

REGARDING TEACHING AND LEARNING

**Prepared for
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By

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Introduction

We learn all the time. It's not that mysterious. People learn what they believe is important to know, what gives pleasure, what helps solve problems (and avoid pain or embarrassment), what makes their lives more comfortable and satisfying. This is the learning we speak of when we refer to life-long learning, and is what we hope happens in school. (None of this is the "learning" of memorizing and quickly forgetting after the test.)

What do we want for our students? What is the purpose of schooling? These are deceptively simple questions, easy to read quickly, and challenging to answer honestly. To address them, we must think about learning and the teaching-learning connection. Students and their abilities are at the heart of this paper. The rest is technique – what we measure because we can't easily measure the important intangibles, like courage and caring.

Response to the interconnected questions and issues highlighted are the basis of this paper. On any given day, newspapers and journals are publishing and policy makers and practitioners are discussing the questions. Some of the current research, practice and thinking in these crucially important areas are provided in order to help raise more issues, stimulate thinking and prepare to make recommendations for Denver Public Schools. Les Woodward, president of the Denver Board of Education, challenged us with the question about reform, "How do we get this done?"

This paper is organized into sections as described in the following outline.

What does it take to learn?

It takes a belief that you can, and a way of connecting what you're learning to what you know in a way that makes sense of both. Informally, it's always happening. In the past, learning was defined as something that occurred only in childhood. There is evidence that new learning can take place, with its own particular challenges, even into old age.

In thinking about secondary education, we focus on adolescents and their development. Research indicates that adolescents are not only culturally different from other age groups, but their brains are still developing and changing all during the teenage years. Young adolescents are different developmentally from older ones. Taken together, social and neurological issues have implications for the way adolescents learn – and for how we might best teach them.

What can teachers do to improve learning opportunities?

Neurological and theoretical studies lead to implications about what can be done to enhance learning. Some of these will look familiar. Some of these will look like things

we might have considered for elementary school but didn't acknowledge were appropriate for secondary teachers' concerns. Some of the recommendations are newer and based on a rethinking of how ideas of schooling have developed in a social context over the last century.

What does it take to be a good teacher?

It takes knowledge, confidence, reflection and planning to create opportunities for those situations to occur. Experience helps.

What can districts and schools do to support good teaching? What is known about organization and structure?

Policies, opportunities and constraints exist in schools that are outside the control of individual teachers, such as size of schools and classes, scheduling, teacher preparation time and professional development. Recent studies have looked at what effective school districts and particular schools have done to help teacher learning and to further help teachers use their learning to inform their own practice and development as instructors. In this way there is support for greater student achievement.

What is the role of choice in teaching and learning?

People are very concerned about issues of choice. The terms are sometimes different: sense of agency, locus of control, local empowerment and democracy. In these various guises it is possible to look at the role choice plays (and might play) in supporting more effective teaching and learning.

Some core principles

Looking at the research as a whole, some recurring ideas stand out as being important for teachers in their daily practice. Some circumstances and strategies continue to be identified as critical in order for students to really learn and value education.

Resources to consider

A few texts are listed from a vast and increasing array of materials that the reader may find interesting and helpful.

WHAT IT TAKES TO LEARN

In order to understand what affects the ability of high school age students to learn, it is important to understand the emerging research on the development of the adolescent brain as well as theories of education and learning and some special circumstances that affect teenage learning.

Brain Development

Because many of us have had lots of schooling and have reflected on that, few of us think about our brain development as part of the equation. Nevertheless, we've probably incorporated thinking along these lines as we've watched little children grow and develop. We have made the assumption in structuring our high schools that students are ready to learn in adult ways (although we often treat them like children in terms of the controls we put on them). However, recent brain research suggests that brain development continues into adolescence. The adolescent brain is developmentally different from both that of a child and that of an adult. (There are also gender-related differences.) Neuroscientific evidence¹ suggests that although teenage brains look like and are about the same size as adult brains, they function differently.²

MRI findings show there are growth spurts in the area of visual/spatial ability and in the regions that control language and emotion, particularly up to about age 16.

- What implications might this have when we consider the sequence in which we teach mathematics, for example? Should it be in an invariant sequence? When would geometry be appropriate?
- How does the research explain differences a teacher might see among student success on English/Literacy Studio assignments? How might allowances for difference be built into performance on various tasks?

The area controlling planning, organization, mood modulation and working memory does not mature until about 18 years of age.³

- What school structures might be considered when thinking about this maturational information? What kind of help do students, particularly younger ones, need in planning and organizing their work? Should all students get support in this? Would a specific course be helpful? How would we know when students could benefit from direct instruction? What is needed besides providing students with planners (or listing homework assignments in the same place on the board every time)?

Adolescent brains are slow to develop a material that improves connection efficiency and enhances travel of electrical impulses in the brain. The last areas to develop are those that control the centers of the brain responsible for controlling reasoning and emotion. (That process is not completed until about age 20, although it occurs earlier in girls than in boys. Researchers say this explains why teenage boys frequently exhibit poorer judgment than teenage girls.⁴)

- What implication might these findings have for disciplinary policies? Zero tolerance? Having students share in the development of policies? Having student dialogue across age/grade levels about appropriate behavior?

There's evidence of neural "pruning" in adolescence. In childhood, neural connections are being built; apparently in adolescence, the less frequently used ones are minimized and the more frequently used connections are strengthened. The number of synapses dramatically declines during puberty.⁵

This might lead us to consider the implications of introducing/ reinforcing/ eliminating certain subjects in high school. It's always going to be a balancing act.

- We don't want to create schools that offer many subjects poorly. This taxes the ability to hire expert teachers; it also makes for scheduling nightmares.
- If we eliminate certain courses, it might imply that in other subject classes we would have to assure the use of these modalities (art, music or physical education) as part of the instruction.
- Yet we want to provide students with a chance to explore and practice many different kinds of learning so that they don't lose the ease of learning and willingness to try different kinds of experiences. What will be important to the students in the future? How can we predict?

Animal research indicates that those raised in "enriched" environments develop more synaptic connections.⁶

- When we walk into many elementary school classrooms we are often taken with the wealth and variety of visual stimulation. The most interesting of it is usually student-made; there are also many excellent commercially prepared materials. When there's not enough wall space, some classrooms have clotheslines hung near the ceiling, with work hanging from them. The research seems to indicate that this is appropriate not only for younger children.
- What would be the challenges for surroundings like this in secondary schools? Teachers might need their own classrooms. Or would same subject area teachers need to share the same classrooms? Smaller school environments could make it easier to accomplish. What about students having their own places in a school (beside the insides of a locker) in which to display the results of their efforts?

Effects of stress

Testing on rodents indicates that stress inhibits learning in females while fostering it in males.⁷

- Competition in classrooms may maintain discipline and excitement, but it apparently fosters learning for some more than others. This underscores, in a different context, the need to consider the appropriateness of whole group instruction.

Health-related effects

Chemicals in the brain affect ability to pay attention. The stimulating chemicals, amines, go through cycles throughout the day, but are at their lowest 12 hours after the midpoint of the previous night's sleep. If a teen sleeps from 10 p.m. to 6 a.m., then sometime around 2 p.m. these chemicals – and the teen's energy level – would be at their lowest.⁸ Sleep helps process learning, particularly thinking that requires logic and the learning of complex material.⁹ Physical activity helps and renews the ability to pay attention.¹⁰

- Does this have implication for starting times of school days?
- What does this say about several teachers assigning major projects all due about the same time? Where does that lead us in terms of planning for teacher collaboration?
- Further, acknowledging sleep needs might put a different face on thinking about students who need to work or have childcare responsibilities or both.

