

KATE SHEAFFER

9/27/2000

Kendria,

as promised —

Draft NIF Report on
Public Schools & copy of
materials sent to Bethany.

Speak with you soon.

Thanks,
Kate

KATE SHEAFFER

September 13, 2000

TO: Bethany Little
Domestic Policy Council
The White House

From: Kate Sheaffer
(718) 478-6540

Thank you for your interest in the National Issues Forums (NIF) report on public education, to be released in Washington, D.C. the first week in October. As promised, enclosed you will find a draft copy of the executive summary of the report, along with background material on NIF and the Kettering Foundation.

The full report is based on an analysis of non-partisan forums held in 34 states and additional field research conducted by Doble Research Associates, a research firm specializing in public attitudes on policy issues. As I mentioned on the telephone, NIF has briefed White House personnel on several issues, including the internet, social security and affirmative action.

Participants who will be coming to Washington for the briefings include John Doble, founder of Doble Research, two or three moderators who have conducted NIF forums and officials from the Kettering Foundation. We are very flexible with the format of our presentations, but generally, we begin with a brief explanation of NIF followed by a 15-20 minute summary of the forum and research results. The group is then available for a Q&A session as your time permits.

I would like to follow-up with you as soon as possible to discuss possible attendees from the White House, and others you might suggest, and dates that might be most convenient for you. I have also spoken to Bill Galston and Bob Eagen, who are interested in the report findings.

To: Bethany Little
Page 2

**Please let me know if you need more information.
Thanks again for your guidance and offer to help
organize a briefing.**

Enclosures:

**"Public Schools" Issue Book
Background on NIF
Kettering Foundation's Brochure
Draft Summary of Findings**

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9/26/2000

Public Schools Are They Making the Grade?

A Report for the National Issues Forums (NIF)
Prepared by Doble Research Associates

September 2000

National Issues Forums (NIF)

NIF are a non-partisan nationwide network of educational and community organizations that deliberate about nation-wide issues. NIF forums do not advocate a specific solution or point of view. Rather, deliberative forums provide a way for citizens to exchange ideas and experiences with one another, and make more thoughtful and informed decisions. For more information about NIF, contact NIF Research, 100 Commons Road, Dayton, OH 45459-2777. Phone: (800) 433-7834. www.nifi.org

Doble Research Associates

Doble Research Associates, a public interest consulting firm based in Englewood Cliffs, New Jersey, specializes in exploring, from a nonpartisan perspective, people's thinking about complex public issues. Public opinion, instead of fixed and immutable, is usually dynamic and evolutionary. Especially when it comes to complex issues or policy initiatives, the formation of public opinion is a process – a work in progress as opposed to a still life or a finished product. Doble Research maps people's thinking by identifying the public's "starting point" – what people think about an issue at the current time, before learning more about it. Then we lay out, step by step, how people's thinking changes or evolves as they consider other points of view and have time to deliberate about an issue. We prepare an in-depth blueprint of *how* and *why* people feel as they do. For more information about Doble Research, contact the firm at 375 Sylvan Avenue, Englewood Cliffs, NJ 07632. Phone: (201) 568-7200.
www.dobleresearch.com

About This Report

To learn how citizens are thinking about the issue of education, Doble Research Associates analyzed the results of National Issues Forums (NIF) on the topic of "Public Schools: Are They Making the Grade?"

What are National Issues Forums?

NIF bring together citizens around the nation to deliberate about, work through, and make informed decisions about challenging social and political issues that face their communities. Thousands of civic, service, and religious organizations, as well as libraries, high schools, and colleges, have sponsored forums on issues such as the economy, education, healthcare, foreign affairs, and crime. The sponsoring organizations select topics from among each year's most pressing public concerns, then design and coordinate their own forum programs, which are held throughout the year.

The Framework for Deliberation

Participants deliberated using the NIF issue book, "Public Schools: Are They Making the Grade?" prepared by Public Agenda in collaboration with the Kettering Foundation. Rather than conforming to the ideas of any one advocate, each approach represents a distinct set of American priorities and views. The issue book outlines the issue in a nonpartisan way and presents four approaches to addressing the issue:

Approach 1: Give Parents a Choice of Schools

This approach says that parents are captive consumers of a failing education monopoly, one lacking competitive pressure to improve or hold costs down. No single system of education can meet the needs of 53 million schoolchildren – many systems are needed. We can improve public education by giving parents the widest possible choice among public schools, publicly chartered schools, private schools, religious schools, and for-profit schools.

Approach 2: Raise the Standards; Stress the Basics

This approach says that the public school system is no longer in sync with the needs of our economy and society. Public schools must be fixed by setting and enforcing high standards for core academics and behavior. Clear, uniform standards provide a blueprint for remodeling public education, from training teachers to

holding schools accountable for student achievement.

Approach 3: Make Education a Community Effort

This approach says education is a community activity, and efforts to improve education must start in the community and draw on the community's strengths and resources. Inadequate citizen involvement in the schools helps explain why a variety of ideas for improving schools have produced unsatisfactory results around the nation. For schools to succeed, they must first become responsive to the community's goals and plans for itself.

Approach 4: Provide Adequate Funds to All Schools

This approach says that the major problem with education today is unequal and inadequate school funding. Many schools are in disrepair, many classrooms are overcrowded, and good teachers are in short supply. As a nation, we are not investing enough in education, and more important, we are not sharing school revenues in a democratic way that ensures every child an adequate education.

Organization of This Report

This report is divided into seven sections.

The **Executive Summary** presents an overview of the themes that emerged from the forums.

In **Working Through**, we explain the public's thinking as they deliberated about the issue.

In **Questions and Answers**, we address key questions about people's thinking on the issue.

In **Questionnaire Results**, we show the results of the pre- and post- forum questionnaires.

In **Methodology**, we explain the research conducted for this report.

In **About National Issues Forums**, we describe NIF in greater detail.

Finally, in **About Doble Research**, we provide background on Doble Research Associates, Inc. and the researchers who worked on this report.

Finding the Public's Voice on Education

This report is an analysis of what happened in more than 60 NIF forums in 34 states and the District of Columbia, a sample of the hundreds of NIF forums that continue to take place across the country.

This analysis should not be confused with poll results, which are a snapshot of public opinion at a given point in time. Nor should forums be confused with focus groups in which a professional moderator, working from a script, interrogates respondents who receive an incentive to attend.

The report details people's *thinking* as they worked through the issue by deliberating together, considering other points of view, and weighing the costs and consequences of different approaches to the issue. It shows that people's thinking is complex and sometimes at odds with the policy debate. The concepts of "school choice" and "standards," for example, had different meanings to participants than they often do in policy terms.

Below is an outline of what happened as people deliberated about: "Public Schools: Are They Making the Grade?"

Six Overarching Themes that Emerged from the Forums:

1. Despite deep concerns about the public schools, participants were overwhelmingly committed to the idea of a public school *system* that provides all children with a quality education along with a common, equalizing, democratizing experience.
2. Participants felt that parents should have control over, or a choice about where their children go to school. But they were not sure a "voucher system" is the way to ensure such choice.
3. Participants saw standardized tests as a useful indicator of performance and a means of articulating higher expectations for students. But they did not see such tests as

the way to determine how well students, teachers and schools are doing, or as the definitive accountability measure.

4. Participants' thinking about "funding" is complex. On the one hand, they said roughly the same amount should be allocated to educate every child, and many favored more funding for smaller classes, higher teachers' salaries, and infrastructure repair. On the other hand, many said a lot of money allocated to education is not well spent, and they strongly felt that more funding, by itself, would not solve our problems with education.
5. Participants' fundamental concerns about education went far beyond the issues of choice, standards, and funding. The crux of the problem, they said, is the public's *relationship* with the public schools. The relationship, they said, is "broken" in that people do not feel connected to, or ownership of, the public schools. And, they said, the greatest obstacle blocking a closer relationship is the attitude of educators, especially administrators.
6. Though they wanted more connectedness to, ownership of, and community involvement with the public schools, participants did *not* want more control over day-to-day or administrative issues. Rather, they seemed – adults and students alike – drawn to smaller, neighborhood schools that would facilitate parental, student, and community involvement, along with more community service, school-to-work internships, and after-school, evening, and year-round activities. In brief, participants wanted the public school, which they saw as having great untapped potential, to become a hub of community life.

1. Despite deep concerns about the public schools, participants were overwhelmingly committed to the idea of a public school *system* that provides all children with a quality education along with a common, equalizing, democratizing experience.

a) Participants had deep concerns about the public schools. Participants were deeply concerned about four issues in particular: learning the basics, school safety and maintaining an atmosphere conducive to learning, reinforcing basic values, and meeting the educational needs of students who are not going to college.

Learning the Basics: In forums everywhere, participants were concerned about high school graduates who cannot read, write, or do basic arithmetic. A man from Vallejo, California lamented that “reading, writing, and math are not stressed in schools today.” A Michigan City, Indiana man said, “Education must focus on teaching students the basics.” A man from Rapid City, South Dakota said, “No matter where you are in the country, you need to be able to read and write and do basic math.” A teacher from El Paso told this story:

One of my students said, ‘I don’t have to worry about college because I’m going to be a plumber.’ I said, ‘Good, you’ll probably make more money than I ever do in my lifetime. But you better get off your duff and start working because, as a plumber, you need to know how to add and subtract and estimate. So you better know your math and how to write.’

Some felt that U.S. students lag far behind their foreign counterparts. A man from Portland said:

My wife spent a month in South Africa. And it [brought] tears to her eyes to go to the villages and see people [who are] living in huts [but whose] fifth- and sixth-grade kids are already speaking English and doing high math [at higher levels than Americans kids].

Participants also objected to “social promotion,” promoting students even if they have not mastered classroom material. By a margin of three to one in the post-forum questionnaire (59 percent to 21 percent), participants said, “We must require students to meet higher standards, even if this causes some to fail.” A man who himself had been “socially promoted” saw the practice as damaging. At a forum in a state prison in Chester, Pennsylvania, he said:

When I was in seventh and eighth grades, I got Fs. I didn’t learn a thing. But I got promoted anyway because my teachers didn’t care.

School Safety and Maintaining an Atmosphere Conducive to Learning: A number of participants were concerned about safety in the public schools. A woman from Rock Island, Indiana said, “There has been too much violence and shooting in the schools, and kids are scared to go.” A Dallas woman said, “When I think of public schools today, I think of violence.” A Philadelphia man said the public schools “must have more security to keep children safe.”

Working Through

A man at state prison forum in Chester, Pennsylvania said:

A lot of teachers feel threatened; [they're] afraid they'll get robbed or killed. Even in the classroom, where they're supposed to be the authority, they can't teach well because they're afraid.

Beyond safety, many said there is not enough discipline in the schools. "They don't enforce the rules," said a woman from Bangor, Maine. A Denver woman said, "Teachers are discouraged from sending disruptive kids to the principal's office." A man from Milwaukee said, "There's no discipline in schools today. And when there's no discipline, there's no learning."

Participants were also concerned, more generally, about maintaining an atmosphere conducive to learning. A Bridgeport woman said, "I'm appalled by the over-demonstration of affection that is allowed." A Philadelphia man called for "color-coded uniforms that would help children stay focused on their education." In a forum with college students in Wayne, Nebraska, participants worried about teenage drinking and about high school cliques, which can be, they said, "terribly alienating."

Reinforcing Basic Values: Participants were concerned that basic values and a sense of right and wrong, what parents should teach their children, are not reinforced in public schools. A man from Washington, D.C. said the public schools "don't teach morals or ethics." A Dallas woman said the public schools "should incorporate values into the school." A high school student from Tuscaloosa, Alabama said schools should pay more attention to teenage pregnancies "because so many girls are getting pregnant and dropping out of school."

While many participants did not see a place for religion in the public schools, others regretted that prayer had been taken out of the classroom. A Sioux Falls, South Dakota man said that while he was "not in favor of the Religious Right influencing my kid," he wished the Ten Commandments were still posted and used as guideposts for behavior. More generally, some saw a connection between prayer in school and a decline in basic values. A Dothan, Alabama woman complained about the "lack of God in the public schools" which has led, she said, to a "low level of morality" among young people.

Meeting the Educational Needs of Students Not Going to College: Many were concerned that public schools do not meet the needs of students who do not go to college. In Naperville, Illinois, participants said those in a vocational training track, need more educational choices and better career counseling. In Mission Viejo, California, people called for more technical schools because "not all students are college bound." In Blacksburg, Virginia, high school students complained that voc ed students are "lumped together as a group" instead of being seen as having different interests and needs.

Others complained about the status assigned to vocational education. An El Paso woman said we should teach "vocational students that it is respectable to [prepare for] a vocation [in high school], that everyone doesn't have to be in college prep." In a Pittsburgh-area forum, participants said students in vocational education are unfairly and routinely overlooked.

b) Despite their deep concerns, participants were overwhelmingly committed to the idea of a public school *system* that provides all children with a quality education along with a common, equalizing, democratizing experience. As they deliberated, it became clear that participants strongly believed in the concept of a public school *system*. A moderator from Helena, Arkansas said participants there felt that the “public schools are instrumental in the economic revitalization of the area and are important in bringing people together.” Participants there also supported a public school system because, as one man said, “We all depend on public schools to educate the majority of our children.” An El Paso woman said, “We don’t have to blow up the public schools, we just need to find out what’s right and change what’s wrong.” A Sun City, Arizona woman said, “Public schools must be nurtured, protected, and promoted, not undermined.”

Sometimes support for the concept of a public school system was implicit in people’s comments about other ideas. For example, an Alabama high school student said a voucher system “could make the problems worse because rich schools will keep getting richer and the poor schools poorer.” In Naperville, a moderator reported that participants worried that a voucher system would “trap low income, undisciplined, or slower students in denuded, lower quality public schools.” A woman from Sun City said, “In our democracy, we should not have a two-tiered system of education delineated by the rich and poor.” A Portland woman asked:

Are we going to leave a bunch of disenfranchised people behind in the public school system and take the cream of the crop and put them into the private school system? And then we’ll have chaos in the United States. We’re going to have [schools filled with] worse underclassmen than we’ve ever had before.

Even some people who had taken their own children out of public school supported the concept of a public school *system*, saying we, as a society, need to ensure a quality education for all children. A man from Denver who was home schooling his children said he and others from his church were tutoring youngsters from a nearby public elementary school. Another man in that forum said:

I’m a big supporter of the public schools. Our first two children went to public school. Then we adopted our daughter who had been abused and who has emotional problems. She didn’t do well in public school and so we put her into private school where she is doing great. But I am still a strong supporter of public schools. They just didn’t work well for her.

Others saw a public school system as a democratizing force. A New Hampshire man said young people “need a common experience.” A Vermillion, South Dakota man said, “Education should be a great equalizer.” Another New Hampshire man said:

One common theme I heard [in our forum] is that the problem with our public schools is a problem of what’s happening in our society. We’re talking about democracy; we’re talking about equality. The fact that we talk about public schools as being critical for democracy, small “d,” and the idea that we need a common experience, shows how important this is to all of us.

2. Participants felt that parents should have control over, or a choice about, the kind of school their children go to or where their children go to school. But most were not sure that a "voucher system" is the way to ensure such choice.

a) Participants said parents should have control over, or a "choice" about, the kind of school their go to or where their children go to school. Some wanted parents to have a choice to ensure children receive an education that best develops their interests and talents. In Saint Cloud, Minnesota, participants said one high school might specialize in fine arts or foreign language immersion, which would enable young people to develop their different interests and talents. Some Bridgeport participants wanted more schools that specialize, including a woman who said we need more "alternative schools like the one with a pre-veterinarian program." A man from Durham, New Hampshire said:

[Suppose] we've got a 6 feet, 4 inch 240 pounds strapping young boy who can run like a deer and our school [is so small that] that we don't have a football team. Should he be able to choose to go to [the neighboring high school] where they do have one? And if the answer is 'yes,' then what about a scrawny 120-pound computer nerd who looks at his school and says, 'It doesn't offer [what I could get] in the school in the next town?'

Others wanted parents to choose the right school for students with special needs. An El Paso woman said her special needs child "could not survive" in public school, saying, "I had to remove my child because they were not meeting his needs.

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And some wanted parents to be able to take their children out of inferior or low quality local schools. An Alabama high school student said, "My parents can't afford to sent me to another school and I'm worried that because I don't go to the best school, I won't get scholarships for college." A woman from Portland said, "If I lived in a poor district and my child had the opportunity to go to a private school and get a better education, I'd want to be able to do that." In the post-forum questionnaire, 51 percent were very concerned that "too many parents are forced to send their children to substandard schools."

b) But most were not sure that a "voucher system" is the way to ensure such choice. As participants deliberated, it became clear that most had an incomplete picture of how a voucher system would work. Many did not know, for example, that vouchers would cover only part of a private school's tuition. Even in places like Milwaukee where a voucher system is being tried, many did not understand what "vouchers" are; indeed, some were unfamiliar with the term.

The more they deliberated, the clearer it became that participants saw the issue of "choice" through a different lens than the one used in the policy debate. In the policy debate, "choice" is often defined as competitive pressure that will spur public schools – as they vye with other public schools, private schools, religious schools, or for-profit schools – to improve or close. But in the forums, participants defined the issue in terms of parents' ability to decide on the best

Working Through

school for their children. While they valued “choice” when defined in those terms, only a minority favored a voucher system. Indeed, many did not see “competition” as vital, with only 29 percent in the post-forum questionnaire saying a very important principle on which to base policy is that “competition from private and charter schools should spur traditional public schools to improve.” Moreover, the idea that “without competition, public schools have little incentive to improve” ranked last on a list of eight educational concerns. Finally, in the post-forum questionnaire, participants, by a margin of 49 to 33 percent, *opposed* allowing “parents to select the schools their children attend, even if that drains resources from the public schools.”

The more people deliberated about choice, the more they expressed concern that every child be offered a quality education and the opportunity to receive a common, public school experience. Some wanted to make sure those at the bottom are not left even further behind. A Portland man said a voucher system would “create a worse underclass than we’ve ever had.” Others said competitive pressures might lead public schools to neglect certain children. A woman from Vermillion said, “To make themselves look good on paper, schools are only going to be concerned with the kids making the best grades, not about the [ones who need] nurturing or the special needs children.” Some felt that public money should go only to public schools. A participant from Blacksburg said, “If you want to send your kid to a parochial school, it shouldn’t be through vouchers.” And when they learned that vouchers would pay only part of the cost of private school education, some agreed with a participant in St. Cloud who said vouchers “would help people who already have money but not people with low incomes.”

An Example of Deliberation about “Giving Parents a Choice of Schools”

(From a forum in Portland, Oregon, January 21, 2000)

Woman: I don’t see the benefits of [vouchers]. If we start diverting the limited number of educational dollars we have, we’ll weaken the [public school] system. I’m not saying it’s wrong to do this. I’m just saying we need to look before we leap.

Man: Education should be a great equalizer. And the U.S. is still a melting pot. The whole question is money. If there’s enough money for education where we can subsidize private schools, fine. But the public education system should get first priority.

2nd Woman: I’m not fond of the voucher system because it won’t get us where we want to go. But a charter school [might] get people invested in education.

3rd Woman: What we want is the ‘private school mentality.’ People say the private system works.

Man: I believe competition can be helpful. And I believe it’s not about money. We spend more money, per capita, than anybody else in the world. And have less to show for it. [With this choice], all principals and teachers are going to be judged on performance.

2nd Man: Can I say one thing? It *is* about money. Without money you cannot even get a glass of water in the U.S. Whose responsibility is it to educate our children? That’s a fundamental question because we’re tampering with something that’s supposed to equalize and protect the meek from the mighty.

3rd Man: Students may do better in private school. But if [a student there] acts up or acts out, what does the private school do? Makes him go back to public school. So we have a different set of rules for public schools. [Public schools] have more students with learning disabilities, learning problems, and behavioral problems. So here we are, vilifying the public school system. All we’re going to do [with a voucher system] is take the cream of the crop and leave a bunch of disenfranchised people behind.

3. Participants saw standardized tests as a useful indicator of performance and a means of articulating higher expectations for students. But they did not see such tests as the way to determine how well students, teachers and schools are doing, or as the definitive measurement to hold them accountable.

a) Participants saw standardized tests as a useful indicator of performance and a means of articulating higher expectations for students: Many participants saw standards as a way of setting higher *expectations* for students, not just measuring their performance by test scores. In the post-forum questionnaire, 58 percent were concerned that “too little is expected of our public school students.” In Pittsburgh, the group felt that “what we need are higher expectations of what our students can do.” An El Paso woman said, “We need to raise the expectations we have of the students, teachers, and parents.” Another woman there said:

I was a public school teacher and now I’m a home-school teacher. The reason I started home-schooling my kids was because of the low level [of] academic expectations at the high school where I was teaching.

The more they deliberated, the more participants said that by setting higher expectations, students will learn to their full potential, not just become good at taking tests. A woman from Portland said:

It kills me to think that [because we rely so much on standardized tests], kids don’t have the opportunity to show who they are [instead of] just writing the answer to a [test] question. [I favor] a holistic kind of education. [Learning] is not a robotic thing. It’s not just about learning the answers.

b) But they did not see such tests as the way to determine how well students, teachers and schools are doing, or as the definitive measurement to hold them accountable. In the policy debate, “standards” is often used as shorthand for the idea of using standardized tests to hold students, teachers and schools accountable for their performance. But people in the forums said “standardized tests” should be only one of several indicators of how students are doing, not the ultimate, definitive measure of student achievement. As they deliberated, participants said that while they want to make sure students are learning, too much reliance on a standardized test does not guarantee a quality education for three reasons:

1. *Standardized tests do not accurately measure what students learn.* Many said that standardized tests, no matter how they are well designed, are imperfect measures of what a student has learned. Some students are simply “not good” at taking such tests, they said. Moreover, such tests may be culturally biased against students in different ethnic groups or from different parts of the country.

Young people were especially critical of standardized testing. High school students in Blacksburg said such tests are unfair because certain people “do not test well.” A high school student from Dothan, Alabama said that because she was a slow reader, she had trouble on

Working Through

standardized tests, even though she knew the material. In Portland, a young woman talked about the other side of that coin:

I could excel at [standardized] tests... You start to gear [yourself] towards performance, which can be different from learning. I became a very good performer.

In a forum with college students at Wayne State College, participants said standardized tests do not capture a student's abilities, motivation, and study habits – the skills that are the ultimate determinants of success. One student summarized his frustration with testing by saying, "Standardized tests don't describe me as a student."

Implying that test scores are less important than other skills, a Dallas woman said high school students "need to be taught how to think." A Durham woman agreed, asking, "Do we want children to learn certain facts, or do we want them to become critical thinkers and good problem solvers?"

Some had another concern – the impact on students who do not do well. A woman from Vermillion, South Dakota said:

I'm really concerned about those people who are marginalized by our standards. We all fail in life from time to time. But failure for a child over and over and over again indicates that there is a need there that is not being met.

2. *Standards would cause teachers to "teach to the test."* Many worried that relying on standardized testing would lead teachers to "teach to the test" instead of providing the best possible instruction. Young people in particular said they knew from experience that standardized testing influences how teachers teach. High school students in Blacksburg said that too much class time is spent on "teaching to the test." In Bridgeport, participants said the local schools "practically shut down" to prepare for standardized tests, adding that while "kids learn and relearn the basics, they seldom move forward" beyond that. A Manassas, Virginia high school student said the schools "don't care about the students; they only care about making sure we pass the standardized tests." A high school student from Dothan, Alabama said:

The teachers aren't teaching. They're spoon-feeding us the information for [standardized] exams or their own tests. We don't actually learn anything!

Others worried about the impact of using standardized test scores to evaluate teachers' performance. In Naperville, participants said standardized tests take teachers away from real teaching because "being rated well means more than how much kids actually learn." In Rapid City, participants said that teachers whose evaluations are based on their students' test scores might give less attention to students who need extra help. Such a model, they said, could skew the efforts of even the most dedicated teachers if their performance and compensation are determined by how well their students do.

Working Through

3. *People may not agree about what standards should consist of and who should develop them.* As they deliberated, some were hesitant about standards because of questions about what they should consist of and who should develop them. A New Hampshire woman said:

One thing I'm concerned about is who sets the standards. Do communities come together and work over a long period of time to set a standard of excellence for their children? Or does it come from the state or federal government?

Some argued against a one-size-fits-all approach, including a man from El Paso:

If you're in a manufacturing environment, you need a different education [than] if you're in an agricultural environment. People in Iowa do not want to be educated the same way as people in Maine. A child of a migrant farm worker [should] be educated differently than a child in an urban environment.

But a woman in that forum disagreed:

[Just because] we live in a manufacturing community, my child has to be trained in a certain way? I don't think so. I want my child to be educated to reach his full potential If I'm a migrant work and my child wants to be a doctor – Hallelujah! Don't short-change him.

A New Hampshire man advanced a similar view:

What if I live where our standard is that all high school graduates have to be computer literate? But a different community doesn't think that's important. So the kid who graduate from my school has computer skills but the kids who graduate from the other one don't?

An Example of Deliberation about "Raising Standards, Stressing the Basics"

(From a forum in El Paso, Texas, December 15, 1999)

Man: I strongly believe we should raise the standards. If we expect mediocrity, that's what we'll get.

Woman: Standardized testing causes teachers to teach to the test . . . [We should] teach students what they need [to know] . . . instead of having everybody in the same classroom with standardized tests and standardized curriculum and standardized everything.

2nd Man: I work with criminal offenders. And in the twenty-odd years that I've been in [literacy education], I've seen people at the bottom improve. . . At the bottom, standards [have been] raised.

2nd Woman: We need to raise standards. But we also need to raise the expectations we have of the students, teachers, and parents. We need to support teachers with additional tools and resources.

Man: We haven't discussed community standards . . . A child of a migrant worker is going to be educated differently than a child who lives in an urban environment.

Woman: I totally disagree . . . If I'm a migrant worker and my child wants to be a doctor: Hallelujah! Don't shortchange him.

Man: National standards should be at the minimum acceptable level, not the top.

Woman: I agree about national standards, they should be the minimum . . . But the key is to motivate kids to want to learn, [help them] find their passion. That's the key.

2nd Man: I think we've lost focus of what education is about. If I thought the children in a manufacturing town should be trained only to be manufacturers, what will happen to great literature or history or geography? [Unless these are included], we will trap these children.

3rd Man: I believe that we got lost in that key word: "competition." We're focusing on education like it's a race . . . We're not necessarily competing against each other; we're running towards [the same] goal. If we look at education as a track meet, then we all lose. We've all lost sight of the goal. Which is the quality [education] we're all talking about.

4. Participants' thinking about "funding" is complex. On the one hand, they said roughly the same amount should be allocated to educate every child, and many favored more funding for smaller classes, higher teachers' salaries, and infrastructure repair. On the other hand, many said a lot of money allocated to education is not well spent, and they strongly felt that more funding, by itself, would not solve our problems with education.

a) Participants' thinking about "funding" is complex. On the one hand, they felt that roughly the same amount should be allocated to educate every child. Most participants said that education funding should be roughly equal for every child everywhere. In the post-forum questionnaire, 82 percent said a very important principle for policy making is that "all public schools should receive adequate funding, regardless of what they are," but only 34 percent said this is what we do. By a margin of four to one (60 percent to 15 percent), participants said we should increase federal and state funding to ensure equality, even if that means a loss of some local control.

Many said that to equalize per pupil expenditures, we must increase spending in low-income areas. In the questionnaire, 63 percent, and 78 percent of African-Americans, were concerned that "school taxing systems favor rich districts." In Hobart, Indiana, participants agreed that "we should equalize funding so that poorer communities have equal quality." In St. Cloud, people said we need "to bring poor schools up to the level of others schools in the state." The public schools near Helena, Arkansas are, participants there said, badly under-funded compared to other schools in the state. An Alabama high school student said, "We need to first build up the poorer schools before we can talk about equal funding." A woman from New Hampshire said:

My guess is that, if students from poor schools had the computers, books, the literacy-rich environment, and the well-paid teachers [that other schools have], and had the heat on in the winter, that students would achieve more than they do.

In some forums, people talked about sacrificing in order to equalize funding. The St. Cloud group felt that we should do more to equalize funding, even if that means higher taxes. A Portland man said, "We have to develop the collective will [and] the fortitude to say that all the resources should go equally to all the schools."

b) And many favored more funding for smaller classes, higher teachers' salaries, and infrastructure repair. As they deliberated, participants said more funding is need to make three main improvements.

Smaller Classes: Many said we needed to reduce class size, especially in the early grades. A New Hampshire man said, "It's becoming clear now that smaller classes, especially in primary grades, make a huge difference." A woman from Clio, Michigan said, "Smaller classes give the kids and the teacher a closer relationship." A man from Lake Forest, California said, "The kids in large classes don't get the attention they need." In Naperville, participants complained that public school classes are "huge." A Portland man said:

In my daughter's economics class, there's over 40 [students]. Spanish has 30. Pre-calculus has 35. That's too many. Some schools have way too many in a class.

A look at young people's thinking about the issue...

