

**CULTURE-BASED EDUCATION**

SEPTEMBER 2010



**Recommended Citation**

Kana'iaupuni, S., B. Ledward, and U. Jensen. *Culture-Based Education and Its Relationship to Student Outcomes*. Honolulu: Kamehameha Schools, Research & Evaluation.



KAMEHAMEHA SCHOOLS

# Culture-Based Education and Its Relationship to Student Outcomes

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## Executive Summary

The long standing achievement gap of Native Hawaiian students in the state's public schools represents a significant concern, one that diverse stakeholders are committed to resolving. New research and developments in education provide fresh opportunities to re-examine the teaching and learning of Native Hawaiian students in ways other than the conventional models many schools have used, most of which have failed to make significant differences in student outcomes.

A recent study, Hawaiian Cultural Influences in Education (HCIE), provides new quantitative data about Hawaiian students and their peers from both private and public schools. The study used hierarchical linear models to conduct multilevel statistical analyses of the data. Results are consistent with prior qualitative studies, indicating that culture-based educational strategies positively impact student outcomes, particularly Native Hawaiian student outcomes.

Specifically, the study found a set of nested relationships linking the use of culture-based educational strategies by teachers and by schools to student educational outcomes. First, culture-based education (CBE) positively impacts student socio-emotional well-being (e.g., identity, self-efficacy, social relationships). Second, enhanced socio-emotional well-being, in turn, positively affects math and reading test scores. Third, CBE is positively related to math and reading test scores for all students, and particularly for those with low socio-emotional development, most notably when supported by overall CBE use within the school.

The study also found that students of teachers using culture-based educational strategies report greater Hawaiian cultural affiliation, civic engagement, and school motivation than do students of other teachers. For example, the survey data show that students of teachers using CBE are more likely to have strong community ties as exemplified by working to protect the local environment and attending public meetings about community affairs. They are also more likely to put cultural skills to use in their communities and report higher levels of trusting relationships with teachers and staff, underscoring a deeper sense of belonging at school. The strength of these connections is critical to producing engaged and successful learners as they prepare for the future.

This research project is the first large-scale empirical study of its kind among high school students. The results are based on survey data from 600 teachers, 2,969 students, and 2,264 parents at 62 participating schools, including conventional public schools, charter schools, schools with Hawaiian-immersion programs, and private schools. It is a collaborative effort of the Kamehameha Schools, Hawai'i Department of Education, and Nā Lei Na'auao, an alliance of Hawaiian-focused public charter schools.

ESPEEDOMETER

**SP1 = Prenatal to 8-years**  
(Optimize and Build)

**SP2 = Grades 4 to 16 and post-high**  
(Sustain Momentum)

**SP3 = Kamehameha Schools Campuses, K to 12**  
(Innovate and Optimize)

## Introduction

The long standing achievement gap of Native Hawaiian students in the state's public schools represents a significant concern, one that diverse stakeholders are committed to resolving. New research and developments in education provide fresh opportunities to re-examine the teaching and learning of Native Hawaiian students in ways other than the conventional models many schools have used, most of which have failed to make significant differences in student outcomes. Increasingly, data and practice in indigenous communities demonstrate the importance of culturally relevant education as a means of engaging and empowering students and their families in the learning process. This report shares the results of a quantitative research study that examines the impact of culture-based teaching strategies on student achievement and socio-emotional development. The findings are consistent with prior qualitative studies, indicating that culture-based educational strategies positively impact student outcomes, particularly Native Hawaiian student outcomes. This research underscores the benefits of culturally responsive pedagogy and practice. The implications of this study are valuable for education practitioners, programs, and policymakers seeking ways to eliminate achievement gaps for indigenous and other students.

## Prior Research

Data consistently document the longstanding gaps in Native Hawaiian educational outcomes, ranging from lower achievement, attendance, and graduation rates combined with higher disciplinary and risk-taking behavior among youth (for example, Kana'iaupuni, Malone, and Ishibashi 2005). Various theories have emerged to explain such gaps in student performance. *Cultural deficit theory* attributes the academic shortcomings of minority students to students' home culture and environment whereas *cultural difference* theories shift focus from the home to differences in language and communication styles between home and school (Erickson 1993). *Cultural compatibility* (Vogt, Jordan, and Tharp 1993) and *cultural congruence* (Mohatt and Erickson 1981) theories similarly explain poorer student outcomes among some groups as a result of language differences and, more generally, cultural mismatch. *Oppositional theory* focuses on student responses to these mismatches, to include broader societal inequities and experiences with discrimination (Ogbu 1996).

Recent theories place culture at the center of debates surrounding relevance, relationships, and rigor in learning processes. *Culturally responsive/relevant education* recognizes cultural gaps between home and school as part of the achievement gap and calls for increased cultural relevance in education to engage, support, and empower learners (Castagno and Brayboy 2008). *Cognitive theory* (Demmert and Towner 2003) reasons that students learn more readily when prior knowledge is activated and connected to new information they are learning, hence supporting the importance of cultural relevance. Finally, *cultural-historical-activity theory*, or CHAT, more specifically emphasizes connectedness to community and culture as the foundation for teaching and learning (Roth and Lee 2007).

Despite some differences in approach and emphasis, all of these theories consider the degree of continuity and congruence between home and school. This body of work suggests that education is both an individual and a collective experience, where engagement and success can be enhanced and enriched via strengths-based approaches which integrate the culture and community of learners. In this research, the term culture-based education (CBE) is used to represent a holistic and comprehensive application of culturally relevant education and refers to educational approaches that are grounded in a particular cultural worldview (Demmert and Towner 2003).

A strong premise of this body of work is that education is a cultural process. Schools are the primary vehicle for transmitting knowledge and skills as well as the values, practices, and culture of a society. What may be less obvious is that all educational systems and institutions are rooted in a particular cultural worldview. Critical questions to consider are whose culture

is being transmitted and what cultural values are being instilled in children? In the United States, schools reflect mainstream, Western worldviews, where American culture is the norm. Some scholars argue that there is bias against non-Western worldviews and that children of non-Western ethnic or indigenous groups are thereby disadvantaged (Jacob and Jordan 1996, Cornelius 1999, Loewen 2007, Sue 2004, King 2005,). Although these biases may be invisible or unrecognized, students of indigenous and other minority communities often feel disconnected in an educational system in which their values, knowledge, and practices are largely ignored. Resulting educational disparities are evident. The gaps are particularly enduring among cultural groups that have not voluntarily migrated to this country with the intent of assimilating (e.g. American Indians, African Americans, and Native Hawaiians).

As prior research indicates, cultural relevance matters because it directly impacts student engagement, learning, and achievement. In education, efforts have been made to include non-Western cultural traditions and knowledge and to promote cultural awareness and tolerance for diversity in our schools and nation. These efforts have led to the practice of teaching *about* cultures rather than grounding teaching and learning within the culturally relevant framework of a particular community. However, in response to the continuing gaps in academic performance, many indigenous communities and educators have developed culture-based pedagogy and strategies to improve the educational experiences and achievement of their children. These strategies have emerged through decades of theorizing and research about educational disconnects between indigenous and minority communities and Western practices.

### Why Culture?

Mounting evidence demonstrates the benefits of creating an educational environment that is relevant to and reflective of student realities, background, and culture. (See Christman et al 2008; Kaiwi and Kahumoku 2006; and Kana‘iaupuni 2007 for examples of successful programs.) This research shows that cultural and ethnic identity mitigate negative experiences, increasing self-confidence, self-esteem, and resiliency among both children and adults. At the collective level, culture is related to the survival of distinct practices and languages, and also the functioning of social and family networks and support systems that may contribute to internal sustainability and vitality of social groups. Many areas of human service have capitalized on these inherent benefits by integrating culturally specific practices or approaches into the delivery of health, social work, education, counseling, and other services. On a global level, diversity is vital to the healthy evolution of any species. As such, cultural diversity contributes to innovation and creativity; the overall advancement of the human race relies on its innovative capacity.

Primarily fueled by the concern and passion of Hawaiian community members, parents, and advocates, culture-based education reform has been an organic solution to the sobering negative statistics that are negatively associated with Native Hawaiian children: high rates of poverty, substance abuse, juvenile deviance and criminal activity, teenage pregnancies, poor educational outcomes, domestic abuse, depression, and suicide. For example, place-based learning is a pillar of educational reform throughout the Hawaiian-focused charter school movement. Typical of this approach, these innovative schools implement project-based and place-based teaching and learning for children, integrating culture, community and the natural environment. Some of the schools use Hawaiian language as the medium of instruction, but all use the language routinely and offer language classes. Students engage in authentic experiences at wahi pana (sacred places) and other community outdoor learning laboratories. They conduct science experiments to assess the relative successes of various methods to revive endangered endemic species or water resources. Their curriculum includes learning about the lifestyles, knowledge, and values of Native Hawaiians. In this way, connections to the land, culture, and community create a rich educational environment that nourishes spiritual, physical, and educational well-being. These connections generate a sense of kuleana (respon-

sibility) and love for learning in students who come to understand that who they are is the foundation with which they learn to engage with the global community.