Diet and physical exercise also affect attention. It appears that what you eat can help or hinder learning. A meal high in carbohydrates decreases the production of another chemical, serotonin, in the brain that helps with attention.¹¹

- This might encourage conversation about what is sold in vending machines in schools. Others might be encouraged to think about school food, treats in classrooms, food provided before standardized tests, establishment in the school culture of breakfast as well as school lunch programs.
- What are ways movement might be incorporated into daily classes? What provisions/opportunities are there to move around the room? How does class size influence this? Is there a better or worse time during the day for physical education?

In summary, brain research suggests that adolescents' visual/spatial ability and their language and emotional development are still maturing up to age 16 (10th grade). It also suggests that their working memory and their ability to plan and organize and their ability to control their moods do not fully develop until about age 18 (12th grade), and their ability to control reasoning and emotion is still developing up to age 20 (junior in college). Finally, we know that sleep, nutrition, physical activity and stress play a role in learning and that chronological age may not reflect the student's readiness to learn.

Educational Research and Theories

Long before scientists were able to conduct brain research, scholars and “ordinary” curious people were thinking about learning and trying to describe it. (Some people today maintain, in fact, that brain research is an overly technical distillation of a more holistic process.) How do those outside the neuroscientific community think about learning? The following information is not discrepant from brain research; it approaches the topic from other perspectives. Each of these sections can be seen as a piece of the larger puzzle – the bigger picture emerges more clearly by examining them together. The work of several theorists and educational researchers (Frank Smith, Lev Vygotsky and Jeffrey Wilhelm) will help guide our understanding.

The way Frank Smith, a professor of education and cognitive psychologist, describes learning applies to all of us as learners, including adolescents and adults.

In *The Book of Learning and Forgetting* (1998)¹², Smith contrasts two visions of learning, the “classic view” and its alternative, the “official theory.” As you can imagine, the current educational system reflects the latter. The “official theory,” or official version, is familiar because it permeates the educational culture in which we were raised. It suggests that learning is an intellectual activity predicated on hard work, dependent on rewards and punishment, and is often a struggle. Material is easily forgotten, assured by testing and often dependent on memorization. Smith discusses the development and origins of this point of view, which he maintains is not much more than 100 years old.

The “classic view” is much older, perhaps thousands of years. It fits what we imagine from hunters and gathers, from ancient Greece and from journeymen in the Middle Ages. It also is applicable to what we learn from modern-day internships and mentoring. Smith calls it “archetypal, universal, deeply rooted, and uncontaminated. It says, very simply, that we learn from people around us with whom we identify. We can’t help learning from them, and we learn without knowing that we are learning.”¹³ “You learn from the company you keep.... You become like them.”¹⁴

Smith talks persuasively about joining “clubs,” defined as communities of influential people. He describes the advantages of club membership:

- It helps establish our identity vis a vis the club’s activity (like fly-fishing or the “literacy club”).
- Others affirm our membership.
- Based on the model of apprenticeship, it’s low risk.
- More experienced members help you do those things that interest you.

“They don’t teach you; they *help* you,” Smith writes.¹⁵ Members of the club:

- Help you to say what you are trying to say.
- Help you to understand what you are trying to understand.

Speaking about being part of the literacy club, he cites research about language acquisition, vocabulary and reading acquisition. He notes that

“[Researchers] discovered that people who read a lot are likely to be good readers ... they didn’t find that you need to be a good reader in order to read a lot, but if you read a lot your reading ability increases. They discovered that people who read a lot understand better what they read, tend to be better writers and spellers, and tend to have better academic skills.”¹⁶

In short, comprehension is important because you can’t learn what you don’t understand.

Another critical component for learning is confidence. If you don’t believe you can learn something, you won’t learn it. This applies, as we’ve discovered, to girls of a previous generation who were steered away from physics and medicine, and boys who were taught they weren’t as good at spelling and nurturing professions. How, then, does one develop confidence to feel welcome and join the club of successful students, good readers and spellers and scientific and critical thinkers?

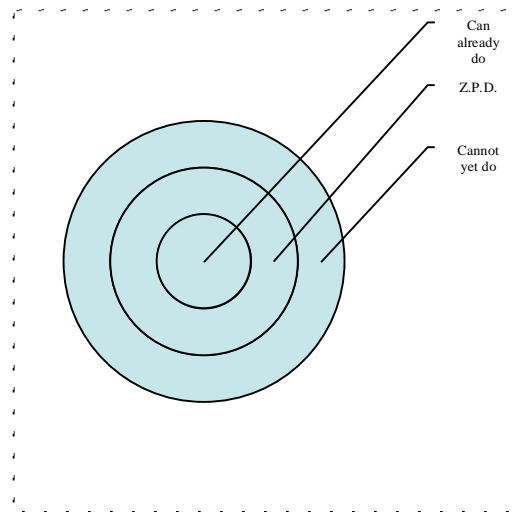
Is it possible to become a member of a club from which you’ve been excluded? What happens to those who feel excluded from a particular club even before they reach high school by having been labeled “at risk,” “struggling” or “slow learner?” And what about teachers who promulgate these labels and this exclusion?

The antidote, Smith says, is to focus on the learner’s self-image. Engage young people in activities they find comprehensible, interesting and confidence building. He suggests finding someone who will help them read what they would like to read and write what they would like to write.¹⁷ This recollects the old saw, “Start where the students are at,” and also implies, for high school, serious conversations about serious topics rather than more worksheets and drills in “the basics.”

It’s pertinent to remember that *everybody* is a “struggling” reader or writer depending on the text and the circumstance. We are all proficient in some areas, and there’s some material each of us finds a struggle. Although Smith is writing about “club membership” as metaphor, it is also literally true. As members of formal or informal clubs we learn their goals, rules and practices. Clubs in school, then, (the chess club, archery club, student government, social justice group, soccer team) are all smaller, more supportive environments that encourage student-student and adult-student relationships as part of fostering specialized skills and knowledge. Smaller school communities might be an extension of this idea.

A central part of the theory of Lev Vygotsky, 20th century psychologist and educational theorist, is that of the Zone of Proximal Development. Many contemporary learning practices (including DPS’ Literacy Studio) base instruction on it. When thinking about learning, Vygotsky might posit three concentric circles. The innermost circle represents what an individual already knows, can do and understands. This is called the Zone of Actual Development. The outermost circle represents what a person cannot yet do or understand. Trying work in that area is too

frustrating or remote to be possible – yet. The middle circle is the Zone of Proximal Development (ZPD). It is the area in which a student can succeed, with help.¹⁸



The job of a teacher is to provide experiences and support for students in that zone. If too much time is spent in the innermost circle, s/he will not be challenged and may become bored. If the student is thrust into the outermost circle, anxiety will likely be too great. The key is to provide opportunities for experiences (and support) that keep students in the ZPD. As students become more accomplished, those skills, behaviors and ways of thinking are added to what they can already do. The area of the ZPD shifts, and so does what the student can attempt next.

