Recognizing Neglected Strengths

From Alaska to Kenya, research shows that students in underrepresented minority groups have culturally relevant knowledge and diverse cognitive abilities that schools can use to promote learning.

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Several years ago, when I was visiting the University of Alaska in Fairbanks, a great debate was raging about how to improve achievement for native Alaskan students. Elementary and secondary school teachers typically found students in Eskimo villages to be slow learners. Multiple efforts to improve their achievement had failed.

Similar stories exist about students in other underrepresented minority groups, leading some people to conclude that these students lack the abilities needed for school success. But do they?

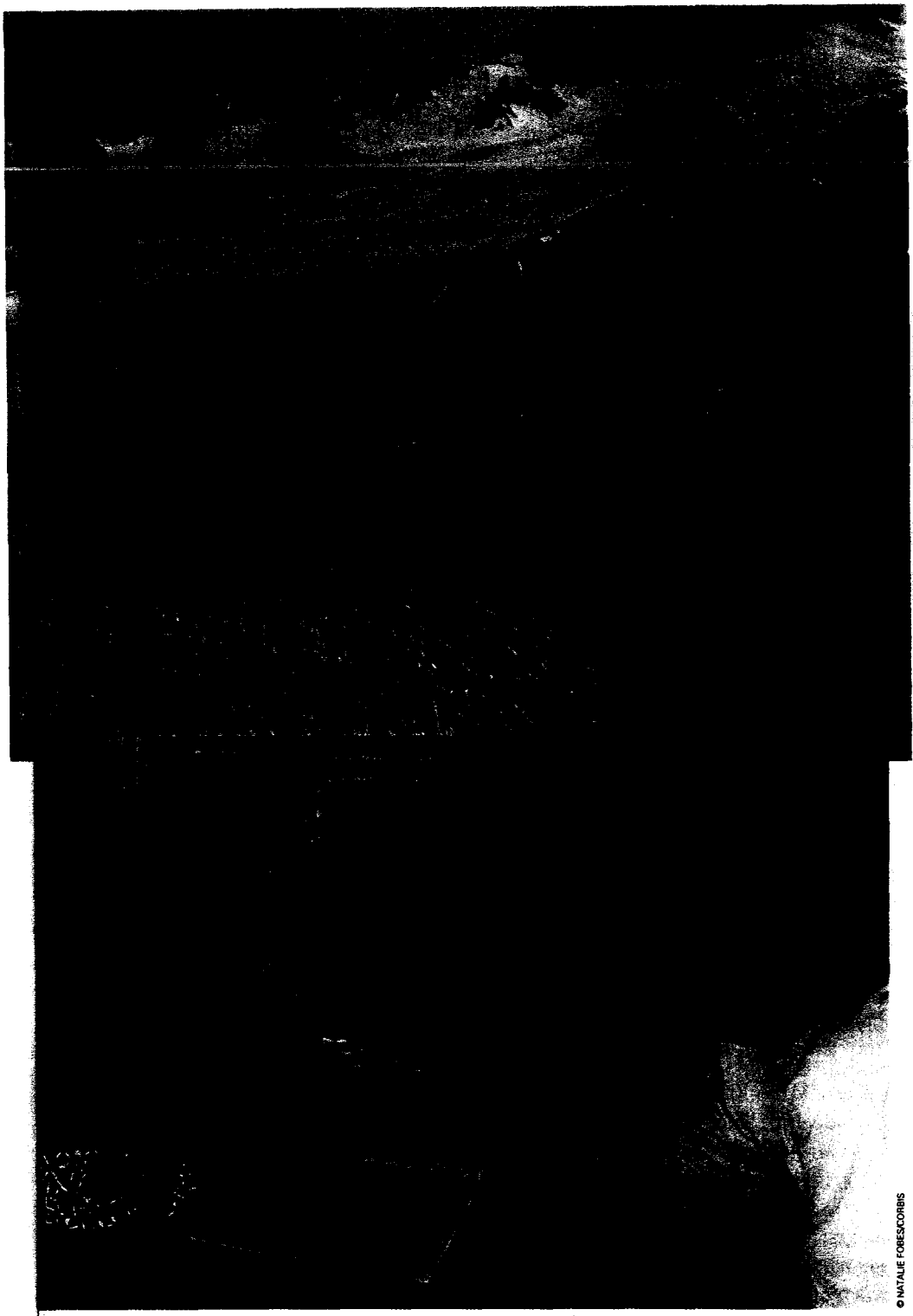
Practical Knowledge and Skills

Studies in Alaska

A group of colleagues and I decided to find out (Grigorenko et al., 2004). Our hypothesis was that children from nonmainstream cultures often bring to school the kinds of knowledge and skills that are relevant to their lives and upbringing. Their teachers, however, fail to recognize this adaptive knowledge. Instead, they assume that the students have other, more school-relevant kinds of background knowledge—and thus they fail to provide the scaffolding the students need to build further learning.

Note that I say *kinds*, not *levels*. The students actually may have quite sophisticated levels of knowledge and skills—just not the kinds that their teachers understand. We were told, for example, that many Alaskan Eskimo children are able to travel in the winter from one village to another across miles of frozen tundra on a dogsled. If you or I attempted the same journey, we would not reach our destination alive. We would soon become lost in the hundreds of square miles of frozen tundra that would all look the same to us, and we would perish.

To find out how this kind of adaptive knowledge relates to students' test performance, we assessed the practical knowledge and skills of 261 students in grades 9–12 in southwestern Alaska. The students were from seven different communities: Akiachak, Akiak, Dillingham, Manokotak, New Stuyahok, Togiak, and Tuluksak. All of these communities are small, rural, primarily Yup'ik Eskimo villages, except Dillingham, which is urban (by Alaskan standards). Items in the assessments measured the students' adaptive



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Students from nonmainstream communities had adaptive knowledge and skills that didn't show up on standard achievement measures.

knowledge of such subjects as herbs, fishing, hunting, folklore, and survival. For example:

