

# Making Assessment Practices Valid for Indigenous American Students

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Educational assessment, as it is typically conducted in U.S. schools, does not successfully capture or build on potentially important content knowledge and understanding of Indigenous students. In fact, current policies (such as the No Child Left Behind Act, 2002) are interfering with the implementation of many of the things we know about making assessments appropriate for Native students. This paper draws from the authors' extensive experience working with Indigenous teachers and communities to discuss how their well-developed ways of knowing, learning, and problem solving can be understood and utilized in the analyses of student processes and products. The paper explores some of the cultural perspectives and culture-related strengths exhibited by Indigenous learners and shows how awareness of them can lead to a reduction in bias and inequity in assessment. It also explores the issues in the context of some of the historical and sociocultural factors that have affected the schooling of American Indians and Alaska Natives. Suggestions are offered regarding research that could contribute to identification of strategies for improving educational outcomes for these students. New research would build on what we know to be effective and take cues from what has worked successfully for English language learners who face challenges similar to Native students.

## Introduction

Given the longstanding detrimental effects of testing policies and practices on the educational outcomes of countless Indigenous students (Chavers & Locke, 1989; Deyhle, 1987; Fox, 2000; Neely & Shaughnessy, 1984; Nelson-Barber & Estrin, 1995), finding ways to minimize testing biases and reveal students' strengths is a high research priority. Recent educational improvement efforts designed to establish clear and definitive standards of excellence for all students (No Child Left Behind Act, 2002), together with the Federal Government's commitment to excellence in Indigenous education (Executive Orders 13096 and 13270; Heine, 2002), ought to mean that schools are becoming better equipped to assure that all students make progress and meet rigorous academic standards. However, there is little evidence that these promises of higher standards of effectiveness in the classroom and greater teacher accountability are translating into more equitable opportunities for Indigenous children. We contend that an

educational system that increasingly relies on test-based accountability and confers on testing a major role as an indicator and promoter of educational change can itself marginalize students.

### **What the Research Shows**

A little over 10 years ago a series of commissioned reports and initiatives identified linguistic, cultural, and community-based components as markers of high-quality Indigenous education (Indian Nations at Risk: An Educational Strategy for Action, 1991; Final Report of the White House Conference on Indian Education, 1992; Native American Languages Act of 1990<sup>1</sup>). A decade later, an expansive literature review on Native student academic performance (Demmert, 2001) further defined elements fundamental to Indigenous students' success in school. Demmert found that the following were key means to improving the academic performance of Indigenous students: (a) maintaining linguistic and cultural congruence between home and school (cf., Lipka, Mohatt, & the Ciulistet, 1998), (b) educating students in their heritage language (cf., Ovando, 1994, Smith, 1998; Watson-Gegeo, 1989), and (c) using local knowledge and culture in the curriculum (cf., Barnhardt, 1999; Nelson-Barber, 2001; Watahomigie & McCarty, 1994) (In addition, see Alaska Native Knowledge Network, 1998; Lipka & Adams, 2004; Stiles, 1997). These same elements were also associated with (a) lowering dropout rates (Eberhard, 1989), (b) enhancing literacy skills (George & Just, 1992; McCarty, Wallace, Lynch, & Benally, 1991), (c) supporting interpersonal development (Smith, Leake, & Kamekona, 1998), and (d) increasing enrollment in college level courses—particularly in mathematics, science, and engineering (Alaska Native Knowledge Network, 1998).

One of the first quantitative studies to systematically document improved academic performance in a core content area using culture-based curriculum comes from longitudinal work conducted in rural Alaska (Lipka, 1994; Lipka, Mohatt, & the Ciulistet Group, 1998; Lipka & Adams, 2004). The research group composed of elders, local teachers, university faculty, and other researchers first developed mathematics curricula that explicitly connect pedagogy to Yup'ik Eskimo elder knowledge and local Yup'ik culture (Lipka et al., 1998). Via a quasi-experimental design with random assignment of students to different groups, researchers gauged impact on the basis of pretest and posttest score differences between groups. The tests were not standardized or published but, rather, developed by the research team. The study's outcome measures were the gain differences between scores on pretests and posttests per student.

Findings show that Yup'ik students who participated in instruction based on the treatment modules outperformed comparable groups of Yup'ik control students, who participated in instruction based on the regular math curriculum (Lipka & Adams, 2004). The results are even more remarkable, considering that the project tests were not, themselves, constructed in a culturally responsive manner. In fact, they look very much like the usual standardized tests. At the present time, the project is developing performance tasks that are culturally

responsive; and those instruments may well reveal greater learning differences between treatment and control groups.

Given current political and fiscal realities, these students will most certainly also be evaluated on the basis of standardized tests. Of course, it is not yet known what such standardized tests will yield following student experience with the treatment curriculum. Nevertheless, it is clear that even if students are judged according to standardized tests, this work offers great promise for further development of educational approaches that are rooted in the learning and problem-solving traditions of Indigenous cultures.

### **What Are the Implications for Assessment?**

If, in fact, the use of local wisdom, recognition of culture, and active involvement of community are mainstays in the established standards of educational practice in Indigenous communities (and contribute to student success), why is this understanding not applied to the realm of assessment? Are we confident that test developers have broad enough understandings of Indigenous students' ways of knowing to enable them to construct appropriate assessments? Do those who administer the tests have adequate preparation to make appropriate use of local knowledge in the assessment process? Are they able to recognize excellence when students demonstrate their learning in unfamiliar ways? For that matter, do program evaluators have the skills to engage in crosscultural evaluation so that judgments about what works for Native students are valid (Nelson-Barber, LaFrance, Trumbull, & Aburto, 2005)?