Young people in communities across the country, including in Blacksburg, Virginia and Dothan, Alabama, participated in NIF forums on the issue of public schools. In addition, young people from 4-H clubs across the country participated in the annual Citizenship Washington Focus (CWF), a 4-H youth leadership program. As part of this year's program, young people participated in NIF forums to deliberate about issues ranging from the environment to governing America. Nearly 125 students participated in 7 forums on the issue of "Public Schools: Are They Making the Grade?"

On School Choice

"I don't go to school with the kid across the street. We only see each other every once in a while."

"I'd like to go to another school, but there's no transportation available. I'm basically stuck at my school."

On Standardized Testing

"Standardized tests are good because that way kids don't 'fall through the cracks' but, I don't think kids should be evaluated only by tests. Some kids don't test well. There should be other ways of measuring learning."

"In history class last year, my teacher stopped the course for three weeks to prepare us for the standardized tests. We aren't learning what we're supposed to know. They are teaching us to pass a test."

"I don't think funding should be linked to test scores. Schools get more money if their students perform well on the tests. But shouldn't the schools with worse performance be getting the money? It's obvious they are the ones who need better textbooks, smaller classes, and more teachers."

On Community Involvement

"If our football team is in the state finals, then money pours in from the community – the whole team has new jerseys. But if we need new textbooks, then there's no money around."

"The stadiums at our school are crowded for a football game, but during a National Honor Society ceremony, there are a few parents scattered around."

On School Funding

"I think our schools have money, it's just that whoever decides how it's spent isn't spending it on the right things. We are still using old computers at our school, but we just got a brand new baseball field."

"We have out-of-date textbooks that we use and our schools are falling apart. We should at least have teachers who want to be there. They need to be paid more, so they'll care more."

"Our mechanics teacher is also our math teacher. We need more teachers who can teach."

Higher Salaries for Teachers: Many also said public education is suffering because public school teachers are underpaid. A man from Dothan said, "If teachers were paid more, they might be more excited about teaching." A woman from Mooresville, North Carolina said, "Give teachers more money." A woman from Hebron, Nebraska said, "Teachers are not valued or paid enough and therefore many people who would make excellent teachers choose other fields." A New Hampshire woman said:

When I was a teacher in the late 1980s, I was making under \$20,000. I had student loans and other payments, and I didn't have a family or a spouse to help me out. And so I left teaching because the balance sheet didn't work, and I ended

Working Through

up in a second career . . . I'd like to think you don't have to have a trust fund to become a teacher.

In the post-forum questionnaire, 65 percent were concerned that "low pay scales discourage many good people from becoming teachers," ranking it first on a list of eight concerns.

Infrastructure Repair: A third area of concern was infrastructure and other basic needs. A woman from Hopewell, Virginia said her local schools "are not up to levels that enhance learning." A man from Clio, Michigan said, "Schools don't have the funding to fix things and buy things that are really needed." A woman from South Dakota said local schools badly need repair. "There are schools right here in South Dakota where the structure of the building isn't safe anymore," she said.

Participants also talked about other fundamentals. A high school student from Alabama said, "We need more money to buy better books that are up to date." A man from Mission Viejo, California complained about the "lack of quality textbooks." Many agreed with a Portland man who said:

Are we funding the schools adequately? Obviously no. What's ironic is that this is happening at a time when every single state in the union and the federal government itself is reporting a budget surplus.

c) On the other hand, many said a lot of money allocated to education is not well spent. A number of participants said the public schools have adequate funding but that the money is not used efficiently or effectively.

Many agreed with a Chester man who said, "I think this very strongly – if public schools would spend money wisely, they wouldn't have to ask for help." Some singled out administrators. Participants in Mission Viejo said, "Money that should be spent on more teachers and smaller classes is wasted on highly paid administrators." Others questioned educational priorities. In Hobart, Indiana, people said the local schools overspend on athletics but under spend on front-line education in the form of more and better quality teachers. An El Paso man made a similar point, saying, "You go to some schools and see that their sports program out rules their arts program."

Then there was an El Paso man who described how a national initiative that was intended to correct funding imbalances had had turned into a reverse incentive that kept schools from doing their best:

Our superintendent once told me – and I'll never forget it – he said, 'We want to be a poor community.' And I said, 'Excuse me?' He said, 'We want to be poor because we get more federal funding.'

d) And they strongly felt that more funding, by itself, would not solve our problems with education. While participants in many forums said increased funding might be a *necessary* condition for educational improvement, they also said it is not *sufficient*. A New Hampshire man said, "Education has the potential to be a bottomless pit." A man from Rock Valley, Iowa said, "It's not more money that would count, but how it's used and what it's used for." Some felt that

Working Through

more spending could not possibly be what is essential because there are some schools in low-income areas where students learn beyond reasonable expectations. A New Hampshire man said:

Every once in a while we see an example of someone from inner city Los Angeles [who is] teaching the poorest of poor kids. And half the kids that pass the advanced calculus test for the entire state of California come out of that class.

As we discuss at length (see #6, below), participants again and again returned to the idea that education will improve only when people are more connected to the schools. A woman from Portland said, "There needs to be adequate funding, but it has to go hand in hand with [community involvement]." A woman from New Hampshire made the same point:

It's not only money. It's creativity; it's commitment. It's the parent who comes and says, 'I want to be part of what's happening in this school.' It's the teacher who says, 'I can make a difference.' It's the businessman who says, 'I will support what you're doing.' And it's because [the public school] is a public institution that is central to our democratic way of life.

The policy debate about this issue often centers on a single question: should funding be increased. But the public, as represented by people in the forums, has a complex set of views that might seem contradictory but are, in fact, logically consistent. While they favored increased funding, they also said spending is not the answer to the problems. A Dallas man said:

Columbine was one of the best-funded schools in Colorado. Being the best, the nicest, the newest didn't stop that tragedy from happening.

An Example of Deliberation about "Providing Adequate Funding to All Schools"

(From Vermillion, South Dakota, April 2, 2000)

Woman: There are schools in South Dakota where the structure of the building isn't safe. So when it comes to basics like having a safe building where students can go to school and not be worried about being crushed by a falling wall, this choice is very appealing.

Man: I agree. In some of the smaller communities, the schools are 80 years old . . . And you're getting more and more students into [the same] classroom. When you have 30 or 35 seventh graders, they can be a bit unruly and hard to manage.

Woman: I think we've heard of both overcrowding and under-crowding in our region.

2nd Woman: [We need] adequate funding not only for structural things but also for our teachers.

Man: As an educator, I find it hard to disagree. My wife is a speech pathologist with an MA. She applied for a position in a South Dakota school and was offered \$22,000.

3rd Woman: I moved here from Georgia. Your pay scale is one of the lowest in the nation. But you have a very high cost of living. It's a double whammy.

Man: And then there is the brain drain.

2nd Man: But by increasing taxes, all we're doing is requiring parents to work longer and work more. Which, from what we were talking about earlier, leads to more problems with the children in the schools.

Woman: Maybe it's that education is not a top concern [in our state]. I watch the news in South Dakota and Iowa. They ask legislators, "What are your top concerns?" In Iowa, 90 percent [of the legislators] say education is their top concern. I'd say 10 percent [would say that] among our legislators.

2nd Woman: I think funding our schools based on property taxes has a lot to do [fairness]. Because if the school is located in a rural area, the property tax is not as high and they aren't getting the same money as other schools.

3rd Woman: But do we want to trade off local control? Because every time we get federal money, you know there's going to be red tape and bureaucracy.

5. Participants' fundamental concerns about education went far beyond the issues of choice, standards, and funding. The crux of the problem, they said, is the public's *relationship* with the public schools. The relationship, they said, is "broken" in that people do not feel connected to, or ownership of, the public schools. And, they said, the greatest obstacle blocking a closer relationship is the attitude of educators, especially administrators.

a) Participants' fundamental concerns about education went far beyond the issues of choice, standards, and funding. The crux of the problem, they said, is the public's *relationship* with the public schools. The relationship, they said, is "broken" in that people do not feel connected to, or ownership of, the public schools. As we explain at length below (see #6, below), one theme consistently emerged in people's comments about the public schools – that the public no longer feels a sense of connectedness to, or ownership of the public schools. Participants' comments reveal that they believe the public's relationship with the public schools is "broken." A man from New Hampshire said, "I definitely see a disconnect between the community and the schools. An absolute disconnection."

b) And, they said, the greatest obstacle blocking a closer relationship is the attitude of educators, especially administrators. In forums everywhere, people said they felt "shut out" from the public schools. In Naperville, the group said community members are not welcomed to serve at the school. A New Hampshire man said the school's response to someone who wants to volunteer is, "Great! We'll call you in ten years or so." In Helena, Arkansas people wanted to get involved but said the schools do not receive them well and that teachers are not comfortable with parents.¹ A county supervisor from Fairfield, California said, "The best argument I know of for vouchers is the impenetrability of the current system." Another New Hampshire man said:

I sometimes think that the school boards or the superintendent put up a wall and say, 'Don't cross the line! Don't come over in my territory! Stay home, mind your own business, and we'll take care of our [business].'

Some, including participants in Blacksburg, said educators, and especially administrators, are "afraid of the public." A South Dakota woman said administrators do not welcome suggestions:

One thing that keeps the schools from opening their doors to [the] community is the fear that business people will see something that should be changed and think they had a right to say something about it. [But] that's a risk the school and the administration have to be willing to take.

¹ We should note that a mayor and some school board members, including a superintendent, were at that forum and afterwards, made a commitment to participants that their concerns would be addressed. The moderator reported that the superintendent saw the group as saying, "We're all in this together" instead of an "attack" on administrators.

A South Dakota man said that teachers used to welcome community involvement:

Over time, things evolved into a hostile situation between the administration and the parents . . . There are many parents who would love to work with the school to help raise standards and help students gain the enthusiasm they need to learn. It's as if the administrators feel threatened by parental involvement.

Some participants said educators have legitimate reasons to be hesitant about opening the doors to the public. In Denver, Dallas, and Fairfield, participants said educators have an overriding responsibility to protect children from what one man called "predatory adults." Others said that instead of working with and backing up their children's teachers, some parents work against them. A Dallas man said:

I know a lot of teachers. And what I hear them say all the time is that parents come to school to defend their child. And in a negative way. [They argue] with the teachers in front of the other kids.

But even when legitimate concerns were discussed, participants said educators should do much more to connect the public to the schools. A woman from Jacksonville, Florida said, "Schools need to know how to work with parents, they need training on how to work with parents." An El Paso man said, "Maybe the vice-principal should have, as one of his responsibilities, involving more of the community in the teaching process of our children." An El Paso woman said:

We need to get families much more involved. And the educators have to encourage them. Some parents are not well educated. Let's encourage them. Let's teach them as we teach their kids. [If we do that], we'll live in a much better community.

6. Though they wanted more connectedness to, ownership of, and community involvement with the public schools, participants did *not* want more control over day-to-day or administrative issues. Rather, they seemed – adults and students alike – drawn to smaller, neighborhood schools that would facilitate parental, student, and community involvement, along with more community service, school-to-work internships, and after-school, evening, and year-round activities. In brief, participants wanted the public school, which they saw as having great untapped potential, to become a hub of community life.

a) Though they wanted more connectedness to, ownership of, and community involvement with the public schools, participants did *not* want more control over day-to-day or administrative issues. In the policy debate, “community involvement” is sometimes interpreted as “the public wanting to take over the administration of the schools.” But while participants wanted more “connectedness,” they did *not* want to take over day-to-day administrative responsibilities. For example, while people in a Pittsburgh-area forum wanted to know what is going on in the schools, they also said “we pay experts” to make administrative decisions and they should be free to do so. In Mission Viejo, participants said the public “should not micro-manage” the schools because “we have paid administrators to make school decisions.” While people in Blacksburg wanted more communication, they did not want the public to manage or run the schools.

We should stress that the call for smaller, neighborhood schools was *not* code language for a return to a racially segregated public school system. And while people may want to have a voice about certain controversial issues, they were *not* calling for a “community-developed” curriculum. Instead, they were willing to delegate that responsibility to professional educators.

b) Rather, they seemed – adults and students alike – drawn to smaller, neighborhood schools that would facilitate parental, student, and community involvement, along with more community service, school-to-work internships, and after-school, evening, and year-round activities. People again and again talked about the need to connect the community to the public schools.

1. *Smaller, neighborhood schools:* People wanted smaller, neighborhood schools that would, they said, make it easier for people to be involved. Participants in Wayne, Nebraska said, “It’s easier for a parent to walk two blocks to help out at school than to walk across town.” In Bridgeport, participants felt that “our kids have lost their sense of neighborhood” because of the size and structure of the schools. In Mission Viejo people said, “We have giant school districts that we need to break down to make them more responsive to the community they serve.” A man from Milwaukee asked, “How can you make education a community effort when it takes kids 45 minutes on a bus to get to school?” A Denver man said:

[Suppose you have] three kids. One’s at this school, one’s at that one, the third is way across town. [Today] everyone is working, mom and dad. A lot of [people] have two or three jobs. You have single parents, grandparents raising kids. You can’t be [connected to what a child is doing] if you have to take time off work and run all over town.

2. *More parental involvement:* Smaller, neighborhood schools would facilitate what participants saw as essential to improving public school performance – more parental involvement. A man from Dayton said, “We need more personal contact between parents, teachers, and administrators.”

The idea that a child’s education depends on parental involvement struck participants as indisputable. A woman from Dallas said, “Education begins at home.” An Alabama high school student said, “The more the family cares about education, the more excited [kids] will get about school.” An El Paso man said, “If the parent is not interested [in the child’s education], the child will not be interested.” In Blacksburg, high school students in 4-H clubs said parents should be involved not only at the elementary and junior high level, but at the high school level as well. Such involvement, they said, would help with the problems of teen alcohol and drug use. One said, “Parents would be around more, and more aware of what goes on in and after school.” A man from Vermillion said:

I was in [another town and saw] big, bright yellow signs on the side of buses and in big, black letters they said: “*Parental Involvement Equals Quality Schools.*” To me, that says it all.

Parental involvement can be vital, participants said, even if a parent is not knowledgeable enough about a subject to help a child with homework. An El Paso woman said:

In some of our poorer schools, they asked the parents, whether or not they could speak English, just to sit at the table with the child at night while they did their homework to show that [doing homework] is important to the parent. And those students’ grades went up.

In addition to higher academic achievement, a woman from Portland said parental involvement might lead to increased community involvement:

My son sees his mom [active] in school [and attentive to his schoolwork and so] he does well. He’s into it because he sees me [caring about] it. We also both volunteer at a homeless shelter. He’s grown so much just seeing me being involved in that, and seeing that I’m involved in the community.

3. *More community involvement:* Though participants saw parental involvement as necessary for educational success, it was not seen as sufficient. In the post-forum questionnaire, 56 percent were concerned that “schools lack the community participation that would help them thrive. A woman from Westerville, Ohio said “Both parental and community involvement are essential to children’s education.”

Community participation is vital, participants said, because school problems are a reflection of community problems and therefore cannot be addressed by the schools acting alone. A New Hampshire man said, “The problem with our public schools is a symptom of what’s happening in our society.” He added, “A sixth grader shooting up in elementary school is not a problem with our schools.” A Portland woman said:

The community has to be involved because the schools are a reflection of the greater community . . . What's going on in society comes right smack dab in the middle of our school system. Everything from drugs to sex to diseases to violence to whatever – it all ends up in our public school system. So there's no choice but to get [the community] involved.

Getting the community involved is not only educationally important, a South Dakota woman said, it will increase the community's investment in education. "If community members are involved," she said, "they are more apt to give money and help with infrastructure." Others said community involvement might encourage students to stay out of trouble. A woman from El Paso said:

You wonder why so many students get involved in gangs or drugs. To deter that, you've got to bring in the community.

4. *More mentoring by volunteers such as the elderly:* Another way the community should be linked to the schools, participants said, is for people to serve as volunteer mentors. Several saw the elderly as an underutilized resource. A Vermillion man said, "Senior citizens are just yearning for ways to improve the community and to give something back to our schools." Older participants in Naperville said they would gladly go into the schools and work as volunteers if they felt welcomed. Others looked to employers. A Dallas man praised a local firm that pays employees who take time off to work as mentors and tutors in the public schools.

5. *More community service:* The idea of high school students doing volunteer work in the community was popular whenever it was brought up. A teacher from New Hampshire said community service enhances learning and nurtures a sense of responsibility. A Portland woman said, "Community service produces a sense of pride." A woman from Vermillion agreed:

Community service builds self-esteem in ways they can't get in the classroom. I've seen how even marginalized students can benefit when they get out and contribute something as a citizen of the community.

6. *More work-study programs and internships:* Many also wanted closer ties between the schools and local employers. An El Paso man described "the positive impact of programs like Partners in Education and Junior Achievement." In Columbus, people said students could learn from numerous employers, including car repair shops. A Vermillion woman said, "My school had a school-to-work program where community members were asked if students could help in their business for a semester, and the students got credit for it."

In addition to getting students out into the community, participants wanted to get employers into the schools, not in any administrative capacity but as partners in education. A teacher from El Paso said, "We need to bring the business community in [via] symposiums to help students see how what you're teaching applies to real life." Professionals might tell students how their subjects apply to different occupations, said an Alabama high school student. "A doctor could come into an anatomy course and show us how what we're learning is applied in the real world."

An El Paso woman who had gone into a local school to talk about her occupation said she'd had a favorable experience:

I talked about how we use math in our jobs. As a speech pathologist, you wouldn't think about me using math every day . . . I think that talk helped make [the subject more] relevant to the students. We could do a lot more of that to make their classes more interesting to them.

Some saw another positive side effect to having businesses linked to the schools. A South Dakota woman said that such linkage would give local businesses "a larger stake in the success of the public schools, which is a huge benefit."

7. More connections to other educational resources such as libraries and museums:

Participants saw other community resources that could enhance education if they were linked to the public schools. In Rapid City, participants said museums and bookstores could work more closely with the schools to help students learn. In the post-forum questionnaire, 66 percent said the idea of schools using "a variety of community resources in educating students" was a very important principle for policy making. Yet only 27 percent said that principle is strongly reflected in what we do.

c) In brief, participants wanted the public school, which they saw as having great untapped potential, to become a hub of community life. In addition to being smaller and nearby, the public schools should provide more after-school activities for young people, participants said. A woman from Panama City, Florida said "After-school and extra-curricular activities can have a huge impact on a child's motivation to do well in terms of academics." A man in a forum in a state prison in Chester said:

Once a child gets out of school, he needs something to do. When I was growing up, there was nothing to do. When kids leave class, they should have a little recreation time, something to do [to keep them occupied and out of trouble].

Participants also wanted the schools to be more accommodating to working parents. A New Hampshire woman said schools have not adjusted to the large numbers of single parents and families where both parents work full time:

We don't have constructive opportunities for [working] parents and schools to get together. Schools are open when parents are at work. And you're really asking a lot when you ask people to [leave work and] give up what's putting food on the table for their kids in order to come in [to school for a conference].

Finally, many wanted what are often called "full-service schools" that offer space for educational programs and evening classes for adults and students and that are open year round. Participants saw the schools as an underutilized resource. In Portland, people said the schools should be the hub of the community and should offer classes for adults at night. In Pierre, South Dakota, a participant said, "Our schools should be the center of everything that happens in the community."

An Example of Deliberation about "Making Education a Community Effort"

(From a forum in Durham, New Hampshire, February 29, 2000)

Woman: It's easy [for people to say to themselves], "I've elected my school board. I'll let them make the decisions. I don't need to have any responsibility for the quality of education." And the way the schools boards are set up really reinforces that attitude.

2nd Woman: Many people are involved on school boards that shouldn't be . . . The [school boards] can't agree on anything. They make bad decisions. . . Talk about raising standards. I think we need to raise the standards of the people making those decisions.

Man: I don't think the school board members are a bunch of dummies. A lot of them are very well educated. And they're sincere about what they're doing. But there's no representation below them. They don't know whom they are representing. They don't have any kind of forum they [must] answer to

2nd Man: I definitely see a disconnect between the community and the schools. An absolute disconnection.

3rd Man: Just to respond to that, my goal is to educate students [so they] are able to live in a *community*. And that's messy and imperfect . . . But I think we're trying to raise citizens, not necessarily the greatest academic persons. And I think bringing community members into the school might be very beneficial.

2nd Woman: I worry about the shifts in New Hampshire communities. This is a state in which town meetings, school board meetings, and school district meetings were very encouraged and very inclusive. And some communities have moved away from that.

4th Man: In my community, I think that the school boards or the superintendent have put up a wall and said, "Don't cross the line. Don't come into my territory. This is our territory. Stay home! Mind your own business! We'll take care of [everything]."

Woman: We don't get many constructive opportunities for parents and schools to get together. Schools are in operation when parents are at work. If [schools] ask, parents will come it to volunteer. If there's an activity their child is involved in, parents will be there. But [parents] have to give up part of their salary to do that . . . We need to think outside the box about how to get the community [more involved] . . . We need to be a little more realistic and creative on how we're going to bring these elements together.

The Public's Approach to the Issue

Questions

Does the public connect to the issue of education as the "conventional wisdom" suggests?

Conventional wisdom holds that ever increasing numbers of Americans are giving up on public schools, educating their children via home-schooling or sending them to private schools and looking to financial help through a voucher system. Moreover, it suggests that many students graduate without having mastered the basics, that public schools do not enforce discipline or maintain an atmosphere conducive to learning, and that they do not teach, or re-enforce, the basic values parents instill in their children. In short, the public thinks the schools are falling short of their responsibility to provide all children with a quality education.

While it is true that education is Americans' number one concern and that many believe the public schools come up short, there is much more to the story.

Americans have not given up on the *idea* of public schools. While people have deep concerns about education and, in some cases, favor wholesale change; the forums revealed that people have a deep commitment to maintaining a public school *system*. Participants from all walks of life, including those without school-age children, strongly believed in the concept of a public school education as a common, equalizing, democratizing experience that offers every child the opportunity to get a quality education.

How does the public approach the issue?

With real concern. Participants said we count on the public schools to educate the great majority of our children. And so, even people who do not have children, or children in public school approached this issue as one in need of immediate attention.

Are there other dimensions of the issue that people in the forums see?

Yes. Much of the policy debate centers on three issues: instituting a voucher system to give parents a choice of schools; using standardized tests to hold students, teachers, and schools accountable for their performance; and increasing education expenditures to reduce class size, repair infrastructure, and equalize per-pupil funding.

But the public, as represented by the diverse group of people who deliberated about this issue in more than 60 forums in 34 states and the District of Columbia, sees each of these issues differently.

While people in the forums wanted parents to have more choice about or control over the kind of school their children attend, most were unsure how to reach that goal. And, as they deliberated, people continually expressed their strong commitment to a common public school experience for all children.

Participants saw standardized tests as a useful indicator of performance and a means of articulating higher expectations for students. But they did not see such tests as the way to determine how well students, teachers and schools are doing, or as the definitive measurement to hold them accountable. Over reliance on such tests would be a mistake because: standardized tests do not accurately measure what students learn; teachers will teach to the test, especially if their evaluation is based on their students' performance; and people in different communities may not agree about what standards should consist of or who should develop them.

While many participants favored increased funding to raise teacher salaries, reduce class size, and repair infrastructure, most also said these improvements are, at best, only part of the solution to addressing our problems with public education.

While nearly all agreed that roughly equal amounts should be spent to educate each child, few felt that increased spending, by itself, was the answer to our problems with the public schools.

As they deliberated, participants kept coming back to their fundamental desire for a closer relationship with the public schools. The greatest obstacle to rebuilding such a relationship, they said, is the closed-door attitude of educators and administrators.

What mattered to people as they deliberated?

As people deliberated about the issue, they considered the following:

Essentials: Participants said all students should have to master the basics in order to graduate; and they said, all students should attend school in a safe environment conducive to learning.

Quality and Equality: Participants felt that *every* school should provide *every* student with the opportunity to get a *quality* education.

Fairness: Participants said that roughly an equal amount should be spent to educate child. They also said we should pay more attention to the educational needs of all students, especially those who are not going on to college.

Educational Equity: People were fearful of developing a public school system that exacerbates the educational and economic gaps between the "haves" and "have nots."

Preparation: Participants wanted children to acquire the skills and attitudes necessary to succeed in higher education or the workplace.

Citizenship: Participants wanted students to be prepared to take their place in the community as citizens and contributing members of society.

Economic Health: People said a strong public school system is important for a host of reasons, including international competitiveness.

And most important to participants was:

Connectedness: Participants strongly valued the idea of small, neighborhood schools that are connected to the community.

Is a "public voice" recognizable? Distilling the public voice on issues related to education may be difficult because much of the education debate does not address what the public sees as the core, underlying issues. While many people said greater choice *and* standardized testing *and* equalized funding are important, they see these issues differently than they are often framed in the policy debate. And their concerns go beyond these issues.

When citizens have a chance to deliberate together, a public voice begins to emerge – people want wholesale, radical change – a redefinition of the *relationship* between the schools, parents, and the rest of the community.

Was any firm common ground for action revealed? Yes. After deliberating, many participants decided that they wanted to:

1. Provide more choice or control for parents to decide what school they wanted their children to attend;
2. Ensure that all high school graduates have mastered basic reading, writing, and mathematics;
3. End the practice of "social promotion;"
4. Make sure all children have an opportunity to get a quality education;
5. Establish more smaller, neighborhood schools that make it easier for parents to be involved with their children's education and students to feel involved personally;
6. Use more of the community's resources, including mentoring, especially by the elderly, more partnering with local employees, more connections to other educational resources such as libraries and museums;
7. Make schools a hub of the community by offering more after-school activities and providing space in the evenings and in the summer for community meetings, classes, or other education opportunities.
8. Re-establish a public school *system* that provides a common, equalizing, democratizing experience and prepares young people to take their place in society.

Questions and Answers

What effect did deliberation have? As they deliberated, participants' perspectives broadened and they began to see the issue of education as a community-wide or national challenge, instead of just a problem for local educators and school officials.

As they deliberated, participants began to see, as one man said, that they "could make a difference in education" and participants began exploring ways of addressing the issue together.

What needs to happen next in the national dialogue? There are differences between the typical political framing of the issue – in terms of vouchers, standards and accountability, and more funding to reduce class size, etc., – and how the public thinks, especially when people have a chance to deliberate. Instead of a *public* school system, many felt that we have a government, or a professional, or a school board school system – all a way of illustrating that people do not feel a sense of ownership over the issue of public education.

The public is not looking for a "quick fix." Most saw the problem with our public schools as a symptom of what's happening to our society.

The public's deepest concerns involve the *relationship* between parents and the community and the public schools. For the public to really tune in to the national dialogue, the issue of public education must be recast to involve these deeper concerns.

In preparing this analysis of people's thinking about "Public Schools: Are They Making the Grade," Doble Research drew on a sample of more than 60 forums in 34 states from the hundreds of forums that took place across the country. Five research methods were used:

"A Public Voice" Forums

We transcribed and analyzed four forums videotaped for the annual PBS special, "A Public Voice," hosted by David Gergen. The forums took place in Durham, New Hampshire, Portland, Oregon, Vermillion, South Dakota, and El Paso, Texas.

Moderator and Convenor Interviews

We conducted 20 one-on-one telephone interviews for 45-60 minutes with forum moderators and convenors. We asked them to describe people's main concerns, their starting points on the issue, the costs and consequences they took into consideration, and the shared understanding or common ground for action that emerged. The forums were held at:

1. Borders Bookstore, Rapid City, South Dakota
2. Bridgeport Public Library, Bridgeport, Connecticut
3. Chamber of Commerce, Pierre, South Dakota
4. Civic Life Institute at Ohio State University, Columbus
5. Cooperative Extension Office, Blacksburg, Virginia
6. First United Methodist Church, Vallejo, California
7. Lake County Public Library, Hobart, Indiana
8. Marketplace Community Center, Helena, Arkansas
9. National 4-H Conference Center, Chevy Chase, Maryland
10. Nequa Valley High School, Naperville, Illinois
11. Northern Tier Regional Library, Gibsonsia, Pennsylvania
12. Northland Public Library, Pittsburgh, Pennsylvania
13. Northpark Baptist Church, Bridgeport, Connecticut
14. Private Residence, Petersburg, Virginia
15. Sadleback College, Mission Viejo, California
16. Senior Community Center, St. Cloud, Minnesota
17. Southeast Regional Library, Jacksonville, Florida
18. Sylvania Campus of Oregon State University, Portland
19. Wayne State College, Wayne, Nebraska
20. WH Over State Museum at the University of South Dakota, Vermillion

A special thanks to the convenors and moderators who shared their forum reflections with us: Ike Adams, Tom Cook, Naomi Cottoms, Patty Dineen, Tina Frank, Mark Furukawa, Michelle Goebharter, Joyce Hanna, Linda Havir, Jeanmarie Heriba, Sarah Monroe, Neal Naigus, Mary Olson, Carole Patterson, Dave Patton, Russell Petty, Barbara Reese, Paul Sunderland, Anne Wolford, Ruth Yellowhawk.