Jeffrey Wilhelm, a former middle school and high school teacher and current researcher and author, describes the classroom application of Vygotsky’s process from a teacher’s perspective in *Strategic Reading*, (2001):

1. I do/you watch (with explicit instruction about the strategy – often a “think aloud”)
2. I do/you help
3. You do/I help
4. You do/I watch – so assessment is built in at each step, and at each step the student has increasing responsibility.¹⁹

“Scaffolding” is a Vygotskyian term/metaphor that describes the gradual release of responsibility (a current educational buzz-phrase). The teacher models and provides small, safe, incremental steps for students to take. The shifting of the responsibility from the teacher to the student allows for students to internalize the process and become more adept with different materials. This approach has been used a great deal in work with students labeled struggling readers, and is expanding into other domains with success.

Wilhelm and Smith have conducted research with adolescent boys identified as “reluctant readers.” They were interested in finding out what kind of reading appealed to these students. They concluded that the reason certain texts appeal had

less to do with the text itself and more with the possibilities for connecting with the students' lives.

The ability to see oneself and one's concerns in a text, and to take the substance of one's reading to the world were significant contributors to engagement and to achieving 'flow' (Csikszentmihalyi, 1990) – a total immersion in the immediate experience of reading. Indeed, this kind of immersion is the most basic fact of engaged reading.²⁰

Being an engaged reader promotes more reading. More reading promotes becoming a better reader. Wilhelm interviewed many boys across the country and identified a few text features that contribute to the sense of "flow." They include short texts that provide for an immediate sense of accomplishment and competence; texts with many visuals to help inform; challenging texts; "edgy" ones (that challenge the status quo); "real" texts, which does not necessarily mean non-fiction, but includes those that are connected to real life and functionality; current texts, like ones that permit keeping up-to-date on sports or news important to the adolescents; and texts that involve humor.

Controversies continue over how students learn and how teachers should teach. Nevertheless, there are some common themes emerging from brain research and educational research and theory. In summary, these educational theorists suggest that membership and participation in communities of influential practitioners makes for learning; modeling the behavior to be learned facilitates learning; building on what a student already knows is crucial to learning, as is working in a zone that has a "just right" amount of challenge; relevance to the learner is critical; engagement leads to more engagement; and gradual release of responsibility to the student helps students learn.

Some Special Circumstances that Affect Learning

There are many special situations to be considered when thinking about students and their learning. Four are cited here: English language learners, grade level (specifically, high school seniors), degrees of student motivation, and economic circumstances.

English language learners

There are different opinions (and often heatedly so) as to the best kind of instruction for English language learners. There are three primary approaches: dual immersion, pullout and inclusion.

The dual immersion model permits students to be taught part of the time in their home language and part of the time in English with a bilingual instructor. With the pullout model, students spend the bulk of their day having instruction in English; the students are "pulled out" of regular classes one or two periods a day for instruction in speaking, reading and writing English. The inclusion model has two teachers in the

classroom, the subject area teacher teaching the entire class in English with an ESL teacher working alongside.

Many educators favor dual language programs because the shared approach represents equity; all students (native English speakers and immigrant students in the same classes) learn in both languages every day. In a recent article in *Educational Leadership*, authors Thomas and Collier conclude that, after 10 years of research on English language programs and school effectiveness:

Active dual-language programs [in many states] are providing win-win advantages for all students. English learners have an opportunity to make faster-than-average progress on grade-level instruction that is not watered down. Native English speakers who are already on grade level can exceed the achievement of their monolingually educated peers. And through the cognitive stimulus of schooling in two languages, which leads to enhanced creativity and analytical thinking, native English speakers who are lagging behind academically receive the accelerated instruction necessary to close the achievement gap.²¹

They cite several large-scale studies and meta-analyses conducted in the last decade that demonstrated that in other forms of English language learning settings (transitional bilingual and English-only programs), students made gains that permitted them to close only half the achievement gap needed to succeed with their native English speaking peers. In contrast, they found that dual language instruction was able to close the gap, although it required about five or six years to reach full parity. They have found both English learners and native English speakers fully prepared for high-stakes tests.

A recent article in the *Journal of Adolescent and Adult Literacy* discusses the issue of second-language learners specifically at the secondary level. The authors compare the ability to learn conversational language (estimated to happen within a relatively short time) with the academic language and literacy needed for high school coursework, which they estimate to take between five and 11 years, depending on which research is cited. Variations include the need to learn the Latin alphabet for some students and not others, and the wide variety of preparation for secondary schooling that students may have had in their home countries.²² Additionally they note, that in ESL instruction, research supports the idea “that the more the native language is academically supported, in combination with balanced second-language development, the more ESL students are able to academically achieve in the second language. Educational programs need to include what students bring with them. Educators should focus on what students have rather than on what they lack.”²³

Educators say that high school age students, particularly those who haven’t had much schooling in their home country, can find the experience traumatizing, isolating and frustrating, making it very difficult for students to keep up with their schoolwork.

Adolescents are often sensitive about social settings and can be embarrassed about practicing a new language in public. Gabriela Rojas, a 15-year-old who arrived in the United States from Mexico a month before school began, called the experience, “intimidating.” In the Alamance-Burlington School System in North Carolina, educators have been experimenting for several years with a model called the Newcomers Center. It offers new immigrant students eight to 16 weeks of intensive instruction, half at their regular school and half at the Newcomers Center. They attempt to provide students with sufficient support in learning English and in schooling practices to keep them from feeling lost in the classroom. They find it particularly effective for students who “come from a variety of educational backgrounds.” Rojas says she appreciates the time at the Newcomers Center but still finds the work at her base school a struggle. “The work isn’t very difficult,” she said. “The problem is the language barrier. That’s what makes the whole thing difficult.”²⁴

Newcomers schools have been appearing around the nation in the last decade or so. (Newcomer High School in San Francisco, founded in 1979, has been seen as a model for others around the country.) School districts experiment with different variations: Chicago’s Newcomers Schools include a four-week intensive summer ESL program and offer workshops for families; Philadelphia’s Newcomers Center offers a full-day program that lasts about a year; a program in Jefferson County, Colo., provides half-time instruction in the comprehensive high school and lasts one to two semesters; in New York City the Newcomers Schools look a little different from one another in the different boroughs, and the International High Schools are ones from which students can receive high school diplomas; and the Austin, Texas, Newcomers Schools use the Principles of Learning and are affiliated with the University of Pittsburgh’s Institute for Learning.

Given the numbers of immigrant students in the Denver Public Schools, particularly recent immigrants of high school age, it might be reasonable to advocate for a dual-immersion school. Given the size of the city, perhaps there could be a dual-language school or a newcomers model adopted in each of the quadrants.

Depending on the fluency in English of the second-language learner, different teaching strategies are needed. Although particular strategies suggested are too lengthy to be addressed here, in the broadest sense, what seems good instruction for all students is good for second language learners: provide low-stress environments; use graphic organizers; use open-ended questions and opportunities for response; utilize frequent comprehension checks; create situations that permit students to extrapolate from text to their own lives; and provide opportunities for performance-based assessment.

The Senior Year

According to the National Center for Education Statistics, 12th-graders' interest in school and evaluation of its relevance has declined.