Also, one must ask whether the standards themselves and the ways achievement are typically judged are culturally congruent with Native communities' values regarding the education of their children (Demmert, 2005; Nelson-Barber & Estrin, 1995). For instance, Gordon (1992) has argued for developing "assessment procedures [that] are a more appropriate reflection of the ways in which people think, learn and work" (p. 2), which would more accurately "reflect the life space and values of the learner" (p. 6). It is not just the inappropriateness of the tests themselves but also the ways they affect the entire educational process that must concern researchers and educators of Native students. The unfortunate outcome of the NCLB legislation may well be that educators of Native students move further away from culturally congruent curriculum, instruction, and assessment rather than increasing their use—despite all the evidence of their value and despite the intent of Executive Orders 13096 (1998) and 13270 (2002). What can be done, then, to assure that assessment and evaluation practices are valid and academically rigorous for Indigenous students?

### **Incorporating "Cultural Validity" as a Core Concept in Assessment**

This is precisely the question that prompted Solano-Flores and Nelson-Barber (2001) to propose that "cultural validity" in assessment development and testing practices be recognized as a core component of validity, much as test use (consequential validity) has become (Messick, 1989). Following Vygotsky

(1978), Solano-Flores and Nelson-Barber argue that because sociocultural groups create meaning from experience in culturally determined ways, “individuals have predisposed notions of how to respond to questions, solve problems, and so forth. It follows that these predispositions influence the ways in which students interpret material presented in tests and the ways in which they respond to test items” (p. 554). The Solano-Flores and Nelson-Barber study investigated ways in which the thinking, communication, and learning styles inherent to students’ cultures influenced how they interpreted and responded to standardized test items.

Four cultural groups participated in the study: Chamorro and Carolinian students from the Commonwealth of the Northern Mariana Islands; Yup’ik students from rural Alaska; and immigrant Latino students from rural Washington State. All were administered one item from a set of two mathematics and two science items selected from the pool of released items of the National Assessment of Educational Progress issued in 1996 (National Assessment of Educational Progress, 1996). The mathematics items involved basic computational and problem solving skills. The science items came from the Earth and Physical Science disciplines. After they responded to the items, students were interviewed individually to elicit information on how they related each item’s content to various contexts of their personal experiences and daily lives, as well as how these contexts may have influenced the reasoning and strategies used to complete the item.

Results show that *students’ demonstrated competence depended on the match between the demands of a task, the context in which it is embedded, and the culturally developed skills of the learner*. The authors assert that current approaches to assessment do not consider “how these sociocultural predispositions influence student thinking” (Solano-Flores & Nelson-Barber, 2001, p. 554). Many teachers of Indigenous children would agree. On the one hand they believe strongly that linking instruction to their students’ cultures and ways of knowing can be critical to student success. On the other hand they question whether existing tests as they are currently designed can elicit their students’ knowledge (Deyhle, 1987; Nelson-Barber, Trumbull, & Wenn, 2000). When assessment is not congruent with curriculum and instruction, it cannot produce valid inferences about student learning.

We want to be sure that test developers and educators develop deep understanding of how to capture what is critical for students to know and be able to do in particular content areas and an ability to specify how well students must perform to be considered content proficient (Nelson-Barber, 1999). This means first defining precisely what the critical domain knowledge and skills are and considering what students’ linguistic, cultural, ethnic, and racial diversity mean for selecting content and instructional approaches across all subject areas. It also means having an understanding of what promotes or hinders achievement for students from different backgrounds. And, when educators do appropriately bring in historical content or implement culturally congruent pedagogy, it means having the confidence that all students will have “fair” opportunities to “show what they

understand about the construct[s] being tested” (Lawrenz, Huffman, & Welch, 2001, p. 280). If students are to have such opportunities, testing must take into account students’ ways of knowing and demonstrating their knowledge (Solano-Flores & Trumbull, 2003; Swisher & Deyhle, 1992).

Thus this paper centers on the need for quantitative and qualitative studies on the development of culturally valid assessment instruments and culturally valid assessment practices. New methods of assessment development and the resulting instruments must be tested appropriately to determine what is effective and valid for students in various settings—and for subpopulations within those settings. For example, local assessment development, rather than adaptation of existing assessments, is one way of beginning to address cultural validity (Solano-Flores, Trumbull, & Nelson-Barber, 2002). As we discuss below, assessment itself is inherently cultural; thus achieving cultural validity in assessment requires attention to all aspects of assessment, from test design through test score use.

