

ACADEMIC ACHIEVEMENT ACROSS SCHOOL TYPES IN HAWAII'I: OUTCOMES FOR HAWAIIAN AND NON-HAWAIIAN STUDENTS IN CONVENTIONAL PUBLIC SCHOOLS, WESTERN-FOCUSED CHARTERS, AND HAWAIIAN LANGUAGE AND CULTURE-BASED SCHOOLS

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Educators and policymakers in Hawai'i are exploring nontraditional school types such as charter schools and Hawaiian language and culture-based (HLCB) schools to address achievement differentials among students. This research examines student data across three school types (conventional public schools, Western-focused charters, and HLCB) and at three grade levels (5, 7, and 10). Overall, mean scores for reading and mathematics are not significantly different in most cases between conventional public schools and HLCB schools. Whereas in lower grades students score significantly higher in conventional public schools, in higher grades there are no significant differences in means or HLCB students outperform their peers. Among both Hawaiian and non-Hawaiian students, mean scores are the highest in Western-focused charter schools. When proficiency statuses are examined under the No Child Left Behind Act, a significantly higher percentage of students in HLCB schools move out of the lowest proficiency level (the Well Below status) than in conventional public schools.

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PREFACE

This paper first began while I was doing research for my master's thesis in California. I had written papers on Hawaiian-focused education using published research, but I was limited to online resources because I was away from Hawai'i. At Stanford University, even though I had access to leading researchers in sociology and education, very few had knowledge about my area of interest, Hawai'i. As a result, I did not have the opportunity to develop my ideas in close contact with others. Similarly, there are many students from Hawai'i who are studying in the continental United States in a variety of fields ranging from education to engineering. If our desire is for these students to return to the islands to work and strengthen our communities, then we must support them in every way possible with aloha,¹ financial aid, and accessibility to ideas that are relevant to Hawai'i.

I moved back to the islands in summer 2007 to enroll in the Ho'okulāiwi Master's of Education in Teaching program at the University of Hawai'i–Mānoa. There I was able to sit at the feet of incredible indigenous and local kumu who shared brilliant ideas and a deep commitment to changing the face of education in Hawai'i. They challenged me to view research on Hawaiian-focused education with a more nuanced and critical eye. As a result, I came to understand research and education from new and exciting perspectives.

At the same time, I began working at Kamehameha Schools in the Research and Evaluation (R&E) division and discovered that many of my personal interests paralleled the research of Kamehameha Schools. Although I did not have the knowledge to run the same kinds of statistical analyses that were being used, I nevertheless felt I was on track because my personal education and ideas led me in the same direction as the R&E group. I feel humbled to now work alongside individuals whose research I read and cite.

Throughout my work I ask myself: who am I to evaluate the effectiveness of Hawaiian language and culture-based (HLCB) schools? As a non-Hawaiian, I am interested in how my own children may fare in Hawaiian-focused schools. Will they be able to learn, grow, and thrive in these settings? With a background in policy, research, and practice, and understanding Hawai'i's sociopolitical context, I want to know the outcomes for the approximately 70% of students in the public education system in Hawai'i who are not Native Hawaiian (Hawai'i Department of Education, 2006). Are the strategies used in HLCB schools effective for both

Hawaiian and non-Hawaiian students? These questions motivate my research for both personal and public policy reasons, and my findings indicate that what is good for Hawaiians is indeed good for all of Hawai'i.

To me, research is only worthwhile if there are practical implications for positive change in our communities. My hope is that educators, policymakers, and providers of funding are encouraged and challenged by the research to make strategic decisions to improve the well-being of all students in Hawai'i.

INTRODUCTION

Under the No Child Left Behind Act of 2001, educators and policymakers across the United States are forced to confront educational differentials as they seek to increase student achievement. Schools are required to report test scores for specific subgroups of race, socioeconomic status, disability, and English ability. If any one of these subgroups fails to achieve predetermined state standards, the school does not meet Adequate Yearly Progress (AYP). Failure to meet AYP may place a school in restructuring status, which may result in state takeover.

