Teaching Systems Thinking to Children with Attention Deficit Disorder through the Use of Mapping Software

by Patricia N. London, Learning Consultant, Ridgewood Public Schools

As you may have noticed in last year's newsletters and again in this one, there have been several calls for projects to be funded through the Gordon Brown Fund at MIT. The following paper was a study undertaken with funding from that Fund. It represents a departure from some of the articles presented in this newsletter for two reasons. Firstly, it is our first article dealing with the practicalities of teaching children with special challenges. It was thrilling to get an article on the subject. As so often happens, better teaching techniques for children who have problems learning can also effectively be used in the regular classroom. Secondly, this article is not about modeling per se, but rather about the skills which lead up to modeling, such as mapping, and are therefore appropriate for younger students.

This study was designed to introduce a unique group of children with Attention Deficit Disorder to the computer program **Inspiration**, with the supposition that graphic organization could improve their memory, attention span, and reading comprehension. Based upon Nancy Roberts' study, reported in *Teaching Dynamic Feedback Systems Thinking: An Elementary View,* which indicated that fifth grade youngsters were capable of taking written material in the area of social studies and explaining underlying structure by drawing causal loop diagrams, the focus of each session was to instruct the children how the com-

puter program could help them map and model the events of a story or book that they read. This three week summer project was designed to determine if children with inherent problems of attention span and recall could improve their understanding of causal relationships and visually diagram sequential information. Furthermore, the writer was interested in determining if they could then apply what they determined in their visual graphic models to their writing summaries, with the byproduct being increased comprehension skills.

Introduction

The author chose to use the computer program **Inspiration** in a project designed to provide an impetus to youngsters with discernible characteristics of Attention Deficit Disorder. The children selected have characteristics of the disorder: limited concentration, difficulty sustaining attention, and a history of school related problems associated with hyperactivity and distractibility. Most of these children receive special educational services and tutorial sessions during the school year, designed to improve their deficiencies in memory, concentration, and focusing. The children ranged in school grade from first through sixth, and participated on a voluntary basis during the month of July. Sessions were held three times a week for a period of three weeks. The writer/teacher provided individual instruction in selection of appropriate

material as well as in teaching how to use **Inspiration** to brainstorm events and concepts introduced in the reading material.

The computer program **Inspiration** allowed the children to graphically organize information on a computer. The emphasis of the sessions was to instruct each child in the capabilities of the program, to show how they could sequence events in a story through diagramming relationships they felt were worth noting. Each student was to become versed in using the computer program to ultimately model and map events and depict relationships between characters, settings, and themes of book selections, which they read independently or aloud. The goal of each session was to determine if memory, measured in terms of reading comprehension, could be enhanced through the use of a computer program which allowed each child to graphically demonstrate cause and effect, sequential events in the book, and interpersonal relationships of the characters.

Rationale for the Project

Inspiration is a software package described as an "easy way to brainstorm, diagram, and write. It is possible to create idea maps, flow charts, and demonstrate causal relationships through this visual thinking tool." It has not been used with the population of

UPDATES. . .

Catalina Foot Hills District

Faced with the challenge of an almost entirely new Grant Project mentor staff (with the exception of Heidi Taylor at Esperaro Middle School), the District has done an incredible job of creating curricular innovation using system dynamics in the classrooms at all levels. There is an energy and excitement as well as a general feeling that the ball is now rolling permeating the project. It is fun to see!

Since the elementary schools are the most recent addition to the active schools in the Catalina district, it might be useful to others to see what kinds of applications of system dynamics are going on in their district at the K-5 level:

Grade 1
•Behavior over Time Graphs to study increasing responsibilities with age.
•Friendship authentic situational simulation, emphasizing friendship skills and "blockers". This took place in a gym with a group of students as the class and others as the 'blockers'' and the "friendship skills". The skills and blockers could "get" people from the center group. It is similar to the rules of Oh, Deer. A physical simulation such as this is graphic and understandable even at first grade level.

Grade 3
•STELLA model used to explore exponential growth of a rabbit population (Fibonacci Numbers).

Grade 4
•Investigation of tool applications in a unit on ecosystems.
•Behavior over Time Graphs used to analyze tensions between Britain and the Colonies leading to the Revolutionary War.
•Systems Archetypes used to analyze the Great Compromises.

FROM THE EDITOR. . .