The results indicate progress. Studies show that best practices among successful teachers of Native Hawaiian students include experience-based, authentic activities (e.g., Kawakami and Aton 2001). Other studies report higher levels of engagement (attendance, timely completion, postsecondary aspirations) among Native Hawaiian students enrolled in conventional public schools that offer hands-on experiences at significant places within students' communities such as streams, freshwater ecosystems, and cultural sites (Yamauchi 2003). The findings are consistent with research on other indigenous groups. For example, studies have found that Native American students exhibit greater preference for tactile and concrete learning experiences than do their peers (Rhodes 1990). Many studies indicate the positive effects of place-based forms of education in a wide variety of settings (Gruenewald 2003; Kawakami 1999; Smith 2002).

Although there are many programs, case studies, and narratives documenting the successful application of CBE, the scholarship is not strongly grounded in quantitative research. Several studies indicate that culturally relevant schooling enhances self-esteem, supports healthy identity formation, and fosters political activity and community participation. These studies provide weak links, however, between CBE and student achievement outcomes. Some empirical studies have supplied stronger causal links to academic performance (see Lipka, Sharp, Adams and Sharp 2007) but there remains a dearth of large-scale quantitative studies on the issue. This study seeks to provide new insights that strengthen our understanding of the impact of CBE on student outcomes. The purpose is to identify relevance-building strategies that lead to positive learning and growth among Native Hawaiian children who, along with other indigenous children in this nation, have yet to achieve parity in educational outcomes with other children in conventional public education settings. The intent is that the findings will contribute to policies and programs directed at improving the condition of education through relevance, relationships, and rigor.

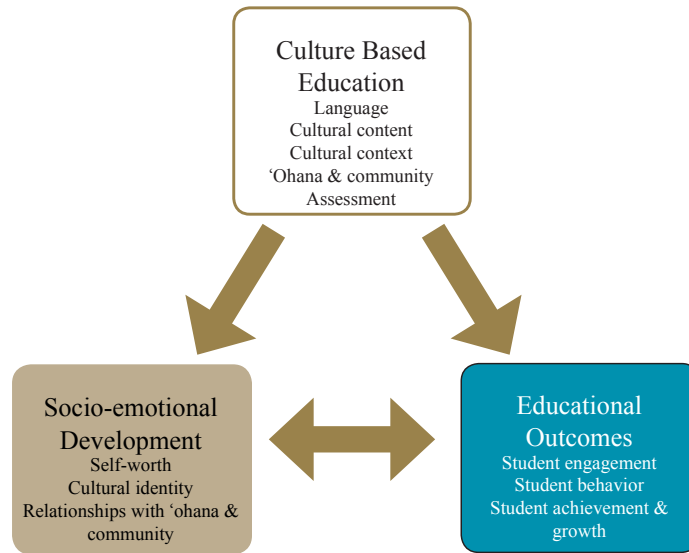
### Study Model and Methods

Seeking new data on the impact of culturally relevant and culture-based education on student outcomes, Kamehameha Schools began the collaborative study entitled, Hawaiian Cultural Influences in Education (HCIE) in partnership with the Hawai'i Department of Education, several Hawaiian organizations, and charter schools in the state. HCIE represents a state-wide research effort across a range of educational settings. The ultimate objective is to understand how we can provide more engaging and relevant educational experiences for all of Hawai'i's children. Planning for the study took place with diverse community stakeholders in 2005 followed by data collection among teachers in spring 2006 and among students and parents/caregivers in fall 2007.

This community-based, participatory research project teamed up first to define CBE and identify indicators of implementation. CBE refers to the "grounding of instruction and student learning in the values, norms, knowledge, beliefs, practices, experiences, places, and language" that are the foundation of a cultural group, in this case, Native Hawaiians. CBE is identifiable by five critical components including language, family and community, content, context, and assessment (Kana'iaupuni and Kawai'ae'a 2008). These initial efforts in defining CBE and its elements informed the creation of the Hawaiian Indigenous Education Teaching Rubric (HIER) and a set of surveys specific to teachers, administrators, students and their parents to serve as tools in gauging the use and impact of specifically Hawaiian culture-based educational strategies (see Table A in the appendix).

The HCIE study explored the kinds of teaching strategies being used in Hawai‘i classrooms and investigated the impact of teachers’ use of CBE on student socioemotional development and educational outcomes. Based on the existing literature, researchers expected that cultural relevance in education would have direct effects on student socioemotional factors such as self-worth, cultural identity, and community/family relationships, as well as direct and indirect effects on educational outcomes such as student engagement, achievement, and behavior (see Figure 1).

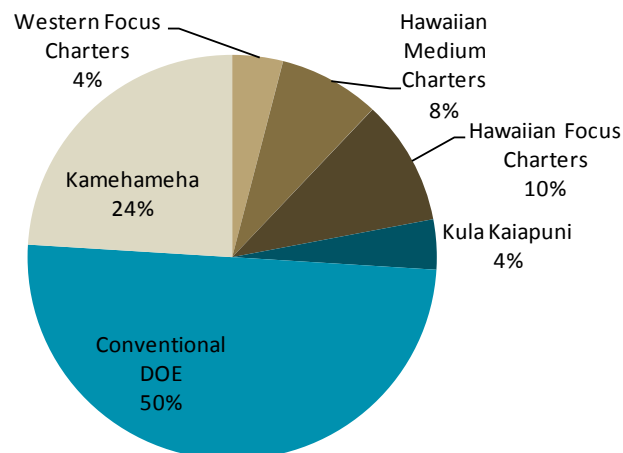
Figure 1. Hawaiian Cultural Influences in Education Study Model



### Participation Rates

In the first phase of the study, teachers across the state were asked to complete voluntary surveys. Sixty-two out of eighty-one schools, or 77 percent, elected to participate. Surveys were distributed to approximately 1,500 teachers who had instructional contact with 7-12<sup>th</sup> grade students. A total of 600 teachers (40 percent) completed surveys. Participating schools reflect a range of geographic and institutional differences across five islands (Hawai‘i, Maui, Moloka‘i, O‘ahu, and Kaua‘i) including conventional and immersion schools in the DOE, start-up and conversion charter schools, and three private campuses of Kamehameha Schools. Figure 2 contains a breakdown of participating teachers by six school types.

Figure 2. Participating Teachers by School Type



In the second phase of the study, students of responding teachers and their respective parents/caregivers were surveyed. Out of an eligible population of around 9,000 students, just over 3,000 surveys were completed for an overall response rate of 33 percent. Parent/caregiver surveys saw a slightly lower rate of return of about 28 percent. Just over half of responding students were from Kamehameha Schools (52 percent), 40 percent attended DOE schools, and 8 percent attended charters (See Table 7 showing student characteristics).

A series of descriptive and multilevel analyses were conducted based on these data. Descriptive analyses examined the characteristics of respondents as well as teacher reports of the frequency and intensity of culture-based teaching strategies that they used in the classroom. These are summarized in the following section, along with aggregate profiles by school type, based on teacher reports. We also include summary descriptive data on student respondents, followed by the results of bivariate analyses examining relationships between use of culture-based strategies and key educational and socioemotional student outcomes. The independent scholars Ronald Heck, Ph.D. from the University of Hawai‘i at Mānoa and Scott Thomas, Ph.D. from Claremont Graduate University conducted multilevel statistical analyses of the data. These analyses use hierarchical linear models to formulate and test models about multi-level relationships among student-, teacher-, and school-level characteristics. For the purpose of this report, results examining the relationships of culture-based strategies specific to math and reading test scores are presented.

### Teachers' Use of Culture-Based Educational Strategies

The first step of this project examines the range of cultural strategies that are reported by teachers in various types of classrooms, including public, private, immersion, and charter schools.

#### Teacher Characteristics

Table 1 displays descriptive characteristics of participating teachers by school type. About two-thirds of overall respondents are women. Ethnicity varies considerably with a quarter of DOE teachers reporting Hawaiian ancestry, a third reporting Japanese ancestry and the largest group (46 percent) reporting Caucasian ancestry.<sup>1</sup> Kamehameha Schools follows a similar trend in age and gender, but more teachers report Hawaiian ancestry (45 percent). In charter schools, 61 percent of teachers identified as Hawaiian, 50 percent as Caucasian, and 19 percent as Japanese. On average, charter school teachers are younger with 60 percent under the age of 35, compared to half that percentage in the other groupings.

