



Chrysalis



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Newsletter of the Cultural Validity in Assessment Project

♦ Spring, 2001

by Guillermo Solano-Flores

Our project, *Assessing the Cultural Validity of Science and Mathematics Assessments*, ultimately seeks to contribute to attaining equitable testing. We intend to determine whether thinking, communication, and learning styles inherent to culture influence how students interpret and respond to science and mathematics tests. We hope to learn how culture should be taken into account to produce fair tests. Using the notion of cultural validity to examine the quality of items from existing large-scale tests, we intend to see how students from different cultural backgrounds make sense of those items and how they relate their content to their everyday lives.

In our study, students complete a short test with two science and two mathematics items and a questionnaire on activities they engage in at school and outside school which may be related to the content of the items. We also interview some students individually and ask them to describe how they relate their everyday personal experiences to the content of the items. Since September of 2000, we have visited schools in Saipan (Commonwealth of the Northern Mariana Islands), Washington, Alaska, California, New York, and Washington D.C. in urban, sub-urban or rural settings. Participating students constitute a good sample of the rich ethnic mosaic of this country: Chamorros and Carolinians from the Pacific, Hispanics, Yupíks (Eskimos), Asians, African-Americans, Anglo-Saxons, and Haitians.

What do we expect to learn from this study? We hope to identify patterns in which culture and cognitive activities interact for students of the same cultural background. We want to determine whether students from different cultural groups exhibit different patterns in which they understand science and mathematics exercises and how those differences can account for performance score differences between cultural groups.

The implications of the study can be serious, as it may shed new light on how science and mathematics test items should be developed in a way that honors cultural diversity while measuring the same high standards desired for all students. We may learn, for instance, that new and improved methods for developing assessments should be created which would address more effectively the way in which items must be worded. These new methods would ensure that the imaginary situations and stories used with the intent to make an item

meaningful do not lay on flaky assumptions about student's experiences, lives and values.

From April through June, after collecting data from ten cultural groups, we will meet with elementary school teachers. They will score the students responses from the written test and will code the responses to questionnaires and interviews. All materials and students' names will be kept confidential.

During the summer, we will analyze the data, and will devote the last three months of the year to reporting our results to the National Science Foundation, our funding agency. We will also disseminate our results among teachers, school administrators, parents, educators, and researchers. During that final stage of the project, we will translate the results from our investigation into concrete actions for schools, and produce formal recommendations for decision and policy makers.

What does our study indicate thus far? Our preliminary observations reinforce the notion that personal experience strongly influences how students interpret items and respond to them. Students may use knowledge acquired through formal instructional experiences at school. However, the informal, first-hand experiences they have at home and within their communities shape the way they make sense of test items. Our preliminary observations also suggest that the way in which some science and math items are worded may in certain cases not work in favor of some students. That may be the case even if English proficiency is not an issue. For reasons yet to be determined, some students demonstrate different levels of competence in science and math depending on whether they are tested in a paper-and-pencil format or interviewed informally.

Because they are preliminary, these observations should be taken with caution. We cannot draw any formal conclusions until we reach the completion of our project. However, the results thus far speak to the relevance of culture as a factor that must be considered in the development of science and mathematics tests.

Suggested Readings

- Kusimo, P., Ritter, M.G., Busick, K., Ferguson, C., Trumbull, E., & Solano-Flores, G. (2000). *Making assessment work for everyone: How to build on student strengths*. San Francisco, CA: Regional Educational Laboratories.
- Smith, G. Pritchey. (1998). *Common sense about uncommon knowledge: The knowledge bases for diversity*. Washington, DC: AACTE Publications.

Article:

Reflecting on Math Assessment Interpretation

by Ursula Sexton

The December 2000 issue of the National Council of Teachers of Mathematics (NCTM) News Bulletin had an excellent article about NAEP (National Assessment of Educational Progress) assessments, and how to best interpret NAEP published results.