Forum Observations

We observed three National Issues Forums, listening to initial concerns and learning how deliberation influenced people's thinking. In addition, we interviewed two participants and the moderator after each forum. The forums were held at:

1. Chester State Correctional Center, Chester, Pennsylvania
2. Rehoboth High School, Dothan, Alabama
3. University of California at Davis, Cooperative Extension Office, Fairfield, California

Questionnaire Results

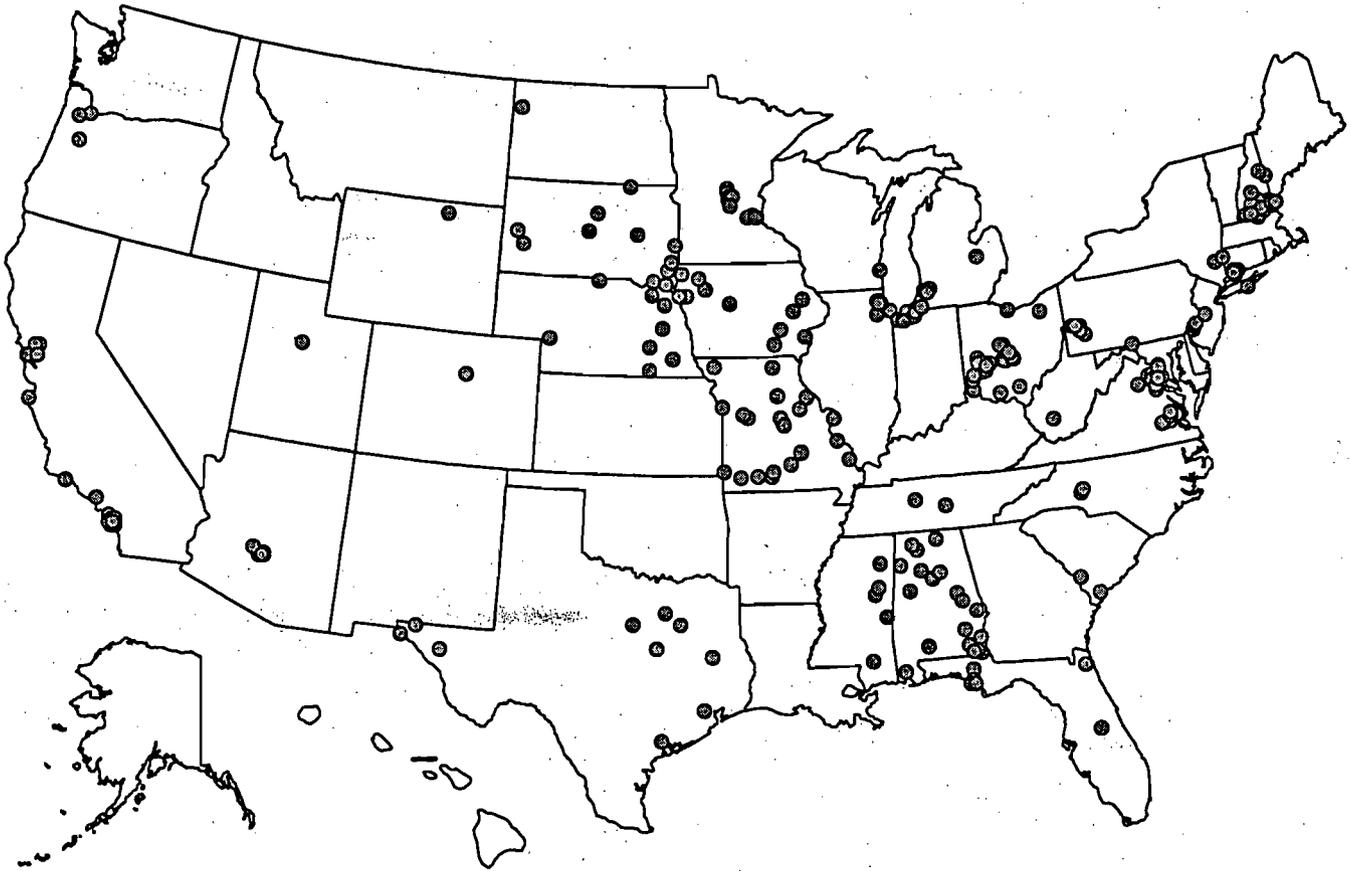
Before and after a forum, participants are asked to fill out a questionnaire that frames the issue and identifies key tradeoffs for different choices. This report analyzes a total of 688 pre-and post-forum questionnaires.

Research Forums/Focus Groups

We conducted three research forums each with a demographically representative cross section of up to a dozen people. The sessions paralleled NIF forums in that, participants viewed the starter tape, filled out the pre- and post-forum questionnaires, and deliberated together about the four choices. The research forums were held in Dallas, Texas, Denver, Colorado, and Milwaukee, Wisconsin.

Methodology

People who participated in the NIF forums analyzed for this report are a sample of the thousands of people who continue to deliberate about this issue in communities across the country. Forum participants represented in this report came from the following states:



Alabama
Arizona
Arkansas
California
Colorado
Connecticut
District of Columbia
Florida
Illinois
Indiana
Iowa
Maine

Maryland
Massachusetts
Minnesota
Mississippi
Missouri
Nebraska
New Hampshire
New Jersey
New York
North Carolina
North Dakota
Ohio

Oregon
Pennsylvania
South Carolina
South Dakota
Tennessee
Texas
Utah
Virginia
West Virginia
Wisconsin
Wyoming

About Doble Research

Each year, Doble Research Associates, a nonpartisan, public interest research firm located in Englewood Cliffs, New Jersey, prepares a report on how citizens across the country are thinking about difficult issues in the National Issues Forums. Doble Research specializes in exploring people's thinking about complex public issues before and after people learn more about them.

Previous "NIF Reports on the Issues" include:

Our Nation's Kids: Is Something Wrong? (2000); Protecting Our Rights: What Goes on the Internet? (1999); Governing America: Our Choices, Our Challenge (1998); How Can We Be Fair? The Future of Affirmative Action (1997); The National Piggybank: Does Our Retirement System Need Fixing? (1997); Mission Uncertain: Reassessing America's Global Role (1996); Pocketbook Pressures: Who Benefits from Economic Growth? (1996); The Troubled American Family: Which Way Out of the Storm? (1995); Contested Values: Searching for Shared Purpose (1995)

Clients and Partner Organizations:

Foundations

The Center for Crime, Communities & Culture (Open Society Institute/The Soros Foundation)
The Chiesman Foundation
The Edna McConnell Clark Foundation
The Community Life Foundation of Owensboro
The Englewood Community Foundation
The Fetzer Institute
The Walter and Elise Haas Fund
The Hager Educational Foundation
The William and Flora Hewlett Foundation
The Kellogg Foundation
The Kettering Foundation
The Charles Stewart Mott Foundation
The Peninsula Community Foundation
The Pew Charitable Trust
The Seva Foundation

Government Agencies

The Board of Pardons and Parole, State of Georgia
The Department of Corrections, Cedar Rapids, Iowa
The Department of Corrections, State of Indiana
The Department of Corrections, State of Vermont
The Environmental Protection Agency (EPA)
The Governor's Family Council, State of Delaware
The National Institute of Corrections (NIC)
The National Institute of Justice (NIJ)
The National Parks Service, Nebraska
The Vermont Commission on Public Healthcare Values and Priorities

Public Service Organizations

The American Judicature Society
The Audubon Area Community Services, Owensboro, Kentucky
The Buckeye Association for School Administrators
The Center for Effective Public Policy
The Center for Sex Offender Management (CSOM)
The Cleveland Summit on Education
The Council of Governors' Policy Advisors
The Council of State Governments, Eastern Regional Office

The Educational and Social Science Consortium
The General Federation of Women's Clubs
The Harwood Institute
The National Collegiate Honors Council (NCHC)
The National Conference of State Legislatures
The National Academy of Social Insurance
The National Environmental Policy Institute (NEPI)
The National Issues Forums Institute (NIFI)
The Oklahoma State-Centered Project
The Pennsylvania Prison Society
The Points of Light Foundation
Public Agenda
The South Carolina State-Centered Project
The Southern Growth Policies Board (SGPB)
The Southern Regional Council
The Study Circle Resources Center (SCRC)
Weavings, A Journal of the Christian Spiritual Life
The West Virginia Center for Civic Life
The Western Governors' Association

States

The State of Indiana
The State of New Hampshire
The State of North Carolina
The State of Oregon
The State of South Carolina
The State of Vermont

Colleges and Universities

The College of DuPage
The Institute on Criminal Justice, University of Minnesota
The Mershon Center at Ohio State University
The University of California at Davis
The University of Delaware

Corporations

Clark, Martire & Bartolomeo, Inc.
Simon and Schuster, Prentice Hall Division
Weiner's Stores, Inc.

DRAFT

Public Schools Are They Making the Grade?

"Citizens' Thinking about Public Education"

**A Report for the National Issues Forums (NIF)
Prepared by Doble Research Associates**

September 2000

To learn how citizens are thinking about the issue of education, Doble Research Associates analyzed the results of National Issues Forums (NIF) on the topic of “Public Schools: Are They Making the Grade?”

What are National Issues Forums?

NIF bring together citizens around the nation to deliberate about, work through, and make informed decisions about challenging social and political issues that face their communities. Thousands of civic, service, and religious organizations, as well as libraries, high schools, and colleges, have sponsored forums on issues such as the economy, education, healthcare, foreign affairs, and crime. The sponsoring organizations select topics from among each year’s most pressing public concerns, then design and coordinate their own forum programs, which are held throughout the year.

The Framework for Deliberation

Participants deliberated using the NIF issue book, “Public Schools: Are They Making the Grade?” prepared by Public Agenda in collaboration with the Kettering Foundation. Rather than conforming to the ideas of any one advocate, each approach represents a distinct set of American priorities and views. The issue book outlines the issue in a nonpartisan way and presents four approaches to addressing the issue:

Approach 1: Give Parents a Choice of Schools

This approach says that parents are captive consumers of a failing education monopoly, one lacking competitive pressure to improve or hold costs down. No single system of education can meet the needs of 53 million schoolchildren – many systems are needed. We can improve public education by giving parents the widest possible choice among public schools, publicly chartered schools, private schools, religious schools, and for-profit schools.

Approach 2: Raise the Standards; Stress the Basics

This approach says that the public school system is no longer in sync with the needs of our economy and society. Public schools must be fixed by setting and enforcing high standards for core academics and behavior. Clear, uniform standards provide a blueprint for remodeling public education, from training teachers to

holding schools accountable for student achievement.

Approach 3: Make Education a Community Effort

This approach says education is a community activity, and efforts to improve education must start in the community and draw on the community’s strengths and resources.

Inadequate citizen involvement in the schools helps explain why a variety of ideas for improving schools have produced unsatisfactory results around the nation. For schools to succeed, they must first become responsive to the community’s goals and plans for itself.

Approach 4: Provide Adequate Funds to All Schools

This approach says that the major problem with education today is unequal and inadequate school funding. Many schools are in disrepair, many classrooms are overcrowded, and good teachers are in short supply. As a nation, we are not investing enough in education, and more important, we are not sharing school revenues in a democratic way that ensures every child an adequate education.

Organization of This Report

This report is divided into seven sections.

The **Executive Summary** presents an overview of the themes that emerged from the forums.

In **Working Through**, we explain the public’s thinking as they deliberated about the issue.

In **Questions and Answers**, we address key questions about people’s thinking on the issue.

In **Questionnaire Results**, we show the results of the pre- and post- forum questionnaires.

In **Methodology**, we explain the research conducted for this report.

In **About National Issues Forums**, we describe NIF in greater detail.

Finally, in **About Doble Research**, we provide background on Doble Research Associates, Inc. and the researchers who worked on this report.

Executive Summary

Finding the Public's Voice on Education

This report is an analysis of what happened in more than 60 NIF forums in 34 states and the District of Columbia, a sample of the hundreds of NIF forums that continue to take place across the country.

This analysis should not be confused with poll results, which are a snapshot of public opinion at a given point in time. Nor should forums be confused with focus groups in which a professional moderator, working from a script, interrogates respondents who receive an incentive to attend.

The report details people's *thinking* as they worked through the issue by deliberating together, considering other points of view, and weighing the costs and consequences of different approaches to the issue. It shows that people's thinking is complex and sometimes at odds with the policy debate. The concepts of "school choice" and "standards," for example, had different meanings to participants than they often do in policy terms.

Below is an outline of what happened as people deliberated about: "Public Schools: Are They Making the Grade?"

Six Overarching Themes that Emerged from the Forums:

1. Despite deep concerns about the public schools, participants were overwhelmingly committed to the idea of a public school *system* that provides all children with a quality education along with a common, equalizing, democratizing experience.
2. Participants felt that parents should have control over, or a choice about where their children go to school. But they did not see a "voucher system" as the way to ensure such choice. Indeed, the more they deliberated, the *less* they liked the idea, saying public funds should go to public schools and voicing concern that a voucher system would leave some students behind, thereby widening the gap between the haves and have nots.
3. Participants saw standardized tests as a useful indicator of performance and a means of articulating higher expectations for students. But they did not see such tests as the way to determine how well students, teachers and schools are doing, or as the definitive measurement to hold them accountable.
4. Participants' thinking about "funding" is complex. On the one hand, they said roughly the same amount should be allocated to educate every child, and many favored more funding for smaller classes, higher teachers' salaries, and infrastructure repair. On the other hand, many said a lot of money allocated to education is not well spent, and they strongly felt that more funding, by itself, would not solve our problems with education.
5. Participants' fundamental concerns about education went far beyond the issues of choice, standards, and funding. The crux of the problem, they said, is the public's *relationship* with the public schools. The relationship, they said, is "broken" in that people do not feel connected to, or ownership of, the public schools. And, they said, the greatest obstacle blocking a closer relationship is the attitude of educators, especially administrators.
6. Though they wanted more connectedness to, ownership of, and community involvement with the public schools, participants did *not* want more control over day-to-day or administrative issues. Rather, they seemed – adults and students alike – drawn to smaller, neighborhood schools that would facilitate parental, student, and community involvement, along with more community service, school-to-work internships, and after-school, evening, and year-round activities. In brief, participants wanted the public school, which they saw as having great untapped potential, to become a hub of community life.

The Public's Approach to the Issue

Questions

Does the public connect to the issue of education as the "conventional wisdom" suggests?

Conventional wisdom holds that ever increasing numbers of Americans are giving up on public schools, educating their children via home-schooling or sending them to private schools and looking to financial help through a voucher system. Moreover, it suggests that many students graduate without having mastered the basics, that public schools do not enforce discipline or maintain an atmosphere conducive to learning, and that they do not teach, or re-enforce, the basic values parents instill in their children. In short, the public thinks the schools are falling short of their responsibility to provide all children with a quality education.

While it is true that education is Americans' number one concern and that many believe the public schools come up short, there is much more to the story.

Americans have not given up on the *idea* of public schools. While people have deep concerns about education and, in some cases, favor wholesale change; the forums revealed that people have a deep commitment to maintaining a public school *system*. Participants from all walks of life, including those without school-age children, strongly believed in the concept of a public school education as a common, equalizing, democratizing experience that offers every child the opportunity to get a quality education.

How does the public approach the issue?

With real concern. Participants said we count on the public schools to educate the great majority of our children. And so, even people who do not have children, or children in public school approached this issue as one in need of immediate attention.

Are there other dimensions of the issue that people in the forums see?

Yes. Much of the policy debate centers on three issues: instituting a voucher system to give parents a choice of schools; using standardized tests to hold students, teachers, and schools accountable for their performance; and increasing education expenditures to reduce class size, repair infrastructure, and equalize per-pupil funding.

But the public, as represented by the diverse group of people who deliberated about this issue in more than 60 forums in 34 states and the District of Columbia, sees each of these issues differently.

While people in the forums wanted parents to have more choice about or control over the kind of school their children attend, most did not see a voucher system as the way to reach that goal. Especially after deliberating, most did not like the idea of a voucher system, expressing concern that: public money should not go to private or religious schools; a voucher system would leave those who remain in public school even further behind, thereby exacerbating the gap between the haves and have nots; and even with a voucher, many could still not afford private school; thus a voucher system would be of greatest help to those who need it least.

Participants saw standardized tests as a useful indicator of performance and a means of articulating higher expectations for students. But they did not see such tests as the way to determine how well students, teachers and schools are doing, or as the definitive measurement to hold them accountable. Over reliance on such tests would be a mistake because: standardized tests do not accurately measure what students learn; teachers will teach to the test, especially if their evaluation is based on their students' performance; and people in different communities may not agree about what standards should consist of or who should develop them.

While many participants favored increased funding to raise teacher salaries, reduce class size, and repair infrastructure, most also said these improvements are, at best, only part of the solution to addressing our problems with public education.

While nearly all agreed that roughly equal amounts should be spent to educate each child, few felt that increased spending, by itself, was the answer to our problems with the public schools.

As they deliberated, participants kept coming back to their fundamental desire for a closer relationship with the public schools. The greatest obstacle to rebuilding such a relationship, they said, is the closed-door attitude of educators and administrators.

What mattered to people as they deliberated?

As people deliberated about the issue, they considered the following:

Essentials: Participants said all students should have to master the basics in order to graduate; and they said, all students should attend school in a safe environment conducive to learning.

Quality and Equality: Participants felt that *every* school should provide *every* student with the opportunity to get a *quality* education.

Fairness: Participants said that roughly an equal amount should be spent to educate child. They also said we should pay more attention to the educational needs of all students, especially those who are not going on to college.

Educational Equity: People were fearful of developing a public school system that exacerbates the educational and economic gaps between the "haves" and "have nots."

Preparation: Participants wanted children to acquire the skills and attitudes necessary to succeed in higher education or the workplace.

Citizenship: Participants wanted students to be prepared to take their place in the community as citizens and contributing members of society.

Economic Health: People said a strong public school system is important for a host of reasons, including international competitiveness.

And most important to participants was:

Connectedness: Participants strongly valued the idea of small, neighborhood schools that are connected to the community.

Is a “public voice” recognizable? Distilling the public voice on issues related to education may be difficult because much of the education debate does not address what the public sees as the core, underlying issues. While many people said greater choice *and* standardized testing *and* equalized funding are important, they see these issues differently than they are often framed in the policy debate. And their concerns go beyond these issues.

When citizens have a chance to deliberate together, a public voice begins to emerge – people want wholesale, radical change – a redefinition of the *relationship* between the schools, parents, and the rest of the community.

Was any firm common ground for action revealed? Yes. After deliberating, many participants decided that they wanted to:

1. Provide more choice or control for parents to decide what school they wanted their children to attend;
2. Ensure that all high school graduates have mastered basic reading, writing, and mathematics;
3. End the practice of “social promotion;”
4. Make sure all children have an opportunity to get a quality education;
5. Establish more smaller, neighborhood schools that make it easier for parents to be involved with their children’s education and students to feel involved personally;
6. Use more of the community’s resources, including mentoring, especially by the elderly, more partnering with local employees, more connections to other educational resources such as libraries and museums;
7. Make schools a hub of the community by offering more after-school activities and providing space in the evenings and in the summer for community meetings, classes, or other education opportunities.
8. Re-establish a public school *system* that provides a common, equalizing, democratizing experience and prepares young people to take their place in society.

Questions and Answers

What effect did deliberation have? As they deliberated, participants' perspectives broadened and they began to see the issue of education as a community-wide or national challenge, instead of just a problem for local educators and school officials.

As they deliberated, participants began to see, as one man said, that they "could make a difference in education" and participants began exploring ways of addressing the issue together.

What needs to happen next in the national dialogue?

There are differences between the typical political framing of the issue – in terms of vouchers, standards and accountability, and more funding to reduce class size, etc., – and how the public thinks, especially when people have a chance to deliberate. Instead of a *public* school system, many felt that we have a government, or a professional, or a school board school system – all a way of illustrating that people do not feel a sense of ownership over the issue of public education.

The public is not looking for a "quick fix." Most saw the problem with our public schools as a symptom of what's happening to our society.

The public's deepest concerns involve the *relationship* between parents and the community and the public schools. For the public to really tune in to the national dialogue, the issue of public education must be recast to involve these deeper concerns.

UNITED STATES DEPARTMENT OF EDUCATION

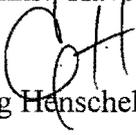
Washington, D.C. 20202

December 23, 1999

Note to Andy Rotherham:

Attached are two copies of the final, "State of Charter Schools: Fourth Year Report." As mentioned, one number has changed from the previous version: the total number of Charter Schools. Please refer to this version only. As you distribute these, please help us to maintain the embargo.

Thanks. Have a nice holiday.


Greg Henschel

Clinton Presidential Records Digital Records Marker

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DISTRICT 31: WORLD CLASS EDUCATION

1998-99 Annual Report
1999 State Report Card



West Northfield School District 31
Northbrook, Illinois

National Issues Forums Research
100 Commons Road
Dayton, OH 45459-2777

937-434-5567
1-800-433-7834
FAX 937-439-9804
<http://www.nifi.org>



A Different Kind of Talk, Another Way to Act

BIOGRAPHICAL SKETCHES

John Doble is founder of Doble Research Associates, a public interest consulting firm that specializes in exploring, from a nonpartisan perspective, public and leadership opinion about complex public issues including crime and corrections, education, health care, and teenage pregnancy. Prior to founding his firm, he was vice president and research director at Public Agenda, a nonpartisan research and educational organization headed by Cyrus Vance and Daniel Yankelovich.

Betty Knighton serves as the director of the West Virginia Center for Civic Life, a nonprofit, nonpartisan organization that promotes the practices of deliberative democracy throughout her state. A primary focus of her work has been in building a network of National Issues Forums in West Virginia through partnerships with educational, civic, religious, and public sector organizations. She coordinates an annual Public Policy Institute at the University of Charleston to help West Virginians learn to convene and moderate community forums and to develop balanced discussion frameworks for local issues. She serves on the Board of Directors for the National Issues Forums Institute.

Patricia Dineen is a National Issues Forums convenor and moderator who has been involved with NIF forums and projects in the Pittsburgh and Philadelphia areas for the last seven years. She has taken part in large deliberative forum efforts such as the *Philadelphia Inquirer's* Citizen Voices project, the Philadelphia Education Summit, Common Ground in Akron, Ohio, and presently is project coordinator for Community Forums 2000. She is also taking part in the convening of approximately 40 community forums in the Pittsburgh area over the next two months on end of life issues in conjunction with the Bill Moyers PBS-TV series "On Our Own Terms." She does free-lance writing concentrating on science and political topics and is currently producing an issue book for the American Bar Association about public trust in the American justice system.

Russell Petty is a junior at Virginia Polytechnic Institute (VA Tech). This past summer he worked as a program assistant at the National 4-H Center in Chevy Chase, Maryland, where he moderated National Issues Forums on *Public Schools*. He was vice president of the Virginia State 4-H program from 1997 to 1999 and during that time conducted National Issues Forums on *Kids Who Commit Crimes* at the Virginia State 4-H Congress.

Bob Kingston is a senior associate at the Kettering Foundation where he has shared in the planning for virtually all program areas of the foundation. He is also editor of the foundation's flagship publication, the *Kettering Review*, and executive producer for the public affairs program, "A Public Voice..." broadcast every year on public television stations across the country. As deputy chairman and acting chairman of the National Endowment for the Humanities, he managed the federal agency in the Nixon, Ford, and Carter administrations.

Iara Peng is a senior research associate at Doble Research who has coauthored studies on public opinion about the Internet, America's youth, and the effects of deliberation on high school students. She has also conducted research on communities that have undergone a visioning process. Prior to joining Doble Research, Ms. Peng was a researcher/editor at the Kettering Foundation, a nonpartisan research organization that studies what it takes to make democracies work as they should. She is a *magna cum laude* graduate from Rollins College where she majored in political science and minored in communications.

Ed Arnone is director of communications at the Kettering Foundation where he oversees the foundation's publications, video productions, and on-line communications. He also coordinated Kettering's work in the study of media in democratic societies, working with U.S. print and broadcast journalists, educators, and researchers, as well as journalists in emerging democracies in Latin America, Eastern Europe, and Africa.

FIRST IN THE WORLD CONSORTIUM SUMMER INSTITUTE

General Session: Sunday, August 10, 1997 - 6:45-7:30 p.m.
Robert Sylwester, Professor of Education, University of Oregon

WHY NOW? THE RAPIDLY EMERGING EDUCATIONAL FOCUS ON OUR BRAIN: SCIENCE AND MATH TEACHERS AS A KEY RESOURCE IN THIS ENTERPRISE

***Concurrent (repeated) Sessions A and B: Monday 1:00-2:25 and 2:30-3:45 p.m.**

Emotion as the Driving Force of Cognitive Activity

Emotion drives attention, which drives learning, memory, problem solving, and just about everything else we do. This non-technical session will (1) explain the intriguing relationship between our emotional and factual memory systems, and (2) discuss how the science/math curriculum might best incorporate this emerging understanding of these two key systems.

***Concurrent (repeated) Sessions C and D: Tuesday 9:15-10:30 a.m. and 10:45-12:00 noon**

The Neurobiology of Personal and Social Identity

Fluctuations in our brain's 60+ neurotransmitter systems help regulate our sense of self and society (intrapersonal/interpersonal intelligences), and so also, the measured-to-reckless behaviors that emerge out of our current level of self-concept/esteem. This non-technical session will focus especially on the neurotransmitters serotonin and dopamine, and on drugs (such as Prozac) that affect neurotransmitter levels and attentional behavior.

***Concurrent (repeated) Sessions E and F: Tuesday 1:00-2:15 and 2:30-3:45 p.m.**

The Neurobiology of Space and Time

Space and time, and so also objects and events and nouns and verbs (and other grammatical representations) characterize the world we genetically inhabit. We've had eons to tune into our natural space/time world, but only a decade or so to explore our rapidly emerging electronic-space/time world. This non-technical session will focus on (1) the cognitive systems that process our space/time-related intelligences, and (2) their powerful connections with the science and math curriculum.

FIRST IN THE WORLD CONSORTIUM SUMMER INSTITUTE

CONCURRENT SESSIONS

Monday **1:00-2:15 p.m.** and **2:30-3:45 p.m.**

Geoffrey Caine	How to Think About Learning, Teaching, and the Brain
Eric Jensen	How to Engage Emotions and Movement in Mathematics
David Hyerle and Chris Yeager	Visual Tools for Constructing Knowledge
Robert Sylwester	Emotion as the Driving Force of Cognitive Activity
Pat Wolfe	There's No Such Thing as Not Paying Attention!

Tuesday **9:15-10:30 a.m.** and **10:45-noon**

Geoffrey Caine	Three Instructional Approaches: From Simple to Complex Ways to Engage the Learner's Brain
Eric Jensen	Drawing the Line: What's Brain-Compatible Learning?
David Hyerle and Chris Yeager	Thinking Maps as Tools for Facilitating Brain-Based Learning
Robert Sylwester	The Neurobiology of Personal and Social Identity
Pat Wolfe	Why Short-term Memory is So Short and What To Do About It

Tuesday **1:00-2:15 p.m.** and **2:30-3:45 p.m.**

Geoffrey Caine	Seeing the World Anew: The Personal and Collective Transformation that Makes Complex Instruction Possible
Eric Jensen	Seeking Meaning Through Patterns in Mathematics
David Hyerle and Chris Yeager	Thinking Maps and Software for Linking Interactive Classroom Practice and Technology
Robert Sylwester	The Neurobiology of Space and Time
Pat Wolfe	Implications of Brain Research for the Math and Science Classroom

FIRST IN THE WORLD CONSORTIUM SUMMER INSTITUTE

General Session: Monday, August 11, 1997 - 9:00 a.m.
David Hyerle and Chris Yeager

USING VISUAL TOOLS FOR CONSTRUCTING KNOWLEDGE

***Concurrent (repeated) Sessions A and B: Monday 1:00-2:25 and 2:30-3:45 p.m.**

Visual Tools for Constructing Knowledge

This overview of the cognitive theory and practical applications of visual tools will include descriptions of three types of tools: brainstorming webs, graphic organizers, and thinking process maps. The linkage between visual tools and brain research will be highlighted. Implications for scientific inquiry, mathematics problem-solving and assessment using visual tools will be discussed. There will be a brief introduction to *Thinking Maps*, a common language of visual tools used in whole schools and districts for teaching and learning across disciplines.

***Concurrent (repeated) Sessions C and D: Tuesday 9:15-10:30 a.m. and 10:45-12:00 noon**

Thinking Maps as Tools for Facilitating Brain-Based Learning

This introduction to *Thinking Maps* will reveal how these eight maps, based on fundamental cognitive skills and supported by brain research, are used from novice to expert levels in every content area. These maps are used by all learners in a school community to construct knowledge, much like carpenters at the workplace use multiple, common tools from a toolkit to build a house. The five key characteristics of *Thinking Maps* will be introduced and used as a filter by workshop participants for evaluating student and teacher work from across disciplines. Mathematics and science applications from kindergarten to high school classrooms will be highlighted.