Indeed, 12th-graders' interest in school exhibited a decline from 1983 to 2000. For example, while 40 percent of 1983 seniors said their schoolwork was "often or always meaningful," 28 percent gave this response in 2000. Similarly, the proportion of seniors who said most of their courses were "quite or very interesting" dropped from 35 percent to 21 percent, and the percentage who said what they were learning in school will be "quite or very important later in life" also declined. Even seniors who reported earning mostly A's decreased their ratings of schoolwork's meaningfulness and how important this learning would be later in life. In addition, students became more likely to take a dim view of school courses over this period: 32 percent of seniors in 2000 said that most of their courses were "very or slightly dull," up from 20 percent in 1983.²⁵

The National Commission On The High School Senior Year (2001) was conducted by a partnership of the U.S. Department of Education, the Charles Stewart Mott Foundation, the Carnegie Corporation of New York and the Woodrow Wilson National Fellowship Foundation. One of its findings notes, "The high school senior year too often represents a lost opportunity to link students with either postsecondary studies or work." The Commission described how college-bound students know by the end of 11th grade (barring "miserable failure" in the senior year), whether they will attend college, and likely, which one. Serious preparation for college, therefore, usually is over. Similarly, students entering the workforce see the academics they take in senior year as "pointless."²⁶

Moreover, the Commission noted that more than half of 12th-graders in the United States work more than three hours a day, three times the international average. It said that student motivation would be best served if students valued learning for its own sake. It cites the need to make that excitement as universal an experience as possible for every high school senior. It concludes, "The United States desperately needs to seize the lost opportunity of the senior year. The need is immediate. The goal is important. The time to act has arrived."

Attendance, effort and relevance

Two indicators taken together, attendance and effort, reflect a different kind of "special circumstance." If you believe that learning is a social activity created, deepened and enhanced in the presence of others, good attendance is necessary. Students need to communicate with others, explore different perspectives and develop multiple ways to solve problems. Evidence from 2000, the most recent year reported by the National Center for Education Statistics, reveals only 40 percent of 10th-graders were never absent in a four-week period. Slightly more than 20 percent were absent one day, 25 percent

were absent two to five days, and 14-plus percent were absent more than five days in that given time.

Fewer than 30 percent of 12th-graders were never absent, and more than 20 percent were absent more than five days. Students also reported the reasons they were absent, from illness to skipping school to other reasons; 15.6 percent of 10th-graders said they'd skipped school and 26.1 percent of seniors said they did.²⁷

Recent thinking also connects “intelligence” with effort. It is possible to become smart, and smarter, by working hard. Achievement is considered to be connected less to externals and more to what is under an individual's control. There has been some effort on the part of reform educators to increase the relevance of schooling and create ways for students to become more engaged in their learning.

Economic issues

Doubtless many factors contribute to a sense of relevance of one's education. Many of these are outside the control of schools. Economic conditions in the nation can affect family responsibilities. Job opportunities based on geography or ethnicity are a factor.

The National Commission of the High School Senior Year, again in its Summary of Findings, speaks to this question, but doesn't let schools off the hook:

What U.S. Secretary of Education Richard Riley has termed “the tyranny of low expectations” and President Bush has called the “soft-bigotry of low expectations” hinder many minority students and many poor students from all ethnic backgrounds. Expectations are often established on a child's first day in kindergarten and continue throughout his or her school experience. The system just expects less of some students. ... Listening to the tales of graduates who entered the workforce right after high school, the Commission was struck by disturbing insights into the “class structure” of school. ... High schools can no longer act as sorting machines, preparing some students for postsecondary education and some for the world of work.²⁸

A recent article in *The Rocky Mountain News* (August 7, 2004) discussed CSAP scores. The headline was “CSAP tests expose gap,” and the sub-head read, “Lower income, lower scores linked.” While performance gaps are evident in all subjects and at all grade levels, it was reported that low-income students' lowest scores were in 10th grade math. Only 10 percent of poor students scored proficient or advanced.²⁹ More than half scored in the “unsatisfactory” category. (Also in the article, the Education Trust, an advocacy group for poor and minority students, reported showing recent (2000) figures that only one-third of the teachers in Colorado's high poverty public schools had a college major or minor in their subject area.)

There aren't particular magic “teaching techniques” to overcome this educational gap once some students are tracked into less demanding courses of study. The problem is

systemic, but can be addressed. We need to be mindful of preconceptions: self-fulfilling prophecies do work. That is part of the reason it is so important to have high expectations for all our students. Naturally, knowing students as individuals helps greatly in avoidance of cultural stereotypes and biases. Knowing students as people with particular aspirations and difficulties is very difficult when one is responsible for 180 or so students per day. Smaller school communities would help tackle this problem.

WHAT TEACHERS CAN DO TO IMPROVE LEARNING OPPORTUNITIES

What does the biological and behavioral evidence addressed above suggest for classroom practice? One thing is clear: typical 9th-graders are cognitively different from typical 12th-graders. Educators need to think about them differently. And what is “typical”? A typical male? A typical recent immigrant? A typical student who has been successful academically? It is impossible to assume a homogeneous class full of typical students.

This is a strength! We know that people learn from one another and from engaging with different perspectives – it strengthens the ability to think and to refine. As students are actively engaged in conversation with one another, they become teachers as well as students. All of this speaks loudly against “ability tracking,” and leads us to the more recent educational perspective that all students who want to take “advanced” courses and are willing to do the work should be permitted to enroll. It follows from the current notion that smart is not something you are by nature; effort makes you smart.

Curriculum specialists and academicians suggest particular curriculum and pedagogy approaches, taking into account the cognitive development of each student. Many of the suggestions below respond to more than one of the findings in the previous sections. For example, using project-based small-group instruction around a relevant question would help create multiple neural pathways and also provide connections to life outside school (important for stimulation and active processing of information).

- Active student involvement (from choosing questions to research to determining ways of engaging with them to demonstrating their learning);
- Many opportunities for students to work with one another;
- Opportunities for examining issues from multiple perspectives;
- A rich sensory environment;
- Depth rather than breadth in curriculum; and
- Environments that build on student strengths.

The following list describes *specific* recommendations that have been advanced:

1. To accommodate growth spurts in visual/spatial ability and in the regions that control language and emotion:

- Provide opportunities for emotional expression (and development of the skill of reading nonverbal cues) through use of drama, the arts and so forth. Once again, classroom discussions would be a supportive strategy that would take

into account the differences among students whose brains are at different stages in development.

- Use graphic organizers in discussion, analysis and in planning of writing.

2. To improve neural connections and stimulation:

- Use instructional modes that include simulations, role-plays, discussion and debate, cooperative learning and sensory-motor activities.
- Explore concepts from multiple perspectives. In learning literature or history, a student who interprets material from multiple perspectives has more ways to understand and be able to access information (such as the differing perspectives of American colonists, American Indians, French settlers and British soldiers in the American Revolution).
- Incorporate interdisciplinary work that provides multiple ways for students to address subject matter. This would help avoid the “use it or lose it” phenomenon.
- Explore essential concepts deeply and thoroughly.³⁰ Encourage students to develop their own questions about a unit of study. Use essential questions and multiple ways of exploring them to build complex neural connections.³¹
- Provide a rich sensory environment with many things on the walls and around the classroom. At the very least, while students are not directly attending to what is happening in class, there is greater likelihood that they will glance at or focus on material that supports learning.
- Challenge students to reinforce particular neural connections. According to Eric Jensen, former teacher and member of the Society for Neuroscience, “In some ways, the worst thing that can happen for a student is to get the right answer immediately.”³²

3. To enhance planning and organization

- Provide students with choice and with different ways of learning and demonstrating their learning.

4. To improve attention

- Keep demands on attention short. Jensen maintains, “Teachers need to keep attentional demands to short bursts of no longer than the age of their learners in minutes.” For high schoolers, this would be around 15 minutes, for example.