Teachers and administrators alike are fully aware of the public's confusion due to apparently opposing reports on mathematics student achievement given by the media. For example, one NAEP report showed significant improvement in mathematics on behalf of U.S. students in the 1990's, while another study showed little gain. Unfortunately, a well-established system to educate parents on large-scale assessment issues does not exist. In addition, teachers often face very limited time and support to become well versed in the implications of those assessments and the interpretation of the results they render.

Teachers are aware that mandated large-scale assessments are only a single snapshot of their students' abilities. Conveying this message to the general public requires access to information such as the brief in the NCTM News Bulletin. As the present accountability driven system focuses its attention on student achievement, it is important for teachers and administrators to have a clearer understanding of the implications of assessments on policy making, and, most importantly, on teaching practices. They should also stress the importance of using multiple measures to more accurately evaluate student achievement.

NAEP is a federally-mandated survey on student achievement in the areas of geography, writing, mathematics,

science, U.S. history, the arts, and other academic subjects. It has informed the nation on the progress of our students' education since 1969. There are three NAEP assessments: Trend, National and State NAEP. It is important to identify them correctly, since each has different objectives, criteria, content, and target sample groups.

The Trend mathematics NAEP assessment looks at changes over the years. It compares student performance on the same set of items taken by students of ages 9, 13 and 17, since 1973. Its content focuses on basic facts, measurement formulas, use of whole numbers, decimals, fractions, percentages, and integers. Its intent is to mainly assess reasoning processes via multiple-choice questions. The National NAEP, given to students in grades 4, 8, and 12, has a different set of items each time it is given, and the content varies with the current national standards at the time of development. Finally, the State NAEP is based on replications of National NAEP items released at the state level, for comparisons only between 4th and 8th grade level students within and across states. It also reflects the content of more recent frameworks of mathematics and changes through time.

Both the National and State NAEP content focus on five identified mathematical strands: 1) number sense, properties and operations; 2) measurement; 3) geometry and spatial sense; 4) data analysis, statistics, and probability; and 5) algebra and functions.

Since each type of NAEP assessment has a specific set of uses and characteristics, the results of the National, Trend, and State NAEP assessment may seem confusing or conflicting. For

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What's on the Web:

Cool Science

by Brittany Jones

Dinosaurs On Your Computer Screen

How did dinosaurs walk? What kinds of sounds did they make? This Discovery Channel site is a great one for kids interested in learning these facts, and some of the latest findings on dinosaurs. There are video clips of dinosaur movement, sound bites of what scientists believe dinosaurs sounded like, dinosaur models, pictures of dinosaur babies, discussions on the latest fossil finds, and theories for dinosaur extinction.

The site is full of cool facts including pictures of a model of what is believed to be the largest dinosaur, which was 130 feet long! On the main page of this site is *Valley of the T. Rex*—an article about a current project in Montana and the finding of a preserved T. Rex skeleton. The article's language is a bit advanced for the general public, but is still presented in a way

that makes the facts fun. You can even “meet” the dinosaur hunter.

Don't miss the video *Walking With Dinosaurs*, which discusses the climate during the different periods in dinosaur history. A worthy resource for any unit on dinosaurs, this site is easy to navigate and designed for kid use but definitely holds information that is valuable to educators.

To view the video clips, your computer must have Flash plug-ins. <http://dsc.discovery.com/stories/dinos/dinos.html>

Book Review:

by Christine Celio

The Spirit Catches You and You Fall Down: A Hmong Child, Her American Doctors and the Collision of Two Cultures
Anne Fadiman
Noonday Press, 1997, 288 pp.

Cultural misunderstanding is the subject of this book, the recipient of the National Book Critics Circle Award, which has earned outstanding praise from authors and book critics alike. Anne Fadiman writes about good intentions and cultural misinterpretation through the tragedy of Lia Lee, a sick Hmong girl, her immigrant family, and the medical community struggling to help in their town of Merced, California.

The book begins by telling the reader that when Lia Lee was three months old, she had her first seizure. Her parents understood that, because of a slammed door, her soul had fled her body and become lost. This is known among the Hmong as *quag dab peg* (the spirit catches you and you fall down). The doctors in her town, however, diagnosed this as epilepsy and decided that the best treatment for her was medication. Her parents preferred to combine their Hmong folk remedies, which tried to coax her wandering soul back to her body, with the Western medicine prescribed.