The main activity at the CLE has, of course, been setting up the conference. It is coming together as a learning conference with the emphasis on passing on of techniques, philosophies and tools from the more experienced to the less experienced. There will also be ample opportunity for the "old hands" to interact and discuss the issues which have come up in their classrooms as well as the deeper philosophic concerns. We have registrations for over 100 people for the approximately 250 places, so if you are intending to come, I would recommend sending in your registrations soon.

We will be putting out a new list of materials this month. At this point one of our criteria for adding anything to the list is that we have it available on disk and are able to put it on the Internet. If you wish a paper copy of it, just send us a call, a note or e-mail.

We are looking forward to seeing old friends at the conference and meeting new ones. Have a beautiful spring!

Lees Stuntz (stuntzln@tiac.net)

•Use of Behavior over Time Graphs in the discussion and analysis of a fairy tale.
•Use of systems archetype to demonstrate issues of increased taxation and troop deployment by the British prior to the Revolutionary War.
•Behavior over Time Graphs and STELLA model with the American Revolution unit focusing on the rising anger and frustration leading to changes sought by the Colonists.

Grade 5
•Computer simulation of the stock market allowing students to "play' the market and simulate the crash (of the Great Depression).
•Behavior over Time Graphs to illustrate changes that occurred during the Industrial Revolution.
•Runaway to Freedom, a literature study including Behavior over Time Graphs and Causal Loop Diagrams.
•Behavior over Time Graphs used to analyze tension between the North and South leading to the Civil War.
•Systems Archetype used to analyze escalation leading to World Wars.
•SD tools used to analyze the rapid

development and expansion of industry during the Industrial Revolution.

Challenge Program
•SD tools used to study population survival relative to habitat.
•Behavior over Time Graphs and Causal Loop Diagrams used to assess personal progress and modify behavior based on feedback.
•SD tools used to study issues that will affect the future.
•Causal Loop Diagrams used to recognize feedback and analyze balance.
•Oh, Deer" authentic situational simulation using Behavior over Time Graphs and Causal Loop Diagrams to illustrate the balance between deer and their environment..
•Harambe Unit on prejudice using Behavior over Time Graphs and a STELLA map of self-esteem and factors that affect it.

Library, multi-grade
•System dynamic tools used to make decisions in the design of an imaginary town.

Teaching Systems Thinking, *continued from page 1*

people and children characterized as Attention Deficit Disordered in any formal study, and the writer felt it had the potential to capture the children's limited attention span and allow them to participate with motivation in the writing process. **Inspiration**'s idea book does refer to a bibliography of texts in which the concepts of mind mapping and clustering are elaborated upon. One reference, *Use Both Sides of Your Brain,* by Tony Buzan, describes how "mind mapping techniques aid in memory retention, note taking and creativity." The writer was interested in the premise that children with ADD also could benefit from a computer program which provides a format for idea mapping and subsequent better creative writing, given that their weaknesses are in memory retention and organizational thinking.

Using computers with special needs children has proven to have many advantages from the writer's personal experience working with children and teaching them programming languages such as FORTRAN, BASIC and LOGO The interactive nature of the computer, the fact that it is non-judgmental, and the instantaneous feedback it provides, all appear to provide a media which is captivating and sustains attention for youngsters with learning disabilities.

In order to understand the uniqueness of the project, one must be familiar with the definition and terminology of the disorder—Attention Deficit. Children and adults with ADD often have serious problems in school: inattention, impulsiveness, hyperactivity, disorganization, and other difficulties which can lead to unfinished as-

signments, careless errors, and behavior which is disruptive to themselves and others. People with ADD exhibit problems with memory often because their metabolic brain activity is such that they are unable to inhibit messages sent from other areas of the brain. These adults and children fail to block out inappropriate responses, and subsequent hyperactivity and inattention result. Children with ADD appear to not pay attention to the big picture and often are described as spacey but creative. These children characteristically approach a task impulsively and with little forethought to the consequences of their actions. The brain of the child with ADD is being bombarded with more information than he can register in his memory, and his attention suffers be-

The Second Systems Thinking and Dynamic Modeling Conference

July 17-19, 1996

Wheaton College
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- Sessions focusing on:
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    - Organizational change using the systems approach
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Preceding the International System Dynamics Conference,
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Teaching Systems Thinking, *continued from previous page*

cause of a faulty filtering system. ADD is best described as a problem with inhibition. This is why these adults and children find it difficult to separate the flow of events, but instead run everything together.