“[The] teacher will want to use attention sparingly for introductions, key ideas, directions, lecturettes, reviews, stories, and closings. The rest of the overall learning time ... ought to be *student time*, used for processing, projects, discussions, group work, partner work, self-assessment, journal writing, feedback, design, research, mapping, interviews, review, or memorization.”³³

- Jensen says that between 55 percent and 80 percent of student time should be involved in the student’s active processing of information. “Students who do the talking and the doing do the learning,” he comments.
 - Provide opportunities for physical movement and activity to help counteract fatigue. More activities of shorter duration may also be helpful.
 - Be concerned with the whole student, including the amount of sleep a student gets. It is appropriate for teachers to reinforce the idea of adequate sleep.
 - Encourage healthy eating habits. Food higher in protein is helpful for maintaining attention.³⁴
5. To modulate stress
- Build on students’ strengths, rather than judge students by their mistakes. In fact, looking for the reasons behind “mistakes” may reveal multiple ways to solve problems, and therefore is supported by brain research.
 - Allow opportunities for apprenticeships to help students understand problems they’ve posed for themselves, be active in their own learning and learn in a safe environment.³⁵
6. To build confidence and self-image
- Maintain an environment that builds on student strength. Provide different ways to handle assignments.
 - Imagine likely errors and misunderstandings when planning. Design lessons that create opportunities for them. Honor “mistakes;” use them. Work toward multiple ways of solving problems.
7. To enhance understanding and comprehension:
- Provide instruction through modeling and scaffolding.
 - Give students feedback. It is important for students to get feedback on how well they understand. A single teacher can’t provide this all the time for each student; it is important to find additional ways during a class period for other options. Team problem solving is one example of a structure that works toward this end. Peer editing, journal writing, access to reference materials to check and extend student thinking are also helpful.

WHAT IT TAKES TO BE A GOOD TEACHER

Entire books have been written on the traits of effective teachers. Many articles and books list particular actions and behaviors of teachers that contribute to good instructional practice. Their lists are all about quantifying. They don’t attend to important intangibles because it doesn’t fit the model to explore qualitative concepts such as “enthusiasm.” In that way, what we measure *becomes* what we value. With this caveat in mind, what is being said about preparation, behaviors and practices at the individual teacher level in these texts and journals?

In the September 2004 issue of *Educational Leadership*, Sam Intrator describes what he found asking students what made for good teaching. He spent more than 130 days shadowing and talking to high school students. He describes the teacher characteristic of “engaged time.” Good teachers manipulate classroom pace, provide opportunities for students to express their originality through discussion or projects, show personal passion for their subject matter, know their students as people (beyond the classroom – who’s interested in a particular sport or activity, for example), and connect content to the issues facing teens in their lives.³⁶

Every researcher or research group has a slightly different approach to what makes for good instructional practice. If you review the literature you can discover the essential 12 or eight or nine (depending on which literature you choose) instructional processes. The kinds of topics noted look something like this: practices that include *classroom organization, implementation and monitoring of student progress*. They describe working with students around *interacting with text, identifying similarities and differences, asking questions, cooperative learning, summarizing, providing feedback* and the like. For a representative flavor of these lists and their diversity, you might consult the following:

- The Southwest Educational Development Laboratory published “How Can Research on the Brain Inform Education?” The article contains 12 suggestions based on recent research.³⁷
- Similarly, the National Reading Panel (2000) describes the efficacy of eight specific comprehension strategies supported by research evidence.³⁸
- In *Classroom Instruction that Works: Research-Based Strategies for Increasing Student Achievement*, (2001) Marzano, Pickering and Pollock create a textbook for teachers that provides nine explicit instructional strategies. These are based on meta-analyses of recent educational research.³⁹
- Robert Rothman, principal associate of the Annenberg Institute for School Reform at Brown University, addresses the question *Who Is the Effective Teacher?* in the January/February 2004 Harvard Education Letter. He cites a recent synthesis of the research as having “found that teachers’ years of experience, the selectivity of the college or university they attended, whether they held a certificate in the subject they taught, their coursework in subject matter and pedagogy, and their verbal abilities... were all associated with higher levels of student achievement.”⁴⁰

In *Qualities of Effective Teachers*, (2002), author James H. Stronge reviewed literature about teachers’ preparation, personalities and practices, as evidenced by student achievement, supervisor ratings and student assessments.⁴¹ He organized the material into six major categories of teacher effectiveness:

1. Preparation (background and professional preparation);
2. Teacher as person (primarily nonacademic interactions with students and professional attitude);
3. Classroom management and organization;
4. Instructional organization;
5. Implementation of instruction; and

6. Assessment (monitoring student progress and potential).

What follows is a small selection of items from Stronge's study that correlate positively to enhanced student achievement outcomes. Included are just several from each category. Many of these seem self-evident, logical or confirm what we believe intuitively about good teachers.

1. Preparation

- Regarding teacher intellectual abilities, teachers' scores on verbal ability tests were the only input found to have a direct positive relationship with student achievement. (p.4)
- Regarding teacher preparation, formal pedagogical preparation, especially in mathematics and science on the secondary level showed a positive effect on student achievement. (p.6)
- The more courses a teacher takes, the more likely s/he is to emphasize conceptual understanding and hands-on learning. (p.6)
- Teachers certified in their subject areas (especially in mathematics and science) have students who make greater gains than do teachers with provisional certification or those teaching outside their license area. (p.7) Similarly, students perform better when their teachers have majored or minored in the subject they're teaching. (p.8)
- Several studies illustrate that teachers with greater subject matter knowledge tend to ask higher-level questions, involve students more in lessons and allow more student-directed activity. (p.9)
- Teacher expertise as defined by experience (as well as education and scores on licensing exams) accounts for as much as 40 percent of the variation in students' achievement. (p.10)

2. Teacher as person:

- Caring teachers are intentionally aware of student cultures outside the school and practice gender, racial and ethnic fairness. (p.15, 16)
- Effective teachers work *with* students as opposed to doing things *to* or *for* them. (p. 17)
- Students indicate that effective teachers spend more time interacting and working directly with them than ineffective teachers. (p. 17)
- Teachers' enthusiasm for learning and for the subject matter has been shown to be an important factor in student motivation, closely linked to student achievement, and is seen as more significant with older students. (p.19)
- Extra hours spent preparing and reflecting upon instruction, preparing questions in advance to ensure they support the goals of the lesson and emphasize key points and preparing materials for students has a positive relation to increased student achievement. (pp. 20, 36, 48)
- Teachers whose students have high achievement rates continually mention reflection on their work as an important part of improving their teaching. (p. 21)

3. Classroom management and organization:
 - Effective classroom managers are able to increase student engagement in learning and make good use of every instructional moment. (p. 28)
 - Creating and maintaining practical procedures allows teachers to support students in knowing what to do and when, with minimum repetition of directions. (p. 29)
 - The time a teacher spends on disciplining students inversely affects student achievement outcomes. (p.31)

4. Instructional organization:
 - Effective teachers consistently put instruction and student learning as a priority and clearly communicate their enthusiasm and dedication. This is reflected in students' behavior and practices. (p.34)
 - Effective teachers maintain momentum within and across lessons. (p.36)
 - High teacher expectations of students have been identified as a key component of student growth, improvement in class and success. Some studies have suggested that subtle communication of lower expectations for certain students limits achievement. In both cases, there seems to be a self-fulfilling prophecy. (pp .37, 46)
 - Instructional planning for effective teaching includes recognizing the importance of linking instruction to “real” life. (p. 39)
 - Identifying clear lesson and learning objectives and carefully linking activities to them are essential. When instruction focuses on meaningful conceptualization, especially students' knowledge of the world, higher achievement results. (pp. 39, 44)