The next four years are documented in this book, which analyzes the crucial cultural differences and linguistic

miscommunication that resulted in more extreme stages of her illness. Fadiman discusses the history of the Hmong in their native country and their situation as immigrants as they entered the United States. Understanding the history and culture of the Hmong people gives the reader a better grasp of the conflict occurring in the little town of Merced and how it can be seen as much more than just the story of a family somewhere in America. This story illustrates the negative consequences of cultural misunderstanding to all involved: those receiving services (in this case, health services), the service providers, and their surrounding community.

This book is a case study with commentary and history infused into it. It does not provide answers for the intense issue of cultural misunderstanding, but it does give the reader ideas on where to start. The book concludes with questions and subjects for discussion, with the hope that greater understanding will occur by awareness and dialogue.

The Spirit Catches You and You Fall Down is an outstanding book for anyone interested in the problematic issues that can occur when there is diversity in a community without true cultural understanding. It is not only a commentary on the medical profession. Teachers, social workers, and all types of service providers can also benefit from Fadiman's perspective and ideas.

What's On the Web:

Resources

by Brittany Jones

Making Schools Work for Every Child

In today's diverse classrooms, it is extremely important to address the various needs of students to ensure educational equity. However, how can we go about addressing these needs when class time is limited and there is a considerable amount of information to get across to students?

This website, created by the Eisenhower National Clearinghouse for Math and Science Educators, addresses the equity questions and concerns of educators, and provides information on how to best meet the needs of underserved students. The site's clear roadmap guides you through the site, providing links to articles, discussion lists and research project lists on equity issues. The site also has stories of classroom practices, and photos and videos to demonstrate these strategies.

On the side bar are topics such as Assessment, Math and Science Instruction, Equity, and Professional Resources where you will find projects, articles written by teachers about their personal strategies, and further resources. Click on Stories and Cases in the Equity section for vignettes on equity issues from the book "How Would I Handle That?," on *Real World Math and Science* for ideas for hands-on science lessons, or on *Assessment* for articles on teacher assessment practices used in classrooms. Another original feature is the section describing activities to make the school a part of the community.

This site is an excellent resource for science and math teachers concerned with addressing the needs of all students.
<http://equity.enc.org/>

**Reflecting on Mathematics Assessment Interpretation
(continued from page 2)**

The resources and references listed below can produce valuable information for initiating collegial discussion on NAEP assessment.

NAEP 1999 Trends in Academic Progress: Three Decades of Student Performance. Online as PDF file at:
nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000469

NAEP Web site:
<http://nces.ed.gov/nationsreportcard/mathematics/>

National Council of Teachers of Mathematics. *News Bulletin*, December 2000, Vol. 37, Issue 5.

Results from the Seventh Mathematics Assessment of the National Assessment of Educational Progress. Edward A. Silver and Patricia A. Kenney, Eds. On-line at:
www.nctm.org/catalog

The Brookings Institute's report by the Brown Center on Education Policy. *How Well Are American Students Learning?* Online at:
www.brook.edu/gs/brown/bc_report/2000/toc.htm

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Chrysalis intends to provide teachers and schools with information on the progress of this research, along with useful information for practitioners of science and mathematics education in multicultural contexts.

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example, the Trend NAEP assessment addresses age groups, and it was reported by the Brookings Institute's Brown Center on Education Policy as not showing much student achievement gain in the 1990's. To properly interpret the results, we have to bear in mind that this test shows how students would perform if they were being taught in 1970. In contrast, the national NAEP mathematics assessment report showed substantial gains across all grades tested during the same period.

These findings led to the conclusion that although there was continued improvement, achievement did not move forward through the 1990's at a great pace.

The complexity of NAEP results underscores the importance of giving teachers the opportunity to learn about external assessments given to their students, and to have meaningful discussions about their interpretation. Shared information builds capacity in schools and promotes a professional community that applies new knowledge into their daily practices, dispels misinterpretations and assists in decision making.

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