***Concurrent (repeated) Sessions E and F: Tuesday 1:00-2:15 and 2:30-3:45 p.m.**

Thinking Maps and Software for Linking Interactive Classroom Practice and Technology

A view of *Thinking Maps* will be presented based on the need for students to have common tools for interactive higher-order thinking, cooperative learning, collaborative problem-finding and solving, and inquiry science. *Thinking Maps* software will also be introduced as a cognitive-patterning, tool-base bridge between interactive classroom practice and the need for students to have concrete organizational tools for filtering, transforming, and evaluating information within computer environments. Discussions will conclude with a look at how *Thinking Maps* and complementary software will provide alternative ways of assessing students' conceptual understandings over time.

FIRST IN THE WORLD CONSORTIUM SUMMER INSTITUTE

General Session: Monday, August 11, 1997 - 9:15 a.m.
Eric Jensen

WHAT CAN RECENT BRAIN RESEARCH TELL US ABOUT BOOSTING LEARNING IN MATH AND SCIENCE?

***Concurrent (repeated) Sessions A and B: Monday 1:00-2:25 and 2:30-3:45 p.m.**

How to Engage Emotions and Movements in Mathematics

This lively and upbeat session discusses the possible links between physical movement, emotions, kinesthetic hands-on learning and recent brain research. Participants will explore links to learning, memory and love of learning. Key findings presented will be easy to understand and memorable.

***Concurrent (repeated) Sessions C and D: Tuesday 9:15-10:30 a.m. and 10:45-12:00 noon**

Drawing the Line: What's Brain Compatible Learning?

This exploration helps participants better understand what is and what is not "good" for brain-compatible learning. How is it different from simply "good teaching?" The discussion time allows everyone to investigate specific classroom activities and fine-tune them for optimizing learning. Plenty of time for questions and answers.

***Concurrent (repeated) Sessions E and F: Tuesday 1:00-2:15 and 2:30-3:45 p.m.**

Seeking Meaning Through Patterns in Mathematics

This hands-on workshop explores the implications of the brain as a meaning-maker. Eric's famous "You are here" math maps are presented. The more meaningful math becomes, the greater the motivation, understanding, recall and application. Through the use of mathematical pattern-making, participants will seek, build and use novel ways of learning age-old math relationships.

FIRST IN THE WORLD CONSORTIUM SUMMER INSTITUTE

General Session: Monday, August 11, 1997 - 10:30 a.m.
Pat Wolfe, Educational Consultant, Napa, California

BUILDING A BRAIN: THE BASICS FOR UNDERSTANDING MEMORY AND LEARNING

***Concurrent (repeated) Sessions A and B: Monday 1:00-2:25 and 2:30-3:45 p.m.**

There's No Such Thing as Not Paying Attention!

The brain is always paying attention to something...unfortunately it's not always the relevant information. This session will focus on how information gets into the brain and the factors that impact on whether or not the brain chooses to "pay attention" to the information it receives through the senses. We'll take a look at "The Cocktail Party Effect" and what neural processes we need to understand in order to make math and science concepts genuinely meaningful to the brain.

***Concurrent (repeated) Sessions C and D: Tuesday 9:15-10:30 a.m. and 10:45-12:00 noon**

Why Short-Term Memory is So Short and What To Do About It

The brain uses dramatically different types of processes to manipulate and store different types of information. In this session we will focus on the neural processes the brain uses when faced with various kinds of learning tasks. Discussed will be the concepts of "Automaticity," "M-Space" and "Chunking" and the types of rehearsal strategies that form the strongest neural connections for specific tasks.

***Concurrent (repeated) Sessions E and F: Tuesday 1:00-2:15 and 2:30-3:45 p.m.**

Implications of Brain Research for the Math and Science Classroom

Can the findings from the neurosciences inform classroom practice? While there is good reason to be cautious about claims that the brain research "proves" that certain educational practices work, many educators believe that the research certainly supports many of the practices that successful teachers have been using for years. This interactive session will give participants an opportunity to discuss implications, analyze various math and science strategies and share their own successful practices.

FIRST IN THE WORLD CONSORTIUM SUMMER INSTITUTE

General Session: Monday, August 11, 1997 - 11:15 a.m
Geoffrey Caine

EDUCATION ON THE EDGE OF POSSIBILITY: VISIONS OF THE FUTURE

***Concurrent (repeated) Sessions A and B: Monday 1:00-2:25 and 2:30-3:45 p.m.**

How to Think About Learning, Teaching, and the Brain

***Concurrent (repeated) Sessions C and D: Tuesday 9:15-10:30 a.m. and 10:45-12:00
noon**

**Three Instructional Approaches: From Simple to Complex Ways to
Engage the Learner's Brain**

***Concurrent (repeated) Sessions E and F: Tuesday 1:00-2:15 and 2:30-3:45 p.m.**

**Seeing the World Anew: The Personal and Collective Transformation
That Makes Complex Instruction Possible**

Seven Strategies That Encourage Neural Branching

Teaching strategies that overcome the brain's natural tendency to limit information can open students' minds to new ideas and creative mental habits.

Imagine trying to hit a baseball and noticing all the colors of the stadium, the advertisements, and the roar of the crowd. The overwhelming amount of stimuli might make it impossible for you to hit the ball.

When we are born, our brains have the potential to assimilate a large variety of stimuli. Over time, we develop mental routines and patterns in response to the stimuli that are critical to our lives. Scientists call the process by which we develop selective mental patterns "neural pruning." It is a natural brain function since we could not possibly survive if we had to learn to interpret stimuli anew each time we experience them. We would be overwhelmed with input to the point of being unable to function.

Recognizing this, it is nevertheless advantageous to be able to attend, selectively, to many stimuli—to overcome our neural pruning. In biological terms, we might call this "extending the neural network" or, in more poetic terms, "neural branching"—the opposite of neural pruning. Current research indicates that this type of significant "brain-work" strengthens the brain—creating more synapses between nerve cells—just as exercise builds muscle tissue.

The Effects of Neural Pruning

A personal example illustrates how neural pruning closes down our ability to perceive information. This summer, we participated in a workshop on visual thinking at the Metropolitan Museum of Art in New York City. In the first exercise, we observed a slide that was

completely out of focus. What was visible was a blur with barely distinguishable smudges of color. We were asked to draw what we saw. In the next phase, the focus was adjusted slightly so that the blurs became unformed patterns of color. In the third phase, the focus was sharpened a little more so that the shapes became more obvious. Finally, the slide was brought completely into focus to reveal Rubens's *Venus and Adonis*.

In the discussion that followed, the instructor asked us to comment on what we had observed. One of us, at phase two, thought he saw an angel and the Madonna. At phase three, he was sure he had this





Fifth graders at Westorward Elementary School (left) look at numbers in a whole new way when they cut them up into parts—or fractions. Below, 4th graders create their own ending to a short story.

“problem” “figured out.” He knew it was a portrait of a 16th-century courtier. He was sure he could “see” a ruffled collar around the courtier’s neck.

During the discussion, the instructor made this point: “If you look for information, you won’t see what is there.” We were so conditioned to discover the content of the picture that we failed to notice or appreciate the aspects of color, line, patterns, and other elements that were present in the object itself. We were imposing our meaning on the data, and in the process, we were creating something altogether wrong. The process we used was wrong, and the results obtained were wrong. When looking at a picture, our neurons had been predisposed to function according to a certain established routine.

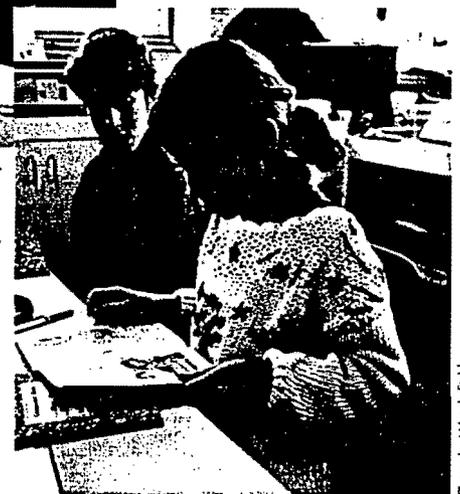
The Implications of Neural Branching

Working to extend our neural networks has important implications for education. Good teaching requires that students have the opportunity to select and assimilate enough data to force them to challenge misconceptions and to create strong, accurate conceptions. They cannot do this if the curriculum or the methodology or the structure of the school is so rigid that students experience only the presentation of data without the opportunity to make sense of it. That kind of teaching only accelerates neural pruning where we

want to encourage neural branching.

The first step in encouraging neural branching is to develop a structure or framework that will support the kind of inquiry we need to do both in the classrooms and in the organization. We need to create a mechanism that will accomplish the same effect as blurring the focus on the slide projector so that we can look at familiar things with new eyes—the things that might not be obvious at first glance given our predispositions. In effect, we are trying to create the opportunity to look at something for the first time—before our mind-set becomes rigid.

The following seven strategies, or types of thinking, are particularly suited to extending the neural network. We have incorporated these strategies into our supervision and coaching of teachers and in our classroom teaching. Underlying all seven is the assumption that questioning is a far more powerful way to encourage neural branching than is explication or narration. The seven strategies can shape a generalized structure for inquiry that should undergird the framework needed to apply these strategies in various arenas—particularly in the design of curriculum. Such a structure would consist of a series of questions that we could apply to new data or to our old paradigms.



Photos by Wendy Field

The examples that follow show how we have used these strategies to effectively extend students’ thinking in all areas of the curriculum.

Seven Strategies

1. Hypothetical thinking. Hypothetical thinking is a powerful technique for creating new information. It is said that Einstein developed his theory of relativity by asking, “What would it look like to ride on a beam of light?” Hypothetical thinking is a powerful stimulant to neural growth because it forces us to conceive of issues and consequences other than the standard and expected ones.

Here are examples of hypothetical questions one might use in a social studies class:

What would have happened if Columbus had landed on the West Coast of North America?

What if the colonies had lost the

Revolutionary War?

What if Washington, D.C., were situated in Kansas?

The key to the use of hypothetical questions is not in asking the question itself but in the follow-up questions that clarify both the complexity of forces that create events and the inter-related web of circumstances that follow from them.

Hypothetical questions take the following general forms:

What if this had happened?

What if this were not true?

What if this had not occurred?

What if I could do something I can not do?

2. Reversal. One of the techniques used in visual thinking to get outside the context or beyond the information is to blur the picture or turn it upside down. What is a verbal equivalent of turning the picture upside down? One possibility is to go backward from results to causes. We could ask, "What could have happened to create this situation?" Reversal is a specific kind of hypothetical thinking that highlights attributes of events or situations that might otherwise go unnoticed.

Here are a few examples of questions that use the reversal strategy:

What happens if I reverse the addends in a math problem? Can I do this in a subtraction problem?

What if Nixon had been elected president before Kennedy?

What if your mother had your father's job and your father had your mother's job?

What if Japan had won World War II?

In some cases, asking students to generate other questions may be even more profitable than looking for answers.

General questions that solicit this kind of thinking are the following:

What caused this?

How does this change if I go backward?

What if I turn this upside down or sideways?

What if ____ had happened first?

3. Application of different symbol systems. Sometimes we get locked into rigid ways of thinking by applying the rules and procedures of particular thinking systems. Another way to extend the neural network is to apply a symbol system to phenomena for which it is not usually used. For example, we use language (the verbal symbol system) for interpersonal communication. What happens if we apply the verbal symbol system to a problem for which we ordinarily use the numerical symbol system? We could, for example, ask students to explain the Pythagorean theorem in words after we teach its mathematical representation. Continuing, we could ask students to draw a picture (visual symbols) of the Pythagorean theorem that shows us they understand it.

We can also move from verbal systems to quantitative systems. Students could graph or chart relation-

Questioning is a far more powerful way to encourage neural branching than is explication or narration.

ships in a social situation or in a literary work. Perhaps they could write an equation to show how human interactions are related.

General questions that prompt this kind of transference include the following:

Can I make this into a word problem?

Can I make this into a number problem?

Can I draw a picture of this?

Can I represent this in musical terms?

Can I act it out?

Can I make a dance to represent this?

4. Analogy. Another process of mental extension is to look for correspondences: What is like this? Looking for forced correspondences requires a greater "stretch"—more creativity. For example, how is the Pythagorean theorem like a cooking recipe? Looking for correspondences will create new insights about both elements of the analogy.

The general question that stimulates analogical thinking is "How is this like ____?"

5. Analysis of point of view. This viewpoint is the act of determining why someone holds a particular opinion or belief. It can be taught in a very behavioral and rigorous fashion by forcing students to question for details and evidence. Considering specifically the reasons why a person may hold a particular belief or opinion is a way of extending our own mind-sets.

The general forms of questions that provoke analysis of point of view are:

What else could account for this?

Who would benefit if I thought this?

What harm might occur if ____?

How many other ways could someone look at this?

What would _____ (for example, my mother) say about this?

6. Completion. When something is incomplete, there is a natural urge to complete it. If you show students a picture with a hole in it, they will immediately ask what was taken out before they attend to other aspects of the picture. This urge can be used to extend students' thinking in multiple ways. Here are a few examples:

Remove the conclusion from a short story and ask the students to create their own ending.

Tell the students that chapter one is about the Revolutionary War and chapter three is about the Civil War. Ask what they expect to find in chapter two.

Give the students the steps in a process or a solution (to a math problem, for example) with one or two

steps missing. Ask what they think is missing.

This exercise involves greater or lesser degrees of ambiguity, depending on the context set. Two aspects of the exercise are important. First, questions should guide students toward reasonable answers—answers with evidence—so that they are forced to think of reasons for their responses. Second, encouraging a variety of answers will help students see that things can be connected in multiple ways, so that they do not become rigid in their approaches.

General forms of questions that provoke this kind of thinking include:

What goes in the blank space?

What is the missing piece or step?

How would you end the story?

Write the beginning of ____.

What if ____ did not happen?

7. *Web analysis.* One of our premises is that events and phenomena are related in complex ways. To make sense of things, our brains tend to oversimplify these relationships. The exploration of the complexity of relationships provides exercise that encourages neural branching. To experience this, answer the following questions with a partner, and during the process, reflect on how the experience feels to you:

How many people's lives do you think were affected by the deaths of Nicole Brown Simpson and Ronald Goldman? How were they affected?

What would happen if people stopped drinking Coca-Cola?

How was subsequent history affected by the death of John F. Kennedy?

What happened when the first settlers in Puget Sound clear-cut all the timber?

At least two significant differences distinguish web analysis from hypothetical thinking. First, web analysis is concerned with what actually happened, not with possibilities. Second, hypothetical thinking may focus on one or two results; in web analysis the goal is to uncover the

complex multitude of effects that may flow from a single source.

The power of web analysis to stimulate neural branching lies in moving beyond the obvious answers to uncover connections that we may not

search for more knowledge, to help us decide what should be selected for attention. We need a methodology to allow us to explore and to help us make sense of the results of those explorations. We need theory for its

It is said that Einstein developed his theory of relativity by asking, "What would it look like to ride on a beam of light?"

have realized previously. After we begin to "trace the web," the operative question becomes, "And what else?"

The following questions are the type that stimulate web analysis:

How extensive were the effects of ____?

How many effects can you imagine from ____?

Track the relationship of events following from ____.

How is ____ connected to ____?

The Ultimate Goal

All these strategies are related to one another in that they provoke divergent thinking. Using the strategies can extend students' neural networks and deepen their understanding—not just of the issue in question but also of the way our minds create meaning, of our biases. The more adept we become at understanding the tool that is our mind, the more power we gain over our own mental processes. It's like gaining the ability to see things as new, like the child who is full of wonder and questions, in order to force the brain into more assimilation and more accommodation.

The intent is not to diminish the importance of basic skills, content, or convergent thinking. These are essential for the growth of understanding. But there is a paradox in creating meaning. We need a framework to organize new information, to guide our

power to generalize and extend our knowledge. At the same time, we need to avoid becoming victims of our own knowledge, theories, and beliefs. That is, we need a way to look beyond the information we have, beyond our theories, and beyond our beliefs.

This is important work. What we are attempting to do is to protect students and ourselves from the curse of the closed mind. It is fundamental to our business as educators.

It is also important because we are not just talking about new ways of looking at the world. We are talking about plans for changing the structure of brains—educating brains that are fundamentally more powerful because they are able to assimilate a greater range of data and educating brains that are structured differently because they accommodate more diverse data. The goal is to create explorers who have an idea of what they are looking for, who have a methodology with which to search, but who come to the exploration with open minds so that, should they discover America, they will not assume they have landed in India just because that's where they intended to go. ■

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Creating Schools for Thought

Students engage in creative inquiry, and teachers facilitate their learning in the technology-rich environment of classrooms participating in the Schools for Thought program.

We want to know if that's the right place for the eagles to live, but we think it is."
"We want to know how high the tower is—'cause if they fall, they might kill themselves when they're a baby eaglet."

"We need to know if the tower prefabs are warm enough for the baby eagles to hatch."

Students in Kerry Sinclair's 5th grade Schools for Thought classroom are weighing the advantages and disadvantages of using various hacking towers¹ to release young eagles into the wild. Working in groups, these students at Carter Lawrence Middle School in Nashville, Tennessee, will draft plans to save the threatened bald eagle. They must research the biology, behavior, and habitat of the species, as well as causes of their endangerment. This task mirrors similar work on recovery plans by conservationists; as a result of this work, the bald eagle is no longer listed as an endangered species.

Students search through CD-ROMs, books, articles, and the Internet for information on food, nesting, and current recovery plans. Using computers, they write, edit, revise, and publish group reports. In an interactive computer forum specially designed for

classrooms, they continually discuss the underlying issues, building on one another's findings. They move from concerns of saving the national symbol of the United States to realizing that even flies are necessary to the food chain.

These students became interested in saving the species while planning a simulated rescue of a wounded bald eagle. A video adventure, *Rescue at Boone's Meadow*, had challenged them to figure out the fastest way to get the eagle to the veterinarian from a remote meadow. To answer the challenge, students had to make decisions based on their calculations of rate, time, distance, weight, and miles per gallon of gasoline. Because the mathematics is set in real life, students also faced broader considerations, such as the safety of the human rescuers and costs versus benefits of saving one eagle.

In each project, Schools for Thought students acquire, evaluate, organize, and interpret information, then communicate their findings to their peers and to an authentic audience of adults. Audience members ask questions to help the students learn even more. The teacher creates a climate of inquiry that fosters learning with understanding, rather than simply memorizing facts.

Creating a Model for Learning

Schools for Thought evolved from three programs developed by independent groups of university researchers in collaboration with classroom teachers (see p. 60):

■ The *Jasper Woodbury* mathematical problem-solving series, a videodisc-

A problem-solving group presents a plan for rescuing a wounded eagle.



Photos by Penny Brandt



based program developed at Vanderbilt University (Cognition and Technology Group at Vanderbilt 1997).

■ *Fostering Communities of Learners* for teaching science and literacy, developed at the University of California at Berkeley (Brown and Campione 1994).

■ *Computer-Supported Intentional Learning Environments* (CSILE), a communal database that supports information sharing and knowledge building, developed at the Ontario Institute for Studies in Education (Scardamalia et al. 1994).

Before being integrated into Schools for Thought, each program was classroom tested and each showed clear benefits for students—including higher rates of achievement (Lamon et al. 1996).

In 1993, the three groups of researchers combined their programs in an effort to restructure middle school classrooms. They named the project Schools for Thought after John Bruer's book (1993). In Nashville, the Cognition and Technology Group at Vanderbilt initiated a pilot project in two inner-city, 6th grade classrooms. The

The deliberate combination of specialization and sharing facilitates both depth and breadth in students' learning.

project has now grown to 22 classrooms. Schools for Thought classrooms are under development across the continent, from California to Iowa to Ontario.² The most notable site is Compton Drew Investigative Learning Center in St. Louis, where an entire magnet school with this philosophy has opened.

In 1996, Metropolitan Nashville Public Schools and Vanderbilt researchers expanded Schools for Thought into 1st grade classrooms, using the award-winning multimedia *Little Planet Literacy Series*.

The Learning Community

Schools for Thought recognizes that learners actively construct their own knowledge rather than passively receiving it from the teacher. They work in collaborative groups, using technology frequently. Teachers, students, and researchers are engaged in continuous learning about learning, based on principles that include the following:

The curriculum is rigorous and standards-based. Students choose their own research topics within a framework set by their teachers to facilitate understanding of important, consistent principles in the core content areas. For example, while studying habitats and endangered species, 6th graders learn about the rise and fall of ancient civilizations—studying cycles, adaptation, and change in both science and social studies—and about sampling and prediction, the mathematics scientists use in determining whether a species is endangered. At the same time, while reading the novel *Hatchet*, students explore issues of human survival and adaptation to adverse circumstances. The questions that arise in their inquiry require them to use basic skills, creative thinking, communication, and teamwork.

Students work together in groups for specific purposes. Several group structures—research groups, reciprocal teaching (Palincsar and Brown 1986), and cooperative learning “jigsaw” groups—are systematically integrated into the curriculum model (Brown and Campione 1996). For example, students in Sinclair's classroom generated questions on information needed to save the endangered bald eagle. Each group studied one aspect of the dilemma, using reciprocal teaching groups to read difficult materials and CSILE to explore issues. Then they shared their findings in jigsaw groups with students who had studied other aspects of the problem. Finally, the jigsaw groups created recovery plans for specific

geographic areas, which required that each group member learn about all the other groups' research. Students cannot create this end product of their research—called the consequential task—without learning what other students and groups have studied. This deliberate combination of *specialization* and *sharing* facilitates both depth and breadth in students' learning.

The careful integration of process and content promotes creation of a true learning community. Many children in these classrooms state that learning how to collaborate is one of their greatest accomplishments. A visitor from the local chamber of commerce was impressed:

They had to learn how to work together and how to listen. You could actually watch children listening to each other, thinking about what the other child said and incorporating that, then offering the next thought.

Feedback on student learning comes from many sources. Students share information with other students as much to find out what they still need to learn as to inform others. Students know they are individually accountable for their learning and work diligently to prepare for presentations and tests, often helping one another.

Teachers actively monitor student thinking. Teachers browse the student-created database and talk with research groups. Removal from the "sage on the stage" role gives teachers time to listen to individuals and groups of students, ask well-placed questions, provide information "just in time," or suggest resources.

Everyone is a part of the learning community. This community includes students, teachers, administrators, parents, business leaders, and members of the surrounding community. Students create and share authentic products, such as books and multimedia presentations. Corporate volunteers serve as authentic audiences for

classroom presentations, experts in a specific topic or skill, mentors, and facilitators in problemsolving and team building.³

Students use technology in authentic ways. Technology does not simply provide a modern format for practicing basic skills, as it does in many classrooms. Students use technology to gather information not found in their school libraries, and they write research reports. They create multimedia supports for oral presentations of their work, and they discuss their findings with other researchers in their classrooms and across the country.

Assessing the Impact of Schools for Thought

During the 1994–95 school year, researchers at Vanderbilt compared student achievement in Nashville's 6th grade Schools for Thought classrooms to those not using the approach. We examined performance on the Tennessee state-mandated standardized achievement test, on the Tennessee Comprehensive Assessment Program (TCAP), and on complex performance assessments of reading and writing. The performance assessments measured students' skill in reading to evaluate an advertisement and in writing for clarity of communication.

Analysis of the 10 subtests of the TCAP revealed that our students scored as well as, or significantly better than, the comparison classes on all of the subtests. Our students' scores for reading comprehension, overall reading skills, social studies, science, and study skills were significantly higher than the scores of comparison classes.

The complex performance assessments required students to use high-level critical thinking skills in reading and writing, competencies not tested by TCAP. Students wrote an essay on "If you could change something about your world, what would you change? Why? How?" They read and summarized a multiparagraph advertisement



The questions that arise in the students' inquiry require them to use basic skills, creative thinking, communication, and teamwork.

from the local newspaper, defined words in context, generated research questions to decide whether the claims were legitimate, and evaluated potential sources of information for their relevance.

On both performance assessments, Schools for Thought students scored significantly higher than did students in the comparison classrooms. Not only were our students doing as well or

better than the other students on standardized achievement tests, but they were also acquiring critical thinking and problem-solving skills that the other students were not.

Preliminary assessment of the social impact of Schools for Thought, by Helen Bateman,⁴ used students' self-reports about safety, social skills, classroom behavior, and sense of community; students' problem-solving responses to stories about conflict; and school discipline records. Our students responded more positively on all items of the self-reports, created more win-win solutions to the conflict stories, and had fewer suspensions.

Excitement About Learning

We have learned that excitement about learning is contagious—an important factor in making massive changes in teaching and learning. Excited parents have been vital in spreading Schools for Thought to other schools in Nashville. During the pilot year, parents asked the superintendent to expand the program to the next grade so their children could continue with it.

Parents expressed surprise at the change in their children's attitudes toward school. At the dinner table, children talked about endangered species and Egypt. Two classes of students took their excitement about learning to new heights: To complete a book they were writing, they stayed two hours after school every day during the last week of school. Parents see their children transfer what they learn in class to other aspects of their lives. One student who had never spoken in public before chose a Boy Scout badge that required him to make a presentation.

Teachers excited about learning serve as important "living models" for their students. Their attitudes infect the students, underscoring Barth's (1990) claim that when teachers "engage in serious learning themselves, their students take learning more seriously" (p. 46). Also, when teachers collaborate

with researchers, they model—for other teachers—the process that students are using in Schools for Thought classrooms (Bray, 1996).

We continue to develop Schools for Thought. It is not a package, not a final product—it depends on continuous improvement in creating a learning community. The most important lesson



we have all learned is that when teachers, students, and researchers collaborate to focus together on learning, everyone benefits. ■

¹A hacking tower simulates the environment of a nest to encourage reintroduced eaglets to return to the area when they reach maturity.

²Collaborations in California, St. Louis, Toronto, and Iowa were funded by the J.S. McDonnell Foundation.

³First American National Bank supports corporate volunteers in Schools for Thought classrooms and broader initiatives to develop learning communities in Nashville.

⁴Preliminary data are available on the World Wide Web at <http://peabody.vanderbilt.edu/projects/funded/sft/general/sfthome.html>.

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Educational Components of Schools for Thought

Animation, interaction, and involvement are the hallmarks of the Schools for Thought Project. Students construct their own meaning in many subject areas as they interact with videos, trade books, CD-ROMs, problem-solving models of instruction, computer databases, multimedia programs—and one another. Whether researching endangered species, serving in the community, or building their own books, students learn through projects related to real concerns. The following programs are components of Schools for Thought.

■ **The Jasper Woodbury Program** teaches mathematical problem solving through video dramas. Students must solve complex, realistic problems by setting goals, devising strategies, finding relevant information in the video, figuring out what mathematics to use, and then doing the math. Mathematics becomes an object of discussion and a practical link to the community. For example, in *Blueprint for Success*, students use geometry to design a neighborhood playground; in *A Capital Idea*, students use statistics and probability to design a recycling project to raise money for a Washington, D.C., trip.

Jasper is distributed by Learning Inc., 10 Industrial Ave., Mahwah, NJ 07430-2262. Internet: <http://peabody.vanderbilt.edu/projects/funded/jasper/Jasperhome.html>

[vanderbilt.edu/projects/funded/jasper/Jasperhome.html](http://peabody.vanderbilt.edu/projects/funded/jasper/Jasperhome.html)

■ **Fostering Communities of Learners** engages students as researchers of important issues in fields such as biology and ecology. For example, students study why and how diseases like tuberculosis and AIDS spread. Groups of students work on different but interrelated parts of the problem, building expertise and sharing their learning during the research process. This *distributed expertise* model establishes a purpose for communicating with peers, as well as interdependence among students and teachers.

■ Using **Computer-Supported Intentional Learning Environments** (CSILE), students build a communal knowledge base, just as scientists use conferences and newsgroups to discuss their ideas. For example, students researching photosynthesis, medieval history, 18th century literature, or Cubism can use CSILE to elaborate their own ideas online. They can provide feedback to others; analyze text and graphics material; build graphic models; and link ideas across units and classrooms, communities, and even continents. Schools for Thought will soon combine databases of working scientists, curators in art galleries, the business

community, and educational institutions.

CSILE is distributed by Learning in Motion, 500 Seabright Ave., Suite 105, Santa Cruz, CA 95062-3481; (1-800) 560-5670; <http://CSILE.OISE.utoronto.ca> (see also *Educational Leadership*, November 1996, pp. 6-10).

■ **The Little Planet Literacy Series**, a multimedia program for beginning readers, evolved from *Jasper* and Schools for Thought. Animated video stories create a world where children love to read and write. These stories "anchor" student activities, such as sequencing, decoding words, and writing and recording their own books. A related math and science curriculum is being developed through a grant from the McDonnell Foundation.

For further information, contact Little Planet Publishing, P.O. Box 158427, Nashville, TN 37215-8427; (1-800)974-2248; <http://www.littleplanet.com/>.

A forthcoming (fall 1997) multimedia book by the Schools for Thought collaborative will introduce educators to Schools for Thought. For publication information, contact Pio Po'e, Learning Technology Center, Box 45, Peabody College, Vanderbilt University, Nashville, TN 37203.

Robert Sylwester

The Neurobiology of Self-Esteem and Aggression

Self-esteem and serotonin—what can we learn from recent neurobiological research about how to help students work together cooperatively and successfully?