5. Implementation of instruction:
 - Students have higher achievement rates when the focus of instruction is on meaningful conceptualization, especially when it emphasizes their own knowledge of the world. (p. 44)
 - Effective (schools and) teachers place priority on reading because it affects success in other content areas and overall achievement gains. (p. 47)
 - Effective teachers use a variety of grouping strategies, including cooperative grouping and ability grouping with differentiation to support student learning. (p. 59)

6. Assessment:
 - Effective teachers are concerned with having students learn and demonstrate understanding of meanings rather than merely memorizing facts or events. (p.47)
 - Questions should be considered carefully and prepared in advance of a lesson to ensure they support the goals and emphasize the key points, along with maintaining appropriate levels of difficulty and complexity. (p. 48)
 - Questions are most valuable when they receive responses – correct or incorrect – because responses encourage student engagement, demonstrate understanding or misconception and further the discussion. (p.48)

- Effective teachers vary not only their own instructional strategies, but also the types of assignments and activities given to students to support increased student engagement. (p. 49)
- Effective teachers think through likely misconceptions that may occur during instruction and monitor students for signs of these misconceptions. (p.57)
- Effective teachers give feedback in a manner that is supportive and encouraging to students. (p. 57)

Stronge summarized all this by suggesting that effective teachers recognize complexity, communicate clearly and serve conscientiously. (p.62)

Evidence concludes that effective teachers are knowledgeable, experienced and enthusiastic about their subject; have high expectations; create connections between the material and the students' knowledge, concerns and life outside school; promote positive attitudes among students and the teacher; build choice into curriculum and/or pedagogy; and provide supportive feedback.

WHAT DISTRICTS CAN DO

Some influences on teachers' work are outside their own decision-making. These are generally district-wide or school-wide decisions and practices. Tony Wagner, co-director of the Change Leadership Group at Harvard's Graduate School of Education, wrote in *Education Week* in 2003,

...the real challenge in schools today is not just to get more students to pass more tests, but to create new knowledge about how to improve the level of instruction for all students.... As a part of this effort, we've documented the strategies used for improving teaching in those districts that have dramatically raised the level of student achievement for the lowest quartile of students, including those from the most at-risk populations.⁴²

The article looks at pioneer school districts in this endeavor. The Change Leadership Group examined districts whose students made dramatic gains in achievement (with emphasis on students considered most at-risk and those in the lowest quartile on standardized achievement tests). While the Group is quick to point out that there is no blueprint, it concluded that district support for change was critical and outlined "seven disciplines for strengthening instruction." In their own unique ways, each district followed similar processes. The seven disciplines are:

1. The district creates an understanding and a sense of urgency among teachers and in the community for the necessity of improving all students' learning, and it regularly reports on progress. Qualitative as well as quantitative data is used; the data are disaggregated so that each segment of the student population can be treated fairly.
2. There is a shared image of what good teaching looks like. There is a focus on rigorous expectations, a high degree of student engagement, and strategies are in place so as to personalize learning for all students.

3. All adult meetings model good teaching. The subject matter of all adult meetings is instruction.
4. Teachers and students have a shared view of what quality work looks like. Standards and performance assessments exist for student work at all levels. These are interpreted consistently across the district.
5. Supervision is entirely focused on improving instruction.
6. Professional development is primarily on-site, intensive, collaborative and job-embedded. People who provide the professional development must model best teaching and learning practices.
7. Student learning is frequently assessed by referring to student data. Effective teaching practices are identified. Time is built into school schedules for staff to share their work.

All of this serves, according to the Harvard group, to develop a school and district culture that supports active engagement and continuous improvement.

Because research suggests that teacher effectiveness improves each year over the first several years of teaching (with effectiveness leveling out at five years to eight years), the National Center for Education Statistics examined the distribution of beginning teachers, defined as having three or fewer years teaching experience. The Center found that schools with the highest percentages of minority students and those with the highest percentages of limited-English proficiency (LEP) students were more likely to employ beginning teachers than schools with the lowest percentage of minority students and those with the lowest percentage of LEP students. Furthermore, public schools with the highest percentages of low-income students (those eligible for free or reduced-price lunch) were more likely to employ beginning teachers than were schools with the lowest percentages of such students.⁴³ Starkly put, there is an unequal distribution of newer (less effective) teachers.

WHAT SCHOOLS CAN DO

The National Center for Education Statistics surveyed teachers regarding networking with other teachers outside the school, having common planning periods for team teachers, individual or collaborative research on a topic of professional interest, mentoring another teacher in a formal relationship, and being mentored by another teacher in a formal relationship. In each case, teachers who met at least once a week with other teachers reported that such meetings supported their classroom teaching “a lot.”⁴⁴ Teachers were also asked about the extent to which participation in professional development activities in their content areas during the previous 12 months had improved their teaching. In all cases, an overwhelming percentage of teachers who had participated in more than eight hours of activities said it helped their teaching “a lot” or “moderately.” Professional development activities included study in the subject of their main teaching assignment, use of new teaching methods and addressing needs of students of differing needs (LEP, diverse cultural backgrounds, disabilities).⁴⁵

Many current structures and approaches within secondary schools themselves inhibit the opportunities to easily support the practices and principles described. Scheduling of teacher time and class offerings, public address interruptions, bells, large classes, the number of offerings (which translates to the number of courses teachers teach) all can inhibit enacting these principles. Some reformers think it better to re-vision secondary education rather than try to tinker with the model that currently exists. They suggest that schools should:

- Create longer blocks of time for instruction.
- Foster enhanced opportunities for learning by including students with different experiences, backgrounds and abilities in a class.
- Develop longer units of study, ones that connect to students' lives, with probing questions that permit creating new (and multiple) ways of seeing.
- Provide opportunities for apprenticeship or internship.
- Build in opportunities for choice (for students and for teachers).
- Keep the number of students small for whom a teacher is responsible.
- Provide teacher preparation and practice in the effective use of new models.

WHAT WE KNOW ABOUT HOW ORGANIZATION AND STRUCTURE AFFECT LEARNING

Critics of traditional public education say that as we grow in school, the ability to question is drummed out of us. As George Bernard Shaw said, "The only time my education was interrupted was when I was in school."

Many would agree that part of defining "learner" includes the ability to formulate questions and engage in a search for answers. Being involved in making new connections and building knowledge toward understanding is a powerful, often transformative experience. It is what we want for students and should be what we want for ourselves.

According to the National Center for Education Statistics, 57 percent of teachers reported that individual or collaborative research on a topic of professional interest, where teachers meet at least once a week, improved their classroom teaching "a lot." Another 30 percent said it improved their teaching "moderately." That's 87 percent!⁴⁶ Even teachers who met less frequently reported its efficacy for their teaching.

There is no scarcity of questions that appear in even a single day of teaching. Teachers need time to formalize them and act on them. Creating a culture of "teacher researchers" in a school has been shown to have powerful results. In schools where "Critical Friends Groups" have been established, teachers meet periodically to present their work or a student's work to their peers or raises questions. Following particular protocols, the staff listens, discusses and responds to the presenting question or issue.⁴⁷ In a (relatively) low-stress environment, teachers are learning about their own questions, their practice and the value of multiple perspectives in seeking fuller understanding. They are creating knowledge in the way we hope our students do when they engage in collaborative group work.