### **The Cultural Nature of Assessment**

Assessment is a cultural process, like all other aspects of schooling. Whether it takes the form of a standardized test, an informal oral quiz, or an observation of a student performance, assessment is associated with culture-based assumptions about how it should be conducted and how students should participate. We do not intend to overgeneralize, as Native peoples are not all the same and there are certainly individual differences within any Native group. Still, a number of observations bear mentioning. For example, the assumption that a student should respond to questions to which the teacher already knows the answer is not held by school-age children in all cultures (Heath, 1983). To go a step further, studies in some Indigenous contexts conclude that many students will not respond to questions at all (e.g., More, 1989; Rhodes, 1988). Such accounts of Native students’ seeming reluctance to participate verbally in the classroom often cause outside observers to characterize them as nonverbal or “silent” (e.g., Dumont, 1972). Certainly educators need to learn more about local norms of communication in their students’ communities. However, in addition, McCarty (2002) suggests that Native students’ silence may be attributable to the fact that “the only available models for questioning and ‘speaking up’ were the silencing practices of Federal boarding schools” and, more recently, the scripted, right-wrong “dialogues of the TESL program and Basic Skills” (p. 138). She notes that an inquiry-based literacy approach that incorporated Navajo language and culture elicited high-level thinking and participation.

With regard to Native students, it has often also been observed that the inherent competitive frame of many forms of assessment diminishes their willingness to participate (Nelson-Barber & Estrin, 1995; Swisher & Deyhle, 1992). The heavy reliance on verbal demonstration of learning may not be culturally congruent for many Native students who have grown up in environments that prize the showing of knowledge through other means and respect for elders (including teachers) through silence.

Studies with Native students and those from other cultural groups have shown that the topic of a writing assessment can have a powerful influence on the quality and quantity of students' writing. Navajo students whose teachers integrated local standards with state standards and aligned curriculum and assessment through a portfolio process were able to engage in high-level literacy activities and demonstrate their learning successfully (Koelsch & Trumbull, 1996). The rubrics for scoring students' writing allowed teachers to evaluate writing proficiency from the perspectives of both Navajo and "school literacy" (Koelsch & Trumbull, p. 277). For example, a piece of writing that is viewed as a fictional product of the imagination from the perspective of "school literacy" may be viewed as a "cultural narrative" (Koelsch & Trumbull, 1996, p. 277) by a Navajo reader.

In a very different context, cultural insight on the part of a third-grade teacher allowed immigrant Latino students to demonstrate their writing skills better on a schoolwide essay test. When they were asked to write about "an experience with their family" in their classroom they produced essays that were longer, more elaborated, and more accurate in use of writing conventions (capitalization, punctuation) than when they wrote about "what it's like to be a good friend" (Trumbull, Diaz-Meza, & Hasan, in press). The school then adopted the new prompt for the following year's third-grade test.

### **Sources of Cultural Bias in Assessment**

Recent research and commentary on assessment development and use speak to the potentially broad range of biases introduced by large-scale assessment (see Hood, 1998; Rivera, Vincent, Hafner, & LaCelle-Peterson, 1997; Rodriguez, 1996; Solano-Flores & Nelson-Barber, 2001; Solano-Flores & Trumbull, 2003). Similar issues extend to classroom assessments, as teachers often use the principles and formats of large-scale, standardized models when they construct their own informal assessments (see Kusimo, Ritter, Busick, Ferguson, Trumbull, & Solano-Flores, 2000; Stiggins, 1997). The content of standardized tests has frequently been criticized on the grounds that it is more familiar to students from dominant-culture, middle-class households (see, e.g., Popham, 2001). In fact, it is not only content but also every aspect of assessment or testing that is prone to cultural bias. Table 1 summarizes the factors that can contribute to bias.

### **Minimizing Bias and Increasing Equity in the Assessment of Native Students**

Because of these kinds of concerns about the validity of standardized, norm-referenced or standards referenced tests, considerable attention has been paid to "accommodating" students' test-taking needs (Abedi, 2001; Abedi, Lord, Hofstetter, & Baker, 2001; Butler & Stevens, 1997). English language learners, who may be given extended time, access to dictionaries, or modification of the language, have been the primary beneficiaries of these methods. However, given the impact of the interaction of cognitive and sociocultural factors mentioned

Table 1  
Sources of Bias in Testing of Native Students

Source of bias	Examples
Test content	Tests that are created by textbook publishers or testing companies may include content that is unfamiliar or even offensive to some students (Popham, 2001). Content is not well matched to the actual curriculum of a given school, particularly if the curriculum draws heavily on local cultural wisdom, knowledge, and skills.
Test language	The language of test instructions and prompts is often unnecessarily complex, adding non-construct-related difficulty to test items (see Solano-Flores & Trumbull, 2003; Abedi, 2003). Native students who speak a “non-standard” dialect of English or who are in the process of acquiring academic English may not be familiar with some terminology commonly used on tests.
Test format	Some common formats (multiple choice and true/false, etc.) are less preferred by American Indian/Alaska Native students because they force a single answer rather than reflection and respect for more than one perspective (Macias, 1989).
Test administration	On-demand assessment may put Native students in the position of engaging in a trial-and-error approach to a task, whereas they have been socialized to attempt a task only when they believe themselves ready to perform well (Swisher & Deyhle, 1992). The timed nature of many tests may penalize students learning the language of school and/or whose cultures have an orientation to time different from that of the dominant culture (Haladyna, 1992; Shaw, 1994).
Test scoring	On short-answer and extended-response items, differences in language usage or spelling may be misinterpreted as errors of comprehension (Beaumont, deValenzuela, & Trumbull, 2002).
Test-score interpretation	Automated scoring cannot identify why a student responded as he or she did. Because of the inappropriateness of tests, students’ scores do not support the intended inferences about learning. When teachers score or grade assessments, they may fail to understand a student’s response because of differences in language and culture (Beaumont, deValenzuela, & Trumbull, 2002).
Test use	Decisions about program placement, course eligibility, grades, graduation, and the like should not depend on a single test outcome (Anastasi, 1990). The knowledge, skills, and understanding of “minority” students may be underestimated by tests designed for “mainstream” students; therefore standardized tests should always be complemented by other assessments, such as teachers’ observations and judgments.

above, it is clear that speaking English as a second language cannot be the only criterion that affects test performance. Standardized tests can lack validity for many students from non-dominant communities who do speak English as a first language. More important, accommodations do not address the fundamental concerns for cultural validity. What, then, can be done to avoid potential sources of bias and inequity in assessments? And how can understanding these elements contribute to improving educational outcomes for Indigenous students?