Table 1. Teacher Characteristics by School Type

	DOE	KS	Public Charter	All Schools
<b>Age (n =574)</b>				
Avg. teacher age (yrs)	44.1	45.5	37.6	43.1
% Age 35 or younger	28.5	26.3	61.2	34.8
<b>Gender (n =585)</b>				
% Female	65.2	58.2	70.5	64.6
<b>Ethnicity (n =582)</b>				
% Hawaiian	24.3	44.6	61.0	36.9
% Caucasian	46.4	47.5	49.6	47.3
% Japanese	32.1	28.8	18.7	28.5
% Other	42.1	51.1	47.2	45.3

1 Across all schools, roughly 45 percent of teachers reported other ethnicities.

Educational Attainment (n =527)				
% BA, Post-Baccalaureate	44.6	32.3	43.3	41.4
% MA or more	54.8	66.2	41.7	54.8
% Hawaiian degree	9.9	14.5	36.5	16.4
Tenure at school (n =537)				
% Employed 5 years or less	52.1	53.3	70.2	56.2
% Employed 20 years or more	6.6	16.3	2.6	8.2
Years of Hawaii residence (n =581)				
% Resided 20+ years	75.8	88.7	80.3	79.9
Subject(s) taught (n =453)				
% Math	15.8	9.7	17.3	14.7
% English	18.2	13.2	23.6	18.2
% Science	9.4	11.1	10.2	10.0
% History/Social studies	16.1	2.8	15.8	12.8
% Hawaiian studies/language	2.4	11.1	17.3	7.7
% Other	36.5	28.5	38.6	35.0
% Missing (n =600)	21.9	26.4	23.6	23.3
N	329	144	127	600

Note: For Ethnicity and Subjects taught, respondents were asked to choose all that apply, therefore percentages will not sum to 100%

Educational attainment also differs considerably across school type. Sixty-six percent of Kamehameha Schools respondents held a Master’s degree, followed by 55 percent of DOE and 42 percent of charter school respondents. More than one-third of charter school respondents have a degree in Hawaiian language or Hawaiian studies, compared to 10 and 14 percent in the DOE and Kamehameha Schools, respectively.

Responses about school tenure and Hawai‘i residence also differed by school type. Significantly fewer DOE and Kamehameha Schools teachers worked at their school for five years or less (about 52 percent), compared to 70 percent of charter school teachers. This difference is indicative of the fact that most charter schools were established after the year 2000. Persistence is noticeably high at Kamehameha where 17 percent of teachers have been employed on site for 20 years or more, compared to 7 and 3 percent of teachers in DOE and charter schools, respectively. Across all school types, roughly 80 percent of teachers have lived in Hawai‘i for 20 or more years. Teachers reported a range of subjects taught; the most common being Math, English, Science, Social Studies and Hawaiian Studies.

### Teaching Practices

Questions on the teacher survey correspond to items on the Hawaiian Indigenous Education Rubric (see Appendix A). Summative values were calculated after weighting and summing survey responses according to the intensity of CBE use. These values were standardized on a scale ranging from 0 to 100 percent to allow comparisons across the five CBE continua defined by the model (language, content, context, family & community, and assessment). An additional continuum was defined based on teacher responses to survey items measuring three standards of effective pedagogy identified by the Center for Research on Education, Diversity, and Excellence (CREDE). The CREDE standards were included as additional measures of effective teaching and for external validation of the CBE strategies (See Kana‘iaupuni and Kawai‘ae‘a 2008). Table 2 shows the reported use of culture-based

educational approaches by teachers in different school settings. Average summative values are provided for the five CBE continua outlined in the Hawaiian Indigenous Teaching Rubric, plus the CREDE continuum. On average, teachers in charter schools reported greatest use of both CBE strategies and CREDE standards, relative to those in the DOE and Kamehameha Schools.

Table 2. Average Summative Values for CBE Use by School Types

Continua	DOE	KS	Public Charter	All Schools
Content (n =587)	56.5	66.0	79.0	63.6
Context (n =596)	64.8	69.5	81.9	69.6
Assessment (n =592)	77.5	80.8	86.0	80.1
Family & community (n =597)	56.4	54.7	73.0	59.5
Language (n =598)	37.9	54.2	74.2	49.5
CREDE (n=600)	70.8	67.5	78.8	71.7
N	329	144	127	600

Note: Scores are summed across all survey items and standardized to 100% to allow comparisons across the continua

To better understand differences in educational approaches, the data were further disaggregated by school type. Table 3 contains the results, showing average summative values for the expanded set of six school types, including conventional and kula kaiapuni (Hawaiian immersion) schools in the DOE, as well as Hawaiian-focused, Western-focused, and Hawaiian-medium charters. The use of CBE strategies varies among the sample with kula kaiapuni, Hawaiian-medium and Hawaiian-focused charters consistently reporting the greatest level of implementation across all five areas.<sup>2</sup>

Table 3. Average Summative Values for CBE Use by Disaggregated School Types

Continua	Conventional DOE	Kula Kaiapuni	KS	Western-Focus Charter	Hawaiian-Focus Charter	Hawaiian Medium Charter
Content (n =597)	33.1	42.2	34.5	33.3	42.4	46.0
Context (n =596)	58.2	75.5	63.8	55.4	74.0	79.8
Assessment (n =592)	68.7	81.0	72.6	77.0	77.9	85.2
Family and community (n =598)	57.0	68.8	56.4	57.2	71.2	84.1
Language (n =598)	31.3	85.4	49.8	28.7	66.7	89.4
CREDE (n=593)	70.2	78.5	67.5	68.9	78.2	84.3

Note: Standardized to 100% to allow comparisons across the continua

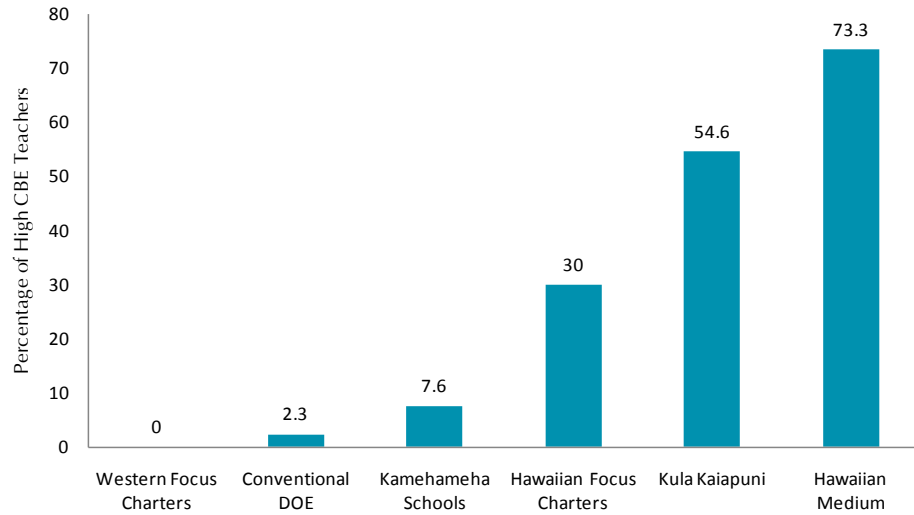
Based on the summative values, teachers were classified into three analytical categories by CBE use: individuals who scored above 75 in four or five areas of the CBE continua were categorized as High CBE Teachers; those who scored above 75 in one to three areas were labeled Moderate CBE Teachers; and the remaining group were considered Low CBE Teachers. Results indicate that half of the respondents (53 percent) are Low CBE Teachers, one-third (33 percent) are Moderate CBE teachers, and roughly 14 percent are High CBE Teachers. Figure 3 illustrates the distribution of High CBE Teachers across six school types. In line with previous results, Hawaiian-medium charters (73 percent), Kula Kaiapuni (55 percent), and Hawaiian-focused charters (30 percent) have the highest concentrations of High CBE

<sup>2</sup> For more discussion regarding teacher survey results, see Ledward, Takayama, and Elia 2009 and Ledward, Takayama, and Kahumoku III 2008.