Ted Sizer of the Coalition of Essential Schools advocates these “Critical Friends Groups,” saying they work well within schools or as clusters of schools.

The schools play off against one another, comparing work, consulting on new directions, promoting honest talk by faculty members across schools, serving each other as sustained “critical friends.” A cluster of schools can help others in their midst get started, both through the small staffs they hire and by lending veteran teachers as consultants.⁴⁸

Another model of individual teacher research has been developed by the Prospect Center in Vermont. Using a rigorous “descriptive process,” teachers study a student in detail. The intention is to understand the student deeply and figure out the next logical step to take with the child, without the labels that we often use to cloud our ability to see. The person is described in terms of 1) physical presence and gesture, 2) disposition and temperament, 3) connections with other people, 4) strong interests and preferences, 5) modes of thinking and learning.⁴⁹ The teacher brings this research to a group of colleagues for presentation and discussion around a focusing question. Teachers report their ability to “see” students and to generalize from the experience to change, and improve, the way they work with students.⁵⁰ This is a particularly interesting approach for secondary teachers, who often see students in a compartmentalized way, perhaps one period per day.

Of course there is much research done and data collected on a scale larger than the classroom level – on the department or the district level. As the department, the school or the district reports the data, a faculty needs time and conversation to use it to help their practice. In discussing characteristics of effective school districts in *Education Week*, Tony Wagner describes “seven disciplines for strengthening instruction.”⁵¹ He cautions against “flooding people” with too much data. Faculty can explore or raise questions about one or two pieces of data and that can generate rich conversation and move to enhance instruction. He adds, “We have found that gathering and sharing qualitative data can often create more urgency for change than numbers alone.”

Another important issue that practitioners frequently raise is the question of the “respectability” of quantitative versus qualitative research, which extends to many fields besides education. (It underpins some of the raging controversies around the standards movement.) What is the function of each? How can people learn from them? How can people talk with one another across the divide? These are all questions that would provide useful conversation among a school staff.

A NOTE REGARDING CHOICE

Many of us have a childhood memory that goes something like, “I can’t wait until I’m old enough to decide... what time to go to bed; my friends; how I’ll treat my kids when I’m grown up ...” We felt the absence of choice.

There's a great deal of evidence that having choice is beneficial. Alfie Kohn addresses this topic in detail in his book, *Punished By Rewards* (1993).⁵² (This book covers topics such as pain management, sustained interest and success in work, ability to tolerate difficult situations and making moral decisions.) In education, choice is valued by some not only to gain compliance (we know that people who help make the rules follow them more reliably), but because we are interested in democracy, morality and courage – and teaching it through action.^{53a}

How much say should the local community have about the schools? How much input (control of choice) is appropriate at the district level and how much at the school level? Is it appropriate to have smaller schools each with fewer choices for students but have a wider variety of different schools from which students and their families can choose? If there are a variety of schools to choose from, who makes the choice of which school to attend? How much choice should individual schools have for their direction and curriculum? Do teachers do a better job when they select the subject matter they teach? Do students do better in courses they've chosen themselves?

These are crucial, potent questions. Decisions we make do and will reflect our deepest beliefs. It is unfortunate that so many shy away from the conversations. We like choice for ourselves – real, consequential choice. Choice in social settings must exist in a framework of trusting relationships. Districts, schools, departments, teachers and students all have opportunities for choice. What do some of the choices look like?

On a large scale, some choices have unintended consequences. Recently a colleague mentioned national concerns about the increase in obesity among children and young people in the United States. My friend paired this information with the current trend to lessen the amount (or eliminate some requirements) for physical education in school (and incidentally to eliminate recess for some young children) in favor of providing more time for “academics.” That is one of the perhaps unintended consequences of the choices we make as the standards movement is played out in many arenas.

Is it possible to have small schools of choice in a large urban area without having the selective process become part of de facto tracking in the district? Fred M. Newmann, a professor of curriculum and instruction and former director of the National Center on Effective Secondary Schools, and his associates, tackle this topic in “Authentic Achievement: Restructuring Schools for Intellectual Quality.”⁵⁴ A school they described found ways to maintain a diverse population by selecting students in a way that ensured a 51 percent low-income population, and about a 25 percent population of students with special needs. (p.236)

Newmann and his associates also discuss ways to have genuine choice within a given school. In one example, Cibola High School (pseudonym) students choose which

^a For an extended, compelling discussion of the role of community in schools and its relationship to choice, see Kohn's (1996) *Beyond Discipline: From Compliance to Community*. Alexandria, Va. Association for Curriculum and Development. (It is one of the few educational books in my library that even has “choice” listed in its index!)

portfolio gets exhibited; there are different agendas for each advisory group and there are individualized intern experiences. At the same time, there is a push to find common student experiences; there is a common set of portfolios that all students create and there are uniform minimum competency exams required for graduation. There is a common curriculum, and some courses are required, although a student's concentration in "senior house" differentiates student experiences. Teachers have the freedom to "teach to their passion."⁵⁵

How might choice look in the daily life of an individual practitioner? A new college counselor in an urban secondary school serving teens labeled "at risk" was thinking about how to begin her work with these young people. She considered asking them what jobs they'd like in the future. On one hand, that seems very logical, engaging and respectful. From a different perspective, it seems narrowing of options, since many of the students haven't had the opportunity to know adults from as wide a variety of occupations and professions as they might if they grew up in environments that had provided more choices.

How can choice impact students? Dennis Littky, director and cofounder of the Metropolitan Regional Career and Technical Center (The Met) and supporter of the small high schools reform movement, recently wrote about choice on the classroom level:

A group of Met freshmen once spoke at the New England Coalition of Essential Schools Conference, and I was blown away by the way they talked about their reading. They each said they were reading so much more than they did in middle school, because at The Met, they didn't have to read any particular book chosen for them by someone else. They could choose their own books, based on their own interests. All of them talked about how they finally had the freedom to really read to learn.⁵⁶

Participation in smaller schools (and smaller learning communities) has been more personalized and created more frequent opportunities to be engaged in deeper conversations with students and colleagues. Smaller schools provided support and challenge for faculty and for students in extending learning – and developed the sense of community that allowed for intellectual risk-taking in a safe environment.

SOME CORE PRINCIPLES

Based on the research, there are some core principles that should be present in every school in order to enhance teaching and learning. We have already identified some of them earlier, in the section on what teachers might do. Some of these teaching and learning methods are not ones that today's teachers, especially older teachers, have experienced in their own schooling; this makes change particularly difficult. The challenge is coupled with some general beliefs in our society (to which teachers are not immune) about who in school *can* be successful. Taken together, these principles point to the need for teachers to engage in meaningful learning experiences together according to the new pedagogical models so they can have experiences from which to generalize

and share their successes. It's easier to have confidence in teaching when one has experienced what this learning looks like and feels like firsthand. Teachers need professional development that uses the same methodologies they are being expected to provide.

Further, it is very frustrating (and counterproductive) to receive mixed messages about what should be happening in a class, or what constitutes learning and achievement. Teachers also need to understand clearly the expectations being set by schools and districts.

If students are to be independent, engaged, successful learners, research indicates that teachers need to:

- Ensure the student needs discussed above are met (no small task!);
- Provide connections, particularly to adolescent issues to enhance learning opportunities;
- Stress depth rather than “coverage” of material;
- Provide opportunities for interdisciplinary exploration;
- Make in-class time for what they really value, including reading, writing, math and opportunities for collaboration;
- Create a rich, literate environment;
- Design deep open-ended questions to stimulate thinking;
- Honor “mistakes”; and
- Know students as people.