> When Eddie runs to collect the ptarmigan that he's just shot, he notices that its front pouch (balloon) is full of food. This is a sign that
>
> (a) There's a storm on the way. (correct)
>
> (b) Winter is almost over.
>
> (c) It's hard to find food this season.
>
> (d) It hasn't snowed in a long time.

> Uncle Markus knows a lot about hunting wolverines. He is most likely to catch a wolverine when he sets his trap
>
> (a) On a slanted tree. (correct)
>
> (b) In the hollow of a dead tree.
>
> (c) Far from any water.
>
> (d) Near a frozen river.

We based the content of the assessment items on extensive interviews with Yup'ik Native Americans. There are three things of note about the items. First, the items use the same form as items on any standardized test—they're written, objective, and multiple-choice. Second, the items are probably difficult, at least for you and me. They were not particularly difficult for the rural Alaskan students whom we tested. Third, the items are relevant to the conditions in rural Alaskan fishing villages. One might disparage the items as *only* relevant to life in these villages, but that is the environment in which these students lived. If you lived in such an environment, this knowledge would be relevant to you, and many of the bits of knowledge that now seem vital—and to the people who create standardized tests—might seem quaint indeed.

The test results showed that the semi-urban students in Dillingham significantly outperformed the rural students on a standard measure of academic knowledge and skills, but the rural students significantly outperformed the semi-urban children on our practically oriented measure. In other words, simple score comparisons—saying that one group performs better on tests than the other—fail to take into account the complexity of the situation. Which students do well depends on what we test.

This study established that students from nonmainstream communities had adaptive knowledge and skills that

don't show up on standard achievement measures. To find out whether teachers could build on these adaptive skills to improve students' instructional outcomes, we initiated a mathematics curriculum project involving 6th grade students from seven communities in Alaska (Sternberg, Lipka, Newman, Wildfeuer, & Grigorenko, in press). A total of 196 students in eight classes were taught with a curriculum based on Alaskan culture using fish racks, an important element of the students' everyday environment. These rectangular racks, used to dry fish, served as the basis for lessons on area, perimeter, and the relationship between the two. In five other classes, 55 students were taught the same subject matter using the conventional textbook-based curriculum.