The writer set out to determine if by using the graphic organization of **Inspiration**, the ADD child's ability to sequence thoughts in a systematic format could improve, as well as his/her memory for linear details. Furthermore, these children, who inherently find it difficult to recognize the flow of events, were studied individually and guided verbally to explain the metacognitive strategy used when documenting each chapter read. Given the fact that the children selected were accustomed to school failure or had difficulties because of their distractible nature, the sessions were voluntary and structured around one chapter of the chosen literature a day.

Description of the Project

Given the ages of the six children, it was possible to group one sixth grader with a fourth grader who had similar reading interests and had selected the same book. The two second graders were grouped in a cooperative learning project in which they were allowed to choose several books by the same author, a collection of poems, or books they brought from home. The first grader participated on a more individualized basis and was assisted by a high school student volunteer who recorded this youngster's summaries and comments on the books she chose.

Each of the six students was allowed and encouraged to take home an Apple PowerBook, with his/her own **Inspiration** disk. Parents were interested in having the computers available each evening and insisted that the children be responsible for understanding how to load and operate the machine and program. Homework for each student involved nightly reading from the

books they selected. They were encouraged to use the **Inspiration** program at home to document anything they would like to share the next time we met. Topics for homework included diagramming a summary of a chapter, describing a game they played at night, or modeling something that was important to them.

The Study

Brett and Derek are a sixth and fourth grader who took part in the project. These two boys used brainstorming to generate their summaries of each chapter from the book about the magic land of Narnia, *The Lion, the Witch, and the Wardrobe*. For these nine and eleven year old boys, **Inspiration** served as a visual tool to help them formulate summary statements about the main idea of a chapter as well as character analysis statements. Initially, these students used a flowchart framework as their rationale for representing a sequence of events or an adventure in the story. While the flowchart symbols were available on **Inspiration**, these youngsters chose to diagram the order of events in terms of steps, with arrows flowing to the next event.

Initially, the diagrams appeared as a "stream of consciousness" in that facts were typed in randomly ordered receptacles, on the **Inspiration** format. After verbally reviewing the first chapter, the youngsters decided to use a framework that would help answer the questions: who, what, when, where, and why. The boys appeared to pick a central idea, generally the chapter title or theme, and project from the center frame to the "what" question. During the second and third sessions the boys were shown the **Inspiration** template for brainstorming provided in the tutorial package. They then began to produce more detailed and comprehensive diagrams themselves. Over the course of two weeks, their diagrams became more organized and connected as they learned to depict how events

were sequential and characters could be associated. These older students selected a central idea graph, or web diagram, and used it to show the relationship between the central main idea and the facts from each chapter. This proved to be a useful tool for writing and reviewing the concepts introduced in each chapter.

Given that these students have Attention Deficit problems, it was remarkable that they were able to stay on task for the hour period, without exhibiting characteristic symptoms of restlessness and inattentiveness. Behavioral characteristics which can be associated with Attention Deficit Disorder are lack of focus and overattention to detail or inattentiveness. The features of **Inspiration** causing distraction for these children were the icons from the symbol selection, which they overused. For example, when shown the possible color choices, the boys utilized the color feature, rather than the significance of the icon's meaning. They tended to want to use only the color printer rather than the black and white. However, the factors impeding their ability to make a more detailed analysis of each chapter were related to their skill deficiencies with keyboarding and spelling rather than ADD.

Initially, these two boys were fascinated by the various possibilities of the pictures which could be incorporated into their webbed diagrams. After getting into the book they were reading, *The Lion, the Witch, and the Wardrobe*, they changed their strategy for diagramming and mapping events, and began to show a preference for the basic geometric symbols rather than the variety of comic symbols. This occurred once they started to understand the chapters, and became more familiar with how **Inspiration** could help them recall the events in a story. The central idea in the circle with the supporting details on the arms of the diagrams became a format for these two students. The actual symbols and their meaning were less of a feature

once the students were given a time limit in which to work. These ADD boys were able to stay focused on the activity of brainstorming and showed a preference for recording sequential and related data in a pattern, completing the answers to who, what, where, when, and why.