### Turning to the Wisdom of Local Culture

One way of thinking about a culture is as a community in which people tend to engage in certain practices in particular ways (Gutiérrez & Rogoff, 2003). This approach is more useful than thinking of members of cultures as having specific traits. By focusing on processes and activities, we can more readily understand how culture intersects with assessment.

Though not all Indigenous peoples have embraced formal western education, they have always considered the understanding of their own cultures and particular environments as indispensable to schooling (Szasz, 1999). Even through the times of forced assimilation, elders and other community members taught new generations the language skills, traditions, and knowledge of their peoples, employing the requisite cognitive tools to suit their local purposes. According to Resnick (1991), such “[c]ognitive tools embody a culture’s intellectual history; they have theories built into them, and users accept these theories” (p. 7). The experiential, hands-on education in a real-world context common to Native communities has built into it the opportunity for true, authentic assessment: High quality performance equates with survival.

It is useful to reflect on the ways that Native peoples traditionally gauged improved learning—ways that can be incongruous with widely accepted, more mainstream ways of demonstrating learning. In their comprehensive review of research on American Indian and Alaska Native education, Deyhle & Swisher (1997) give accounts of some of the cultural influences (including a group’s ethical values) on education in Native communities. For example, both adults and children are expected to maintain a respectful attitude toward any task. It may be considered disrespectful to attempt a task before one is relatively sure of doing it correctly. Consequently, Native children are accustomed to being given opportunities to learn privately and to practice on their own before performing in public; moreover, it is often the student who determines when he or she is ready to perform (Swisher & Deyhle, 1992). These are not cultural prescriptions, so to speak, but examples of the kinds of behaviors that can be misconstrued by those outside of these cultures.

Today, drawing on these strategies along with traditional approaches that emphasize cooperation and reflection in a meaningful context, elders and others continue to prepare younger generations for success in their own communities, helping them develop culturally based “funds of knowledge” (see Lipka et al., 1998; Moll, Amanti, Neff, & Gonzalez, 1992). It is interesting that these traditional educational strategies are remarkably similar to those promoted in current educational improvement efforts that “regard students’ culture-based experiences and ways of learning as resources for designing daily instruction that provide students with tools to address needs and solve problems of their own environment” (Trumbull, Nelson-Barber, & Mitchell, 2002, p. 2). Likewise, many assessment reformers have encouraged the use of methods, such as observation and portfolio assessment, that are embedded in or integrated with instruction (e.g., Hein, 1991; Koelsch & Trumbull, 1996; Mangione, 2004) in much the way that



Native parents and elders have used authentic situations as opportunities for assessing young people's learning.

### Paying Particular Attention to the Language of Testing

Some outcomes of research on the assessment of English language learners point to promising assessment modifications that educators of Native students should consider. The *Standards for Educational and Psychological Tests*, developed jointly by the American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education state that every assessment is an assessment of language (American Educational Research Association & American Psychological Association, 1999). There is no way to eliminate language completely from assessment practices, but there are ways to reduce its interference with the assessment of content knowledge. Research has shown that simplifying the language used on tests can reduce the performance gap between English language learners and native English speakers (Abedi, Leon & Mirocha, 2001). Simplification may be applied to vocabulary, grammar, or length of a prompt. However, caution needs to be taken to ensure that test developers not simplify the conceptual aspects of test items in the process of linguistic simplification.

Students whose academic-language proficiency (oral or written) is low struggle with language-heavy assessments, like many of the newer performance assessments (Kiplinger, Haug, & Abedi, 2000; MacGregor & Price, 1999). Recent research with large numbers of English language learners and native English speakers suggests that “the higher the English ‘language load’ in the assessment, the larger the gap between performance of LEP and non-LEP students” (Abedi, 2003, p. 4). For many Native students, learning the academic language of the school may be comparable to the task that English language learners face. They may have mastered everyday English but not the language of school. Some may speak another language at home, meaning that linguistically they cannot be treated as equivalent to native, monolingual English speakers when it comes to testing (Valdés & Figueroa, 1994).

The particular academic language of assessments—apart from the specialized vocabulary of a content domain—may, itself, be a source of what psychometricians call “measurement error.” Consider the vocabulary and syntax of a typical test item shown in Figure 1 below. If it is indeed true that the language of assessments is unnecessarily interfering with their validity, parallel research on modifying the language of assessments for Native students is something that ought to be undertaken.

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In my carpenter shop, I make only three-legged stools and four-legged tables. One day I looked at my day's output and counted 31 legs. How many tables and stools could I have completed that day?

National Assessment of Educational Progress, 1996

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Figure 1. A fourth-grade mathematics item.