Both locally and globally, stakeholders are looking to different mechanisms to improve education and academic achievement while calling for an overhaul in the settings and contexts of learning. One method of doing so can be seen in the creation of new schools that embrace a pedagogy integrating community and school, utilizing life applications, and delivering highly rigorous and relevant education. Such mechanisms often take the form of charter or other schools that serve a specific cultural purpose.

In 1988, Albert Shanker, president of the American Federation of Teachers, called for the establishment of charter schools as autonomous public schools free from district and state regulations and held accountable more for student outcomes than educational inputs such as teacher certification (Brouillette, 2002). Minnesota followed suit in 1991 as the first state to establish charter school laws, and in 1994, Hawai'i passed its first law establishing charter schools (Hawai'i Association of Charter Schools, 2002).

Recognizing academic differentials between majority and minority/indigenous students, culture-based schools and strategies attempt to close the achievement gap by increasing the relevance of education for specific groups. For example, schools and curricula have been used with American Indian and Alaska Native students to account for differences in language and worldview (e.g., Adams, Adam, & Opbroek, 2005; Demmert, 2005; see also Kana'iaupuni, 2007, for more examples). Additionally, Kana'iaupuni and Ishibashi (2003) argued that culturally relevant learning environments are important for Native Hawaiian students to address stereotypes and ethnic bias.

RESEARCH QUESTIONS

This research specifically examines academic achievement differentials across three publicly funded school types in Hawai'i: conventional public schools, HLCB schools, and Western-focused charters.² HLCB schools refer to kula kaiapuni, or Hawaiian language immersion schools within the Hawai'i Department of Education, as well as Hawaiian-focused and Hawaiian-medium charter schools. Categorization of schools into these three groups reflects institutional and philosophical differences, which are evident in teacher practice (Ledward & Takayama, 2008).

Recognizing that there are significant differences in reading and mathematics test scores among ethnic groups in Hawai'i and that, among major ethnic groups, Hawaiians tend to have the lowest test scores (Takayama, 2007; Uyeno, Zhang, & Chin-Chance, 2006), I examine school type differentials for Hawaiian and non-Hawaiian students. The Hawai'i State Assessment (HSA) assigns students to one of four proficiency levels—*Well Below*, *Approaches*, *Meets*, or *Exceeds* proficiency—based on their HSA results. Because previous ability is the highest predictor of academic achievement (Anderson & Keith, 1997), movement out of lower proficiency statuses in test scores may show how well schools help students to achieve higher levels. Thus, in my research, I explored the following questions:

RESEARCH QUESTION 1: Do certain school types predict higher academic achievement among Hawaiians and non-Hawaiians in Hawai'i when controlling for small school size?

RESEARCH QUESTION 2: Do certain school types predict greater movement out of the “Well Below” status among Hawaiians and non-Hawaiians in Hawai‘i when controlling for small school size?

BACKGROUND

Academic achievement tends to be measured in two primary ways: school grades and performance on standard tests. While grades and test scores are potential markers of student learning, Coleman et al. (1966) noted that they are not “culture-free” but rather culture-bound. Still, they are widely used for purposes of student assessment in schools. Other important outcomes for students, such as school engagement, quality community and school relationships, and civic engagement, are not yet available on a systemwide basis.

Researchers have investigated many variables that predict academic achievement. These variables can be categorized into three major groups: characteristics of the student, characteristics of the student’s environment, and demographic/background factors. It is crucial to note, however, that relationships exist across these variables as well.

Characteristics of the student include ability and motivation. Ability, as measured by a number of variables including prior standard achievement test scores, prior school grades, and nonverbal tests of ability, has been found to be the strongest correlate of academic achievement and holds true for both White and minority students (Anderson & Keith, 1997). However, these measures of “ability” are clearly linked to experiences in school. Additionally, increased rigor of coursework is associated with higher levels of achievement (Cool & Keith, 1991). Characteristics of the student’s environment that predict academic achievement include those of the home and school, such as parental involvement (Steinberg, Dornbusch, & Brown, 1992), quality of instruction (Cool & Keith, 1991), and quantity of instruction (Alexander & Pallas, 1984).