Teachers on average. In contrast, roughly 8 percent of respondents from Kamehameha fall into the same category as do 2 percent of conventional DOE teachers. None of the 22 teachers from Western-focused charters were classified as High CBE teachers.<sup>3</sup>

Figure 3. Concentration of High CBE Teachers by Disaggregated School Types



CBE strategies are reported by both Hawaiian and non-Hawaiian teachers. Although not shown here, about a third of non-Hawaiian teachers are Moderate or High CBE Teachers compared to 69 percent of Hawaiians. Table 4 contains figures for Hawaiians and non-Hawaiians for the five CBE continua. Across all school types, 1 out of 20 non-Hawaiian teachers was in the High CBE group, compared to 6 out of 20 Hawaiians.

Table 4. Percentage of Teachers with High CBE Use by Teacher Ethnicity

	Non-Hawaiian	Hawaiian
Content	15.0	47.0
Context	11.7	37.7
Assessment	23.6	50.7
Family and community	7.6	25.6
Language	6.2	44.7
High CBE Teachers	4.9	28.8

Notes: 1 Teachers with high CBE use score at or above 75 for each individual continuum

2 High CBE Teachers intensively use CBE strategies in at least 4 of the 5 continua

Internal reliability coefficients and correlations among the five continua, the CREDE standards, and patterns in responses by school type suggest the Hawaiian Indigenous Education Rubric is a reasonable tool for gauging CBE. Cronbach's Alpha coefficients for each of the CBE continua are provided in Table 5. Results ranged from .71 to .94, suggesting a high degree of internal reliability. In addition, fairly high correlations (ranging from .78 to .88) exist among the CBE and CREDE sets of items. Table 3 compares the reported use of CBE strategies and CREDE standards by six school types. Data show a convergence among high rates of CBE users within schools and implementation of CREDE standards. Hawaiian-medium charters, Hawaiian-focused charters, and Kula Kaiapuni have both greater concentrations of

<sup>3</sup> The results for Western-focused charters and kula kaiapuni should be considered with caution given the small sample sizes.

Moderate and High CBE Teachers and higher reported use of CREDE standards compared to others.<sup>4</sup>

Table 5. Correlations between CBE and CREDE

Continuum	<i>N</i>	Raw $\alpha$	Std $\alpha$	Correlation with CREDE standards
Language	598	.94	.94	.88
Family and community	597	.80	.80	.86
Content	585	.78	.78	.85
Context	585	.75	.76	.84
Data and accountability	592	.64	.71	.78
All items combined	578	.93	.93	.94

The first-ever statewide effort to assess the affects of culture-based educational approaches on high school students produced a great deal of rich and meaningful data, which are presented here in highly summarized form. The development of the Hawaiian Indigenous Teaching Rubric and the teacher survey results provide new understandings of CBE strategies across geographic, institutional, and ethnic differences. Findings indicate that culture-based education is not the normative approach to teaching and learning in Hawai‘i. Instead, there is substantial potential for its development, both through its alignment with other research-based best practices and its appeal among a growing number of teachers seeking to enhance relevance for their learners. The information in Table 6 summarizes the CBE strategies that teachers reported as most helpful to effective teacher practices.

Table 6. Culturally Relevant Strategies Reported by Teachers Aligned with Best Practices

Theme	Description	Best Practice
Pilina ‘Ohana	Family integration where parents are seen as a child’s first teachers	Active participation of family members in educational activities;
Pilina Kaiāulu	Community integration informed by a Hawaiian sense of place	Using the community as a setting for student learning
Haku	Original compositions imbued with a person’s experience and spirit	Rigorous assessments accounting for a range of competency and skills
Hō‘ike	Performances requiring multilevel demonstrations of knowledge and/or skills	
Mālama ‘Āina	Land stewardship focusing on sustainability and a familial connection	Place-based and service learning projects promoting community well-being
Kōkua Kaiāulu	Community responsibility embodying the Hawaiian value of lōkahi (unity, balance)	
Ola Pono	Values and life skills that synthesize Hawaiian and global perspectives	Career planning and preparation for global citizenship

Note: Themes above came from responses to open-ended items on the teacher survey.

<sup>4</sup> See Kana‘iaupuni and Kawai‘ae‘a, 2008 for discussion about the development and testing of the Hawaiian Indigenous Teaching Rubric.

### Summary of Teacher Results

The teacher data reveal three main findings. First, the data show evidence that CBE is being implemented to varying degrees in classrooms across the state. As expected, Hawaiian culture- and language-based schools are quick to adopt CBE. However, results indicate strong CBE users teaching in mainstream settings as well. Second, CBE is not limited to Hawaiian teachers. Although Hawaiians subscribe to culture-based pedagogy more often, these approaches also are embraced by non-Hawaiian teachers, especially those in school settings that prioritize cultural relevance in education. Third, across all school types, including culturally grounded schools, teachers report regular use of the strategies that are generally considered best practice in teaching and instruction. Rather than CBE being divergent from best practices, the data suggest a “double win” for children in culture-based environments. Specifically, the data suggest that in culture-rich environments, teachers go above and beyond conventional best practice to achieve relevance and rigor, delivering highly relevant education via culture-based strategies *in addition to* the research-based body of teaching strategies known as best practices. In effect, principles such as contextualization and joint productive activity are most often achieved by teachers using culturally relevant strategies.

### Student Outcomes Associated with Teacher Use of CBE

The second step of this project examines student outcomes associated with teachers’ CBE use. Student characteristics are identified as well as indicators of socioemotional development reported by students across private, public, immersion, and charter schools.

### Student Characteristics

Table 7 displays select student characteristics by school type. Because of its admissions policy and mission, Kamehameha Schools has an almost exclusively Hawaiian student body (99.9 percent), albeit an ethnically mixed one. The Hawaiian student populations in charter schools and the DOE are 83 percent and 54 percent, respectively. Based on proportions of students receiving free- and reduced-price lunches, a much larger portion of charter school students come from low-income families compared to DOE (70 percent and 45 percent, respectively). There are no directly comparable data available from Kamehameha Schools, although over 60 percent of the student body receives need-based financial assistance. Less than 3 percent of the students in charter schools and at Kamehameha Schools lived in Hawai‘i for five years or fewer compared to about 8 percent in the DOE.

Table 7. Student Characteristics by School Type

	DOE	Kamehameha Schools	Public Charter	All Schools
Gender (n=2,695)				
% Female	56.1	50.8	44.3	52.6
Ethnicity (n=2,802)				
% Hawaiian	54.1	99.9	83.0	79.7
Social Economic Status (n=1,425)				
% Free/reduced lunch*	44.6	NA	70.5	NA
Hawai‘i Residence (n=2,969)				
% Five years or less	8.3	2.7	2.7	5.05
N	1242	1544	183	2969

### Socioemotional Development

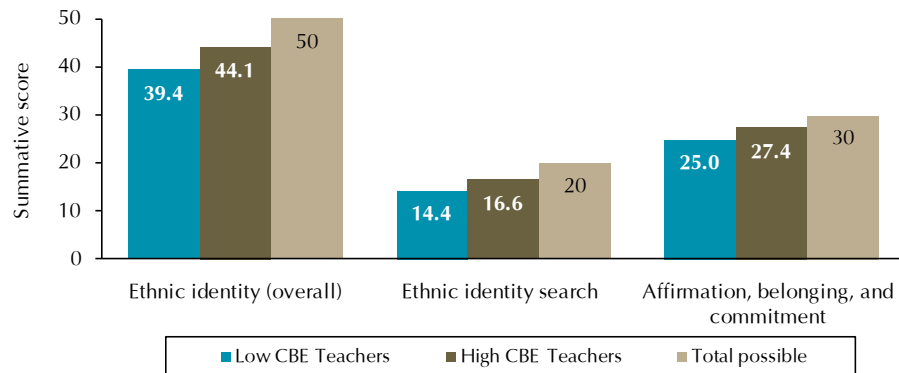
To better understand how culture-based educational strategies relate to student outcomes, respondents were classified into two groups: students who had instructional contact with one or more High CBE Teachers and those who attended classes with only Low CBE Teachers.<sup>5</sup>

In the initial bivariate analyses reported here, the sample was reduced to Hawaiian students in public schools only. As shown below, the results from various components of socioemotional development suggest culture-based educational strategies resonate well with Hawaiian students.