Violent acts like gang-related murders, playground shootings, riots, suicides, and assaults in school are prominently featured in the news, but they aren't the norm in social interactions. Young males commit most of the physically violent acts, and 7 percent of the population commits 80 percent of all the violent acts. Thus, violence is a limited social pathology, but one that evolutionary psychologists seek to explain because of its distressing, even tragic, results. Since impulsive behavior can lead to reckless or violently aggressive behavior, we also seek to understand impulsivity. Many personal and social problems begin with an impulsive act—triggered perhaps by the aggressor's low level of self-esteem. Impulsivity, recklessness, violence—all these behaviors can negatively affect educational processes. Some recent related research developments in brain chemistry—particularly the effects of the neurotransmitter serotonin—shed light on educational practices.

Self-Esteem in a Hierarchy

Consider the following scenario—from the point of view of a neurobiologist studying social hierarchies or an evolutionary psychologist studying human behavior:

A young man joins an athletic team in his freshman year of high school. He's thrilled just to make the team, even though he knows he's low in the hierarchy and won't get to play much in games. He's content for now because he also knows that the coaches and his teammates will note every successful act he makes in scrimmage, and so his playing time will come. He moves up the team hierarchy, substituting a few minutes here and there. His competition for most of this journey isn't the *alpha males* at the top of the hierarchy, but, rather, those who are competing with him for the next slot in the hierarchy.

Over several years, his talent and that of his teammates will determine the level he achieves. He thus may settle for four years of comradeship, scrimmage,

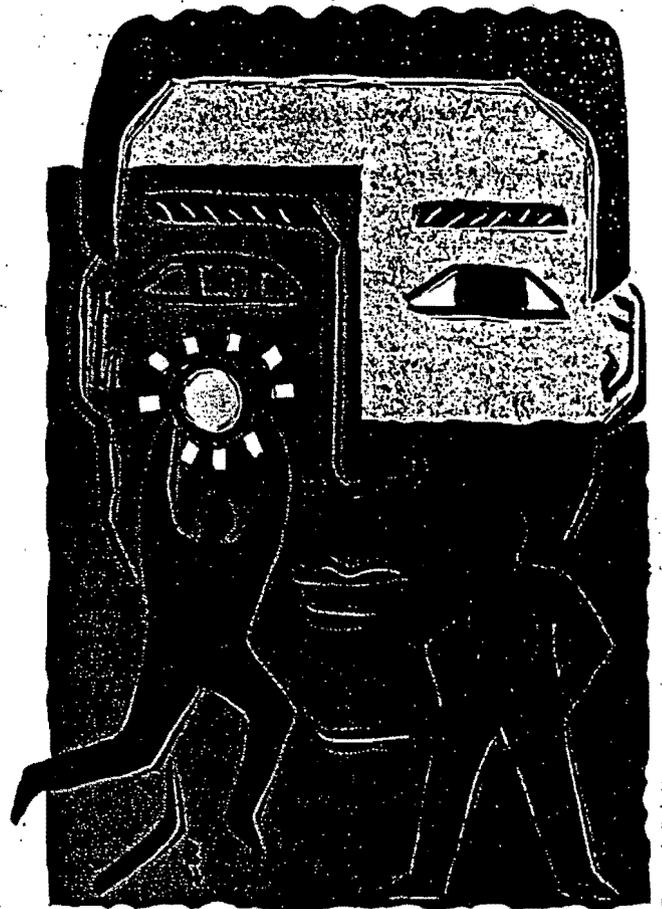


Illustration by Becky Hermans

and limited game time because he realizes that's where he properly fits in the team hierarchy; or he may eventually bask in the celebrity afforded to him as one of the stars on the team. If the latter, he may seek to begin the sequence anew in a college team, and then perhaps a pro team. If the former, his memories and friendships will have to suffice—and he will seek success in other social arenas.

But what if he believes that he rates very high compared to the others—but the coaches don't agree, and won't give him a chance to play? Perhaps it's because of something he can't control, such as his height (or by extension, gender or race or whatever defines the *glass ceiling*). Imagine his frustration and rage. His opportunities don't match his sense of self.

It is adaptive for a social species (like humans) to develop a system that arranges groups into reasonably compatible hierarchical arrangements to perform various group tasks. The entire group benefits if

survival-related tasks are assigned to those who are generally recognized to be the most capable. But things often don't work the way we'd like them to.

The Roots of Violent Aggression

The cognitive drive to move into our expected slot in the hierarchy is so strong that many people will do whatever it takes to achieve success. To continue with our sports scenario, if the frustration becomes too intense, a person may act impulsively or recklessly for any possible chance of success—and such risk-taking may on

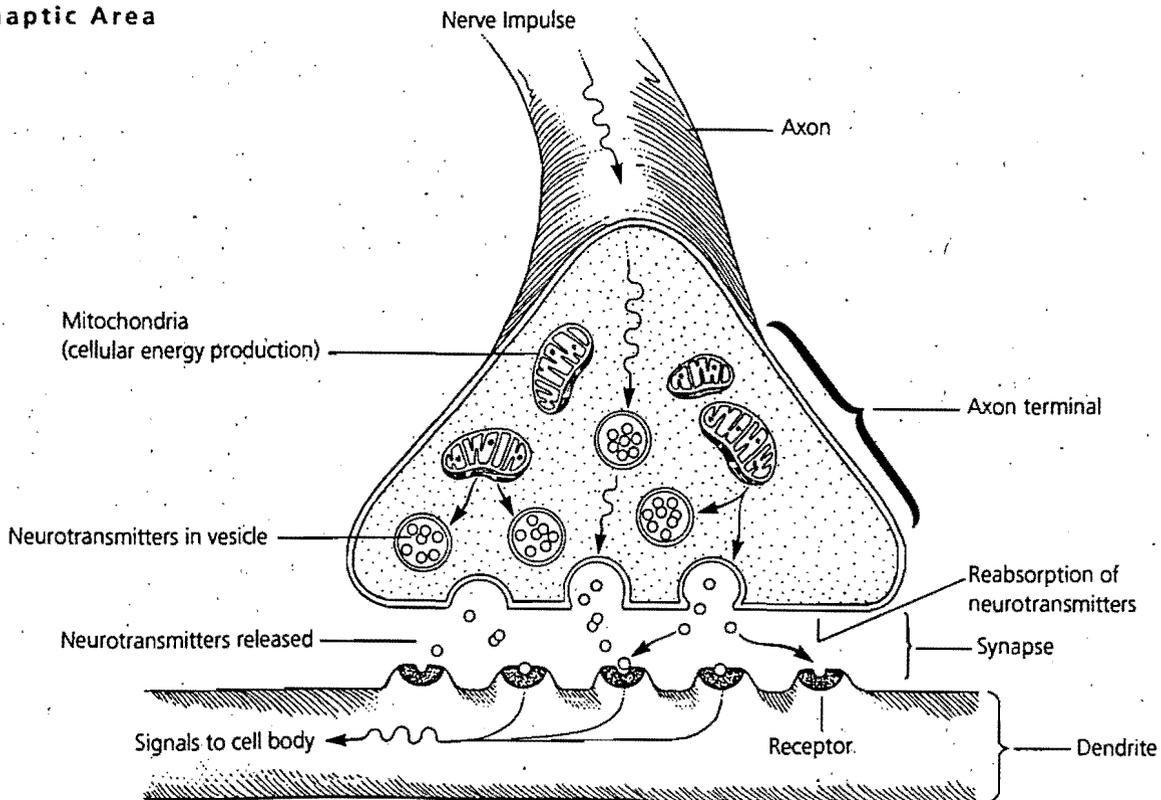
The best support for a serotonin deficiency is probably the natural system of positive social feedback that we have evolved over millennia.

occasion escalate into aggressive and violent acts, which we may witness in news accounts of various sports, from baseball to Olympic-level figure skating.

Evolutionary psychology argues that each success enhances the level of the neurotransmitter *serotonin* in the brain—and so also our motor coordination and self-esteem (see box

FIGURE 1

Synaptic Area



Note: Medical illustration by Lydia Kibiuk. Edited from *A Celebration of Neurons: An Educator's Guide to the Human Brain* by Robert Sylvester (ASCD 1995).

below). Failure and negative social feedback inhibit the effects of serotonin and lead to lower self-esteem and possible violence.

When young people see no hope to rise within mainstream society, they may create their own hierarchical gang cultures that provide them with opportunities to succeed within their counter-culture's mores. Those among successful people in mainstream society who decry gang symbols and exclusionary turf areas should look to the high-status symbols they use to flaunt their success and to their exclusionary golf courses and walled communities. People in both mainstream cultures and countercultures have the same biological need to succeed; they all need a positive self-concept and self-esteem. Wealthy financiers have ruined small communities by closing moderately profitable plants for even greater profits elsewhere. Are such exploitative acts any less psychologically violent to the victims than the physical violence that erupts later in such communities from those whose plummeting serotonin levels suggest no vocational hope?

Recent research on stress (Sapolsky 1994) shows that in primate groups with a developed, stable hierarchy, those at the bottom (who had little control over events) experienced far more stress and stress-related illness than those at the top. Conversely, during periods in which the hierarchical structure was unstable and shifting, those currently at the top (whose power position was threatened) experienced the most stress and stress-related illness. This finding suggests that it is in the interest of the power elite (in community and classroom) to maintain social stability, and it is in the interest of the currently disen-

franchised to create as much social instability (and classroom disruption) as possible in a desperate search for respect and success.

The fewer opportunities young people have to succeed in mainstream society, the more social instability we can expect. It is in our best interest to support inclusionary policies that promote social goals and to enhance the powerful role that schools can play in helping students to seek their dreams.

Our Brain and Social Systems

Our brain's complex collections of neural networks process our cognitive activity. Several dozen neurotransmitter and hormonal systems provide the key chemical substrate of this marvelous information-processing system. Neurotransmitter molecules, which are produced within one neuron, are released from that neuron's axon terminal into the synaptic gap, where they attach to receptors on the dendrites or surface of the next neuron in the information sequence (see fig. 1).

Recent studies with human and nonhuman primates suggest that fluctuations in the neurotransmitter serotonin play an important role in regulating our level of self-esteem and our place within the social hierarchy. Researchers associate high serotonin levels in the brain with high self-esteem and social status and low serotonin levels with low self-esteem and social status. High serotonin levels are associated with the calm assurance that leads to smoothly controlled movements, and low serotonin levels with the irritability that leads to impulsive, uncontrolled, reckless, aggressive, violent, or suicidal behavior.

Evolutionary psychologists focus on the biological underpinnings of such

educationally significant concepts as self-esteem, impulsivity, and aggression and on the effects of drugs like Prozac. If genetics and fluctuations in biochemical systems combine to trigger aggression, for example, one could argue that chronically aggressive people have a

Serotonin and Prozac

Serotonin (hydroxytryptamine, or 5-HT) is a monamine neurotransmitter that enhances relaxation and smooth/controlled motor coordination (by inhibiting quick motor responses). It regulates intestinal peristalsis, cardiovascular function, endocrine secretion, mood, pain, sexual activity, appetite, and behavior and is probably (along with other neurotransmitters) involved in attention deficit disorders and seasonal affective disorder.

Serotonin is derived from the amino acid *tryptophan*. Wurtman found that carbohydrates in our diet enhance the entry of tryptophan into the brain, where it is converted into serotonin (Wurtman and Suffes 1996). Another neurotransmitter, *nitric oxide*, acts on serotonin to help curb aggressive behavior, as Nelson and colleagues (1995) found in studies with male mice.

Fluoxetine antidepressant drugs, such as Prozac, Zoloft, and Paxil, enhance the effects of serotonin. When neurotransmitters pass on their chemical message, most are then reabsorbed into the axon terminal and used again. These drugs block the *reuptake channels* on the terminal, and so slow down the reabsorption process (see fig. 1). This means that the serotonin neurotransmitters may activate receptors several times before being reabsorbed; thus, fluoxetine drugs increase the effectiveness of a limited discharge of serotonin without actually increasing the amount.

The serotonin system provides us with a way to cope psychologically in a bad social situation.

reduced capacity for free will and thus are not (legally) responsible for their acts. Further, if courts mandate medical treatments for such people, the policy could be viewed as governmental *mind control*. The social implications of this research are profound and wide ranging. For example, in determining responsibility for an aggressive act, how important are the negative effects of the aggressor's life experiences and the events that triggered the aggression?

Wright (1995) suggests that social feedback creates fluctuations from our basal serotonin levels, and these fluctuations help determine our current level of self-esteem. Thus, serotonin fluctuations are adaptive in that they help primates to negotiate social hierarchies, to move up as far as circumstances permit, and to be reasonably content at each stage, as our earlier sports scenario suggests. Social success elevates our self-esteem (and serotonin levels), and each such elevation further raises our social expectations, perhaps to try for a promotion or leadership role we hadn't considered when we were lower on the hierarchy.

A biological system of variability in self-esteem prepares and encourages us to reach and maintain a realistic level of social status. A high or low level of

self-esteem (and serotonin) isn't innate and permanent. Successful people may tumble precipitously in social status, self-esteem, and serotonin levels when they retire or are discharged and thereby may experience a rapid reduction in positive social feedback. This doesn't mean that the serotonin system developed to help low-status people endure their fate for the good of all. Evolutionary psychology argues that natural selection rarely designs things for the good of the group. But the serotonin system provides us with a way to cope in a bad social situation—

to be content to play a group role that is consistent with our current limitations. The human serotonin system seems to function similarly in males and females in the important roles it plays in regulating self-esteem and impulse control.

The Role of Drugs and Nutrition

Is it possible to stimulate the serotonin system when conditions become so aversive in a person's life that self-esteem and serotonin levels plummet into the depths of depression? Drugs

Useful Resources

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such as Prozac (a fluoxetine antidepressant; see box on p. 76) can produce an elevation in the effects of serotonin that often enhances a person's self-esteem; this increased optimism and happier mood leads to the positive social feedback that allows the natural system to take over again in time and to function effectively. Think of jump-starting a dead car battery—a few miles of driving will reenergize the battery, and it can then function on its own.

People often use alcohol when they feel low, and alcohol does increase

boost in self-esteem, and diets require a certain level of self-control. The best support for a serotonin deficiency is probably the natural system of positive social feedback that we have evolved over millennia.

Educational Implications

If positive social feedback is nature's way of regulating the serotonin system so that both an inexperienced substitute football player and the team's star can work together comfortably and effectively, then positive feedback in the classroom is a powerful social device

because an impulsive, reckless act escalates into aggression. We have tended to view these events only in negative terms—as misbehavior, as something to be squashed. But what if we used positive group strategies to help students study such behavior and discover how to reduce it? David and Roger Johnson (1995) provide practical cooperative learning strategies for conflict resolution that are consistent with neurobiological research.

■ Emmy Werner's four-decade longitudinal study of seriously at-risk children who matured into resilient, successful adults found that they received unconditional love from family or nonfamily mentors, who encouraged their curiosity, interests, and dreams and assigned them responsibilities that helped them to discover their strengths and weaknesses (Werner and Smith 1992). We can also provide this support in the classroom—and parents, guardians, and other community members can help.

Cognitive science research is now providing some welcome biological support for practices that many educators have felt were *simply right*, even though these strategies take more instructional time and energy and result in less precise evaluations. Serotonin was identified as a neurotransmitter at about the time that Werner began her studies of resilient at-risk children in 1955—with no hint of the powerful biological substrate of her research. That kind of research is now becoming available to us. Let's use it. ■

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The fewer opportunities young people have to succeed in mainstream society, the more social instability we can expect.

serotonin levels. Thus, it can temporarily help to raise our mood and self-esteem—but chronic alcohol use depletes a brain's store of serotonin, and so it makes matters even worse by further impairing the impulse control system.

Nutrition may provide another avenue to serotonin elevation. Prolonged periods of stress increase our brain's need for serotonin. Nutrition researchers have discovered a connection between serotonin/carbohydrate levels and emotionally driven eating disorders that emerge out of family stress, premenstrual syndrome, shift work, seasonal mood changes, and the decision to stop smoking. Wurtman and Suffes (1996) propose nondrug diet adaptations that could solve some of these problems.

Prescription and other drugs can provide only a temporary chemical

for helping us to assess and define ourselves (self-concept) and to value ourselves (self-esteem). Serotonin research adds biological support to some educational practices that enhance self-esteem—and these practices don't require a prescription or an ID card that proves you are 21 years old.

■ Portfolio assessments encourage self-examination in students and enhance student self-concept and self-esteem. Journals, creative artwork, and other forms of reflective thought can produce the same results.

■ When students have many opportunities to work together in groups, they may experience success in both leading and supporting roles. Positive self-esteem can develop at any level in a work group, if the problem is challenging and the group values the contributions of all.

■ Many school conflicts arise

Thinking Maps:

Seeing is Understanding

David Hyerle

By using visual tools that correspond to thinking processes, students can organize their ideas on paper or by computer, and—as a result—read, write, and think better.

Walk through schools these days, and you will see teachers and students using a wide array of visual tools to construct, organize, assess, and convey knowledge. Semantic maps for brainstorming, graphic organizers for structuring information, and simple maps in textbook lessons are just a few tools being used to activate student learning. While educational reformers seek to restructure schools, a gradual, but fundamental, shift has been occurring in the everyday communication in classrooms.

Over the past 20 years (and more rapidly during the past five years), teachers, administrators, curriculum designers, staff developers, and even test-makers have turned to graphic representations for showing relationships. In some states, such as Texas and North Carolina, graphic organizers are showing up on tests as formal guides to find out how students are solving problems.

My first experiences with visual tools came during the early 1980s, when I began teaching writing in an urban middle school in Oakland, California. I introduced my students to the “mind mapping” and “webbing” techniques developed by innovators such as Tony Buzan, Gabriele Rico, and teachers with the Bay Area Writing Project at the University of California at Berkeley. There was a fundamental problem, however.

Despite the wealth of knowledge my students displayed on their semantic maps, they were ultimately confused about how to further organize, analyze, and evaluate their representations. They could brainstorm exciting and imaginative ideas, but they were less capable at following through with an organized, coherent piece of writing. As a novice teacher, I began asking myself: What happens to the brain after the storm?

After the Brainstorm

I became immersed in the thinking process approach to curriculum, and later devised a language of eight related visual tools—what I call

Thinking Maps (see fig. 1). These forms are designed to help K–12 students generate and organize their thoughts and ideas, either on paper or by using the software, and construct simple to complex mental models. Each Thinking Map corresponds to a single thinking process:

- *Circle map*—helps define words or things in context and presents points of view.
- *Bubble map*—describes emotional, sensory, and logical qualities.
- *Double bubble map*—compares and contrasts qualities.
- *Tree map*—shows the relationships between main ideas and supporting details.
- *Flow map*—shows events as a sequence.
- *Multi-flow map*—shows causes and effects and helps predict outcomes.
- *Brace map*—shows physical structures and part-whole relationships.



Photo courtesy of David Hyerle

■ *Bridge map*—helps to transfer or form analogies and metaphors.

Teachers are trained to introduce students to all eight maps as a related set of tools for content learning. They then show the students how to use these maps as needed, isolated or together. Teachers can do this in a short time because each map is a concrete tool rather than an abstract definition.

For example, Figure 2 shows how a 6th grader used the bubble map to understand the story, "William Tell, the Archer and the Apple," which her

class in Brooklyn, New York's District 13 had read. The bubble map may look like a generic web, but it isn't. It is based on the thought process of identifying qualities using adjectives and adjective phrases. Students use it in analyzing character traits in language arts, attributes in mathematics, properties in science, and cultural traits in social studies.

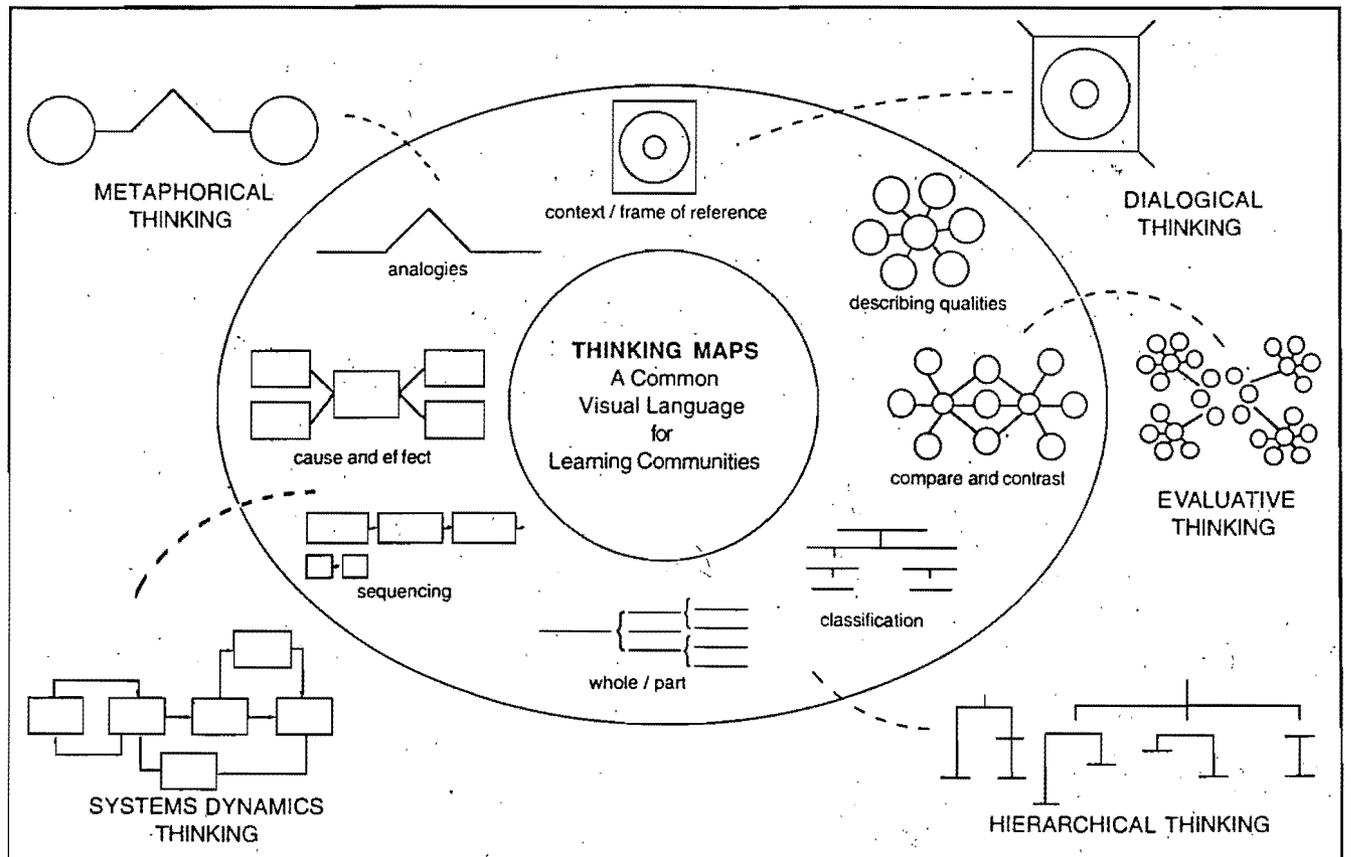
The graphic configuration of each Thinking Map becomes more complex as student thinking improves and content knowledge is enriched over time. Upper elementary, secondary,

and college students quickly become fluent in using the maps for complex tasks. Lower elementary students usually need several years to build up the capacity to use all the maps as interrelated tools.

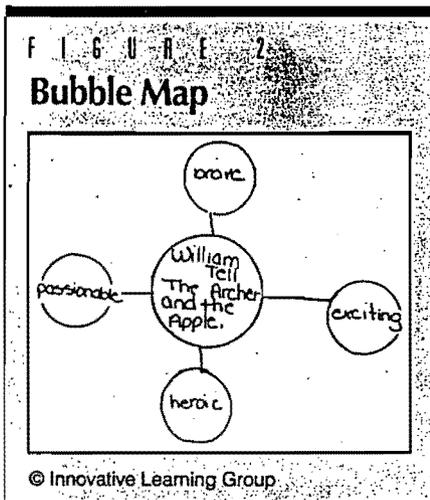
Schemes for Subtler Thinking

Typically, graphic organizers are useful as isolated strategies, but using a single graphic related to a specific task may not provide the student with the flexibility necessary to link strategies in more complex situations, such as in reading comprehension across

FIGURE 1
Thinking Maps



© Innovative Learning Group



disciplines and interpreting literature. For example, we may ask students to do several things while reading—to understand the context for the story, identify qualities of a central character, compare characters, and sequence what happened. These four tasks require different thinking processes that are not necessarily linear in form.

The investigation of character traits in the William Tell story led naturally—and graphically—to a comparison of two characters, using the double bubble map. By using this map, the student began to think about comparing and contrasting qualities and how the characters are similar and different. The student also used the flow map (see fig. 3) to analyze the story's plot and see the events as a sequence.

This linking of different patterns of thinking when analyzing literature is similar to structuring information and constructing knowledge in other content areas. Indeed, one can use visual representations as key tools for concept development and for the interpretation and assimilation of new information in every content area.

In science, for example, students use concept mapping or systems diagrams

to develop mental models of scientific concepts, and teachers use it to assess students' development of concepts and misconceptions (Novak and Gowin 1984). For reading comprehension, students might receive preset text structures, such as problem-solution formats, to help them organize and summarize what they read (Armbruster 1987). New Thinking Maps software will help students quickly make connections and organize information for oral reports, social studies research, science experiments, and other projects.

Researchers have found that presenting selected graphic organizers on computers helps students to see the relationships between main ideas and supporting details (as in the tree map), and that this in turn leads to higher scores on reading and writing tests (Cronin et al. 1990).

In North Carolina, many elementary and junior high schools that had introduced the Thinking Maps schoolwide in 1993–94 found significant increases in holistic writing test scores over successive years (Hyerle, in press).

Researchers also have found that students enjoy using graphics for networking information and

constructing knowledge, thus shifting from passive to interactive learning.

In this age of information overflow and networking, students must be able to use multiple strategies to solve complex problems. In language arts, for example, students are evaluated through their responses to complex reading selections or to an array of writing prompts. In mathematics, they must solve multistep word problems. The new testing formats require them to complete varied tasks and show their work and reasoning.

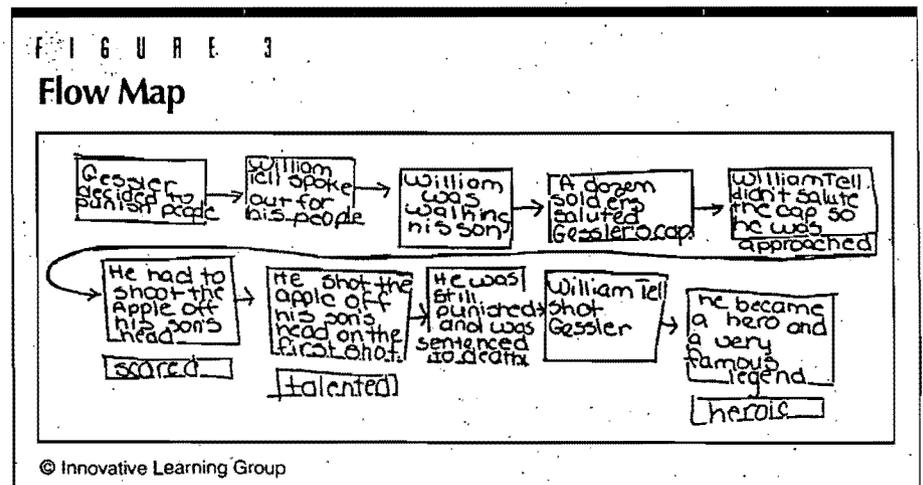
Unfortunately, most students are not prepared for these layered tasks. Barbara Bell, principal of the Joe Hall Elementary School in Miami, says one reason she adopted Thinking Maps at her school was that

it is particularly difficult to find strategies that work together to develop higher-order thinking skills.

By learning how to use Thinking Maps together, students show they can persevere and not give up in mid-problem.

Whole School Ties

In a learning community, Thinking Maps become a common-visual



language among students and between students and teachers—not only within content areas but also across disciplines. In the Thinking Maps transfer approach, we work with whole schools over several years. This is essential because it offers all-important continuous support for students as they move through grade levels.

“The key to the success of this approach,” suggests Barbara Bell, “is the common thinking process, vocabulary, and visual language.” She reflects on the 1993–94 school year, during which all her administrators, teachers, and 1,400 students—from kindergarten on up—began using the maps:

The teachers embraced these maps because they were able to incorporate them directly into their everyday questioning techniques and classroom activities. Students learned the maps easily because the maps were reinforced across the whole school.

Marilyn Lawrence, director of curriculum in Brooklyn’s District 13, has guided implementation of these maps in schools there. She believes it is critical that teachers be trained “to introduce and model for students how to transfer the maps across content areas,” so that students can consciously use them, both independently and in cooperative groups.

Teachers at Joe Hall Elementary School participated in a year of professional development in Thinking Maps and follow-up support in the classrooms. They then met in groups, by grade. They brought their own curriculum ideas, along with student writing portfolios, including those showing work by bilingual, special education, and gifted students.