### Using Cultural Experts to Score and Interpret Student Performance

Earlier (in Table 1), we alluded to the need for those who evaluate students' writing and other learning products to be schooled in the language and culture of the students. For interpretations of student performances to be valid, those evaluating performance results must know in great detail the contexts of students' learning and assessment, including previous experiences in and out of school; how students have been educated outside of school; the languages of learning in and out of school; student affect, motivation, and apparent effort; and the more immediate conditions surrounding the assessment itself, such as time allotted and teacher supports given. In addition, they must be knowledgeable about how students' home language or dialect may influence their actual spelling and grammar on an assessment (Beaumont, de Valenzuela, & Trumbull, 2002). Understanding the real meaning of a student's response to an assessment question—sometimes even a seemingly simple question—depends upon these kinds of knowledge. The following example underscores this fact.

In Chinle, Arizona, on the Navajo nation, Navajo teachers collaborated with non-Navajo teachers to design performance assessment tasks that were culturally valid (Koelsch, & Trumbull, 1996). Among these was the "Hero Task" which required fourth-grade students to write a fictional or nonfictional narrative about a "hero," who could be a well-known figure or someone the student knew. The narrative was to incorporate a visual, symbolic illustration (in the form of a mandala) of the hero's character traits. The activity was a personal extension of the class's reading of *Island of the Blue Dolphins* by Scott O'Dell.

The students' resulting narratives were evaluated in terms of both "school" literacy standards and Navajo storytelling standards. For example, "school" literacy proficiency would entail structuring a narrative with a beginning, middle, and end. Navajo storytelling proficiency would entail representation of Navajo values such as environmental awareness. Whereas state standards make a firm distinction between fiction and nonfiction, Navajo teachers stressed that a narrative that demonstrated genuine cultural knowledge—even though it was not a "true story"—was not considered fiction from their perspective. Rather, it was regarded as a *cultural narration* (Koelsch & Trumbull, 1996, p. 274). When Navajo teachers read their students' narratives, they read them from a bicultural perspective that valued both Navajo ways and school ways of being proficient.

This example illustrates how important context is in assessment—the context of children's past experience, the context of an assessment item, and the school context itself. In this case, the Navajo teachers are able to bring some of the context of children's past experience into the classroom and into the testing situation because they have an understanding of all of those contexts. Until assessment practices with Native students can be flexible enough to take into account the contexts of such students' lives, they will not meet a standard of cultural validity.

## Discussion and Conclusions

Concerns about the appropriateness of mainstream assessments and assessment practices are well-founded and heightened because of recent educational policies and legislation. Much is already known about what works for Native students, and that knowledge needs to be brought to bear on assessment. At the very least, caution should be exercised when interpreting the meaning of Native students' assessment performance. High-stakes decisions about grade promotion, graduation, or program eligibility must be made on the basis of more than one type of assessment, in part because of the wide range of influences that affect Native students' performance. In the best possible situation, the school staff would include Native teachers who can help non-Native teachers understand and judge student work. As in any community, continuous information flow between parents and teachers is also critical to understanding students' school performance.

Native communities have asserted renewed interest in culturally valid curriculum, instruction, and assessment. And, although the numbers of Native teachers are still small, there is increasing recognition that they, along with Native researchers and community members must be tapped as sources of important expertise if schools are to improve their capacity to teach Native students. By adopting a sociocultural orientation to understanding how Native students learn and know, educators can reflect more productively on classroom practices and their implications for Native students. Learning about the community, understanding the ways expectations of children are communicated, observing what children do at home—all are important for non-Native teachers (Teachers Panel, 1994).

We recognize the fact that even the most culturally responsive instruction and assessment will not automatically translate into academic success for Native students. As Spindler and Spindler (1990) note, "Cultural differences do not explain all aspects of minority/mainstream relations, for there are always economic and political factors that enter into the interaction. Nevertheless the cultural process is always present" (p. 79). These students still face the challenge of developing their own identity in the face of the multiple and sometimes conflicting demands of a highly complex social context (see McCarty, 2002). Mastering multiple cultures, alone, demands a great deal of time and energy, both in finite supply. However, even with these challenges, many Native students are thriving in programs that are based on culturally responsive curriculum, instruction, and assessment. And—fortuitously—the current climate of reform provides an opportunity for educators, policymakers, and test developers to reexamine old assumptions and develop new bases of knowledge from which to re-create instruction and assessment.

It is clear that research on new approaches to assessment design and use that consider the role of culture in learning and assessment are needed. Studies within specific Native communities need to be done. They stand to shed light on the processes that inhibit or promote valid testing practices with Native students and provide rich, contextualized examples to stimulate research in other kinds of communities.

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### Endnotes

<sup>1</sup>March 2003 Senate Bill 575 was introduced to amend the Native American Languages Act (Amendments Act of 2003) to include support for language nests (exemplified by the Maori in New Zealand) and language survival schools, and to demonstrate their positive effects on the academic success of Indigenous students.

<sup>2</sup>Babiche Cultural Exchange, "Mathematics in Cultural Context" Curriculum Development Project, Coalition of Educators for Native American Children, language immersion programs in the United States, Canada, Circumpolar North, affiliated territories and freely associated states in Micronesia, and New Zealand, the OERI-funded Center for Research on Education, Diversity and Excellence, the 7th Generation Project, among others.