#### Hawaiian Cultural Affiliation

A modified version of Phinney’s (1992) Multigroup Ethnic Identity Measure (MEIM) was used to gauge Hawaiian cultural affiliation, specifically. The 10-item scale contains two subfactors, “Ethnic Search” (four items) and “Affirmation, Belonging and Commitment” (six items). Together they total 50 possible points, with higher scores indicating greater cultural affiliation (see Figure 4). Students with at least one High CBE Teacher reported significantly higher scores than students with all Low CBE Teachers for the overall scale as well as both subfactors ( $p < .001$ ).<sup>6</sup>

Figure 4. Hawaiian Cultural Affiliation among Hawaiian Students by Teacher CBE Use



#### Community Connections

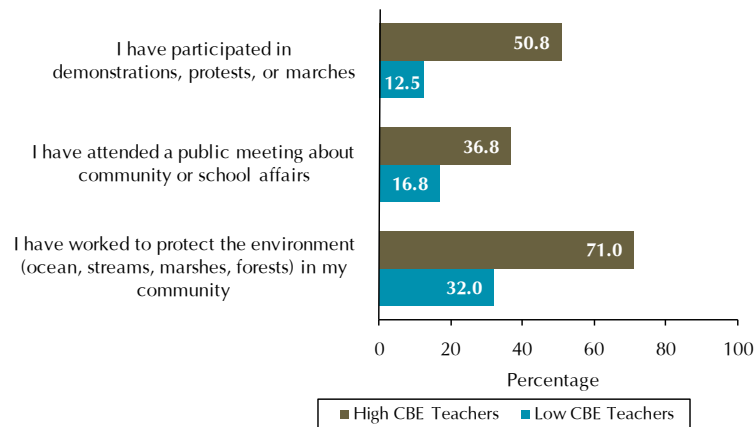
Across the board, students of High CBE teachers reported higher rates of community attachment and giveback compared to students of Low CBE teachers. Positive and significant differences were seen between the groups in all seven items in this domain ( $p < .001$ ).<sup>7</sup> Figure 5 highlights a sub-domain labeled, “community involvement,” where respondents answered that they participated in the given event more than once. In results not shown, students of High CBE teachers also reported greater engagement with local issues such as: land development, Hawaiian language revitalization, and native rights.

<sup>5</sup> Students with Moderate CBE Teachers were omitted from analyses. Descriptive analyses focused on indicators of student socioemotional development, particularly, cultural affiliation, community connections, and school engagement.

<sup>6</sup> Table B1 in the Appendix lists all the items relating to this category.

<sup>7</sup> Table B2 in the Appendix contains the full set of questions about community connections.

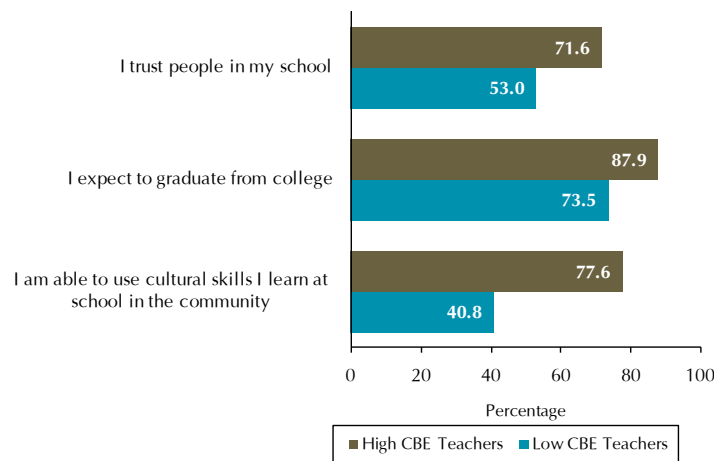
Figure 5. Community Connections among Hawaiian Students by Teacher CBE Use



*School Engagement*

Overall, students of High CBE teachers reported greater school engagement compared to those exposed only to Low CBE teachers. Out of 15 items on the student survey relating to school engagement, seven were positively and significantly related to CBE ( $p < .05$ ).<sup>8</sup> Figure 6 displays results for select items relating to emotional, behavioral, and cognitive engagement, which are areas researchers routinely use to assess school engagement. In results not shown, 71 percent of students of High CBE teachers also reported that they would attend their current school if given a choice compared to 54 percent of students with Low CBE teachers ( $p = .012$ ).

Figure 6. School Engagement among Hawaiian Students by Teacher CBE Use



**Summary of Student Results**

Initial bivariate analyses show positive and significant relationships between teachers’ implementation of culture-based educational strategies and student socioemotional development. When classified in two groups, students with at least one High CBE Teacher report higher Hawaiian cultural affiliation, community attachment and giveback, and school engagement than students with all Low CBE Teachers. They also are more likely to feel connected to Hawaiian culture, participating in Hawaiian cultural practices and celebrating important events in Hawaiian history. Likewise, students of High CBE Teachers are more strongly engaged

8 Table B3 in the Appendix lists the items in this question set.

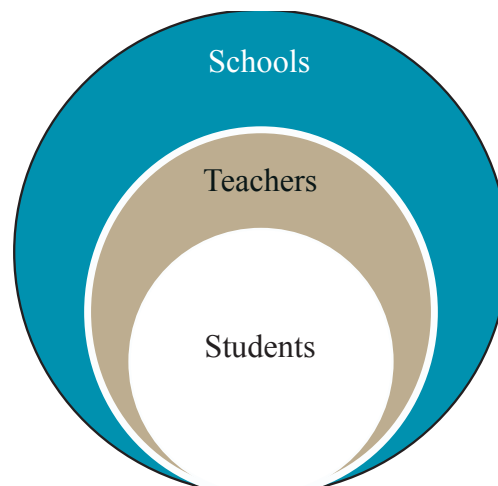
with their community than students of Low CBE Teachers. They have worked to protect the local environment and attended public meetings about community affairs. Students exposed to high levels of CBE by their teachers are also more likely to be engaged in schooling than others, by putting cultural skills to use in their communities and forming trusting relationships with teachers and staff.

### Piecing It All Together: Results of Multilevel Analyses

Culture-based educational strategies seek to integrate native language and ways of knowing into the classroom and involve using teaching strategies that integrate students' cultural and community context. Using multilevel statistical models, data from this phase of the study clarify how teachers' reported use of CBE instructional strategies affects classroom behavior and student educational outcomes across a variety of school contexts. The theoretical model portrayed in Figure 1 requires linking data across surveys to examine how teacher practices relate to key student outcomes. The relationships are additionally complex, however, because the impact of any teacher practice on student learning may vary from student to student depending on his or her individual attributes (ethnicity, gender, socioeconomic status); from one classroom to the next (e.g., a classroom with a new versus an experienced teacher); and from one school setting to another (e.g., a Hawaiian immersion compared to an English-medium private school). The benefit of generating data from a large sample of students and teachers is the ability to examine the relationship of CBE strategies on student outcomes across a range of individuals and settings, controlling for other explanatory variables that impact outcomes.

These relationships were operationalized using a three-level hierarchical linear model (see Heck and Thomas 2009) tiered by students, then by teachers to whom those students are connected, and finally to the schools within which the sampled students are enrolled (see Figure 7). The final dataset yielded 10,791 paired student/teacher records, where students' responses are linked to those of their teachers represented in the survey. This figure is based on a total of 1,991 unique students for whom test data were available. These data were used to examine the impact of CBE on student math and reading achievement outcomes.

Figure 7. Multilevel Analysis of Nested Relationships



The results are consistent with prior qualitative studies demonstrating that culture-based educational strategies positively impact student outcomes, especially among Native Hawaiian students. Thomas and Heck report:

*Taken together, the results from our various multilevel analyses suggest that CBE is an important predictor of achievement, contingent on the school's implementation of these principles. We note that the three major constructs at the center of this research (i.e., teacher CBE, student affect [socioemotional development], and achievement) seem to work in expected ways. More specifically, we have evidence that teacher CBE (at either the school or teacher level) is related to both student affect and achievement (Thomas and Heck, 2009, p. 38).*

Tables 8 and 9 present a set of final results for math and reading outcomes, controlling for student socioemotional development, prior achievement in the content area, ethnicity, socioeconomic status, gender, and private school attendance. At the teacher level, controls for gender and experience are included, in addition to teacher CBE use and an interaction variable<sup>9</sup> for average CBE use in the school. At the school level, explanatory variables include overall content area scores, socioeconomic composition, and socioemotional development, in addition to average CBE use in the school.

Results in Table 8 show that individual student math outcomes are positively affected by overall math performance in the school and the interaction between average CBE in the school and teacher CBE use in the classroom. Additionally, math scores are positively affected by student socioemotional development, the interaction of teacher CBE and low socioemotional development, student SES, female gender, previous math test scores, and private school attendance.