The two second grade students were also male youngsters with symptomatology of ADD and learning difficulties. For these children, the ramifications of **Inspiration** were somewhat different from those for the older boys. They were fascinated by the concept that they could take home a PowerBook computer to document their reading each night. When first shown the program and the brainstorming template, the students proceeded to change all of the elliptical shaped idea frames to asteroid shapes. This impulsive action had more to do with their preference for the shape and its enlarged form than any significance to the story elements. They did, however, maintain the interconnecting features through the use of arrows between frames. One student diagrammed the book *Nate the Great*. His main idea frame was an asteroid, but no other facts were drawn to the central space. From there, this child sought out the structure that was provided in the tutorial model template and inquired how to incorporate the diagram into his own chapter summary. He proceeded to place numerals with a pencil and put the events into order. He then wanted to retype the diagram. His second attempt was much more organized and involved the use of the graphic organizer representing sections with who, what, when, where, and why.

The poems of Shel Silverstein were used for oral reading and were graphically represented by these second graders. The second graders chose to compare poems and used a graphic organization pattern consisting of a split page with various icons as the means to represent the each boy's favorite poem.

The project undertaken by the first grader was more content related, and consisted a book report written with **Inspiration** and dictated by the child. This particular girl was able to recall through an exchange of dialogue, although she lacked keyboarding skills. She produced more chapter summaries than the older students, but all were in the format of a sequence of events. Her attention span was limited and after one half hour she fatigued generally. Her diagrams with inspiration served as a means to help improve her memory and recall . She was able to reread her dictated **Inspiration** work and could remember the events of the story in order. Most of the diagramming for this six year old consisted of step diagrams which relayed the order of events in the story. The graphic symbols which accompanied them appeared to be enlarged and were chosen from the comic icons. She also used many colors to print her information.

Results

The results of the three week project appear to be positive for many reasons. For the students, the gains were evident in their improved facility in reading comprehension skills and utilizing mapping techniques for various ideas and concepts introduced in their reading material. The computer program, **Inspiration**, proved to be motivating for all of the students. This may be attributed to the fact that its use was demonstrated on an individual basis, and feedback for the students' modeling was provided immediately, unlike in a regular classroom situation. The best results were seen in the computer projects that involved cooperative learning and the use of partners to document reading comprehension.

The sessions for the ADD students occurred over a three week time period. The hours were scattered to accommodate the individualizing which was necessary for brainstorming and recording information with the **Inspi-**

ration program. Each child was interviewed to determine his/her reaction to the summer project.

It was interesting to note that attendance was perfect. Each child followed through with his/her homework assignment of reading, but only two actually used **Inspiration** on their own. Only the parents of the younger students used the program for dictation. Each child commented that they enjoyed working with the computer and liked the program. The older students felt that given a choice between paper and pencil, they would use the computer to web and diagram their sentences. They said that in the future they could use **Inspiration** for all their book reports to help classify information and make it easier to write. They felt that **Inspiration** was not all good because it took a long time for them to make the branches of the diagram with arrows. They were impatient with the idea that they had to click on the main idea and then move the arrows in different directions. When asked if they would use the program for writing other than book reports, the boys commented they could use it for studying the main idea in social studies. They felt that they could write a topic sentence after using **Inspiration**. They also commented that paper and pencil could be easier because you could erase.

The second graders felt that they learned how to make things bigger on the program. They stated that they could now web and make diagrams. When asked how they could use the program themselves in the future, they commented, "When I get a new book, now I can outline." They did not like the idea that only some of the computers had a colored monitor, but preferred that all should, as well as colored printers.

The first grader's mother provided the feedback that her daughter's memory for details and information was

Teaching Systems Thinking, *continued from previous page*

significant after using the brainstorming format with the graphic organizer. She was able to verbally recall the sequential events of the stories that she read much better than without the visual clues.

For students with ADD, the summer session with mapping and modeling on **Inspiration** provided a media for them to organize their thoughts about what they had read. Each student was able to apply metacognitive strategies to organizing information regarding chapter summaries. They systematically explained verbally how they would be illustrating the relationships in the next chapter, after they completed a chapter reading. This ability to verbalize their thought processing was novel to these children who characteristically approach tasks impulsively and with little forethought to results. The individualizing which occurred in the project allowed the children the opportunity to express their ideas while the writer recorded for those with limited keyboarding skills.

The fact that the students became aware of the distracting features of the colors and icons and shared their later preference for the elliptical shape, indicated that they were aware of a metacognitive strategy that worked for them. The ellipse was chosen because they said it took less time to produce. This to the writer represented their increased perception of time management and their awareness that mapping and modeling sequential information could help them direct their efforts with a meaningful result.