Demographic/background variables are often used as control variables or as independent variables with one or more intervening variables and explain the largest part of total variance for academic achievement. The strongest associations with

test scores are family income, parental educational levels, and race/ethnicity (Grissmer, Flanagan, Kawata, & Williamson, 2000). Even when one controls for other background variables such as socioeconomic status and English ability, White students tend to score better on standard tests than minorities, and boys tend to score better than girls. However, in Hawai'i, girls often score higher than boys (Uyeno et al., 2006). Additionally, higher ability and higher socioeconomic status are associated with higher quality of instruction (Cool & Keith, 1991). Of particular interest to me is the intersection of ethnicity and school type in predicting academic achievement.

In response to the Civil Rights Act of 1964, James Coleman published the first exhaustive analysis of educational equality across major ethnic groups in the United States (Coleman et al., 1966). Coleman's research revealed how school characteristics affect student academic achievement. What came to be known as the Coleman Report sparked a surge in educational research about the intersections of school characteristics, family background, and educational outcomes (Gamoran & Long, 2006).

Research has examined a plethora of intervening variables to better understand the relationship between race and academic achievement, including racial identity and psychological well-being (Arroyo & Zigler, 1995; Fordham & Ogbu, 1986), attention problems (Rabiner, Murray, Schmid, & Malone, 2004), segregation (Rosignano, 1999), family disadvantage (Phillips, Brooks-Gunn, Duncan, Klebanov, & Crane, 1998), effects of prejudice and stress (Gougis, 1986), and ethnic socialization (Marshall, 1995).

When race is used as a variable in educational research, there tends to be a focus on African Americans because of historical injustices and noted underachievement as compared with Whites (Fordham & Ogbu, 1986; Gougis, 1986; Jencks & Phillips, 1998; Rosignano, 1999). In Hawai'i, educational research has focused on four primary ethnic groups: Native Hawaiian, East Asian (Chinese, Japanese, Korean), Filipino, and Caucasian. It has been found that Native Hawaiian and Filipino students, on average, tend to score lower than East Asian and Caucasian students on standard tests (Uyeno et al., 2006). Prior research has also disaggregated students into five major ethnic groups in Hawai'i (Native Hawaiian, Japanese, Chinese, Filipino, and White), and also into Hawaiian and non-Hawaiian (Kana'iaupuni, Malone, & Ishibashi, 2005).

SCHOOL TYPE AND ACADEMIC ACHIEVEMENT

Research has been done on the relationships between various school types and academic achievement. This body of work primarily compares outcomes for students in conventional public schools with their peers in religious schools (Sander, 1996; Willms, 1985), private schools (Sander, 1999; Witte, 1992), and charter schools (Hoxby, 2004; Nelson, Rosenberg, & Van Meter, 2004). Although culture-based schools are growing in size, little research exists on outcomes for students in these schools. Two types of schools are of particular interest in this study: charter schools and HLCB schools. There is overlap in the two types in that there are Hawaiian-focused charter schools but also non-Hawaiian-specific (i.e., Western-focused) charter schools as well.

Charter Schools

Charter schools are publicly funded schools that operate under a contract (charter) that allows increased flexibility and autonomy, while still meeting federal and state accountability requirements (U.S. Department of Education, 2004). Proponents of charter schools argue that they represent opportunities for educational innovation and offer alternatives to students and families in regular public schools that otherwise may be failing (Hoxby, 2004). However, current research on charter schools offers mixed conclusions.

A study by the American Federation of Teachers compares the achievement of fourth- and eighth-grade charter school students with their counterparts in regular public schools on the 2003 National Assessment of Educational Progress. The results show that charter school students score lower than regular public school students for both reading and mathematics (Nelson et al., 2004). A similar trend of lower achievement occurs among low-income and minority students.

Hoxby (2004), on the other hand, reached a different conclusion after using a methodology that matches schools geographically. When charter schools were compared with nearby regular public schools with similar racial compositions, elementary school students enrolled in charter schools showed higher levels of proficiency on state assessments of both reading and mathematics. Moreover, Hoxby found that the charter school advantage was greater for Hispanics and low-income students. The differences in findings between Hoxby and the American Federation of Teachers may be due to differences in assessments (national vs. state) and methodology (national sample vs. matched schools).