Table 8. Multilevel Analysis Modeling Math Outcomes

Variable	Estimate	SE
<i>School</i>		
Mean Math	45.81*	5.24
Mean SES	1.56	1.28
Mean CBE	-0.15	0.97
Mean Socio-Emotional	-0.34	1.80
<i>Classroom</i>		
Teacher CBE	-0.15**	0.08
Mean CBE x Teacher CBE	0.49*	0.18
Female	0.11	0.14
Experience	0.01	0.01
<i>Student</i>		
Socio-Emotional	1.56*	0.07
Teacher CBE x Low Socio-Emotional	0.23*	0.07
Hawaiian	-0.04	0.31
SES	0.48*	0.06
Female	1.15*	0.13
Previous Math	1.10*	0.01
Kamehameha Student	5.92*	0.48

\*p < .05; \*\*p < .10 (N = 10,791 [1991 students], N = 372 teachers, N = 43 schools)

<sup>9</sup> An effect of interaction occurs when a relation between (at least) two variables is modified by (at least) one other variable.

Table 9 shows that individual student reading outcomes also are positively affected by overall school reading performance and mean CBE use in the school, teacher CBE use in the classroom, gender distribution of students in the classroom and the presence of experienced teachers. Additionally, reading scores are positively affected by student socioemotional development, the interaction of teacher CBE and low socioemotional development, female gender, previous reading test scores, and private school attendance.

Table 9. Multilevel Analysis Modeling Reading Outcomes

Variable	Estimate	SE
<i>School</i>		
Mean Reading	51.38*	5.27
Mean SES	0.87	1.29
Mean CBE	1.92*	0.96
Mean Socio-Emotional	-2.21	1.77
<i>Classroom</i>		
Teacher CBE	0.21**	0.12
Mean CBE x Teacher CBE	0.23	0.23
Female	0.96*	0.17
Experience	0.14*	0.01
<i>Student</i>		
Socio-Emotional	0.29*	0.09
Teacher CBE x Low Socio-Emotional	0.80*	0.25
Hawaiian	-2.65*	0.38
SES	0.04	0.07
Female	0.34	0.17
Previous Reading	0.80*	0.01
Kamehameha Student	7.15*	0.67

\*p < .05; \*\*p < .10; (N = 10,791 [1991 students], N = 372 teachers, N = 43 schools)

From the results of these multilevel analyses, several findings emerge based on the nested relationships linking the use of CBE strategies by teachers and throughout schools to student outcomes<sup>10</sup>:

1. CBE use is positively related to student socioemotional well-being (e.g., identity, self-efficacy, social relationships).
2. Enhanced socioemotional well-being, in turn, is positively linked with math and reading test scores.
3. The analyses indicate a statistically significant relationship between CBE use and math and reading test scores, most notably for math when teachers' use of culture-based strategies is supported by overall use of culture-based strategies in the school. For reading outcomes, the impact of average CBE use in the school has a large, statistically significant positive relationship in addition to a smaller, positive relationship of teacher CBE use.
4. The association of teacher CBE use to math and reading outcomes is strongest among students with lower socioemotional development, relative to those with higher socioemotional development.

<sup>10</sup> Forthcoming publications will provide greater detail on the methodology and results of multilevel analyses.



### Limitations

There are two significant limitations attached to this study. First, due to external constraints, the dataset is cross-sectional and therefore provides a snapshot of relationships at one moment of time. The processes through which CBE is presumed to impact student behavior and learning likely unfold over time. Therefore a future longitudinal study would add greatly to our current understanding of the positive relationships observed between CBE and student outcomes and would begin to address the issue of causality.

A second limitation of the study has to do with the nature of secondary schooling. In middle and high school, students typically have instructional contact with six or more teachers in any given semester. One objective of this study, particularly the teacher survey, was to gain a better sense of what CBE looks like in the classroom. Therefore, teachers were surveyed first, followed by the students of participating teachers. However, it was not possible to match some students with all their teachers and vice versa. Ideally, a future study could maximize statistical power by a more targeted and complete data collection effort.

### Conclusion

The question of whether a particular educational model has a substantial impact on student learning is of primary importance for educational reform. School personnel are challenged to change practices in ways that can lead to improved student outcomes. Building a school's capacity for delivering challenging and culturally relevant instruction through targeted professional learning activities represents a key objective of school leadership efforts to meet the needs of a diverse student body, particularly of Native Hawaiian students.

Previous research on school effects suggests that some schools are better able to produce high quality and more equitable outcomes across a broad social and racial/ethnic distribution of students. Efforts to improve schools often attempt to impact conditions that create positive learning environments for students. One approach is to increase teacher sensitivity and pedagogical knowledge for working with the cultural diversity of all students. Studies of promising practices are needed if research is to provide information about new instructional practices that are more effective with culturally diverse students than contemporary mainstream school and classroom practices.

As such, the focus of this study was to create a model and definition for understanding the relationships between culture-based education and student outcomes. Culturally-based educational practices encourage instruction and learning that is rooted in cultural and linguistically relevant contexts. Based on this framework, this study explored the use of CBE by teachers in diverse educational settings. The project linked this information on the use of culturally-based instructional practices to students' reported socioemotional development and academic outcomes in reading and math.

Overall, the HCIE study adds to an understanding of culture-based education with a definition of CBE from a Hawaiian perspective, a theoretical model of what it looks like in the classroom, and a set of rich, quantitative data that can be used to examine various questions about schools, teachers, parents, and students. The findings to date offer fresh insights regarding culture-based education, where it is implemented, who implements it, and how its implementation is related to socioemotional and academic student outcomes.

The data help to debunk some myths associated with culture-based education such as: the use of CBE is limited to only "Hawaiian teachers" or "Hawaiian schools", CBE is radically different from conventional best practices, or there is no added value of CBE to educational outcomes. In fact, the data support the hypothesis that cultural approaches strongly enhance relevance and relationships at school, while also supporting positive academic outcomes.

The latter is critical, given limited prior quantitative research on student academic outcomes related to CBE implementation. Further research using these data and longitudinal data can be used to guide programs and policies designed to support positive Hawaiian and other indigenous student outcomes. For example, the HCIE rubric offers a useful framework for actual teaching strategies and the analyses indicate that support for CBE at the school level enhances the impact of teacher's CBE use on student achievement. Additionally, the survey data offer information about types of CBE that teachers find useful.

Taken together the bivariate and multilevel analyses tell a compelling story. Cultural knowledge and language are clearly areas of greater proficiency among students of teachers that intensively use culturally relevant strategies. These students are also more likely to know stories and facts about their communities and demonstrate higher levels of civic responsibility. They reported multiple occasions of working to protect the environment in their communities (reflecting *mālama 'āina*, caring for the land, a significant value and practice in Hawaiian culture). Perhaps more importantly, students exhibit high levels of trust and connection to their schools. This outcome is exceptionally meaningful because many Native students come from families with low socioeconomic backgrounds who have experienced multiple generations of marginalization in public schools.

In addition to enhanced socioemotional outcomes, multilevel analyses consistently point towards positive relationships between CBE and student math and reading test scores. In terms of broader policy and program implications, recent national education policies have failed to recognize the importance of language and culture for native children. The consequences of this failure are significant and replete in the well worn trail of low achievement, low socioeconomic status and poor health of this nation's indigenous populations. One-size-fits-all education models make no sense at the community level, where scripted approaches could be replaced by those that harness the wonders, the fullness, and the richness of cultural practices, values, and knowledge in the educational process. This study contributes to the work of many educators and researchers across the nation who demonstrate the possibilities that arise when communities are able to guide the education of their children and to ensure relevance and meaning in both outcome and substance.