In addition to memory-based items, our assessment contained items to measure the students' performance in three areas that are essential for *successful intelligence* (see Sternberg, 1997): analytical, practical, and creative (see fig. 1). Assessment results revealed superior instructional outcomes in the fish-racks (experimental) group in all four areas. In other words, capitalizing on students' cultural strengths improved their achievement.

A Study in Kenya

Some might think that our findings would apply only to native Alaskan students. Not so. In another study (Sternberg et al., 2001), we tested rural Kenyan students on knowledge that is particularly relevant to *their* environment. We were interested in their knowledge of natural herbal medicines used to combat parasitic illnesses; in the communities we studied, more than 95 percent of the children were infected with malaria, hookworm, whipworm, and so forth. The following is a typical item from our test of adaptive knowledge and skills:

> A small child in your family has homa. She has a sore throat, headache, and fever. She has been sick for three days. Which of the following five Yadh nyaluo (Luo herbal medicines) can treat homa?
>
> (a) Chamama. Take the leaf and fito (sniff medicine up the nose to sneeze out illness). (correct)
>
> (b) Kaladali. Take the leaves, drink, and fito. (correct)
>
> (c) Obuo. Take the leaves and fito. (correct)
>
> (d) Ogaka. Take the roots, pound, and drink.
>
> (e) Ahundo. Take the leaves and fito.

The students did quite well on this objective, multiple-choice test. You and I would probably score at chance. We also gave the students standard tests of academic skills and knowledge. We found that the better the students did on the practical test, the *worse* they did on the academic tests. The cultures of these villages did not primarily associate success with school-based performance, but with performance in valued community activities, such as treating people with parasitic illnesses. Once again, the students' strengths were not reflected in conventional tests.

FIGURE 1. Sample Test Items to Assess Students' Geometry Learning

Memory

A square has four sides that are the same length. Circle the answer that shows how you would calculate the distance around the outside of a square.

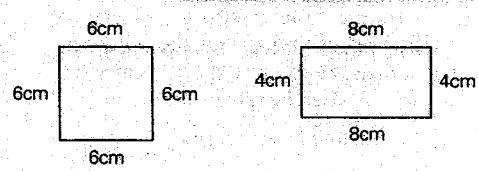
a. $y - y + y - y$
b. $y + y + y + y$
c. $y \times y$
d. $y + y - y$

Analytical

You have two pipe cleaners of the same length. Make a circle with one and an oval with the other. Which shape has the larger area? Why?

Practical

You can have the square piece of your favorite chocolate bar or you can have the rectangular piece. Circle the piece that will give you the most amount of chocolate.



Creative

Young children learn new words best when there is a picture or a symbol for them to remember. You want to help children remember the new word *area*. Come up with a symbol or simple picture that helps young children remember what area is.

Diverse Cognitive Strengths

Our studies in Alaska and Kenya suggested that cultural knowledge, often neglected in traditional instruction, can make a difference in student achievement. The same principle applies to other groups of students and to other kinds of nonmainstream strengths.

We have tested our ideas with more typical populations of students in grades 4–12 in a range of subject areas—language arts, mathematics, science, and social sciences. In a first set of studies, we explored the question