### REFERENCES

- Abedi, J. (2001). *Assessment and accommodations for English language learners: Issues and recommendations* (Policy Brief No. 4.). Los Angeles, CA: National Center for Research on Evaluation, Standards, and Student Testing. Retrieved February 27, 2003 from [http://www.cse.ucla.edu/products/policy/cresst\\_policy4.pdf](http://www.cse.ucla.edu/products/policy/cresst_policy4.pdf).
- Abedi, J. (2003). *Impact of students' language background on content-based performance: Analyses of extant data*. Executive Summary (CSE Technical Report No. 603). Los Angeles: University of California, Center for the Study of Evaluation/National Center for Research on Evaluation, Standards, and Student Testing.
- Abedi, J., Leon D., & Mirocha, J. (2001). *Impact of students' language background on standardized achievement test results: Analyses of extant data*. Los Angeles: University of California, Los Angeles, National Center for Research on Evaluation, Standards, and Student Testing.
- Abedi, J., Lord, C., Hofstetter, C., & Baker, E. (2001). Impact of accommodation strategies on English language learners' test performance. *Educational Measurement: Issues and Practice*, 19(3), 16-26.
- Alaska Native Knowledge Network (1998). *Alaska rural systemic initiative: Year three annual progress report. December 1, 1997 -November 30, 1998*. Fairbanks: University of Alaska.
- American Educational Research Association, American Psychological Association, & National Council on Measurement in Education (1999). *Standards for educational and psycho-logical testing*. Washington, DC: American Educational Research Association.

- Anastasi, A. (1990). What is test misuse? Perspectives of a measurement expert. In *The uses of standardized tests in American education: Proceedings of the 1989 ETS invitational conference* (pp. 15-25). Princeton, NJ: Educational Testing Service.
- Barnhardt, C. (1999). *Kuínerrarmiut Elitmaurviat: The school of the people of Quinhagak. Case Study*. Portland, OR: Northwest Regional Educational Laboratory and Fairbanks: University of Alaska.
- Beaumont, C., de Valenzuela, J., & Trumbull, E. (2002). Alternative assessment for transitional readers. *Bilingual Research Journal*, 26(2), 241-268.
- Butler, F., & Stevens, R. (1997). *Accommodation strategies for English language learners on large-scale assessments: Student characteristics and other considerations* (CSE Technical Rep. 448). Center for the Study of Evaluation National Center for Research on Evaluation, Standards, and Student Testing; Graduate School of Education & Information Studies, University of California, Los Angeles.
- Chavers, D., & Locke, P. (1989, April). *The effects of testing on Native Americans*. Paper commissioned by the National Commission on Testing and Public Policy.
- Demmert, W. (2001). *Improving academic performance among Native American students: A review of the research literature*. Charleston, WV: ERIC Clearinghouse on Rural Education and Small Schools (ERIC Document Reproduction Service No. ED463917).
- Demmert, W. (2005). The influences of culture on learning and assessment among Native American students. *Learning Disabilities Research & Practice*, 20(1), 16-23.
- Deyhle, D. (1987). Learning failure: Tests as gatekeepers and the culturally different child. In H. Trueba (Ed.), *Success or failure* (pp. 85-108). Rowley, MA: Newbury House.
- Deyhle, D., & Swisher, K. (1997). Research in American Indian and Alaska Native Education: From assimilation to self-determination. In M. Apple (Ed.). *Review of Research in Education*, 22 (pp. 113-194). Washington, DC: American Educational Research Association.
- Dumont, R. (1972). Learning English and how to be silent: Studies in Sioux and Cherokee classrooms. In C. Cazden, V. John, & D. Hymes (Eds), *Functions of language in the classroom* (pp. 344-369). New York: Teachers College Press.
- Eberhard, D. (1989). American Indian education: A study of dropouts, 1980-1987. *Journal of American Indian Education*, 29(1), 32-40.
- Executive Order 13096, *American Indian and Alaska Native Education, August 11, 1998*. Retrieved March 6, 2003, from <http://www.ncele.gwu.edu/miscpubs/whitehouse/eo13096.htm>.
- Executive Order 13270, *Tribal Colleges and Universities, July 3, 2002*. Retrieved March 6, 2003, from <http://www.ed.gov/offices/OPE/TribalColleges/exec.html>.
- Fox, S. (2000, May). *Standards-based reform and American Indian/Alaska Native education*. Paper presented at national Indian Education Research Agenda Conference, Albuquerque, NM.
- George, C., & Just, A. (1992). *Enhanced student outcomes and valuable community resource: Evaluation results about California's Indian education centers*. Report prepared for the California Department of Education.
- Gordon, E. (1992). *Implications of diversity in human characteristics for authentic assessment* (CSE Technical Reports 341). National Center for Research on Evaluation, Standards, and Student Testing (CRESST), UCLA Graduate School of Education, Los Angeles.
- Gutiérrez, K. D., & Rogoff, B. (2003). Cultural ways of learning: Individual traits or repertoires of practice. *Educational Researcher*, 32(5), 19-25.
- Haladyna, T. (1992). Test score pollution: Implications for limited English proficient students. In *Proceedings of the second national research symposium on limited English proficient student issues: Focus on evaluation and measurement* (Vol. 2, pp. 135-163). Washington, DC: United States Department of Education Office of Bilingual Education and Minority Languages Affairs.