The final product for the older students was a paragraph which served to demonstrate that these children saw the application of **Inspiration** to the writing process. "Up until this point," one child commented, "I had no idea how to start to write." The culminating paragraph contained numerous spelling errors and was devoid of punctuation. It did fulfill the assignment requirement of writing and was a significant accomplishment for a child with limited attention span and problems organizing and completing a task.

Summary of Findings

•Children with ADD were able to improve their memory for details through the use of pictorial representation.

•Sequential memory was enhanced by means of graphic organization which allowed each child to see the relationship between events.

•Keyboarding skills were not an important factor for the older students as much as spelling ability.

•Older children produced fewer graphic organizers and were more analytical in their summaries. They devised a format of diagramming who, what, when, where, and why webbing maps for plot, character, government and weather elements of the story.

•Younger children were more interested in the color selections and the choices of the icons. They did not necessarily choose icons related to what they had read. When time limits were placed on them, the students did not want to bother with the icon choices, but worked to finish their diagramming within the time period.

•Comprehension and memory improved as the older students demonstrated the relationship between the diagram they made and the outline it produced. They were able to write a well developed paragraph which incorporated all of the ideas introduced in the mapping.

•The ADD children appeared to sustain attention to the task at hand and were able to recall more details, particularly when reminded of a time limit.

While the study was limited in time, it appears to demonstrate that children with ADD can recall more information when they are given a framework and a process of recording data they read in a story. **Inspiration** allowed this ADD population the opportunity to perform metacognitive ex-

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Please join the K-12 Discussion Group

We need more people who are active in K-12 education.to join the Internet discussion group at **k-12sd@sysdyn.mit.edu**. Professor Forrester hopes in the next few weeks to establish a much more useful flow of communications.

The following are among the topics that should be exchanged:

1. Reports of experiences—successes, interesting vignettes, problems, failures.
2. How best to introduce systems and modeling to students.
3. How to encourage colleagues to use systems education.
4. What organizational structures contribute to learner-centered learning.
5. What classroom techniques work best.
6. When does the learning curve steepen for students and teachers.
7. What materials are most effective.
8. What research would help systems education and learner-centered learning.
9. What assessment techniques are effective.

Send request to join to: **nlux@mit.edu** (Nan Lux). When contacting Nan Lux, please send the following for the database: First Name, Last Name, Title, Organization, Street, City, State, Zipcode, Country, Day telephone, Evening telephone, Fax number, Email address

Updates, *continued from page 2*

Entire Staff (at various schools)

•Participation in the Fish Banks Simulation.

•Introductory presentation- system dynamics tools and their applications.

•Inservice workshop (half day) repeated each year for new staff members including: What is system dynamics? What are the tools? What are some potential applications?

•Inclusion of suggested system dynamics tool applications throughout the social studies curriculum document.

•Development of discussion questions designed to encourage recognition and analysis of change over time for use with a simulation.

Parker Essential School

The Parker Essential School is a Charter School established on the old Fort Devens Army base in Ayer, Massachusetts. They have joined the Schools of the Systems Education Consortium (Acton, Carlisle, Concord and Harvard) in applying for a middle school grant for the use of systems thinking and dynamics in an interdisciplinary approach to problem solving. This excerpt is from their newsletter.

What are Parker Students Doing with STELLA?

Visitors to Parker's first Exhibitions Week may have noted that some of the students incorporated a mathematical "systems modeling" approach into their project work. In Deb Merriams' project on Food, Population and Community, students used computer simulation software called *Systems Thinking and Experiential Learning Laboratory with Animation* —or STELLA, for short—to explore how changes in things like birth rate and food supplies affect the way an entire system functions. Dessa Dancy and Kathleen Newman, two Harvard residents with expertise in systems thinking and mathematical modeling, volunteered their time to Deb's project during an intensive week of coaching that

introduced "a whole term's worth of material," as Dessa commented wryly later.

We look forward to exploring this interesting resource with more Parker students as the year progresses, and invite other parents or community members with expertise in this field to help us learn together how to use it best.

Carlisle Public Schools

A member of the Systems Education Consortium, Carlisle Public Schools availed themselves of Peter's Senge's talents last year when they had their first Technology and Education day. The second was held recently.

I had the pleasure of attending Carlisle's second annual Technology in Education Forum held on Saturday, January 27th. Last year Peter Senge spoke and stimulated a great deal of enthusiasm and interest. This year's talk was by Tom Snyder of Tom Snyder Publications. He is a publisher of high quality "educational" software. He has many interesting things to say and, he says them very entertainingly. He reiterated several times during his speech that the way to introduce technology into schools was to give each teacher a computer and let them find out how useful they are. What middle manager in America is without a computer on her desk??

