How Do Students Get Smart?

Can you draw? Most of us will clearly answer *yes* or *no* to that question. We've learned that artistic ability is something you either have or haven't got. Yet Betty Edwards, an art teacher in New York, succeeds in teaching all of her clients to draw. What is startling is that she can look at your first attempts and determine how old you were when you quit trying to draw. Either someone told you that you weren't very good at it, or you learned that drawing was not a valued skill for schoolwork, so you stopped working at it. Effort, plus expert instruction, creates artistic ability (Schwartz, 1995).

Are you smart? Can you get smarter?

For centuries, school systems in the United States have operated on the assumption that the answer to the latter question is *no*. At an early age, students judge which of their peers are smart or not so smart by the way they are grouped, the tasks and leadership roles they are given, and the patterns in how teachers call on them. They echo the adults in their lives who say things like, "I'm not good at math," "I can't give speeches," or "I just can't sit still with a book."

When we talked with at-risk students about how they differ from students who get good grades (notice we did not say smarter), they told us the following:

- They get to keep learning new things. We're stuck with the same old.
- Teachers pay more attention to them.
- They blurt the answers so fast we don't have a chance.
- They don't even try, and they get As.
- They've been a teacher's pet at some time.
- I don't learn. I watch.
- By the time I'm ready, all the good answers are taken.

Paraphrase their comments. In a nutshell, "Smart students learn effortlessly and get to do all kinds of interesting things. It takes me more time, so I must be dumb. If I learned fast, teachers would like me more."

Is smart all about being fast? Thomas Edison would be shocked to hear that, since it took him over two years, three thousand theories, and six thousand tries before he developed a commercially viable light bulb. (Incidentally, Edison, who had hearing problems and was bored by rote memorization, was labeled a misfit and dropped out of school at age twelve.)

The students we spoke with internalized that they were not cut out to be good students. And students live up to expectations—their own and those of their teachers. The frightening result of assuming that "smart" is something innate is that teachers actually change how they treat students when they are told how "smart" or "dumb" the students are. Feinberg (2004) reports:

> **One study at Columbia University took two groups of college students and asked them to act as teachers. In the first group, subjects were told that intelligence was fixed and innate; the second was told that intelligence could be cultivated. "What we saw bowled us over," said Carol Dweck, the Ransford Professor of Psychology at Columbia. "The fixed intelligence group really humored their underachievers, complimenting them as much as possible to make them feel good." But the teachers with the malleable intelligence mindset did something quite different. Instead of praising the children at every turn, Dweck found that teachers started meeting with the students, trying to diagnose what went wrong. "They felt it was worth thinking up every possible way to help that child improve." (p. 4)**

Up until now, school structures in the United States have thus reinforced that students are or are not smart. So-called smart students are given challenging curricula, and teachers expect good results. Other students are given lower-level work without being taught to think and reason. Their lack of ability to do so is then cited as evidence that they cannot learn at higher levels. Low expectations mean they never received rigorous instruction. But what if intelligence isn't fixed?

Resnick (1999) summarizes how research in cognitive science and social psychology is merging to provide an entirely different way of looking at intelligence. Cognitive science concludes, "Intelligence is the habit of persistently trying to understand things and make them function better. . . . Intelligence is knowing what one does (and doesn't) know, seeking information and organizing that information so that it makes sense and can be remembered" (p. 2). Think how different this is from the comments of the at-risk adolescents who believed that smart meant instantaneous knowing!

Whether students think intelligence is innate or that effort creates ability actually changes how they tackle tasks. Dweck and Leggett (1988) studied changes in the cognition, affect, and behavior of children as they moved from tasks they could easily succeed on to those that were far more difficult. They noted two patterns: mastery oriented and helpless. If anything, the helpless children were slightly more proficient at the tasks everyone could do easily. However, when the work grew difficult, they did the following:

- Quickly attributed their failures to personal deficits in intelligence, memory, or problem-solving ability
- Complained of being bored, hating the task, or having anxiety even though they'd enjoyed the first tasks

- Made comments unrelated to the tasks (more than two-thirds of them), such as altering the rules, or bragging about sports or how much money they had, apparently wanting to otherwise feel successful
- Lapsed into ineffective problem-solving methods instead of continuing with the mature, useful strategies they'd used on the easier problems

In contrast, the mastery group:

- Verbalized to themselves such comments as, "I'll have to keep trying" or "This one takes more concentration"—they viewed the problems as challenges to master.
- Made optimistic statements (two-thirds of them), such as "I did it before, I can do it again," or "I'm almost there."
- Stayed positive and enjoyed the challenge
- Increased the complexity of the strategies they tried even if they failed to solve the very last problems

In other words, the students who think that effort creates ability keep putting in effort. Those who believe that ability is fixed see no point in trying. The good news is that teachers can create classroom atmospheres in which students learn that effort creates ability. Saphier (2005, p. 97) chronicles the beliefs that need to change, as shown in the following table.