The teachers agreed that the maps had successfully helped students develop their thinking processes and their ability to organize ideas, improved the quality and quantity of

their writing, and also motivated them to learn. Further, the maps benefited the teachers by helping them organize content and assess student learning.

Significantly, the teachers who gave the maps the highest approval rating were those who worked closely with the large population of Spanish-speaking students who are learning English. They said that the common visual language for thinking enabled their students to transfer patterns of thinking from Spanish into English, to focus on learning, and to build vocabulary.

Portfolios of Change

When teachers collect Thinking Maps over time and within student portfolios, many interesting possibilities emerge. Portfolios enable students and teachers to see how learners are assimilating new knowledge into the big picture of any content area, and how thinking and content knowledge develop incrementally.

Karen Joslin, a teacher at Hurley Elementary School in Salisbury, North Carolina, reviewed the portfolios with her Title I students to decide which Thinking Maps were appropriate to include in their portfolios. In this way, she helped students evaluate what they knew and how they came to construct content knowledge using Thinking Maps with other strategies. Students



become aware of how visual tools support what Arthur Costa has described as their “displayed metacognition” of patterns of thinking (in Clarke 1991). Or, as one 3rd grader from Laurel, Mississippi, put it: “I see what I learn.”

In most schools, teachers find continuous development of student thinking from grade to grade much more elusive than planning the scope and sequence of a curriculum. Yet it is this kind of reinforcement of thinking processes that helps students become independent, reflective learners. Thinking process maps of all kinds become a visual crossroads for consciously linking content with process learning.

As with any innovation in education, we have encountered obstacles along with positive changes in implementation. One of the first hurdles is

gaining the commitment of a school's whole faculty to develop a schoolwide design for using these tools. But with time and visible successes, this commitment tends to come.

Success Stories

Chadbourn Elementary School in Goldsboro, North Carolina, wrote Thinking Maps into its Chapter I program to prepare students for the state's first annual assessment of 4th graders' writing in February 1993. (Nearly 90 percent of Chadbourn's students qualify for a free or low-cost lunch.) The first year, teachers systematically introduced the maps, and the second year, they helped students use the maps to organize their writing in response to test prompts.

The result? In 1992-93, the 4th graders' writing scores averaged 35 percent—the highest of the 11 district schools tested, and more than 11 percent higher than the district and state averages. In 1993-94, Chadbourn's 4th graders did even better: they finished first with a 51 percent average. This compared to 31 percent and 34 percent, respectively, for the district and state averages. This past year, Chadbourn's average shot up to 61 percent. Rarely do scores increase so significantly three years in a row.

At Another Title I school, Atlanta's Margaret Fain Elementary, reading scores on the Georgia State Test of Basic Skills rose sharply—from 29 to 69 percent. Principal Patricia Austin says Thinking Maps helped her students improve in both the reading and mathematics portions of the test.

Then there was the initial workshop at Marcelle Elementary in Mission, Texas, when a teacher specialist, Louise Esau, asked me how she could use these maps with a 4th grader named Richie, who is blind. Visual tools for the blind? I had never

thought about the possibilities.

During my next visit, Esau unveiled a set of Braille Thinking Maps, some created by Richie, showing how he had used the Braille machine to pattern his ideas. Along with the raised bumps and patterns on these papers, she presented a video clip showing Richie proudly reading his Thinking Maps by hand and leading his classmates in discussing a description of a truck he had written.

After seeing and feeling this work, I had no doubt that patterns of thinking run much deeper than how we traditionally have conveyed them to students. Although we are now going beyond linear representations, we are just beginning to investigate how student-centered designs for thinking facilitate learning. And we're on the edge of seeing the implications of using visual tools for opening up the mind's eye. ■

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What Does It Mean to Be Smart?

A Yale study, based on the premise that intelligence has analytical, creative, and practical aspects, shows that if schools start valuing all three, they may find that thousands of kids are smarter than they think.

The most widely circulated newspaper in Connecticut recently carried a story on the meteoric rise of the president of one of the major banks in the state. I might have passed over the story with a glance had the name of the bank president not caught my eye. He was someone with whom I had gone to school from 1st grade right up through high school. What especially caught my attention, though, was that he had been a C student—someone who didn't seem to have much to offer.

Were the bank president an isolated case it might not be cause for alarm. But one cannot help wondering how many such students conclude that they really do not have much to contribute—in school or in the world at large—and so never try.

The Cost of a Closed System

Our system of education is, to a large degree, a closed system. Students are tested and classified in terms of two kinds of abilities—their ability to memorize information and, to a lesser extent, their ability to analyze it. They are also taught and assessed in ways that emphasize memory and analysis. As a result, we label students who excel in these patterns of ability as smart or able. We may label students who are weaker in these abilities as average or even slow or stupid.

Students may, however, excel in other abilities that are at least as important as those we now reward. Creativity and the practical application of information—ordinary common sense or “street smarts”—are two such abilities that go unappreciated and unrecognized. They are simply not considered relevant to conventional education.

The ability tests we currently use, whether to measure intelligence or achievement or to determine college admissions, also value memory and analytical abilities. These tests predict school performance reasonably well. They do so because they emphasize the same abilities that are emphasized in the classroom.

Thus, students who excel in memory and analytical abilities get good grades. Practically oriented learners,

however, who are better able to learn a set of facts if they can see its relevance to their own lives, lose out. (Indeed, many teachers and administrators are themselves practical learners who simply tune out lectures or workshops they consider irrelevant to them.)

The consequences of this system are potentially devastating. Through grades and test scores, we may be rewarding only a fraction of the students who should be rewarded. Worse, we may be inadvertently disenfranchising multitudes of students from learning. In fact, when researchers have examined the lives of enormously influential people, whether in creative domains (Gardner 1993), practical domains (Gardner 1995), or both, they have found that many of these people had been ordinary—or even mediocre—students.



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their own strengths (Sternberg 1996; Sternberg and Clinkenbeard 1995; Sternberg et al. 1996). Known as the Yale Summer

Psychology Program, the study involved 199 students from high schools across the United States and some from abroad.

Each school had nominated students for the program. Interested nominees then took a

Teaching in All Four Ways

At any grade level and in any subject, we can teach and assess in a way that enables students to use all four abilities (Sternberg 1994, Sternberg and Spear-Swerling 1996. See also Sternberg and Williams 1996, Williams et al. 1996). In other words, we can ask students to

- Recall who did something, what was done, when it was done, where it was done, or how it was done;
- Analyze, compare, evaluate, judge, or assess;
- Create, invent, imagine, suppose, or design; and
- Use, put into practice, implement, or show use.

In physical education, for example, competitors need to learn and remember various strategies for playing games, analyze their opponents' strategies, create their own strategies, and implement those strategies on the playing field. Figure 1 presents some examples of how teachers can do this in language arts, mathematics, social studies, and science.

When we use this framework, relatively few activities will end up requiring only one of these four abilities. On the contrary, most activities

will be a mixture, as are the tasks we confront in everyday life. Notice that in this framework, instruction and assessment are closely related. Almost any activity that is used for the one can be used for the other.

In addition, no type of activity should be limited to students whose strength is in that area. On the contrary, we should teach all students in all four ways. In that way, each student will find at least some aspects of the instruction and assessment to be compatible with his or her preferred way of learning and other aspects to be challenging, if perhaps somewhat uncomfortable.

Teaching in all four ways also makes the teacher's job easier and more manageable. No teacher can individualize instruction and assessment for each student in a large class, but any teacher can teach in a way that meets all students' needs.

Does This Work in Practice?

In the summer of 1993, we conducted a study of high school students to test our hypothesis that students learn and perform better when they are taught in a way that at least partially matches

test designed to measure their analytical, creative, and practical abilities. The test included multiple-choice verbal, quantitative, and figural items, as well as analytical, creative, and practical essay items (Sternberg 1993). A sample of the items appears in Figure 2.

We then selected the students who fit into one of five ability patterns: high analytical, high creative, high practical, high balanced (high in all three abilities), or low balanced (low in all three abilities). We based these judgments on both the individual student's patterns and the way these patterns compared to those of the other students.

We then placed each student into one of four differentiated instructional treatments. All included a morning lecture that balanced memory, analysis, creativity, and practical learning and thinking. All students used the same introductory psychology text (Sternberg 1995), which was also balanced among the four types of learning and thinking. The treatments differed, however, in the afternoon discussion sections. There, we assigned students to a section that emphasized either memory, analysis, creativity, or practical learning and thinking.

The critical feature of this design was that, based on their ability patterns, some students were matched and others mismatched to the instructional emphasis of their section. Another important feature was that all students received at least some instruction emphasizing each type of ability.

We assessed student achievement through homework assignments, tests, and an independent project. We assessed memory specifically through

multiple-choice tests, and we evaluated analytical, creative, and practical abilities through essays. For the essays, we asked students questions such as "Discuss the advantages and disadvantages of having armed guards at school" (analysis); "Describe what your ideal school would be like" (creativity); and "Describe some problem you have been facing in your life and then give a practical solution" (practical use).

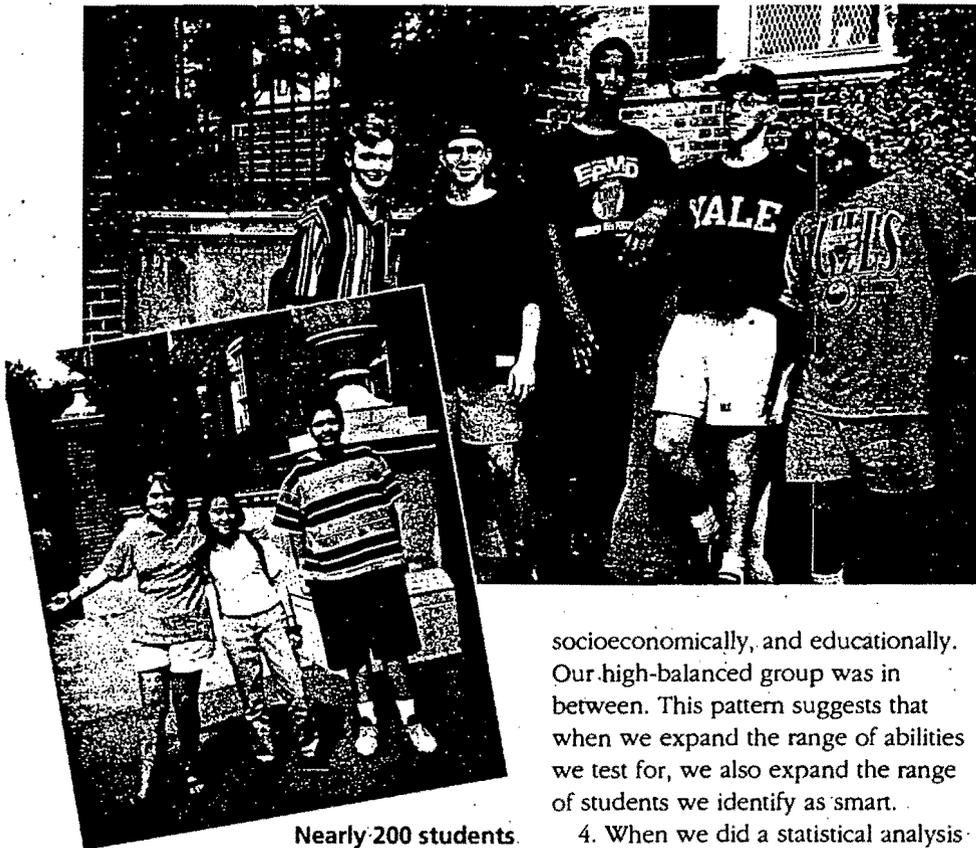
Because we assessed all students in

exactly the same way, we could more easily compare the groups' performance. Had we used the more conventional forms of instruction and assessment, emphasizing memory and analysis, the creative and practical ability tests would probably not have told us much.

Some Surprises

The study yielded many findings, but four stand out:

FIGURE 1			
Teaching for Four Abilities			
Type of Skill			
Memory	Analysis	Creativity	Practicality
Language Arts Remember what a gerund is or what the name of Tom Sawyer's aunt was.	Compare the function of a gerund to that of a participle, or compare the personality of Tom Sawyer to that of Huckleberry Finn.	Invent a sentence that effectively uses a gerund, or write a very short story with Tom Sawyer as a character.	Find gerunds in a newspaper or magazine article and describe how they are used, or say what general lesson about persuasion can be learned from Tom Sawyer's way of persuading his friends to whitewash Aunt Polly's fence.
Mathematics Remember a mathematical formula (Distance = Rate x Time).	Solve a mathematical word problem (using the $D=RT$ formula).	Create your own mathematical word problem using the $D=RT$ formula.	Show how to use the $D=RT$ formula to estimate driving time from one city to another near you.
Social Studies Remember a list of factors that led up to the U.S. Civil War.	Compare, contrast, and evaluate the arguments of those who supported slavery versus those who opposed it.	Write a page of a journal from the viewpoint of a soldier fighting for one or the other side during the Civil War.	Discuss the applicability of lessons of the Civil War for countries today that have strong internal divisions, such as the former Yugoslavia.
Science Name the main types of bacteria.	Analyze the means the immune system uses to fight bacterial infections.	Suggest ways to cope with the increasing immunity bacteria are showing to antibiotic drugs.	Suggest three steps that individuals might take to reduce the likelihood of bacterial infection.



Photos courtesy of Robert Sternberg

Nearly 200 students participated in the Yale Summer Psychology Program, held to test the hypothesis that students learn and perform better when they are taught in a way that at least partially matches their own learning strengths.

1. Students whose instruction matched their pattern of abilities performed significantly better than the others. Even by partially matching instruction to abilities, we could improve student achievement.

2. By measuring creative and practical abilities, we significantly improved our ability to predict course performance.

3. To our surprise, our four high-ability groups differed in their racial, ethnic, and socioeconomic composition. The high-analytic group was composed mostly of white, middle- to upper-middle-class students from well-known "good" schools. The high-creative and high-practical groups were much more diverse racially, ethnically,

socioeconomically, and educationally. Our high-balanced group was in between. This pattern suggests that when we expand the range of abilities we test for, we also expand the range of students we identify as smart.

4. When we did a statistical analysis of the ability factors underlying performance on our ability test, we found no single general factor (sometimes called a *g* factor score or an IQ). This suggests that the general ability factor that has been found to underlie many conventional ability tests may not be truly general, but general only in the narrow range of abilities that conventional tests assess.

A Clear-Eyed Sense of Accomplishment

By exposing students to instruction emphasizing each type of ability, we enable them to capitalize on their strengths while developing and improving new skills. This approach is also important because students need to learn that the world cannot always provide them with activities that suit their preferences. At the same time, if students are never presented with activities that suit them, they will never experience a sense of success and accomplishment. As a result, they may

tune out and never achieve their full potential.

On a personal note, I was primarily a creative learner in classes that were largely oriented toward memorizing information. When in college, I took an introductory psychology course that was so oriented; I got a C, leading my instructor to suggest that I might want to consider another career path. What's more, that instructor was a psychologist who specialized in learning and memory! I might add that never once in my career have I had to memorize a book or lecture. But I have continually needed to think analytically, creatively, and practically in my teaching, writing, and research.

Success in today's job market often requires creativity, flexibility, and a readiness to see things in new ways. Furthermore, students who graduate with A's but who cannot apply what they have learned may find themselves failing on the job.

Creativity, in particular, has become even more important over time, just as other abilities have become less valuable. For example, with the advent of computers and calculators, both penmanship and arithmetic skills have diminished in importance. Some standardized ability tests, such as the SAT, even allow students to use calculators. With the increasing availability of massive, rapid data-retrieval systems, the ability to memorize information will become even less important.

This is not to say that memory and analytical abilities are not important. Students need to learn and remember the core content of the curriculum, and they need to be able to analyze—to think critically about—the material. But the importance of these abilities should not be allowed to obfuscate what else is important.

In a pluralistic society, we cannot

When we expand the range of abilities we test for, we also expand the range of students we identify as smart.

afford to have a monolithic conception of intelligence and schooling; it's simply a waste of talent. And, as I unexpectedly found in my study, it's no random waste. The more we teach and assess students based on a broader set of abilities, the more racially, ethnically, and socioeconomi-

cally diverse our achievers will be. We can easily change our closed system—and we should. We must take a more balanced approach to education to reach all of our students. ■

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F I G U R E 2

Sample Multiple-Choice Questions from the Sternberg Triarchic Abilities Test

Analytical Verbal	The vip was green, so I started to cross the street. Vip most likely means: A. car B. sign C. light D. tree
Creative Quantitative	There is a new mathematical operation called graf. It is defined as follows: $x \text{ graf } y = x + y$, if $x < y$ but $x \text{ graf } y = x - y$, if otherwise. How much is 4 graf 7? A. -3 B. 3 C. 11 D. -11
Practical Figural (Students are shown a map)	After attending a performance at the theater, you need to drive to House A. If you want to avoid the traffic jam at the intersection of Spruce Avenue and Willow Street and take the shortest alternative route, you will drive A. west on Maple Avenue to Route 326. B. west on Pine Street to Hickory Street. C. east on Maple Avenue to Oak Street. D. east on Pine Street to Oak Street.

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Getting Specific About Multiple Intelligences

Children may display similar strengths—interpersonal, linguistic, musical—but not necessarily in the same ways or to the same extent over time.

If you were a kindergarten teacher and listened to Maggie making up words, playing with rhymes, and pretending to speak French, what would you say about her abilities?

If you had been introduced to the theory of multiple intelligences (Gardner 1983), which suggests that there are at least seven different capacities worthy of being called intelligences, you might suspect that Maggie was displaying linguistic intelligence and that she could do well on a number of linguistic tasks. You would not necessarily conclude that she would do well on tasks involving the other intelligences—interpersonal, intrapersonal, musical, spatial, bodily-kinesthetic, and logical-mathematical.¹

Such a view of intelligence is reflected in programs and practices that seek to determine in which areas young children show the greatest strengths. Children who do well on tasks in a particular area—storytelling or reporting, athletics or dance, drawing or building—are broadly labeled as having strengths in the linguistic, bodily-kinesthetic, or spatial realms, respectively.

Such an approach, however, implies that children have a reservoir of talent in a variety of activities, shown consistently over time. It suggests that there are more intelligences, but does not necessarily call into question assumptions about the nature, display, and development of intelligence.

How Does Maggie Display Her Strength?

Instead of expecting that a particular intelligence will be equally evident across related activities, here's another way of looking at the way a child displays intelligence. Maggie, for example, could be demonstrating an interest in and sensitivity to the sounds of language. Accordingly, she might not show the same

linguistic strengths when telling a story. Labeling Maggie as "linguistic" is therefore not as informative as noting the different ways and situations in which she demonstrates particular linguistic strengths and interests.

Adults often display their intelligences in such specific ways (Gardner 1983). For example, some people demonstrate their linguistic intelligence by writing poetry, others by writing news reports, and still others by writing fiction. Being able to create moving poems does not necessarily mean that one can write informative newspaper articles or inventive and engaging novels. People may show linguistic strengths across a variety of activities, but there is no guarantee that they will.

From this perspective, instead of determining how many intelligences a child like Maggie displays, we need to be sensitive to the kinds of activities and roles in which the child shows strength (Feldman 1986;

Instead of asking how many intelligences each young child has, we need to ask, "In what ways does this child demonstrate intelligences?"

Krechevsky 1991). Instead of asking how much intelligence each young child has, we need to ask, "In what ways does this child demonstrate intelligence?" To do this, we must take into account a constellation of factors—what intelligences they possess, their interests in and knowledge of particular fields, and the contexts in which they live and learn.

Three Faces of Interpersonal Intelligence

Consider how three kindergartners—Ned, Kenny, and Mark—display interpersonal intelligence. Young children cannot articulate and reflect on other people's motivations, intentions, moods, or thoughts to the degree that most adults can. But many children—even kindergartners—can show a sensitivity and responsiveness to other people in remarkably different ways (Hatch, in press).

Ned's organization. Although Ned is shy, he is a particularly effective organizer. He often spends his time in free play coordinating the children's activities.



forgotten the arguments, Kenny seizes another opportunity and declares himself the leader. But rather than seizing all the power himself, Kenny magnanimously declares that they can play all the games they want. The conflict over leadership is resolved, and play proceeds.

Kenny's strength as a negotiator undoubtedly benefits from his linguistic intelligence, which he displays in

He may organize them in dramatic plays or direct their activities at the sand table. This skill helps make him the most popular boy in his class—so popular, in fact, that when he enters the classroom, he is mobbed by his peers. Ned's strength in organizing groups benefits from his interest in activities that are popular with his peers. For example, he knows about different play scripts and characters; this understanding provides a solid foundation for group activities. His systematic approach to many tasks may also help him keep these activities running smoothly.

In addition, Ned possesses spatial intelligence, evident in the realistic and colorful figures he draws. This talent probably helps him act as a leader at the art table, where it's not unusual to find a row of children sitting next to him, drawing the same Ninja Turtle characters that he does.

Kenny's negotiation. Kenny also seems to care about being the leader, but he is not always as effective as Ned is at organizing and coordinating play. Instead, Kenny excels as a negotiator.

He can resolve conflicts in ways that satisfy his peers and help to advance his own interests. In contrast to other children, who may try to get their way by stating a position and sticking to it, Kenny is able to make gradual adjustments until he finds a suitable alternative. For example:

Kenny wonders who the leader will be today.

"How 'bout Ned?" Mark suggests.

Ned says he thinks Mark should be the leader. Kenny protests that Mark already had a turn and adds that it should be *his* turn because his last turn was before Mark's. Ned argues that since he (Ned) was the leader the last time, he gets to pick the new leader.

Now Kenny says, "Actually, I was the leader the last time, so I get to pick the new one. And that is exactly..." he pauses for a long time, "no one in this area."

Somehow, even when he appears to have no other options, Kenny manages to find an alternative. Then, a few minutes later, after the boys have

his clear and convincing arguments. He also seems to draw on a wide range of strategies to help resolve disputes.

While other children use similar strategies—ranging from determining who said it first to voting—Kenny seems to have a larger repertoire than many of his peers, and an unusual ability to use the strategies to his advantage.

Mark's relationships. Mark shows no interest in being a leader or getting his own way. When I ask him which Ninja Turtle he likes to be, he answers, "Leonardo." But when I ask what happens when someone else wants to be Leonardo too, he responds simply: "They get to be Leonardo, and I get to be someone else."

Because Mark never acts as a leader and his peers occasionally exclude him from group situations, some might conclude that he displays little interpersonal intelligence. But Mark's social strengths lie in his ability to act as a friend to many of his peers. He has been able to develop and sustain relationships with many of his classmates—even girls (with whom many of the boys hardly ever play). Mark has



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also made friends with Eric, one of the toughest and least popular students.

Mark's success in developing relationships seems to benefit from his interest in other people and his capacity to attend to and respond to what others are thinking, feeling, and doing. He notices and reacts to other children who are upset, and pays regular, almost constant, attention to what others are doing. For example, art is an individual activity for most of the kindergartners, but Mark turns it into a social occasion. He painstakingly copies the work of the children seated next to him, asks for their advice, and often solicits their assistance. Mark also shows an unusually good knowledge of the social interactions around him. As a result, even though he has little to say about his own activities and is relatively quiet in general, he is a much more reliable source of information about what, for example, happened on the playground than are his classmates.

Balancing Strengths and Needs

In these examples, young children often display their strengths in specific activities or roles, rather than in all

activities related to a particular intelligence. By continuing to pursue those specific activities, a child could master more challenging content, develop even greater expertise, and gain more confidence and motivation than he or she could in other activities.

In addition, helping children develop specific strengths needs to be balanced with opportunities to develop all the skills they need to succeed in school. This is not a simple task, particularly in a society that continues to emphasize quantitative measures of a narrow range of intelligences. Some suggestions follow.

■ *Instead of organizing the curriculum around the intelligences, organize around the child.* We do not have to teach every child every subject in seven or eight different ways or ensure that every child develops every intelligence. Although we should expose children to a range of activities, every child does not, for example, need to develop musical intelligence or have mathematical or scientific concepts presented in musical form.

Further, a knowledge of each child's intelligences and the ways in which he

or she demonstrates them are merely tools that can help us understand and respond to that child's needs. If a child like Mark struggles in math or English, a teacher could draw on his sensitivity to people to help him in those subjects. The teacher might give him opportunities to survey his classmates and tabulate the results, or to cowrite biographies of family and friends. If, on the other hand, Kenny struggles in English or social studies, he may benefit more from writing assignments or debates that enable him to build on his skill as a negotiator.

■ *Look for specialized strengths, but don't attach permanent labels.* Just because young children display particular capacities does not necessarily mean that they will grow up to excel in activities involving those capacities. Children's intelligences, the manner in which they display them, and how successful they are, shift, grow, and vary over time.

For example, Ned, Kenny, and Mark are now in the 6th grade. There is a link between the strengths they displayed in kindergarten and their current activities, but important changes have occurred. For Ned, organization remains a valued strength. In describing a radio show he helped produce, he explains, "I'm, like, the anchor person, who organizes and assigns everyone roles and gives everyone the script."

Kenny continues to be a good negotiator. His mother predicts he'll be a good lawyer because he's so good at arguing. His teacher says he's unusually adept at persuading her to see things his way. And Kenny himself describes a long argument in which he resolutely maintained a position and found several ways to convince his peers that he was correct. As for Mark, he

continues to work well with a variety of children and still shows little interest in taking on leadership roles.

Yet for all three children, important changes have occurred. For one thing, it appears that Kenny has become as effective a leader as Ned. And Mark seems to be excluded from groups more often than he had been in kindergarten. In fact, even though he has moved to a neighboring state and has not seen Kenny and Ned in several years, he still regards them as among his best friends.

In addition to these changes, other strengths have emerged. Ned demonstrates a talent for reporting that was not (nor could have been) apparent in kindergarten. He writes news reports

and could even include a few paragraphs that the children write. Arranging for teachers and children to work together for two years instead of one also helps address this problem.

have a pretty good sense of a particular child's strengths, most teachers must begin every year without that knowledge. When I asked Kenny and Ned's 6th grade teacher what she knew about them when they arrived in her classroom, she responded, "I think I knew that they were hard workers and relatively bright. That's probably all I really knew." With few sources of information other than grades, tests, and typical school records, the teacher had no way of getting the specific information that could help her respond to her students' strengths and needs.

Portfolios that the children and their teachers construct could help to pass along valuable information. The portfolios would display children's strengths

and respond to that child as an individual. ■

Recently, Gardner (1995) has argued that there is an eighth intelligence—naturalist intelligence—the capacity to draw on materials and features of the natural environment to solve problems or fashion products. He cites Charles Darwin as one example of such a person. Gardner (in press) is also exploring other possible intelligences, including a spiritual or existential intelligence.

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Labeling Maggie as "linguistic" is not as informative as noting the different ways in which she demonstrates particular linguistic interests.

for field trips, recaps of kickball games ("Homets Sting Tigers," one headline announces), and scripts for the news broadcasts of his radio shows. Kenny has also experienced success as a writer. And Mark now demonstrates an interest in science and science experiments that was not apparent earlier.

Assumptions that these children would continue to display the same strengths failed to take into account such factors as new interests, new peer groups, and the drastic change from largely social play activities in kindergarten to frequently individual academic pursuits in 6th grade.

■ *Maintain and pass on information about children's strengths.* Although many parents and even peers may

and could even include a few paragraphs that the children write. Arranging for teachers and children to work together for two years instead of one also helps address this problem.

Beyond Intelligence Tests

To go beyond current intelligence tests and formulate much more useful hypotheses about the kinds of activities in which a child does—or will—excel, we must take into account not only the child's specific interests and development, but also the opportunities and resources available to that child. Further, we must constantly question our assumptions about that child's strengths and about intelligence in general. And we must be willing to



Maximizing Learning

A Conversation with Renate Nummela Caine

In Making Connections and in Education on the Edge of Possibility, you and Geoffrey Caine discuss principles of brain-based learning. Some people might say, "Well, of course, we learn with our brains—so what else is new?" But you and Geoffrey have connected the latest cognitive and neurological research to education.

What is new? What is the most significant finding that relates to what we do in schools?

We debated about using the term *brain-based learning* because, of course, all learning is brain based. But if we just said "learning," then people might not understand what we were talking about, either. Humans have a marvelous brain, whose possibilities appear endless. So when we refer to brain-based learning, we are concerned about maximizing learning—understanding how the brain works best—and we have encapsulated our findings in 12 learning principles that

What do the neurosciences, biology, and psychology teach us about what our schools should be like? How can we change our mental models of education to meet the needs of children? Renate Caine answers these difficult questions in exploring how children learn.

Carolyn R. Pool



emphasize the connections and patterns our brains make (see fig. 1). Our current studies are taking us into the great impact that early childhood development has on the way children learn. These findings have enormous implications for schools—even preschools—because so many neurological pathways critical for later life are laid down from age zero to age 3. These pathways affect the way children interact with formative experiences during later developmental stages. These patterns also include children's beliefs about themselves and their world, which continue into adulthood.

