.

MathDEN: Mathematics Resource for the Home and Classroom. Act360 Media Ltd. Available Online: <[http://www3.actden.com/math\\_den/iindex.htm](http://www3.actden.com/math_den/iindex.htm)>.

Murphy, Lynn. *ADD and Autistic-Like Behaviors*. Kidsource Online: Source-The Feingold Association. Available Online:

<[http://www.kidsource.com/Feingold/ADD\\_and\\_drug.html](http://www.kidsource.com/Feingold/ADD_and_drug.html)>.

Newman, Renee M. (1998). *Home-School Management for Attention Deficit Children (ADD/ADHD), With or Without Hyperactivity*. Henderson, MI: Dyslexia & Dyscalculia Support Services. Available Online:

<<http://www.shianet.org/~reneenew/ADHD.htm>>.

Portable Computing (July, 1998). *Feeding Your Head*. EEG Spectrum: Encino, CA. Available online: <<http://www.eegspectrum.com/articles/portabex.htm>>.

Palladino, Lucy Jo (1997). *The Edison Trait: Saving the Spirit of Your Nonconforming Child*. Reviews: Parenting and Families Editor's Recommended Book. Amazon.com: A Glance. Available Online:

<<http://www.amazon.com/exec/obidos/ISBN%3D0812927370/borntoex.../002-4464133-924545>>.

Seay, Bob. *Attention Deficit Disorder: A Brief History of ADD*. From the Mining Company. Available Online:

<<http://add.miningco.com/library/weekly/aa090597.htm>>.

Subtle Brain Circuit Abnormalities Confirmed in ADHD (1996). *KidSource Online*, National Institute of Mental Health Studies. Bethesda, ND: Source-PR Newswire. Available Online:

<[http://www.kidsource.com/kidsource/content/news/brain\\_ADHD.html](http://www.kidsource.com/kidsource/content/news/brain_ADHD.html)>.

Suite101.com: Community Based Best-of-Web Guide. Available Online: Homepage <<http://www.suite101.com/>>.

State Library of Tasmania: Internet Curriculum Resources. Available Online: <<http://www.tased.edu.au/ccddiv/library/dealic/1997/697/learn.htm>>.

A Teacher's Guide to Using NewsDEN in the Classroom. Act360 Media Ltd. Available Online: <[http://www3.actden.com/news\\_den/t-guide.htm](http://www3.actden.com/news_den/t-guide.htm)>.

Teaching with the Internet: Make Your Lessons Memorable Learning Experiences. Interactive Curriculum: Subject Specific. Available Online:

<<http://www.classroom.com/onlinecatalog/28.asp>>

TestDEN: TOEFL Trainer Information. Act360 Media Ltd. Available Online:  
<<http://www.testden.com/info.htm>>.

Webb, James T., Latimer, Diane (1993). *ADHD and Children Who Are Gifted*.  
Reston, VA: ERIC Clearinghouse on Disabilities and Gifted Education. ERIC Digest  
522: ED 358673. Available Online:  
<<http://ericps.ed.uiuc.edu/npin/respar/texts/special/adhd.html>>.

ZDU (Ziff Davis University): *Learn More, Learn Now*. Available Online.  
Homepage. <<http://www.zdu.com/>>.