•His two central points were:
1. Teachers are the center of the loop of learning.
2 Learning is all about relationships—the bottom line of education and learning is the relationships between people. Learning happens in relationships.

•Many of our problems with technology stem from the fact that technology is both irresistible and pathetic—like kids.

•Let us introduce technology gracefully, not spending huge amounts of money, but gently and slowly. The

factors which prevent that grace:
1. Built-in insecurity for all of us. We are blinded by science.
2. Guilt about new technologies—it is almost evil to resist technology.

•Technology is coming—it is here for good. We need to start to use our insight and intuition as educators about how technology can be used and not just accept it whole hog.

•A large study was done by the Rand Corporation in 1978 to address the problem of technology's being funded and then petering out (the two examples were teaching machines and language labs) This study came to two conclusions:
1. Innovations in schools will fail if they don't take into account the complex social nature of schools.
2. A group of central adults must be found and directly benefited. People have to find technology easier to use than not use. (In education this group of central adults is self-evident—the teachers.) Change has much more to do with the anthropology of the system than with anything else. If the technology can't exist comfortably in a school, it won't make a difference.

•Our instincts have gotten murky: There are many circumstances which threatened Tom Snyder's instincts, they were situations which made him go against his instincts about people, relationships and teaching for a brief periods of time before he came back to his instincts.

•Current educational fallacies:
1. Computers are interactive. You have more interaction with your cat than you can have with a computer. A relationship with a computer is what we have to cure ourselves of. The teacher is a necessity to bring it alive! No one asks the question "is it interactive?" except about kids and software. Resist the notion that children must

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have a relationship with a computer. Computers are not interactive; they are choosy.
2. Linear is "bad." Try living with someone who is not linear. What is a book, a well conceived report? Language is linear. Do you want your child to write a report as a paper or as a hypercard stack? Which shows his thinking better? Which shows consistent sequence?

Mr. Snyder ended with an interesting story about a school in Chinatown. The school followed every technological advance from teaching machines through digital computer labs through PC's. The principal was able to get funding for every technological advance. They all failed to become part of the structure of the school. A few years ago they were about to give it up when Tom counseled: give every teacher a computer as a tool. They now are a technologically adept school.

Ridgewood

The activities in the Ridgewood Public Schools range from a comprehensive technology plan, through a nascent middle school curriculum project, to the ongoing activities in the Willard School headed by Tim Lucas, in both organizational uses of systems and in curricular applications. (Patty London, the author of our lead article, works with Tim at Willard.) One of Tim's foci has been to continually bring systems thinking tools, not only internally to the school organization and his staff, but also in an outreach program to the students' parents.

Last week at a parent workshop I reviewed the three major areas we need to strengthen together as a school community. In each of these areas there are specific tools we need to use to help ensure our success in a rapidly changing world. I also attempted to show that these tools are also incorporated into our curriculum and school program.

In brief, the tools focus on building our **aspirations** *(using the tools of Personal vision and Shared vision).* In the classrooms, that involves Willard's Mission Statement, understanding the role of technology in elementary education, and creating an atmosphere where we gracefully disagree.

A second area of focus is strengthening **communication skills** *(using the tools of Mental Models and Team learning).* Both in the classroom and in our community we need to be able to share our aspirations and understand differing points of view using maps and models. Children in the class and adults working together on school programs can learn as a team and solve problems as a team when refined communication tools are used.

The final area we must understand is the **interdependencies** *(using the tool of systems thinking)* that exist in our world. In our classrooms, writing, reading, working with number, understanding history and the natural sciences and solving problems are all interrelated. In our community, growing populations, budget concerns, quality education, parenting issues, and our aspirations for our children are all related. The important tool we need in this area is the understanding of systems thinking and how a range of variables impact each other and change over time.

When we offer students the opportunity to use all of these tools in the classroom we are equipping them with 21st century skills because their world will continue to become more complicated and challenging. When we use these tools as a school community of teachers, parents, and principal, we are able to apply leverage to complicated local problems and work as a learning organization.