In your work, you discuss threats that inhibit learning. What are these threats? What happens to learning when we feel threatened?

Many children's lives are filled with threats to learning—child abuse, poverty, malnourishment, family and community violence. These are devastating experiences for the child—and for the human brain. These experiences can program the child to effectively live in anticipation of such experiences. Children who have lived with extreme threat develop perceptual loops; they look for certain signals in the environment that to some extent replicate their own experiences. Their brains are not programmed to help them cope in a healthy way. When we feel threatened, we downshift our thinking. Downshifted people feel helpless; they don't look at possibilities; they don't feel safe to take risks or challenge old ideas. They have limited choices for behavior.

What does downshifting mean for teachers?

We define downshifting as the psychophysiological response to threat, accompanied by a sense of helplessness or fatigue. The downshifted person experiences a sense of fear or anxiety, not the excitement of a challenge. Downshifting is accompanied by a feeling that you cannot access your own ability to deal with the situation. Downshifting can result from very drastic conditions in early childhood, as I mentioned; but what we're seeing is that, to a lesser degree, downshifting is everywhere in the schools.

Do children face threats in school?

Yes, but here we're not talking about traumatic threats like guns in school. We are concerned about emotional threats to higher-order thinking and



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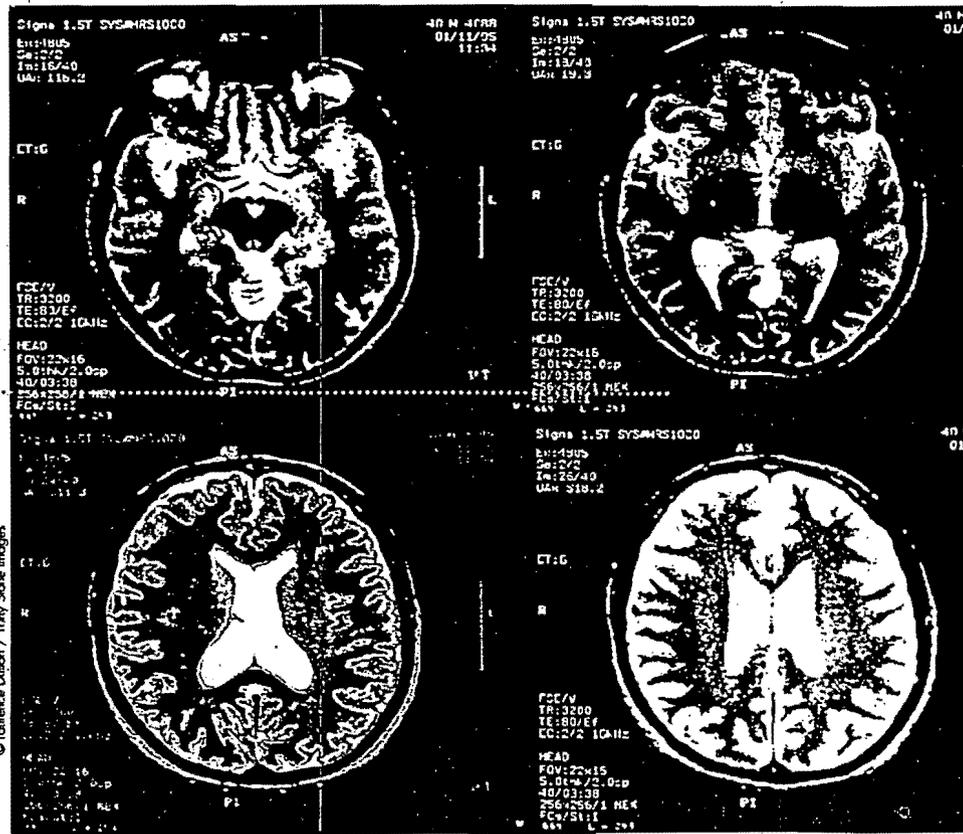
learning. The system of traditional education can be a threat that inhibits higher levels of learning. If as a teacher I am in charge of the curriculum, you as the student are supposed to learn

what I say you must learn. I know the answers that you have to get. I'm also going to tell you how long it will take you to learn this and when it's due. And not only that—I evaluate you and your work. In this approach, where is your input? Where is your self-efficacy? And what are you learning but compliance? So students are doing what teachers want them to do. And downshifted people can do some things well, like memorizing, because the brain perseverates under threat and likes to do things over and over again—repetition provides a sense of safety when you feel

helpless. Memorization is compatible with traditional teaching. But real learning—making connections, higher-order thinking, and creativity—is incompatible with that kind of environment.

What are some examples of strategies that are compatible with brain-based teaching and learning?

Let me give you an example that shows how teachers faced a challenge that they first perceived as a threat. Geoffrey and I were working with teachers beginning to use a rich, brain-based approach to learning to read and write. The district suddenly mandated its own literacy program. All the teachers dropped the brain-based approach; they abandoned their new understanding of learning—they just implemented the district's mandates. They were frightened; they did not have the self-efficacy they needed. In the mandated program, the students were scheduled to do unrelated tasks and drills every day. Soon, kids began



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to ask, "Why are we doing this? This isn't any fun and we're not learning anything!" Geoffrey and I also asked, "Why are you doing this?" Basically, the reason was fear; the teachers felt helpless in dealing with the district—they downshifted.

We encouraged the teachers to examine the literacy program and start incorporating it into what they knew about the human brain. The teachers then said, "Okay, what do we know about learning? We understand that children need to be in a community. They need to follow their own interests, and we need to constantly question and challenge them." The teachers began to see that brain-based learning moves away from what you do on Monday morning to how children learn. They began to see that brain-based learning is not limited to one approach or strategy.

In the process, the teachers took the best from the district's program—but they also took the best out of Reading Recovery, whole language, and



© Ron Chaplin / FPG

Many children don't understand or *feel* poetry. One teacher using a brain-based approach to language arts decided to turn her whole classroom into a coffeehouse. The kids helped set it up—low lights, candles on the tables, tablecloths, music playing softly. The teacher asked adults from the school and community to come in and read their favorite poetry and talk about it. Through this complex experience, the teacher gave her students a sense, or felt meaning, for what poetry is and that it is valued by adults in the real world. Teachers can do the same thing in science and math.

What would be an example of brain-based science or math?

In science and math, teachers and students might ask natural questions like "What happened?" "How did you do this?" "What happened when we added this element?" and "How else might this have worked out?" They ask critical questions that are not necessarily in the book or worksheet. Take the "owl pellet" lesson, for example.

Owl pellets are material that owls regurgitate after they eat. The pellets include the bones and fur of rodents and birds the owls consume. In a science lesson that I was observing, students pulled some owl pellets apart and then answered worksheet questions about what owls eat. I walked around this classroom and asked another question: "You know, I'm wondering—how does an owl's stomach know how to separate the meat from the bones?" This was a genuine question. And the students looked at me as though I were crazy because that question was not on the worksheet.

A teacher asking real, live questions provides rich possibilities for students. But for these possibilities to become reality, teachers need to shift their

phonics. They began seeing kids in kindergarten and 1st grade doing critical thinking and analysis. As a result, this school has gone from the second from the bottom in reading in their district to the second from the top.

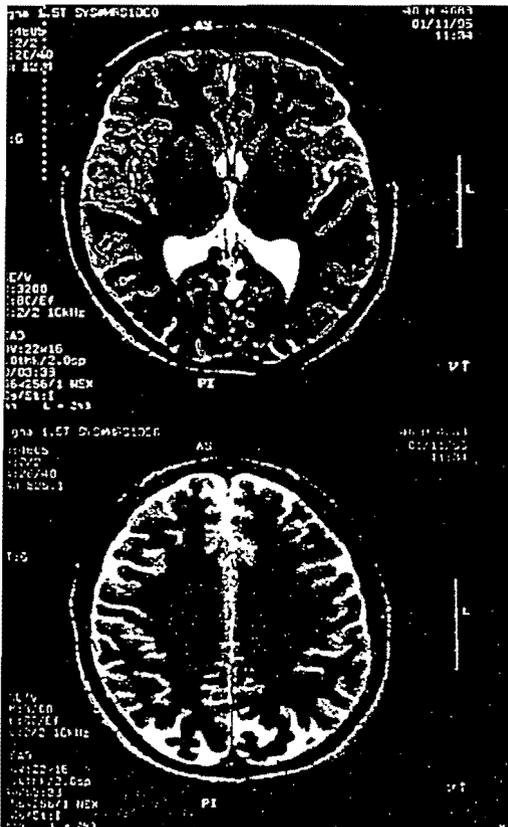
What are some ways that a brain-based approach to, say, language arts, might differ from a traditional approach? I remember being intrigued by your discussion in Making Connections of relaxed alertness, orchestrated immersion, and active processing as conditions for learning.

Well, you cannot really separate these conditions. Relaxed alertness means "low threat, high challenge." If children are to think critically, they must feel safe to take risks. And if the teacher insists on one correct answer and is going to evaluate them, children are not foolish. They will give the answer the teacher wants. But for making connections and actually changing their thinking on the basis of accrued knowledge, they need relaxed alertness—that is, safety and challenging learning experiences.

As for orchestrated immersion, children learn best if they are immersed in complex experiences and are given the opportunity to actively process what they have learned. The best learning happens when necessary facts and skills are embedded in experiences that relate to real life, when there's a big picture somehow.

Can you give an example?

Even though many teachers creatively use *haiku* and other forms of poetry that appeal to students, most teachers approach poetry as a subject to cover.



Children learn best if they are immersed in complex experiences and are given the opportunity to actively process what they have learned.

thinking about teaching and learning. They also need extensive resources, including technological support. Brain-based learning is wonderfully compatible with technology.

Your examples remind me of some good teachers I've had. My 9th grade chorus teacher took our class to many concerts, shows, and competitions. Her bubbling enthusiasm for all sorts of music, from gospel to folk to classical, stays with me to this day. What suggestions do you have for teachers to improve their own practice?

In our recent work, we found three distinct styles of teaching. In the first instructional approach, the teacher is in charge, using traditional strategies like lecturing, memorization, testing—the old factory model. When you speak of relaxed alertness or orderliness to teachers who are dedicated to this approach, they tend to think in terms of good discipline, of going along with the teacher's plan. Orchestrated immersion might consist of a teacher's bringing in some World War II artifacts to introduce a lecture, or allowing students to ask questions of a guest speaker.

In the second approach, the teacher is comfortable with many innovative learning strategies and sees new possibilities for defining discipline, but still largely directs student learning. We have found that more and more teachers are moving to the second approach, though most teachers still operate from the mental model of the traditional approach to education, because that was the way they were taught.

In the third (and rarest) instructional approach, which is actually brain-based teaching, learning becomes collaborative—teachers and students have much more mutual responsibility. Here, students know what they want to do,

time parameters are flexible, and orderliness and coherence prevail. Teachers have an extensive repertoire of strategies. These classrooms are characterized by ongoing questioning and analysis. Students and teachers ask experts, they get on the Internet, they learn together.

That reminds me: I heard of a new program called STTC—it stands for Students Teaching Teachers about Computers.

I like that. Students are often much more comfortable with the third instructional approach. On the other hand, some students are so used to the traditional factory model that they are initially confused when they encounter

FIGURE 1

Brain/Mind Learning Principles

1. The brain is a complex, dynamic system.
2. The brain is a social brain.
3. The search for meaning is innate.
4. The search for meaning occurs through "patterning."
5. Emotions are critical to patterning.
6. Every brain simultaneously perceives and creates parts and wholes.
7. Learning involves both focused attention and peripheral perception.
8. Learning always involves conscious and unconscious processes.
9. We have at least two ways of organizing memory.
10. Learning is developmental.
11. Complex learning is enhanced by challenge and inhibited by threat.
12. Every brain is uniquely organized.

Source: *Education on the Edge of Possibility*, by R.N. Caine and G. Caine (Alexandria, Va.: ASCD, 1997).

brain-based teaching. And it is difficult for some parents to understand that the traditional approach to teaching is no longer going to prepare their children for the future. But five years from now, if I were a parent and I still saw my children sitting in a classroom with desks in a row and a teacher up front, I would panic because that will absolutely be inappropriate.

What if parents disagree with what you're doing and insist on a certain type of curriculum?

Parents need to be brought into the educational community wherever possible. Orderliness depends on constant communication among teachers, students, and parents. But for parents who fundamentally disagree with the rest of the community, charter schools are a real possibility. Parents can create their own school, organized around their own purposes and meanings. Private and religious schools can also meet some of these needs, though I am not in favor of vouchers. Acknowledging and celebrating diversity—in a democratic community—is an important outcome of principle 12, "Every brain is uniquely organized."

Speaking of diversity, what is your view of multiple intelligences?

We all have different talents, skills, perspectives, and intelligences. We need to encourage children's gifts in two ways. First, we need to acknowledge diversity; second, we need to focus on our commonalities, what makes us human and what ties us to the rest of nature.

So Geoffrey and I agree with the basic premise of multiple intelligences. But how is it used in the classroom? Do teachers simply incorporate variation into traditional presentations? Or do they address multiple intelligences by providing complex experiences within



Photo by Gail Beebe

my own strengths and initiative when I know that a drug has changed my behavior? I know that Bob is not advocating the use of Prozac with children—I am pleading for the exploration of other ways to enhance children's

which students can use their individual intelligences (expanding into other types of skills and modes and benefiting from other people's intelligences)? Interaction and complexity are key.

In a recent article, Bob Sylwester' discusses neurological research concerning the effects of serotonin on self-esteem—not only through drugs like Prozac, but by positive social feedback students get from portfolios, cooperative group learning, and nurturing from caring adults (see also this issue, p. 16). Where does brain-based learning fit in this picture?

On the whole, I would tend to agree with Bob about the importance of positive social feedback and the benefit of the strategies he mentions. But here, again, we must consider developmental learning and the effects of downshifting on children's ability to become self-motivated, to believe in their own capacities and abilities. We have suggested that the opposite of downshifting is self-efficacy.

I think we need to be very careful that we do not depend on Prozac and other psychotropic drugs for other than temporary assists, particularly for downshifted people who have difficulty in ascribing any success to their own efforts and who are easily influenced by others. There seems to be a real danger here. How can I believe in

self-esteem and self-efficacy, such as by removing threats from our classrooms and making them safe, challenging places for children to learn. This should be the focus of education.

In Education on the Edge of Possibility, you and Geoffrey describe your work with two elementary schools in implementing brain-based teaching. What was this process like?

Shifting out of an exclusively traditional instructional approach is difficult. Our book relates the challenges and setbacks the schools faced. First, I want to recognize all the teachers who use traditional approaches really well. It's not that their work is wrong; the times are changing on us. Our knowledge base is changing, with new information from the neurosciences and biology and technology. We're living in a different world. There's so much for us to understand, and we can't do it by getting what I call "surface knowledge"—what somebody else tells us is important to learn.

Second, to change our mental models, we have to address how our own brains learn—and immerse ourselves in interactive, real-life, complex experiences out of which we can process new ideas. To help teachers change their mental models, we found that using "process groups" was critical.

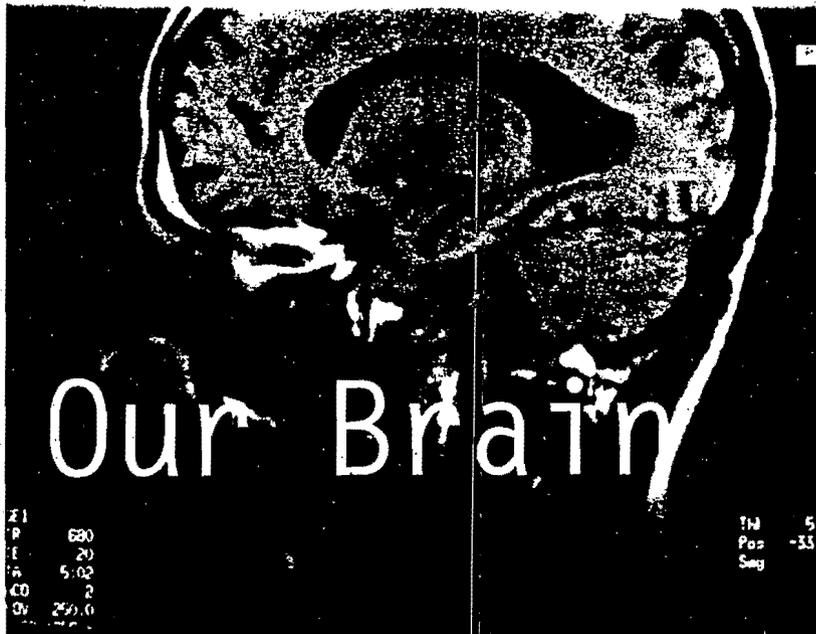
What is a process group?

We encouraged teachers to get together in small groups and look at new information from the sciences, examine educational research, and study the brain/mind principles—as people, not just as teachers. They asked questions like "What does it mean that the brain is a complex, dynamic system?" Then they began to reflect on how their own practices did (or did not) maximize learning. The groups included not only teachers but also custodians, librarians, and other nonteaching staff, in an attempt to arrive at common beliefs, purposes, and values—the foundation for orderliness. They all shared ideas on how to create a school and environment based on how children learn. The groups came up with their own solutions to the "time and energy" problems that plague many other reforms: How can we allow time for complex experiences when we have to cover the curriculum? Do children really learn best in 50-minute increments? Where do we get planning time? A supportive administration and funding arrangements gave the groups time to constantly rethink and enrich what they were doing in school—and this work is ongoing. We see no other way to produce effective change in schools—there's no top-down way to teach a new mental model. It has to come from the educators themselves. ■

¹R. Sylwester, (February 1997), "The Neurobiology of Self-Esteem and Aggression," *Educational Leadership* 54, 5: 75-79.

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About Our Brain



With all this activity, do you expect a steady stream of new information about the brain in the years ahead?

Oh, yes. In science, when there's a big technological breakthrough, researchers start working on questions that until now were unanswerable. And as pieces of knowledge start coming in, they begin to see how things fit together. So eventually, we'll have the universal brain theory. We'll be able to deal with consciousness: how we know what we know and how we know we know it.

Naturally, educators are interested in all of this. They are looking for ways they can apply the new knowledge from brain research in their schools. What do you say?

Well, I think we've done it all along, but we didn't call it brain research. If you're a teacher, you're dealing every day with about 100 pounds of brain tissue floating several feet above the classroom floor. Over a 20- or 30-year career, watching how those brains react, what they like to do, what they do easily and what with great difficulty, you're going to try to adapt your procedures to what works with brains. So, at that level, teachers have always been brain researchers.

We've known, for example, how long a lesson should be to hold student interest. We've known that more boys have trouble with reading and writing than do girls, and that young children can pick up a foreign language more

easily than adults can. But we didn't have a biological substrate for that. Now, we're beginning to add this biological dimension that helps us understand why these things are true.

You know, people were successfully breeding dogs and horses long before DNA was discovered 40 years ago. It's taken 40 years to move from animal breeding to genetic engineering. So it

discovery, it usually isn't a big surprise to most educators. For example, teachers have long encouraged students to find patterns and connections in what they've learned, but new knowledge about our brain may help us discover new ways to help students expand their knowledge. And the best teachers know that kids learn more readily when they are emotionally

... We must take the time and effort to learn all we can about our brain—then figure out what to do about it.

took a while to find practical applications of this monumental discovery.

So what about practical applications of neuroscience?

We must take the time and effort to learn all we can about our brain—then figure out what to do about it. We teachers never really knew what was going on in those kids' brains. Now we have a chance to get beyond compassion and frustration. But first we have to really understand.

What is brain-compatible teaching?

I'm hesitant to use that term because it seems too pat. It seems to negate everything positive that teachers have been trying to do in the past. When the neurosciences come up with a

involved in the lesson because emotion drives attention, which drives learning and memory. It's biologically impossible to learn anything that you're not paying attention to; the attentional mechanism drives the whole learning and memory process. Teachers know that emotion is important; they just don't always know what to do about it.

The point is that teachers need to study many things—biology, anthropology, psychology, and other subjects—and make their own discoveries about improving instruction.

Let's take attention research, for example. For very good reasons, our brain evolved to be good at sizing things up quickly and acting on the basis of limited information. This has big survival value, because it keeps you from being eaten by predators. You don't need to know how old they

**Teachers need to study many things—
biology, anthropology, psychology, and other
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about improving instruction.**

are and whether they're male or female; you just get out of there as quickly as you can. But because of this tendency of our brains to make quick judgments, we go through life jumping to conclusions, making a mess of things, and then having to apologize.

So we're very good at rapidly sizing things up and acting on limited information, but we're not so good at the reverse—anything that requires sustained attention and precision, like worksheets. That doesn't mean worksheets are bad; it depends on how you're using them. But some are clearly not used appropriately.

I've heard you say that our profession needs to move from dependence on social science to greater emphasis on biology. What do you have in mind?

Throughout history, educators have worked with brains—with limited information on how brains work. In this century, we have turned to the social scientists, who don't know about one brain but do know about bunches of them. So our professional education has focused on negotiating behavior with a group of kids, on allocating energy and resources.

Now, the social scientists could be compassionate about something like dyslexia; they could tell what percentage of the population would have the problem, but they couldn't solve it. Biologists look at underlying causes; they can help us understand what dyslexia is. The problem is that biologists deal with neurons and synapses and blood and tissue, which most educators didn't study in their professional preparation.

But in the years ahead, they will?

They'll have to. Teacher education programs will have to change. I can't imagine a person preparing to become



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a teacher these days without having access to cognitive science.

What would you emphasize if you were teaching future teachers?

The first thing would be that we are basically a social species. We are born with an immature brain and have a long childhood, so we have to depend on other people to take care of us in childhood. The marvelous thing about our maturation process is that our individual brains develop very differently—just like the files individuals may later create in their computers. Our brains develop in their own way, which lends credence to the idea of multiple intelligences and specialization. When we think about implications of our social brain, we see that everybody in a community must know how to do some things, such as communicate, but not everyone has to be able to repair automobiles.

Another obvious implication is the need to consider whether a particular learning task is individually oriented or socially oriented. It's foolish and wasteful to teach something to individuals if it's really a socially oriented behavior. I mentioned worksheets earlier. I saw a worksheet recently on which elementary students were supposed to list the five best qualities

of a president—and hand it in with no discussion or feedback. Now, that's the kind of task we humans do more easily and naturally through discussion. It's not like a worksheet of multiplication problems, which is an individual task.

Another thing a biological approach can do for educators is change the way they

think about education. For example, we talk about “higher order” and “lower order” as though one is much more important than the other. But it's really quite remarkable that we have the ability to remember a simple fact like where we're supposed to be at 12:30. If you can't remember the name of the restaurant where you're supposed to meet somebody, it may be lower thinking, but it's critical.

Another misconception is that the really important things are the hardest. Tasks that require a lot of energy and effort, like calculus, are the most significant. Biologically, that's just wrong. The way your brain looks at it, if it's important, it has to be a fail-safe operation—like digital competence, the ability to pick things up. If it's really important, you don't have to go to school to learn it; you can do it quickly and easily.

Why is it that the same kids who learned to speak their native language with no formal schooling—and who could have learned any language in the world the same way—have so much trouble learning to read and write? The answer scientists give is that reading and writing aren't nearly as critical to survival as is oral competency. That doesn't mean we should ignore the unnatural things, but it does mean that we sometimes get our priorities wrong

when we talk about standards and rigor and so on. We need to remember that from a biological standpoint, importance and difficulty are not at all the same.

You've said that in the future, teachers will know more about the brain. In the meantime, what advice can you give today's educators?

First, as I said before, take the time to begin learning about this. Read books by educators and by the brain scientists themselves. Exciting new books are being published almost every week.

Second, think about how what you're learning applies to education—but broadly, not narrowly. We don't need catchy program titles. We do need to study and contemplate, discuss and explore. If something sounds like a good idea, try it. And don't worry too much about making exploratory mistakes. We have this marvelous student feedback system; when we try out inappropriate ideas on our students, they let us know.

Last, don't promise too much. You aren't going to be able to boost SAT scores with this knowledge; it's just too early for that. And many important brain properties, such as metaphor, compassion, and love, aren't measurable. By all means read and study. By all means try new ideas. But don't overpromise. ■

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Reinventing Schools Through Brain-Based Learning

Renate Nummela Caine and Geoffrey Caine

After three years of immersion in brain-based learning theory and practice, Dry Creek Elementary School has internalized a more meaningful model of how teachers and students learn.

The overwhelming majority of teachers ... are unable to name or describe a theory of learning that underlies what they do in the classroom, but what they do—what any of us does—is no less informed by theoretical assumptions.... Behind the practice of presenting a colorful dinosaur sticker to a 1st grader who stays silent on command is a theory that embodies distinct assumptions about the nature of knowledge, the possibility of choice, and what it means to be a human being.

—Alfie Kohn, *Punished by Rewards* (1993)

In *Making Connections—Teaching and the Human Brain* (Caine and Caine 1994), we outlined a new theory of how people learn based on current research in the cognitive and neurosciences. We wanted to demonstrate that our theory could serve as a practical guide for a dynamic way of approaching teaching and learning.

We, together with our colleague Sam Crowell, have applied our theory in several schools, among them Dry Creek Elementary, a K–6 elementary school in Rio Linda, California. Most children at this Chapter 1 school come from low socioeconomic—and often dysfunctional—families. They have done poorly on standardized tests. And the school has had an exceedingly high student turnover rate—49 percent of all students in the 1993–94 academic year.

When we began working at Dry Creek, we expected students to improve academically, but not until the end of this, the third, academic year of the program. Yet the standardized test scores of students who have been here since the beginning of our program have shown steady improvement. Particularly impressive are the academic strides of special education students.

Much to our delight and the delight of the school and community, the California education department presented Dry Creek with a distinguished school award toward the end of our first year

together. The award was not based on standardized test scores (these were still relatively low),

but on the school's commitment to the ideas expressed in the California Elementary Task Force report "It's Elementary," which is highly compatible with brain-based instruction. In addition, the National Education Association produced a film about the school that aired on the Learning Channel last October.



Photos courtesy of Cindy Tucker, Dry Creek Elementary School

Dry Creek has temporarily accepted our notion of an apprentice community as an ultimate goal. That is, a community in which students can experience and test many of the relationships and ideas they will need in the real world in a safe, nurturing, and challenging context. In this environment, each student is engaged in multiple apprenticeships—to other students, to teachers, and to community members.

In brain-based learning, students use stories and complex themes to link information and understanding.

It is important to note that the staff originally had a vision of the kind of learners they wanted their students to become and that they were engaged in a process of change. But they had no vision of what the school itself would look like. In effect, the entire school set out to discover its own strengths and to reinvent itself based upon a small-group process; continuous reflection on the brain-based theory of learning; and input from shared experiences, from us, from subject matter experts, and from outside consultants.

Dry Creek has taught us about the reality of translating our theory into the everyday life of a school with few resources and an extraordinarily high student turnover rate. The school has made our theory come alive.

Traditional Teaching and Learning

Based on our own observations and discussions, almost all teachers at Dry Creek had embraced the traditional model of learning and teaching—their mental model. They were not unusual in this respect. Most teachers have a mental model of teacher roles and learning—deeply held assumptions that are, we believe, physiologically entrenched as a result of early experiences in school.

Traditionally, instruction has focused on memorizing what we call surface knowledge. It has been, for the most part, teacher-dominated, a delivery model to which traditional resources, such as textbooks, lectures, and possibly videos or movies, are closely tied. Traditional assessment is based on quantitative data. It is carried out with multiple-choice and true-false tests that are designed to find out whether students can answer the teacher's or textbook's questions.

In this context, teachers see discipline as maintaining the "good behavior" that enables students to absorb information that an official curriculum or teacher plan determines. Students must do so on an inflexible schedule, because learning time is

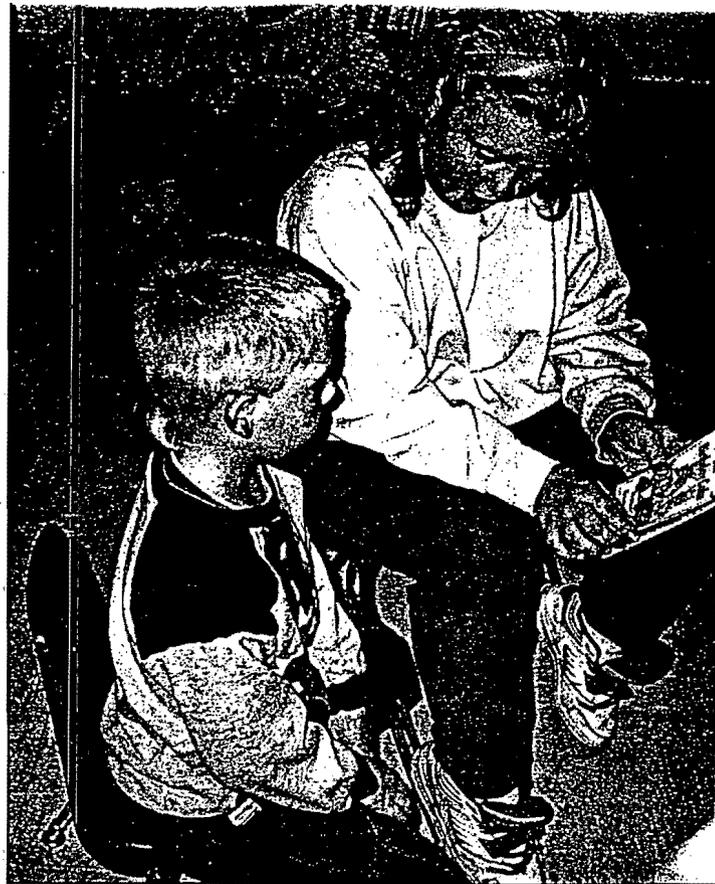
closely guided by an external (artificial) time schedule, which is antithetical to reflection. Finally, computers are largely absent, or used only for paper-and-pencil tasks.