In keeping with the research and practices listed earlier, we can assume that if we want independent, engaged and successful learners, research indicates that students need to:

- Feel physically and emotionally safe;
- See their learning connected to their lives;
- Have their thinking valued;
- Have options in how they approach their studies;
- Have multiple ways to approach issues and know multiple perspectives are valued;
- Find their strengths, their cultures and their individuality valued;
- Understand that experiences and reflection are central to learning.

Finally, schools would be more “real world” places if all adults participated as learners and teachers. The list directly above, about what students need, applies to teachers, too. They need to feel emotional safety, have their thinking valued, find their strengths, see themselves as a part of a community of learners, and create new knowledge and meaning and find that central to the work. Teachers would be able to lose the need to be, and the pressure of being, “the sage on the stage.” Similarly, if everyone’s thinking were valued, students would know they had something to offer and the responsibility to do so. Diversity in the group would become a strength. Engagement, enthusiasm and inquiry could become natural.

RESOURCES TO CONSIDER

There are bookshelves of resources available about school reform. Part of the great pleasure in researching this topic is how readily many sources link to others. This small, selected, idiosyncratic list is designed to be provocative and challenge much of the current thinking.

Texts:

Daniels, Henry, Bizar, M., and Zemelman, S., *Rethinking High School: Best Practice in Teaching, Learning, and Leadership*, Portsmouth, N.H., Heinemann (2000).

This book offers a template for secondary school reform, whether breaking up large high schools or creating new, small ones. It chronicles the development of Best Practice High School, a new Chicago public high school, based on work the authors had done on national standards. They discuss their goals and what remains to be done.

Himley, Margaret, and Carini, P. *From Another Angle: Children's Strength and School Standards*, New York, Teachers College Press (2000).

This collection defines and describes the descriptive process, including theoretical papers and an example of descriptive process in an urban high school.

Kohn, Alfie, *Punished by Rewards: The Trouble with Gold Stars, Incentive Plans, A's, Praise, and Other Bribes*, Boston, Mass., Houghton Mifflin (1993).

This book includes discussion of performance pay, motivation, and collaboration in the workplace and incentives, rewards and punishments in the classroom.

Marzano, R.J., *What works in schools: Translating Research into action*, Alexandria, Va., Association for Supervision and Curriculum Development (2003).

This text describes many variables researchers have identified as correlating with teacher effectiveness. These range from Marzano's 3 to more than 150 variables. The 3 Marzano uses are: instructional strategies, classroom management and classroom curriculum design. For each category, he presents specific behaviors identified with it.

Meier, Deborah and George Wood (Eds.), *Many Children Left Behind: How the No Child Left Behind Act is Damaging Our Children and Our Schools*, Boston, Mass., Beacon Press (2004).

This is a collection of essays by authors including Meier, Wood, Linda Darling-Hammond, Alfie Kohn, Ted Sizer and others on topics including issues of equity, democracy, privatization, standards, and more.

Sizer, Theodore, *Horace's Compromise: The Dilemma of the American High School*, Boston, Mass., Houghton Mifflin (1984); *Horace's School: Redesigning the American High School*, Boston, Mass., Houghton Mifflin (1992); *Horace's Hope: What Works for the American High School*, Boston, Mass., Houghton Mifflin (1996).

This highly readable series of books describes research visiting many high schools and outlines the basic tenets of the Coalition for Essential Schools, co-founded by Sizer. Descriptions of core principles of this reform effort are discussed.

Smith, Frank, *The Book of Learning and Forgetting*, New York, N.Y., Teachers College Press (1998).

Smith challenges the current definition of “learning” and offers a history of how we came to have the definition we commonly hold in American schools.

Wiggins, Grant, and McTighe, J., *Understanding by Design*, Alexandria, Va., Association for Supervision and Curriculum Development (1998).

Unlike other more theoretical and policy books in this section, this influential book is about curriculum development and presents an approach that matches much in the school reform movement. It examines a *backward design* process, presents a theory of “facets of understanding,” emphasizes depth over breadth, considers the uses of predictable student misunderstandings and discusses assessment measures.

Articles and Reports:

Elmore, R.F., The Politics of Education Reform. *Issues in Science and Technology Online* (fall 1997). www.issues.org/issues/14.1/elmore.htm

Richard Elmore, a professor of political science at Harvard, succinctly reviews the evolution of U.S. education reform, the movement toward standards, and connects policy and practice. He outlines hard topics and decisions about policy and resources and advocates conversation among all key constituents.

The Education Trust, Inc., prepared for the National Commission on the High School Senior Year. *Youth At the Crossroads: Facing High School and Beyond*
www.woodrow.org/CommissionOnTheSeniorYear/HSReportfinal.pdf

This report asks: Are Today’s Students Ready? How Many Students Make it Through? It looks at achievement trends; dropout rates by family income, race and gender; student expectations; rigor of coursework; teacher qualifications; expectations; and school size. Many charts and graphs are provided.

Websites:

Bill and Melinda Gates Foundation. www.gatesfoundation.org/Education

This site provides information on 23 innovative schools, research and evaluation, bibliographies on high school reform research, and school size research.

National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. www.nces.ed.gov/programs/coe/2002

This site contains many tables and charts about education, arranged by topics such as learner outcomes, language minority students, student effort and educational progress, and contexts of secondary education.

ENDNOTES

- ¹ Some of the research regarding these findings has been done on rats and monkeys; other findings are based on MRIs of teenage human subjects. The research cited here illuminates several concepts: the different ages through which development continues; the impact of stimulation and rich environments; and the effects of stress. Some readers are more likely to resist extrapolation from populations other than human. For that reason, I've named the animal population studied when it's not been human.
- ² Caskey, M., & Ruben, B. (2003) Research for Awakening Adolescent Learning. *Education Digest*, 69 #4, p.36
- ³ Wilson, Lucinda M. & Horch, H. W., (2002, Sept) Implications of Brain Research for Teaching Young Adolescents. *Middle School Journal*, p.2. www.nmsa.org/research/articles/res_articles_sept002.htm
- ⁴ Caskey & Rubin, p.36
- ⁵ Wilson and Horch, op.cit., p.1
- ⁶ Ibid, p.1
- ⁷ Wood & Shors (1998) reported in Wilson & Horch, p.3.
- ⁸ Jensen, Eric. (1998). How Julie's Brain Learns. *Educational Leadership*, 56, #2, p.3. www.ascd.org/xchange/threads/nodes/brain/extjensen.html
- ⁹ Ibid, p.5
- ¹⁰ Ibid, p.3
- ¹¹ Ibid, p.3
- ¹² Smith, Frank. (1998). *The book of learning and forgetting*. New York, NY: Teachers College Press.
- ¹³ Ibid, p. 3
- ¹⁴ Ibid, p.9
- ¹⁵ Ibid, p. 18
- ¹⁶ Ibid, p.23-4
- ¹⁷ Ibid, p. 36
- ¹⁸ Ibid, see Figure 11.1, p. 84
- ¹⁹ Baker, Tanya N., Jeffrey D Wilhelm and Julie D. Hackett. (2001) *Strategic Reading: Guiding Students to Lifelong Literacy, 6-12*. Portsmouth, NH: Heinemann Boynton Cook, see p. 11+
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