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Internet Information

For those of you who have had trouble accessing the ftp server (sysdyn.mit.edu) and the web site (http://sysdyn.mit.edu), your difficulties should be coming to an end. The members of the System Dynamics in Education Project (SDEP) under Jay Forrester and Nan Lux at MIT have done a complete revamping of both sites. Soon there should be available to down load from both sites:

1. A complete set of Road Maps (excluding *Systems 1* by Kauffman which is available from the CLE or Pegasus Communications).

2. All the CLE materials which are available on disk as well as the latest List of Materials.

We have switched over, both at CLE and on the server, to a universal document format by Adobe Acrobat. That means that you will need to download an Acrobat viewer from the Internet (or get one from the CLE if you are asking for documents on disk to be mailed to you). We switched from many reasons, not the least of which was automatic compression for all platforms, as well as the fact that Acrobat is rapidly becoming the industry standard.

The Common Ground documents can still be read indefinitely from you machine with your Common Ground viewer. If you wish to switch all your documents to Acrobat, we will do our best to send them to you.

GORDON STANLEY BROWN FUND

**To support preparation for distribution of materials
for using system dynamics in K through 12 education**

May 1, 1996: Application deadline for funding for the summer of 1996

Be sure to submit your proposals prior to the deadline.

The Gordon Stanley Brown Fund has been established to promote system dynamics and an understanding of dynamic behavior in feedback systems in kindergarten through 12th grade schools.

The Gordon Brown Fund can support teachers for:
  • Released time or summer time to put into usable form materials and methods that have already been used in schools and that could be of help to others.
  • Communicating experiences that did not meet expectations so that others can be forewarned.

The Fund will focus on making experiences available to others. The financial assistance can be used for released time and summer time for putting into transmittable and usable form materials and experiences that have already had classroom exposure. Small and medium proposals are encouraged.

Work supported by the Fund is to be available for distribution through the Creative Learning Exchange and any other channels that the author arranges.

The Fund honors Gordon Brown, who pioneered the theory and practice of feedback dynamics and engineering control systems at the Massachusetts Institute of Technology in the 1940's. Brown went on to be head of the Electrical Engineering Department and Dean of Engineering at MIT. During retirement, he has devoted energy and skillful leadership to bringing system dynamics into the Catalina Foothills school system in Tucson, Arizona.

There is no standard application form. Address requests, with an outline of the proposed project, to:

Jay W. Forester, Committee Chairman
Massachusetts Institute of Technology
Building E60-389
Cambridge, MA 02139
e-mail: jforestr@mit.edu

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ercises and then structure their brainstorming ideas to show relationships of cause and effect.

The children were asked questions about how they could record the main idea of a selection and related facts. The process of predicting outcomes together and discussing events appeared to assist their memory for details at a later date. Sharing ideas through peer interactions was a significant feature of this project. Also significant was the fact that each student spent an increased amount of time on task using a strategy which produced results. For the population of ADD children, staying on task is significant due to their limited attention span, impulsiveness, and overall lack of organizational skills.

While thinking and sharing ideas through peer interaction was a significant factor of the project, there were specific benefits for these children in the use of the computer application with its ability to organize information visually. Each child was able to increase his/her amount of time on task, a factor of deficiency associated with limited attentions span and concentration. Although limited in time, the study demonstrated to the writer that these children could work more indepen-

dently when given a framework to structure their writing.

Children with ADD responded to the instantaneous feedback of the computer and the fact that they did not have to be proficient typists to document their recall of events. Reading comprehension was improved as each student was able to recall the book or chapter they read with supporting details. Writing a final short paragraph was an accomplishment for these youngsters who are normally resistant to committing their thoughts to paper and who are also weak students in organizing and finishing their work on time.

Educational Implications of Using *Inspiration* with an Attention Deficit Population

Graphic organizers have been proven helpful for arranging ideas prior to answering essay questions and writing expository written language assignments. For youngsters with ADD, the use of **Inspiration** could provide a framework and a process to record information and help alleviate the steps that are often overwhelming for these children and require intervention from a teacher. **Inspiration** was a tool for metacognitive exercises as well as a structure for recording data which the

children obtained in their reading assignments. By providing a process by which children predicted an outcome to a story, and thought aloud before recording data, the writer noticed increased motivation and a willingness to complete a task.

Future projects involve the use of **Inspiration** as a tool for improving the writing ability of students with ADD. **Inspiration** can be a medium for recording story sequences and a source of encouraging independence in writing through graphic organizers and outlining. Key to this is the availability of enough computers and printers to make the daily writing and printing of summaries possible, rather than as an exercise in a computer class.

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