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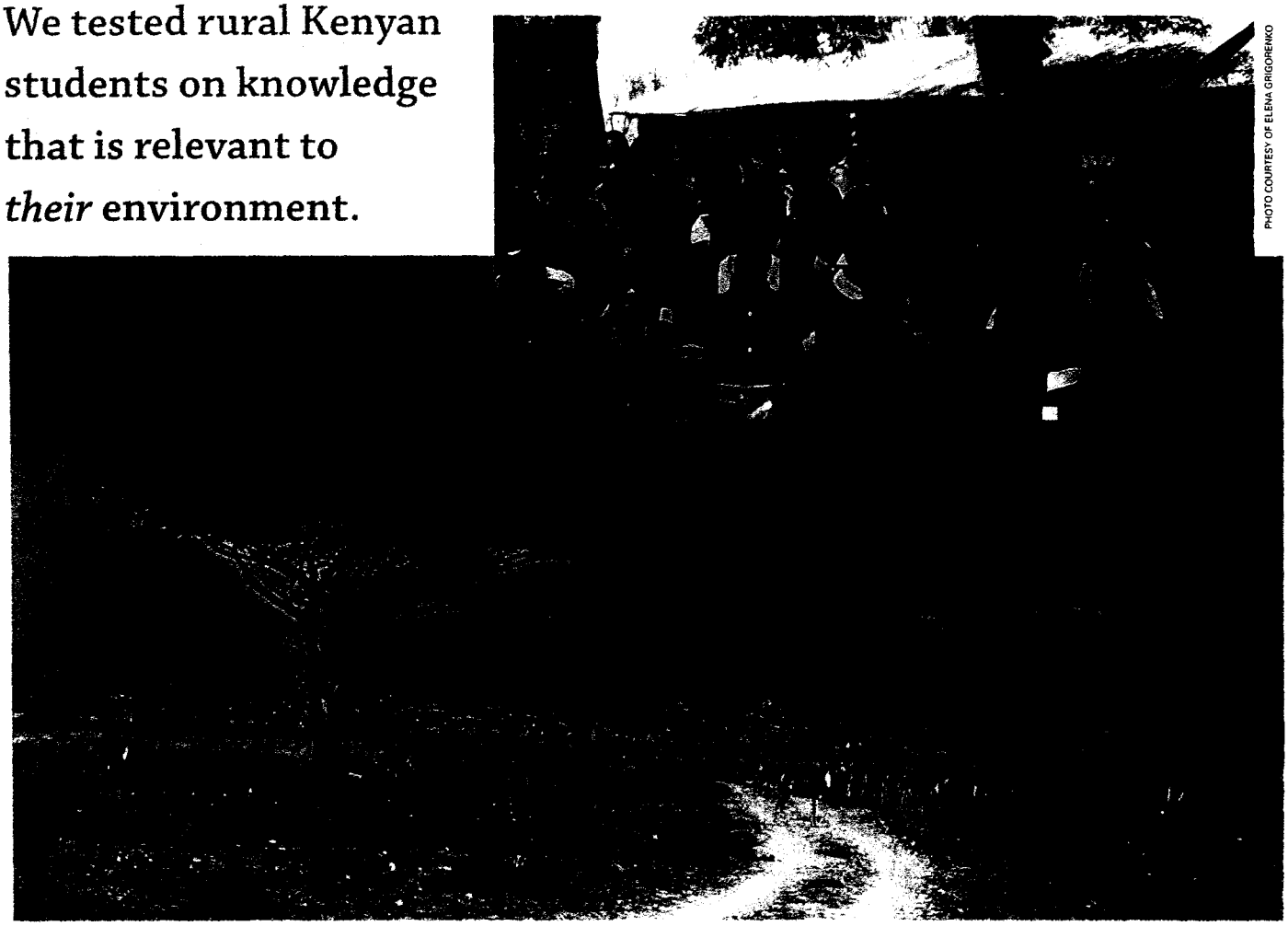

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of whether conventional instruction in school systematically discriminates against students with creative and practical strengths, and tends to favor students with strong memory and analytical abilities (Sternberg & Clinkenbeard, 1995; Sternberg, Grigorenko, Ferrari, & Clinkenbeard, 1999). In one study, we administered a test of analytical, creative, and practical skills to 326 high school students whom their schools had identified as gifted. Most of the students came from the United States; a small percentage came from South Africa (4 percent) or other countries (2 percent). We invited them to attend a summer program at Yale University in college-level psychology and classified them into one of five ability groupings: high analytical, high creative, high practical, high balanced (high in all three abilities), or low balanced (low in all three abilities).