In an ability-based atmosphere . . .	In an "effort creates ability" atmosphere . . .
Mistakes are a sign of weakness.	Mistakes help us learn.
Speed counts—faster equals smarter.	Care, perseverance, and craftsmanship count.
Good students do it by themselves.	Good students need help and a lot of feedback.
Inborn intelligence is the main determinant of success.	Effort and effective strategies are the main determinants of success.
Only the bright few can achieve at a high level.	Everyone is capable of high achievement.

The good news is that students can be taught to put in the kind of effort that creates ability. Saphier (2005) suggests focusing on the following with students, based on a model developed by Jeff Howard of The Efficacy Institute (www.efficacy.org):

- Do students understand the *time* and effort required for quality work?
- Are students able to *focus* on work? What skills could we help them develop in this area?

- Are students *resourceful* when they need help? Do they know where to go and who to ask?
- What *strategies* do they have for academic tasks?
- Do they seek and accept *feedback?* Do they use it to improve their performance?
- Are they *committed* to trying hard?

Being willing to try may be the hallmark of those who know that effort creates ability, but that hard work must pay off. Teachers need to design tasks so that students succeed. That success then embeds the belief "If I work hard, I can do it."

In the popular book *Outliers: The Story of Success,* Malcolm Gladwell (2008) probes how effort, ability, and culture interact to produce greatness. In fact in most endeavors, hard work is more important than talent. He documents how seven thousand more hours of practice differentiates piano virtuosos from piano teachers. Breakout musical groups like the Beatles put in ten thousand hours of practice before anyone heard of them. Bill Gates, founder of Microsoft, had logged more hours of programming by the age of fifteen than most professionals and eventually dropped out of Harvard to start his own company.

Gladwell devotes a chapter to learning mathematics, describing how cultures differ in their attitudes toward math. In some cultures, such as the United States, the prevailing attitude is that you either are or are not good at math. In others, including most Asian cultures, the prevailing attitude is that anyone can learn math if they work hard.

He cites the work of Alan Schoenfeld, a professor at Berkeley, who through filming students found that math is not so much ability as attitude. Students mastered mathematics concepts if they were willing to try. Gladwell (2008) summarizes:

> **Schoenfeld attempts to teach his students that success is a function of persistence and doggedness and the willingness to work hard for twenty minutes to make sense of something that most people would give up on after thirty seconds. [Get students to persevere] in a classroom, and give them the space and time to explore mathematics for themselves, and you could go a long way. (p. 246)**

He compares this attitude to cultures around the world. Many Asian cultures are grounded in rice patty farming; farmers there say, "No one who can rise before dawn 360 days a year fails to make his family rich." Growing rice takes almost three times the effort of corn or wheat, where fields sit dormant for months. Machinery is no substitute for manual labor in that delicate environment, yet the labor brings a direct return of higher yields. Effort is worth it.

An interesting correlation exists when one looks at performance on the Trends in International Mathematics and Science Study (TIMSS) test. Countries with students who have the patience

to fill out the 120-question general information before the mathematics questions are the ones with the highest scores on the test. Gladwell (2008) summarizes:

> **Think about this another way. Imagine that every year, there was a Math Olympics in some fabulous city in the world. And every country in the world sent its own team of one thousand eighth graders . . . we could predict precisely the order in which every country would finish in the Math Olympics without asking them a single math question. All we would have to do is give them some task measuring how hard they were willing to work. (p. 248)**

In other words, effort creates ability. Every goal worth pursuing (for example, career, relationships, or moral strivings) at some point poses risks or perceived barriers. Our students need to believe that "Smart isn't something you are, but something you get," if they are to be successful in and out of the classroom.

References

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