- Heath, S. B. (1983). *Ways with words: Language, life, and work in communities and classrooms*. New York: Cambridge University Press.
- Hein, G. E. (1991). Active assessment for active science. In V. Perrone (Ed.), *Expanding student assessment* (pp. 106-131). Alexandria, VA: Association for Supervision and Curriculum Development.
- Heine, H. (2002). *No Child Left Behind Act of 2001: Implications for the Pacific territories and freely associated states*. Honolulu: Pacific Resources for Education and Learning.
- Hood, S. (1998). Culturally responsive performance-based assessment: Conceptual and psychometric considerations. *Journal of Negro Education*, 67(3), 187-197.
- Indian Nations At Risk Task Force (1991). *Indian nations at risk: An educational strategy for action. Final Report of the Indian Nations At Risk Task Force*. Washington, DC: U.S. Department of Education.
- Kiplinger, V. L., Haug, C.A., & Abedi, J. (2000, April). *Measuring math—not reading—on a math assessment: A language accommodations study of English language learners and other special populations*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans.
- Koelsch, N., & Trumbull, E. (1996). Portfolios: Bridging cultural and linguistic worlds. In R. C. Calfee & P. Perfumo (Eds.), *Writing portfolios in the classroom: Policy and practice promise and peril* (pp. 261-284). Mahwah, NJ: Erlbaum.
- Kusimo, P., Ritter, M., Busick, K., Ferguson, C., Trumbull, E., & Solano-Flores, G. (2000). *Making assessment work for everyone*. San Francisco: WestEd.
- Lawrenz, F., Huffman, D., & Welch, W. (2001). The science achievement of various subgroups of alternative assessment formats. *Science Education*, 85(3), 279-290.
- Lipka, J. (1994). Culturally negotiated schooling: Toward a Yup'ik mathematics. *Journal of American Indian Education*, 33(3), 14-30.
- Lipka, J., Mohatt, G., & the Ciulistet Group (1998). *Transforming the culture of schools: Yup'ik Eskimo examples*. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.
- Lipka, J., & Adams, E. (2004). *Culturally based math education as a way to improve Alaska Native students' math performance*. The Appalachian Collaborative Center for Learning, Assessment and Instruction in Mathematics Series Retrieved 1/20/04 from [http://acclaim.coe.ohio.edu/rc/rc\\_sub/pub/3\\_wp/list.asp](http://acclaim.coe.ohio.edu/rc/rc_sub/pub/3_wp/list.asp).
- MacGregor, M., & Price, E. (1999). An exploration of aspects of language proficiency and algebra learning. *Journal for Research in Mathematics Education*, 30(4), 449-467.
- Macias, C. (1989, August). The role of Indigenous learning strategies. *Journal of American Indian Education*. Special Issue, pp. 43-52.
- Mangione, P. (2004, April). *Research-based curriculum-embedded assessment of children in a statewide child development system*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans.
- McCarty, T. L. (2002). *A place to be Navajo*. Mahwah, NJ: Erlbaum.
- McNeil, L. M. (2000). *Creating new inequalities: Contradictions in reform*. Phi Delta Kappan, 81(10), 720-734.
- McCarty, T. L., Wallace, S., Lynch, R. H., & Benally, A. (1991). Classroom inquiry and Navajo learning styles: A call for reassessment. *Anthropology & Education Quarterly*, 22(1), 42-59.
- Messick, S. (1989). Validity. In R. L. Linn (Ed.), *Educational measurement* (3rd ed., pp. 13-103). Washington, DC: American Council on Education and National Council on Measurement in Education.
- Moll, L., Amanti, C., Neff, D., & Gonzalez, N. (1992). Funds of knowledge. *Theory into Practice*, 31(2), 132-141.