We randomly divided the students who came to Yale into four instructional groups so that each ability type was represented in each instructional group. Students in all four groups used the same introductory psychology textbook and listened to the same psychology lectures, but they attended different afternoon discussion groups that emphasized either memory-based, analytical, creative, or practical instruction. For example, the memory-based group might discuss the main tenets of a major theory of depression. Students in the analytical group might compare and contrast two theories of depression. In the creative group, students might formulate their own theory of depression. In the practical group, they might discuss how they could use what they had learned about depression to help a friend who was depressed.

We evaluated students in all four instructional groups through their performance on homework, a midterm exam, a final exam, and an independent project. We evaluated each type of work for memory, analytical, creative, and practical quality. Thus, we evaluated all students in exactly the same ways.

The results were clear: Students who participated in discussion groups that matched their pattern of abilities outperformed students who were mismatched. In other words, when we teach students in a way that fits how they think, they do better in school. Students with creative or practical abilities, who are almost never taught or

assessed in a way that matches their pattern of abilities, may be at a disadvantage in course after course, year after year.

A follow-up study (Sternberg, Torff, & Grigorenko, 1998) examined the social studies and science learning of 3rd graders and 8th graders. The 225 3rd graders attended school in a low-income neighborhood in Raleigh, North Carolina. The 142 8th graders were largely middle to upper-middle class, and lived in Baltimore, Maryland, and Fresno, California. In this study, we assigned students to one of three instructional conditions. In the first condition, they were taught the regular course, which emphasized memory (recalling, recognizing, identifying, and retrieving facts and concepts). In a second condition, students were taught in a way that emphasized analytical thinking (analyzing, critiquing, evaluating, judging, and comparing and contrasting). In the third condition, they were taught diversely, meaning in a way that emphasized analytical thinking as well as creative thinking (creating, imagining, and inventing) and practical thinking (applying, implementing, and putting into practice).

We assessed all students' performance for memory learning (through multiple-choice assessments) as well as for analytical, creative, and practical learning (through performance assessments). As expected, students in the diverse teaching condition (analytical, creative, and practical) outperformed the other students on the performance assessments. One could argue that this result merely reflected the way they were taught. Nevertheless, the result suggested that teaching for these kinds of thinking was successful.

More important, however, was another result: Students in the diverse teaching condition outperformed the other students even on the multiple-choice memory tests. In other words, even if our goal is just to maximize students' retention of information, teaching for diverse styles of learning still produces superior results. This approach apparently enables students to capitalize on their strengths and to correct or to compensate for their weaknesses, encoding material in a variety of interesting ways.

We extended these results to reading instruction at the middle school and high school levels. In a study of 871 middle school students and 432 high school students, we taught reading either through the regular curriculum or through a curriculum that emphasized analytical, creative, and practical skills. At the middle school level, reading instruction was explicit; at the high school level, it was infused into mathematics, physical sciences, social sciences, English, history, foreign languages, and the arts. In all settings, students who were taught analytically, creatively, and practically substantially outperformed students who were taught in standard ways (Grigorenko, Jarvin, & Sternberg, 2002).

When we teach and assess in ways that respect different strengths, students learn and perform better.

In some of our most recent research (Stemler, Grigorenko, Jarvin, & Sternberg, 2006), we modified Advanced Placement psychology and statistics tests to measure not only traditional memory and analytical learning, but also creative and practical learning. We found that when we included these additional types of items, score differences between ethnic groups decreased. In other words, different groups have somewhat

different styles of learning, on average, and when we teach and assess in ways that respect these different strengths, students learn and perform better.

Many Studies, a Common Principle

The studies described here, conducted in diverse locations and with diverse groups of students, suggest that many students have strengths that are unrecognized and neglected in traditional schooling. By becoming aware of those strengths and incorporating them into instruction, educators can boost student achievement. Whether we are talking about students whose cultural background differs from the mainstream or about students whose cognitive strengths diverge from the model commonly emphasized in schools, the same principle applies: Teaching to strengths works. EL

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