Brain-Based Teaching and Learning

The traditional mental model of learning is being challenged in many quarters, but alternative theories are still fragmented

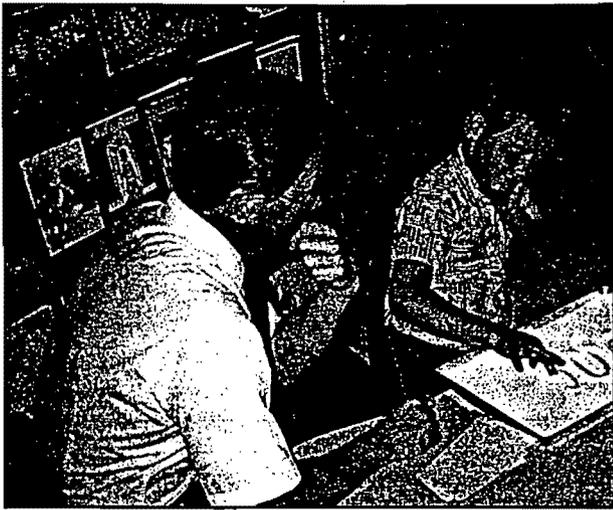
and limited to supporting specific approaches, such as thematic instruction, cooperative learning, meaning-centered curriculum, and so on. By contrast, brain-based teaching and learning takes a holistic approach, looking at teaching developmentally, socioculturally, and in other broad ways.

Specifically how does our theory differ from traditional instruction? Above all, we want instruction to shift from memorizing information to meaningful learning. Brain-based learning stresses the importance of *patterning*, that is, the fact that the brain does not easily learn things that are not logical or have no meaning. Because our natural tendency is to integrate information, we resist learning isolated bits of information. Because the specifics of instruction are always tied to larger understandings and purposes, we believe teachers must help their students see the meaning of new information. We expect to see teachers and students using stories and complex themes and metaphors to link information and understanding, and we expect computers to be used for all types of work.



Brain-based learning also stresses the principle that the brain is a *parallel processor*—it performs many functions simultaneously. Therefore, all meaningful learning is complex and nonlinear. This means that teachers must use all available resources—including community resources and multiple apprenticeships—to orchestrate dynamic learning environments. These environments cannot be linked to an artificial time schedule based upon some general need for order or convenience. Instead, schedules should be tied to the actual time it takes a student to explore a point of view or to master a task, much as in a professional, research, or business setting. Yet, as Margaret Wheatley noted in *Leadership and the New Science* (1992), there must be a sense of coherence and orderliness, as well as the sort of safety that naturally engenders risk. We've learned that when the community is orderly and coherent, children with special needs can be included in normal classrooms.

In our system, there is not necessarily one right way for students to handle an assignment. Teachers must overcome the natural preference for conveying information tied to clear



Dry Creek has taught us about translating our theory into the everyday life of a school with few resources and an extraordinarily high student turnover rate.

directions and opportunities for students to do it right rather than to explore and experiment. Accordingly, assessment includes, but moves beyond, paper-and-pencil tests. There is authentic assessment of all types, and students participate in evaluating their learning process and progress. In addition, outside experts and expert panels may be called upon to help assess students' achievements.

As for discipline, teacher/student interactions are governed by a totally different assumption. Students are seen as—and are expected to see themselves as—responsible for both their own behavior and group progress.

Viewing it another way, brain-based learning is a response to a set of questions, which Wheatley (1993) beautifully formulated:

- What are the sources of order?
- How do we create organizational coherence where activities correspond to purpose?
- How do we create structures that move with change, that are flexible and adaptive, that enable rather than constrain?

■ How do we resolve personal needs for freedom and autonomy with organizational needs for prediction and control?

Putting Theory Into Practice

At Dry Creek, we were not interested in achieving these changes through direct teacher training or teaching specific skills, but in using our theory and practice with the entire school. We wanted to change assumptions about schools, learning, and teaching; to encourage teachers' own efforts to implement brain-based instruction. We hypothesized that if we contributed to theory, process, and instruction, and if teachers had substantial opportunities to learn how *they* learn, everyone would move toward brain-based learning.

Our ultimate objective was to unleash the creativity in teachers and other staff, so they would take chances based on a much broader understanding of curriculum. In a sense, brain-based learning is improvisational; no two "lessons" are ever the same. Teachers find connections among everything from prepackaged math and science materials to music, art, and computers.

Another goal was to provide academic enrichment. We wanted to empower teachers through greater content knowledge. Many of the teachers we have encountered are academically impoverished. When they limit children to their own learning, they do them an enormous disservice.

Changing the Mental Model

When we first attempted to apply our theory in schools, we discovered all kinds of problems. Educators who had welcomed our book's ideas saw implementation as another matter entirely. Most wanted instant solutions; they didn't understand that they would have to change powerful assumptions about learning and teaching that guide their daily decisions, and that this does not happen overnight.

We believed that our theory, properly understood, would influence teaching decisions. But we were aware that before the theory could drive change, it had to become a mental model—a "deeply ingrained assumption, generalization, or even picture or image that influences how we understand the world and how we take action," as Senge defined it (1990, p. 8). Although our behavior may not be consistent with our espoused theories, Senge noted, it is consistent with our mental model—our "theories-in-use." Yet, he said, "very often, we are not consciously aware of our mental models or the effects they have on our behavior."

In effect, when our theory of brain-based learning becomes a mental model, it becomes possible to integrate learning, instruction, curriculum, and the system as a whole, because all share common roots. For this to happen, however, the entire system must be reconfigured. We must do more than simply integrate subjects that used to be separate and instead recognize styles and intelligences that used to be disregarded. A certain dynamism is needed to trigger self-organization and change. Such a shift cannot be imposed or put together in a fragmented or mechanistic way; it must be allowed to emerge naturally. The timing and intensity of each stage depends on the school itself.

At Dry Creek, our objective for the first year was to build the appropriate atmosphere and to generate awareness of what brain-based education actually

requires. We were primarily interested in creating fertile soil in which advanced teaching and learning could flourish. Accordingly, we formulated no teacher or student outcomes for the year, although we did expect that ultimately, student performance would be excellent on any measure that the state of California mandated.

A change in mental models is a perceptual change. For it to come about, three elements must be at work simultaneously:

1. *Relaxed alertness, that is, creation of a challenging, but nonthreatening, environment.* Since brain-based learning requires reflection and other aspects of active

There is authentic assessment of all types, and students participate in evaluating their learning process and progress.

to overcome. Predictably, teachers reverted to the tried-and-true, particularly when faced with open-ended projects.

We attempted to counter downshifting in several ways. First, we decided to allow a long period (five years) for restructuring so as to lower pressure and give genuine change a chance. Second, we formed "process" groups, which meet for two hours three times a month. These groups serve as low-threat, high-challenge think tanks, giving teachers the freedom to reflect on the purpose and function of learning, teaching, and schools. They also help teachers learn to trust themselves and one another and to play with thoughts and ideas. Finally, we have countered downshifting by making participation voluntary, although we would like all adults to participate. (Ultimately, almost everyone at Dry Creek has volunteered.)

2. *Orchestrated immersion in complex experience.* Children learn not only from teachers but also from brief events, ongoing activities, and all sorts of social interactions—in short, from the entire experience and physical context. We therefore decided all adults—custodian, librarian, secretary, cafeteria worker, as well as teacher and administrator—should be included in the process. In each of the process groups, we purposely included an interesting mixture of people with different functions. We wanted all participants to see themselves as teachers, contributing either directly or indirectly to children's learning. (The custodians, in fact, are highly regarded

by the teaching staff, and are emerging as real-life counselors for students.)

In addition, we set out to have our theory and principles embedded, as much as possible, in the day-to-day routine of the school. And we also applied the principle of orchestrated immersion to all adults. We immersed them in our writings and periodic workshops and gave them other opportunities to bring their own understandings to bear at any point.

3. *Continuous active processing of ongoing changes and experiences to consolidate the emergent mental model.* To create a genuine learning community in which staff internalize our theory of instruction, staff must reflect on and actively process the ideas in a social setting. We therefore provided each participant with our book *Mindshifts* (Caine et al. 1994), which guided them through the principles of brain-based learning and open-ended experimentation. The book has also been a gentle focus for the process groups in their meetings. It encourages them to reflect on how they themselves have learned and do learn, and to relate those insights to specific teaching situations.

Becoming a Learning Community

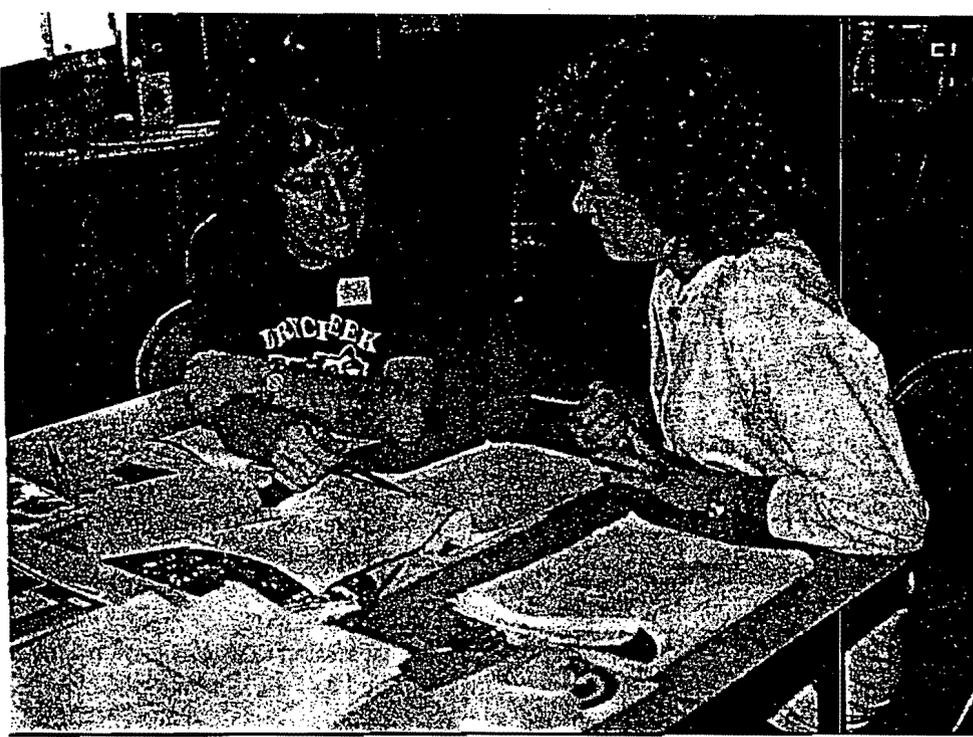
We have spent much time at Dry Creek creating a coherent community, where common practices and routines and celebrations provide continuity. In a two-day retreat at the beginning of the year, all staff members were involved in a mixture of creative self-direction with some very precise guidelines. The retreat included a ceremonial or formal way of starting each meeting, a process for the orderly sharing of individual opinions about some general principles or pithy sayings or extracts from a book, exploration of one of the brain principles, and a ceremonial or formal closing.

In addition, all process group members participated in a four-day workshop on brain-based instruction. Here, the community worked to



processing, Dry Creek teachers had to be free to explore ideas in an environment that was as nonjudgmental as possible.

A secure environment counteracts "downshifting," that is, the tendency under stress to shift to a defensive mode and become less flexible and open to new information and ideas. Our own teaching experience alerted us to the fact that teachers tend to be extremely reluctant to share their thoughts on education, particularly with their colleagues. This reluctance grows stronger when time limits are imposed externally. Often, the unarticulated need for power, status, and territory, exacerbated by lack of communication, destroys the original vision. In our workshops, downshifting has been an important hurdle



understand the meaning of orderliness and coherence, where people are connected by mutual caring in an intellectually challenging climate. We examined authentic assessment, innovative instruction methods, and ways to become more creative.

After three years of work, Dry Creek is now a learning community, with cross fertilization of learning in the school as a whole. This is reflected in a host of ways. Parent-staff interactions are far more positive and friendly. Classrooms have been redesigned to reflect a more natural, dynamic approach to learning. Notwithstanding the extremely high student turnover rate, staff have maintained their interest and enthusiasm.

Perhaps one of the most exciting results has been the jelling of the process groups. Within about two months, people who rarely associated with one another had bonded quite closely, and their commitment to the school as a whole was stronger. This was powerfully reflected in the anonymous survey that the principal, Cindy Tucker, conducted. Some typical comments:

It's great getting to know group members in a new way.... There's a feeling of excitement here.... People are working with their colleagues, sharing the kids in their classes through peer tutoring, cross-age work, and study buddies. We're not as isolated as we used to be.... The process was

often exhausting, but it was a rich place to be as an educator. The biggest change I see is that, yes, this is a community of learners. It's moving from my class to our kids.

Trials and Rewards

It has not been all clear sailing, of course. Some teachers stuck resolutely to lecture and directed instruction, even while studying about diametrically opposite ways of looking at instruction. They were looking for directions from us—cookie-cutter types of directions. Yet they also experimented and began to do things that looked very much like brain-based instruction.

Our major breakthrough occurred several months ago. As part of our inservice, we invited four lead teachers to present to their colleagues math and science programs implementing brain-based instruction. We then began teacher demonstrations with team feedback.

The shift in mental model is invariably a messy process and teachers need to develop a great deal of tolerance for ambiguity. We have learned that genuine restructuring ultimately must result in systemic change within the individuals as well as the school and the broader community. The dance between letting go of old beliefs and taking on a new way of thinking and perceiving is delicate and complex. At Dry Creek the entire

community is engaged in intellectual discussions that link theory to practice, applying the force of a coherent, orderly mini-society.

The pressures of time were, and continue to be, daunting. The entire process would have been too difficult, if not impossible, without outstanding and continued leadership from the principal and the assistant to the principal, Chris Halverson. Fortunately there also was support from many parents. And the district offered consistent support, agreeing to allocate all monies for staff development days to this one program.

Many schools around the country are organizing their school days differently. It is important to emphasize that neither the schools nor the teachers themselves need to come up with the same solutions. In fact, we have continually adjusted our process to Dry Creek's particular needs and experiences. Dry Creek, in turn, continues to prove that our theory works with average teachers and children. ■

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To Be Intelligent

What does it mean to be broadly intelligent? Our schools and communities need to develop this capacity in our young people as they face the complex challenges of life today. Research on the brain and its infinite complexity can help.

John Abbott

For several summer holidays, when my three sons were young, we had swapped our home just outside Cambridge, England, with friends in Virginia. To our children, America was a land of long summer days, plenty of ice cream, and visits to national parks and historical sites.

Late one evening back in England, we were driving home from a day in the country with the children. My wife played a Garrison Keillor tape—the one describing his fictitious one-room schoolhouse in Minnesota. “At one end of the room there was a portrait of George Washington and at the other end one of Abraham Lincoln, beaming down at us like two long-lost friends,” Keillor drawled in his best Lake Wobegon style.

“That’s silly,” piped up 7-year-old Tom. “They weren’t alive at the same time, so how could they have been friends?”

I asked Tom how he knew that. “Well,” he said, “when we went to Mount Vernon they said how sad it was that Washington didn’t live into the 19th century—and you once told me Lincoln was born after Admiral Nelson was killed at the Battle of Trafalgar.” His logic, and the connections he had built, fascinated me.

Several years later, at a dinner party in Seattle, I recounted that story. “How I wish American elementary schools taught history as well as that!” mused our host, a professor of education.

“That’s silly,” said our adolescent Tom. “History lessons in school are boring. I just love everything to do with America!”

My wife interjected, “What’s your favorite subject?”

“It’s math, because my teacher always gets us to think about connections and patterns. That’s really interesting; I can see how things come together.”

Patterns and relationships, emotions, the need to make sense, intrinsic interest, formal and informal learning, history dates, and mathematical formulas—these elements in Tom’s learning defy any logical structure. The process of learning is

wondrously spectacular and messy, and it does not easily fit within a closely defined, classroom-based curriculum—particularly for adolescents.

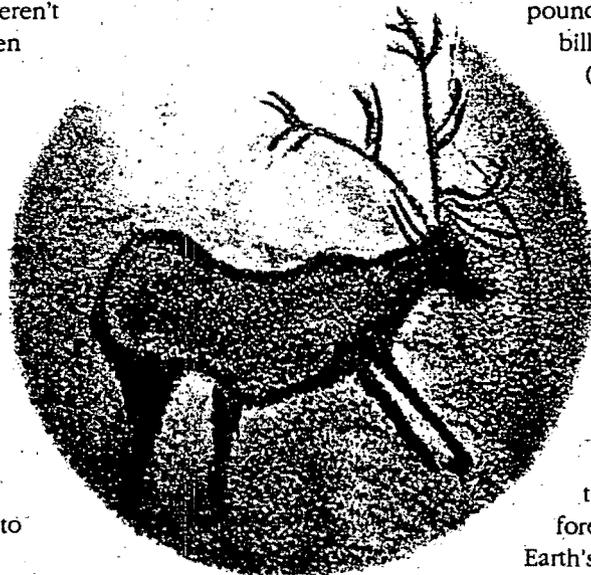
Try as we might to accommodate children’s spontaneous questions, too often their natural enthusiasm is dulled by the needs of the system for order. Nevertheless, the capacity for self-organization (“I want to think this out for myself”) is valued more and more highly

in our society, which is changing so rapidly that today’s questions are answered almost overnight. Some people call such an ability wits. In the north of England, people use an old expression—*nous*, a level of common sense that goes beyond book learning. It’s what the brain is all about.

The Complex Workings of the Human Brain

Medical and cognitive sciences, new technologies, and pedagogic research are helping us appreciate how the brain works. The human brain is the most complex living organism on Earth. Coveney and Highfield (1995) call it the “Cathedral of Complexity.” Although

it weighs only about three pounds, it contains billions of cells (neurons). The total length of the “wiring” between the neurons is about 100,000 kilometers (62,150 miles). To illustrate: The total number of neurons is estimated to be greater than all the trees, in all the forests, on the entire Earth’s surface. The



number of synaptic connections between neurons may be more than all the leaves on those trees. Susan Greenfield, when lecturing a group of 14-year-olds at the Royal Institution in London, compared the memory capability of all those neurons with that of 1,000 CD-ROMs, each one containing an entire *Encarta Encyclopedia*. The brain is, literally, a mind-boggling thought. Every human—including the most



difficult adolescent—has just such a brain.

Biologists can tell us much about brain chemistry; but, for educational practice, the concept of complexity helps us understand the layers of organization within the brain that act together, apparently miraculously, to handle not only memory, but also vision, learning, emotion, and consciousness.

The structures and processes of the brain are a direct response to the complexity of environmental factors faced by humans since our species appeared. Until about half a million years ago, the brain changed slowly through evolution. But our brains started to grow more rapidly as we learned to use language. Only within the last 30,000–60,000 years have we developed the capacity to be broadly intelligent.

What does broad intelligence mean? Archaeology and cultural anthropology show that humans developed many discrete skills over about a million years (social intelligence, technological intelligence, natural history intelligence, language intelligence); but only recently—say, in the past 30,000 years—have we been able to combine these skills to create the broad intelligence that now gives us our amazing versatility. The cave paintings discovered by M. Jean-Marie Chauvet in southern France in 1994 date from this period.¹ Highly sophisticated, they bring social, technological, and natural history intelligences together. They seem to have leapt out of nothing—we know of no earlier primitive art. With the emergence of broad intelligence, modern man was created (Mithen 1996). Archaeology is starting to endorse Howard Gardner's call to educators to work with all of children's many forms of intelligence. That is what gives us our creativity.

How the Brain Flows

The brain can handle many situations simultaneously; historical facts are fitted into mathematical patterning when the brain is comfortably challenged in a nonthreatening situation. Psychologists and cognitive scientists call this a state of *flow*—a state you reach when you become so engaged in what you are doing that all tasks seem within your capability (Csikszentmihalyi 1990). This state enables us to react to our environment while also thinking about many abstract matters. The brain handles this complexity through several layers of self-organization and vast interconnecting networks. Once established, traces of these networks appear to survive almost indefinitely and are frequently used as solutions to new problems and as the basis for new ideas. That is how, unconsciously, 7-year-old Tom built up his understanding of historical chronology.

Photos © Shelly Gransman / Woodfin Camp & Assoc

Discovered in 1940, the Lascaux cave drawings in Dordogne, France, date to 15,000–13,000 B.C.

Neurologists can now see some forms of memory in operation. Through magnetic resonance imaging (MRI), they watch specific patterns of activity within the brain light up on a computer screen. To the researchers' surprise, memory exists in many locations in the brain, not just one place. Some people liken memory to a hologram where the whole exists in all the parts. Memory traces seem to follow neural networks that the individuals—at the time of original thought—found most to their advantage, even if only for a short time. Nothing is ever irretrievably lost, though we still do not know how we can access memory more effectively at some life stages than at others. If part of the network is later activated, the brain may well question why it is not being asked to complete the original set of connections.

Going with the Grain of the Brain

All brain activity occurs spontaneously, automatically, in response to challenge. The brain does not have to be taught to learn. To thrive, the brain needs plenty of stimulation, and it needs suitable feedback systems. Effective learning depends on emotional energy. We are driven (the ancestral urges of long ago) as much by emotion as by logic. Children—and adults—who learn about things that matter to them are far more resilient and determined when they face problems than are people who seek external rewards. When in trouble, people with intrinsic motivation search for novel solutions, whereas extrinsically motivated people look for external causes to blame for their failure. The brain is essentially a survival system, and emotional well-being may be more essential for survival than intellectual well-being.

Too much stimulation, however, at any stage in life, turns a challenge into a threat. The brain deals with threat easily. It just turns off—as MRI dramatically shows. Give a person an interesting mental task, and many parts of the brain are seen to light up. Persistently insult that person, and the brain

goes into a form of mental defense. The lights literally go out. Downshifting—a phenomenon long recognized by psychologists—is a strictly physiological defense mechanism. Research suggests that working effectively at a challenging task requires significant amounts of reflection—a critical part of brain functioning (Diamond 1995).

No two brains are exactly alike; thus, no enriched environment will completely satisfy any two people for an extended period. Challenge and interactivity are essential. Passive observation is not enough. "Tell me and I forget. Show me and I remember. Let me do it and I understand," says the ancient Chinese proverb.

Learning What Matters

With our new understanding of the brain, we are in an excellent position to make it possible for people to become better learners. The implications of this new knowledge for society and for the economy are massive.

Ernest Hall, a successful English entrepreneur, understands the transforming power of learning. He was born in a northern industrial town near Manchester. His parents knew long periods of unemployment in the textile trade. One afternoon, when he was 8 years old, his teacher played a recording of "Apollo's Lyre." Ernest was spellbound; here was a form of beauty that was to transform his life. His family managed to obtain an old piano. By age 12, Ernest played so well that his parents urged him to leave school and earn his living by playing the piano in pubs. "No," said Ernest, "I love music too much to trivialize it. I will make enough money to play the piano properly."

That is exactly what he did. For years he worked in the textile industry, with great success—and continued practicing the piano. By his early 50s, he had bought the closed-down Dean Clough Mills and created an amazing complex that today provides employment for more than 3,000 people in an array of high-tech and other businesses, including a mill—and that

"Ability is not innate. It exists like a shadow of ourselves when we are willing to stand in front of a bright light."

—Ernest Hall



Native-American pictographs from Newspaper Rock, Monticello, Utah, date from 1,500 years ago.

reserves a quarter of its space for art galleries, working studios, concert halls, and exhibition spaces. This complex vividly demonstrates that living, learning, and working—beauty and economic productivity—are all deeply interconnected.

To celebrate his 65th birthday, Ernest fulfilled a dream: He performed Bartok's First, Second, and Third Piano Concertos, accompanied by the Leeds Sinfonia Orchestra. His CDs sell alongside those of the greatest pianists of our day.

Ernest believes in the potential of all young people to develop their particular abilities. "I discovered my interest," he says, "before the crushing routines of my little school would have reduced me to a mere cog in a machine. Ability is not innate. It exists like a shadow of ourselves when we are willing to stand in front of a bright light. . . . We must say to every child, 'You are special. You are unique; but to develop your genius you have to work at it, and stick with it year after year.'"

My son Tom comes from a privileged background. Young Ernest certainly did not. But creativity does not depend on privilege, nor does learning necessarily follow from teaching. Thus the old plaint of the teacher: "I taught them everything I ever knew, but they were so uninterested that they learned nothing!" Contrast that with David Perkins (1992), writing in *Smart Schools*: "Learning is a consequence of thinking" (p. 78). We should remind every child of this statement each day.

How Do We Create Intelligence?

The understanding of learning will become the key issue of our time. The creation of intellectual capital has been going on with every generation for millions of years, with perhaps one exception—and that is what has happened over the past five or six generations.

Until the early 1800s, people learned in real-life, on-the-job situations. Then our industrial society required people to develop no more than a range of

functional skills (such as reading, writing, and calculation) that allowed them to fit into the dull routines of manufacturing. Schools ignored the more inclusive skills that enabled people to make sense of things for themselves in earlier ages. For much of the past century or more, the spontaneous, deep learning of the Toms and Ernests of this world has existed largely outside the formal education system of Western industrial nations.

The ability to think about your own thinking (metacognition) is essential in a world of continuous change. Through metacognition, we can develop skills that are genuinely transferable. These skills are linked to reflective intelligence, or wits. As never before, the human race needs all the wits it can muster.

Being able to step back as a specialist and reflect—to honestly reevaluate what you are doing from a general perspective—is naturally developed in the rich, collaborative, problem-solving, and uncertain world of the apprentice, as opposed to the tasks, schedules, and measurable activities of the formal classroom. Expertise requires much content knowledge—and metacognition. This deep reflective capability is what helps us develop new possibilities.

A New Model of Learning

A model of learning that could deliver expertise is ours for the asking. It would work on the basis of the biological concept of weaning—giving very young children plentiful help and direction, and then reducing this direction progressively as children master more and more skills. In this model, as adolescence ends, young people will already have taken full responsibility for directing their own learning. The age of 18 should mark not the beginning of independent learning but the age at which young people perfect that art and know how to exercise it responsibly.

Formal schooling, therefore, must start a dynamic process through which pupils are progressively weaned from their dependence on teachers and institutions and given the confidence to



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manage their own learning. Surely it should be the child who is tired at the end of the term, and not the teacher.

To achieve this model of learning, we must reappraise the school system and its current use of resources and turn it upside down and inside out. Early childhood learning matters enormously. We must progressively show the youngest children that a lesson about American history, for example, can also be a lesson about how to learn how to learn and remember. As children grow older, they start to become their own teachers. The older the child becomes, the more he or she becomes a productive resource of value to the community (Abbott 1994).

In such a model, we should create smaller classes in the early years of elementary education (using developmentally appropriate styles of teaching) and progressively provide children with an ever richer array of learning resources and situations. Learning need not be confined to an institution—it must become a total community responsibility. It is not merely teachers who can teach, not just pupils who need to learn, and certainly not just the classroom that can be the major access point to knowledge, information, and skills.

Our new understanding about learning is paralleled by radical developments in technology. The technological revolution holds the power to alter our education system, our work, and our culture. Indeed, this revolution puts learning and our traditional, conventional education systems on a collision course. The essence of the coming integrated, universal, multi-media digital network is discovery—the empowerment of the human mind to learn spontaneously, independently, and collaboratively, without coercion.

Such a new learning environment would be highly compatible with the natural functioning of the brain; with what we know about human aspirations; and, in particular, with the adolescent's need to feel involved and of value. It offers the greatest hope for an improvement in people's intelligence and the development of

thoughtfulness.

The current crisis in learning has originated not so much in the failure of our classrooms as in the failure of our communities to capture the imagination, involvement, and active participation of young people. A society motivated by a vision of thoughtfulness will quickly recognize that broadly intelligent young people will revitalize the whole community. We must escape from the 19th-century assumption that learning and schooling are synonymous. Good schools alone will never be good enough—we need communities that think differently, work differently, and are even designed and built differently.²

Such communities would make for a

better, more exciting world in which living, working, and learning come together again and recreate vibrant, self-sustaining communities. I would love to live in such a world. ■

¹The French Ministry of Culture Web site includes photos of the Chauvet cave drawings at <http://www.culture.fr/culture/gvpda-en.htm>.

²This article is based on the work of The 21st Century Learning Initiative (draft synthesis, December 1996).

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