## References

- Castagno, A. and B. Brayboy. 2008. Culturally Responsive Schooling for Indigenous Youth: A Review of the Literature. *Review of Educational Research*, 78 (4): 941-993.
- Christman, D., R. Guillory, A. Fairbanks, and M. Gonzalez. 2008. A model of American Indian School Administrators: Completing the Circle of Knowledge in Native Schools. *Journal of American Indian Education*, 47(3). Pp. 53-71
- Cornelius, C. 1999. *Iroquois Corn in a Culture-Based Curriculum: A Framework for Respectfully Teaching About Cultures*. Albany, NY: State University of New York Press.
- Demmert, W. G., Jr., and J. C. Towner. 2003. *A review of the research literature on the influences of culturally based education on the academic performance of Native American students*. Portland, OR: Northwest Regional Education Laboratory.
- Erickson, F. 1993. Transformation and school success: The politics and culture of educational achievement. In *Minority education: Anthropological perspectives*, by E. Jacob & C. Jordan, (Eds.). New Jersey: Ablex, 27-52.
- Gruenewald, D. A. 2003. The Best of Both Worlds: A Critical Pedagogy of Place. *Educational Researcher* 32(4): 3-12.
- Hishinuma, E. S., J. J. McArdle, R. H. Miyamoto, S. B. Nahulu, G. K. Makini, Jr., Y. C. Yuen, S. T. Nishimura, J. F. McDermott, Jr., J. A. Waldron, K. L. Luke, and A. Yates. (2000). Psychometric Properties of the Hawaiian Culture Scale-Adolescent Version. *Psychological Assessment* 12(2), 140-157.
- Jacob, E. and C. Jordan. 1996. *Minority education: Anthropological perspectives*. Norwood, New Jersey: Ablex Publishing.
- Ka'iwi, M. A. and W. Kahumoku III. 2006. Makawalu: Standards, Curriculum, and Assessment for Literature through an Indigenous Perspective. *Hūlili: Multidisciplinary Research on Hawaiian Well-being* 3: 183-206.
- Kana'iaupuni, S. M. and K. Kawai'ae'a. 2008. E Lauhoe Mai Na Wa'a: Toward a Hawaiian Indigenous Education Teaching Framework. *Hūlili: Multidisciplinary Research on Hawaiian Well-being* 5: 67-90.
- Kana'iaupuni, S. M. (2007). *A brief overview of culture-based education and annotated bibliography* (Culture-Based Education Brief Series). Honolulu: Kamehameha Schools, Research & Evaluation.
- Kana'iaupuni, S. M., N. Malone and K. Ishibashi. 2005. *Ka Huaka'i: 2005 Native Hawaiian educational assessment*. Honolulu: Kamehameha Schools, Pauahi Publications.
- Kawakami, A. J. 1999. Sense of Place, Community, and Identity. *Education and Urban Society* 32(1): 18-39.
- King, J. (Ed.). 2005. *Black education: A transformative research and action agenda for the new century*. Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Ledward, B., B. Takayama and K. Elia. 2009. *Hawaiian cultural influences in education (HCIE): Culture-based education among Hawai'i teachers* (Culture-Based Education Brief Series). Honolulu: Kamehameha Schools, Research & Evaluation.

- Ledward, B., B. Takayama and W. Kahumoku, III. 2008. *Hawaiian cultural influences in education (HCIE): 'Ohana and community integration in culture-based education* (Culture-Based Education Brief Series). Honolulu: Kamehameha Schools, Research & Evaluation.
- Lipka, J., N. Sharp, B. Adams, F. Sharp. 2007. Creating a Third Space for Authentic Biculturalism: Examples from Math in a Cultural Context. *Journal of American Indian Education* 46(3): 94-115.
- Loewen, J. 2007. *Lies My Teacher Told Me: Everything Your American History Teacher Got Wrong*. New York: Simon & Schuster.
- Mohatt, G. and F. Erickson. 1981. Cultural differences in teaching styles in an Odawa school: A sociolinguistic approach. In *Culture and the bilingual classroom: Studies in classroom ethnography* by H. Trueba, G. Guthrie, and K. Au (Eds.). Rowley, MA: Newbury, 105-119.
- Ogbu, J. 1996. Variability in minority school performance: A problem in search of an explanation. In *Minority education: Anthropological perspectives* by E. Jacob and C. Jordan (Eds.). Norwood, New Jersey: Ablex Publishing, 83-112.
- Phinney, J. 1992. The Multigroup Ethnic Identity Measure: A new scale for use with adolescents and young adults from diverse groups. *Journal of Adolescent Research* 7 (1), 156-176.
- Rhodes, R. W. 1990. Measurements of Navajo and Hopi brain dominance and learning styles. *Journal of American Indian Education* 29 (3): 29-40.
- Roth, W. and Y. Lee. 2007. Vygotsky's Neglected Legacy: Cultural-Historical Activity Theory. *Review of Educational Research* 77 (2): 186-232.
- Smith, G. A. 2002. Place-Based Education: Learning to Be Where We Are. *The Phi Delta Kappan* 83(8): 584-594.
- Sue, D. 2004. Whiteness and Ethnocentric Monoculturalism: Making the "Invisible" Visible. *American Psychologist* 59: 761-769.
- Thomas, S. and Heck, R. 2009. Hawaiian Cultural Influences in Education Multilevel Statistical Analyses. Report delivered to Kamehameha Schools. Honolulu.
- Vogt, L. A., C. Jordan and R. G. Tharp. 1993. Explaining school failure, producing success: Two cases. In *Anthropological perspectives on minority education* by C. Jordan & E. Jacobs (Eds.). Norwood, NJ: Ablex, 53-65.
- Yamauchi, L. A. 2003. Making school relevant for at-risk students: The Wai'anae High School Hawaiian Studies Program. *Journal of Education for Students Placed At Risk* 8(4): 379-390.
- Zehr, M. 2010. Culture-Based Education "Hawaiian Cultural Influences in Education: School Engagement Among Hawaiian Students." *Education Week* 29(28): 5.

Appendix A

Table A. Hawaiian Indigenous Education Rubric in Full Detail

	NONE	EMERGING	DEVELOPING	ENACTING
<b>I. LANGUAGE: USE OF HERITAGE LANGUAGE IN TEACHING</b>				
<p>Critical indicators</p> <p>a. Integration of Hawaiian language in class</p> <p>b. Hawaiian language materials and resources (e.g., books, electronic media, audio/visual technology, kūpuna, community members)</p>	<p>I do not have use for Hawaiian language in my class.</p> <p>I have no Hawaiian language materials or resources in my classroom.</p>	<p>I use simple Hawaiian words and/or songs to expose my students to Hawaiian language.</p> <p>I occasionally use Hawaiian language materials in my teaching.</p>	<p>I speak and display Hawaiian language in the learning environment, using phrases and simple language exchanges.</p> <p>I use Hawaiian language materials in my teaching fairly often.</p>	<p>I teach and communicate with my students in <i>‘ōlelo Hawai‘i</i> (Hawaiian language).</p> <p>I use Hawaiian language materials in my teaching all the time.</p>
PHILOSOPHY ON LANGUAGE	Hawaiian language is less relevant to core academic subjects like math, English, science, and social studies.	I believe it is important for all students to be exposed to Hawaiian language.	My teaching is grounded in the belief that all students should have a basic level of competency in the Hawaiian language.	My teaching is grounded in the belief that all students should be proficient in Hawaiian language to achieve our vision for a Hawaiian-speaking community.

	NONE	EMERGING	DEVELOPING	ENACTING
<b>II. 'OHANA AND COMMUNITY INVOLVEMENT</b>				
<p>Critical indicators</p> <p>a. Integration of 'ohana/ community in curriculum</p> <p>b. Communication between 'ohana and teachers</p> <p>c. Relationship between 'ohana and teachers</p>	<p>Families are so busy that I don't expect them to actively contribute to my class or my students' learning.</p> <p>Most of my contact with students' families occurs through open houses and school events.</p> <p>As a teacher, my relationship with students does not extend beyond the classroom.</p>	<p>I provide students' family members with information about ways they can support their child's learning at home.</p> <p>I contact family members (e.g., by phone, in person, by e-mail) when their children are having problems in my class.</p> <p>I talk with my students about their home lives but maintain appropriate physical and emotional boundaries.</p>	<p>I develop homework assignments and activities that require the active participation of family members.</p> <p>I frequently contact family members about a variety of student matters, both good and bad.</p> <p>I invite students' family members into the learning environment to create a sense of 'ohana.</p>	<p>I integrate 'ohana, community members, and kūpuna into the learning experience.</p> <p>I work closely with 'ohana to support their children's growth and success in and out of school.</p> <p>I work hard to get to know my students, their families, and their community through interactions outside of school.</p>
<b>III. CONTENT: CULTURE- AND PLACE-BASED</b>				
<p>CULTURE-BASED</p> <p>Critical indicators</p> <p>a. Curriculum</p> <p>b. Content</p>	<p>I use vendor-developed textbooks and materials for my class to ensure that the content and quality meet state standards or other benchmarks and guidelines.</p>	<p>I use readily available curricula and materials and try to interject Hawaiian or "local" examples where relevant.</p>	<p>I use culturally appropriate curricula and materials that include some Hawaiian cultural content.</p>	<p>I embed Hawaiian knowledge, practices, values, behaviors, language, and spirituality into the content and materials of my class.</p>
<p>PLACE-BASED</p> <p>Critical indicators</p> <p>a. Experiential</p> <p>b. Community-based</p> <p>c. Place-based</p>	<p>I use textbook-based lectures and discussions in my class.</p>	<p>I use hands-on learning activities outside the classroom.</p>	<p>I relate my coursework and content to the local (but not necessarily Hawaiian) community and my students apply what they have learned to community settings.</p>	<p>I use the community as a setting for student learning that is responsive to community needs and grounded in the Hawaiian knowledge, practices, and history associated with a place.</p>