- More, A. (1989, August). Native Indian learning styles: A review for researchers and teachers. *Journal of American Indian Education*, Special Issue, pp. 15-28.
- National Assessment of Educational Progress (1996). *Mathematics items public release*. Washington, DC: Author.
- Native American Languages Act of 1990, Pub. L. 101-477 (1990). Retrieved March 3, 2003, from [www.ncela.gwu.edu/miscpubs/stabilize/ii-policy/nala1990.htm](http://www.ncela.gwu.edu/miscpubs/stabilize/ii-policy/nala1990.htm).
- Neely, R., & Shaughnessy, M. (1984). *Assessments and the Native American*. Portales: Eastern New Mexico University, Psychology Department (ERIC Document Reproduction Service No. ED 273889).
- Nelson-Barber, S. (1999). A better education for every child: The dilemma for teachers of culturally and linguistically diverse students. In N. Simms and A. Peralez (Eds.), *Including culturally and linguistically diverse students in standards-based reform: A report on McREL's diversity roundtable 1* (pp. 3-21). Aurora, CO: Mid-continent Regional Educational Laboratory.
- Nelson-Barber, S. (2001). Exploring Pacific knowledge and classroom learning in Micronesia: The promise of "cultural considerations." In C. Park, A. Goodwin, & S. Lee (Eds.), *Research on the education of Asian and Pacific Americans* (pp. 41-54). Greenwich, CT: Information Age Publishing.
- Nelson-Barber, S. & Estrin, E. (1995). Bringing Native American perspectives to the teaching of mathematics and science. *Theory into Practice*, 34(3),174-185.
- Nelson-Barber, S., LaFrance, J., Trumbull, E., & Aburto, S. (2005). Culturally-responsive program evaluation. In S. Hood, R. Hopson, & H. Frierson (Eds.), *The role of culture and cultural context: A mandate for inclusion, the discovery of truth and understanding in evaluative theory and practice* (pp. 61-85). Greenwich, CT: Information Age Publishing.
- Nelson-Barber, S., Trumbull, E., & Wenn, R. (2000). *The coconut wireless project: Sharing culturally responsive pedagogy through the world wide web*. Honolulu: Pacific Resources for Education and Learning.
- No Child Left Behind Act, Pub. L. 107-110 (2002). Retrieved March 3, 2003, from <http://www.ed.gov/legislation/ESEA02/107-110.pdf>.
- Ovando, C. (1994). Changes in school and community attitudes in an Athabaskan village. *Peabody Journal of Education*, 69(2), 52-62.
- Popham, W. J. (2001). *The truth about testing*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Resnick, L. (1991). Shared cognition: Thinking as social practice. In L. Resnick, J. Levine, & S. Teasley (Eds.), *Perspectives on socially shared cognition* (pp. 1-22). Hyattsville, MD: American Psychological Association.
- Rhodes, R. (1988). Native American learning styles: Implications for teaching and testing. In Arizona Department of Education (Ed.), *Proceedings of the eighth annual Native American Language Issues Institute* (pp. 11-21). Choctaw, OK: Native American Language Issues Institute.
- Rivera, C., Vincent, C., Hafner, A., & LaCelle-Peterson, M. (1997). Statewide assessment programs: Policies and practices for the inclusion of limited English proficient students. *Practical Assessment, Research & Evaluation*, 5(13). Retrieved April 19, 2002 from <http://pareonline.net/genpare.asp?wh=4&abt=rivera>.
- Rodriguez, N. (1996). Predicting the academic success of Mexican American and white college students. *Hispanic Journal of Behavioral Sciences*, 18(3), 329-342.
- Shaw, J. M. (1994). *Science performance assessment and language minority student: Exploring the interface*. Unpublished doctoral dissertation, Stanford University, Stanford, CA.
- Smith, D., Leake, D., & Kamekona, N. (1998). Effects of a culturally competent school- based intervention for at-risk Hawaiian students. *Pacific Educational Research Journal*, 9(1), 3-22.

- Smith, L. (1998, spring). The educational and cultural implications of Maori language revitalization. *Cultural Survival Quarterly*, 22(1), 27-28.
- Solano-Flores, G., & Nelson-Barber, S. (2001). On the cultural validity of science assessments. *Journal of Research in Science Teaching*, 38(5), 553-573.
- Solano-Flores, G., & Trumbull, E. (2003). Examining language in context: The need for new research and practice paradigms in the testing of English language learners. *Educational Researcher*, 32(2), 3-13.
- Solano-Flores, G., Trumbull, E., & Nelson-Barber, S. (2002). Concurrent development of dual language assessments: An alternative to translating tests for linguistic minorities. *International Journal of Testing*, 2(2), 107-129.
- Spindler, G., & Spindler, L., with Trueba, H., & Williams, M. D. (1990). *The American cultural dialogue and its transmission*. London: The Falmer Press.
- Stiggins, R. J. (1997). *Student-centered classroom assessment* (2nd ed.) Upper Saddle River, NJ: Merrill.
- Stiles, D. (1997). Four successful Indigenous language programs. In J. Reyhner (Ed.), *Teaching indigenous languages* (pp. 248-262). Flagstaff, AZ: Northern Arizona University Press.
- Swisher, K., & Deyhle, D. (1992). Adapting instruction to culture. In Reyhner, J. (Ed.), *Teaching American Indian students* (pp. 81-95). Norman, OK: University of Oklahoma Press.
- Szasz, M. (1999). *Education and the American Indian*. Albuquerque: New Mexico Press.
- Teacher Panel (1994). Remarks of 10 American Indian teachers at a day-long meeting held at Far West Laboratory, June 29, 1994.
- Trumbull, E., Diaz-Meza, R., & Hasan, A. (in press). Using cultural knowledge to inform literacy practices: Teacher innovations from the bridging cultures project. To appear in P. M. Greenfield, A. Isaac, E. Trumbull, C. Rothstein-Fisch, & B. Quiroz (Eds.), *Bridging cultures in U.S. classrooms*. New York: Sage Foundation.
- Trumbull, E., Nelson-Barber, S., & Mitchell, J. (2002). Enhancing mathematics instruction for Indigenous American students. In J. Hankes & G. Fast (Eds.), *Changing the faces of mathematics: Perspectives of Indigenous people of North America* (pp. 1-18). Reston, VA: National Council for Teachers of Mathematics.
- Valdés, G., & Figueroa, R. (1994). *Bilingualism and testing: A special case of bias*. Norwood, NJ: Ablex.
- Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Watahomigie, L., & McCarty, T. (1994). Bilingual/bicultural education at Peach Springs: A Hualapai way of schooling. *Peabody Journal of Education*, 69(2), 26-42.
- Watson-Gegeo, K. (1989, November). *The Hawaiian language immersion program: Classroom discourse and children's development of communicative competence*. Paper presented at the Annual Meeting of the National Council of Teachers of English, Baltimore.
- White House Conference on Indian Education (1992). *White House Conference on Indian Education* (Washington, DC, January 22-24, 1992). Final report. Volumes 1 and 2. Washington, DC: Author (ERIC Document Reproduction Service No. ED 353 123).