	NONE	EMERGING	DEVELOPING	ENACTING
PHILOSOPHY ON CULTURE IN CLASS	I try to keep my class neutral and free of cultural references so that no students feel left out.	I design my class to support the diverse cultural backgrounds of my students.	I incorporate Hawaiian culture in my teaching to better engage students.	My ultimate goal in working with students is to preserve and perpetuate Hawaiian culture for generations to come.
<b>IV. CONTEXT</b>				
Critical indicators  a. Culturally grounded context	My teaching methods and delivery have little to do with Hawaiian culture, practices, values, or beliefs.	In my teaching, I incorporate universal values, couched in Hawaiian terms such as ‘ohana and <i>lōkahi</i> (unity, harmony).	I integrate Hawaiian practices, rituals, and protocol as part of the learning experience for my students.	The learning environment and daily practices of my class grow from my fundamental Hawaiian beliefs and native spirituality.
a. Culturally relevant community of learners	I lead class discussions that give individual students a chance to be heard when called on.	I facilitate student discussions and group interactions using a free-flowing, “talk story” structure that is collaborative in nature.	I encourage students to teach and learn from each other.	I create opportunities for intergenerational learning, where students learn from each other, from teachers, and from kūpuna.
b. Community well-being, kuleana	I define and direct my students’ roles and responsibilities.	I teach my students to recognize their responsibilities and the importance of their roles.	I expect my students to recognize and carry out their roles and responsibilities on their own.	I encourage my students to initiate and lead community projects to promote greater community well-being.
PHILOSOPHY ON THE ROLE OF TEACHER	My primary goal in teaching is to improve my students’ academic achievement.	I am just as responsible for my students’ social and emotional growth as I am for their academic achievement.	As a teacher, building cultural identity and self-worth in my students is as important to me as increasing their academic achievement.	I am responsible for ensuring that my students have a strong cultural identity, sense of place, and academic achievement.

	NONE	EMERGING	DEVELOPING	ENACTING
<b>V. DATA AND ACCOUNTABILITY</b>				
<p>INDIGENOUS ASSESSMENT</p> <p>Critical indicators</p> <p>a. Demonstrate knowledge/skills</p> <p>b. Application</p> <p>c. Value to community, culture</p>	<p>I use multiple-choice and other paper-and-pencil tests to assess students.</p>	<p>I assess my students by having them engage in projects or performances that:</p> <p>1. Require a range of knowledge and skills.</p>	<p>I assess my students by having them engage in projects or performances that:</p> <p>1. Require a range of knowledge and skills, AND</p> <p>2. Demonstrate a meaningful understanding of the material including the ability to problem-solve and creatively adapt knowledge to different situations.</p>	<p>I assess my students by having them engage in projects or performances that:</p> <p>1. Require a range of knowledge and skills, AND</p> <p>2. Demonstrate a meaningful understanding of the material including the ability to problem-solve and creatively adapt knowledge to different situations, AND</p> <p>3. Are culturally purposeful and useful (i.e., have real value to the community and to Hawaiian culture).</p>



## Appendix B

Table B1. Student Hawaiian Cultural Affiliation

Items	Percentage of Hawaiian students who answered agree/strongly agree		
	Low CBE Teachers	High CBE Teachers	P Value
I have spent time trying to find out more about Hawaiian history, traditions, and customs	57.2	82.6	<.0001
I am active in organizations or social groups that include mostly Hawaiians	23.9	69.1	<.0001
I have a clear sense of my Hawaiian background and what it means to me	63.1	85.5	0.0004
I think a lot about how my life is affected by my Hawaiian ethnicity	59.9	76.8	0.0097
I am happy that I am Hawaiian	83.0	94.2	0.0195
I have a strong sense of being Hawaiian	80.4	92.8	0.0152
I understand what it means to be Hawaiian	64.4	88.4	0.0001
I participate in Hawaiian cultural practices such as special food, music or customs	64.8	85.5	0.0009
I feel a strong attachment toward Hawaiians	77.3	88.4	0.0428
I feel good about my Hawaiian cultural and ethnic background	87.4	91.3	0.3686

Source: Adapted from Phinney's (1992) Multigroup Ethnic Identity Measure.

**Table B2.** Student Community Connections

Items	Percentage of Hawaiian students who answered more than once		
	Low CBE Teachers	High CBE Teachers	P Value
I have worked to protect the environment (ocean, streams, marshes, forests) in my community	32.0	71.0	<.0001
I have attended a public meeting about community or school affairs	16.8	36.8	0.0003
I have participated in demonstrations, protests, or marches	12.5	50.8	<.0001
How many makani (wind) and/or ua (rain) names do you know for your community or district?	1.6	22.4	<.0001
How many families do you know that have lived in your community for two generations or longer?			
How many mo'olelo (stories) do you know for your community?	14.6	27.9	0.0097
How many native plants can you identify in your community?	20.8	38.2	0.0028

**Table B3.** Student School Engagement

Item	Percentage of Hawaiian student who answered agree/strongly agree		
	Low CBE Teachers	High CBE Teachers	P Value
I complete all my homework on time	56.6	60.9	0.5297
I like reading	41.9	54.4	0.0656
My parent(s) is/are always involved in my schoolwork or activities	61.6	57.4	0.5286
I want to go to college	80.5	91.0	0.0419
I am able to practice skills I learn in school at home	73.4	79.7	0.2885
I like school projects where I can involve my family	58.2	63.2	0.4544
I am able to use cultural skills I learn at school in the community	40.8	77.6	<.0001
Many of the people at my school are like family	59.7	88.1	<.0001
I don't like school	20.2	21.2	0.8619
My teachers go out of their way to help me	47.8	74.2	0.0001
I am rarely absent from school	77.9	73.1	0.4157
I expect to graduate from college	73.5	87.9	0.0142
I trust people in my school	53.0	71.6	0.0060
I try hard at school	74.4	81.3	0.2550
Getting good grades is very important to me	83.8	89.6	0.2419
I spend at least one hour doing homework every school day	48.4	52.2	0.5800

Source: Adapted from the Asian /Pacific Islander (API) Youth Survey available from the Asian/Pacific Islander Youth Violence Prevention Center ([www.apiyvc.org](http://www.apiyvc.org)).

## Appendix C

Table C1. Student Self-Efficacy (Modified Rosenberg Scale)

Item	Question
1	It is important to think before you act
2	If I study hard, I will get better grades
3	When I try to be nice, people notice
4	If you work hard, you will get what you want
5	I am responsible for what happens to me
6	I can help make the world a better place to live in
7	Helping other people is its own reward

Source: Adapted from the Center for Disease Control (CDC) Compendium of the API Youth Survey.

Table C2. Student Hawaiian Cultural Knowledge and Practice

<b>Customs and beliefs</b>	
Item	Description
1	Having family home blessed by Hawaiian priest or kahuna
2	Taking part in Native healing or medicinal practices (ho‘oponopono, lomilomi, lā‘au lapa‘au)
3	Making offerings or ho‘okupu at heiau or in other appropriate situations
4	Learning genealogy/origin of family
5	Teaching family traditions/knowledge to younger generations
6	Know the ocean signs at the beach
7	Knowing how to fish and gather in proper ways and at the right time
8	Feeding and entertaining guest, family and friends when they visit
9	Preparing food for important cultural celebrations like a baby lū‘au
10	Greeting people in Hawaiian ways
<b>Lifestyle and activities</b>	
Item	Description
12	Hula
12	Chanting
13	Playing Hawaiian music
14	Listening to Hawaiian music
15	Taro farming
16	Participating in Hawaiian clubs
17	Canoe paddling
18	Lei making
19	Surfing or bodyboarding
20	Kapa making
21	Preparing Hawaiian food
22	Ocean food gathering and/or preparation (crab, he‘e, fish, limu)
23	Net, spear, trolling or ‘ōpelu fishing
24	Hunting
25	Poi making

Source: Adapted from Hishinuma et al. (2000) Hawaiian Culture Scale.

Table C3. Student Family Connections

Item	Description
1	My family gives me the moral support I need
2	I rely on family for emotional support
3	There is a member of my family I could go to if I were just feeling down, without feeling funny about it later
4	I have a very close relationship with a number of members of my family
5	I share what I learn in school with my family
6	In my family, we make decisions together
7	My family gets together often
8	My family supports my education
9	I show that my family is important to me by helping out around our home
10	Family activities are just as important to me as activities with my friends