Hawai'i's first charter school law was passed in 1994 and used the phrase "student-centered schools." On May 27, 1999, the state legislature passed Act 62 formally establishing "New Century Charter Schools" (Hawai'i Association of Charter Schools, 2002). Charter schools are run independently from the Hawai'i Department of Education and allow for more autonomy via decision making at the local level. However, admission policies must be nondiscriminatory and students are still required to meet the Hawai'i Content and Performance Standards. During school year 2005–2006, there were 27 charter schools in the state of Hawai'i, including 14 Hawaiian language immersion and/or culture-based schools.

In Hoxby's (2004) study, seven charter schools in Hawai'i were examined with a relative enrollment of 233. The study found that 14.3% more students in charter schools than matched regular public schools are proficient in reading on the Hawai'i State Assessment, and 12.1% more students in these charter schools are proficient in mathematics.

Kana'iaupuni and Ishibashi (2005) compared the academic achievement of Native Hawaiians in charter schools and in regular public schools. They found that Native Hawaiian students in charter schools tend to score as well or better on standard tests for reading and mathematics compared with their counterparts in regular public schools. After controlling for gender, socioeconomic status, grade, teacher credentials, and region, the authors found that Native Hawaiian students in charter schools also had significantly higher scores on the SAT-9 for reading and mathematics as well as the HSA for reading alone. Their data, however, do not distinguish between Hawaiian-focused and non-Hawaiian-specific charters, and the authors are not sure if such relationships are due to specific characteristics of charter schools or because of a smaller school size. It is also unclear if charter schools promote higher achievement among non-Hawaiians.

Culture-Based Schools

Another type of school reform that continues to grow is culture-based schools, which oftentimes use language, content, contexts, and assessment strategies that are culturally relevant for students of indigenous and/or minority groups and integrate family and community into the learning experience (Kana'iaupuni, 2007). Recognizing that the United States typically views education through a Western lens, culture-based education seeks to use the cultures of indigenous and minority

students to address educational inequalities where Western-based education has failed. Research has shown culture-based models to be promising for Alaska Native students (Adams et al., 2005; Lipka, Sharp, Brenner, Yanez, & Sharp, 2005), Native American students (Demmert, 2001), and Native Hawaiian students (Kaiwi & Kahumoku, 2006; Kawakami & Aton, 2001; Tibbetts, Kahakalau, & Johnson, 2007). Although there is a growing body of research on culture-based education, Demmert and Towner (2003) found that little statistically sound research exists that shows how culturally relevant strategies influence academic achievement.

In Hawai'i, research has found that the development of a formalized education system based on Western values rather than on the transmission of traditional knowledge has alienated Native Hawaiian students, whose culture tends to focus on experience in authentic environments (Kana'iaupuni et al., 2005; Kawakami, 2004). Prior to Western contact, Native Hawaiians—elites and commoners alike—highly valued education that was skill-based, place-based, and practical. Keiki were taught by caregivers including older siblings and adults who were considered masters in their occupations. Additionally, values important to the shaping of education included the land as a natural classroom, ongoing pursuit of excellence, and respectful observation of the kumu. Oral tradition was especially valuable for the communication of history, beliefs, and technical skills and allowed for mastery in several areas, including agriculture, aquaculture, sea navigation, healing, and genealogy (Kana'iaupuni et al., 2005). It is upon these values and skills that Hawaiian-focused schools are based.

After Western contact, however, Native Hawaiians were made strangers in their homeland. In 1893, a group of American businessmen backed by United States armed forces illegally overthrew the Hawaiian monarchy. In order to avoid bloodshed Queen Lili'uokalani, the reigning monarch of the time, allowed American occupation of the Hawaiian kingdom in hopes that US government leaders would correct the injustice upon her people, but this never happened (Benham & Heck, 1998). What followed was the effective banning of the use of Hawaiian language in both public and private schools in 1896 (Kawai'ae'a, Housman, & Alencastre, 2007; Warner, 1999b; Warschauer & Donaghy, 1997; Wilson & Kamanā, 2006). This Western-focused education system threatened traditional teaching and learning.

Currently, Native Hawaiian families are nearly twice as likely to live in poverty as compared with the total population of Hawai'i and are half as likely to have a bachelor's degree or higher. The media report that Native Hawaiians are also more

likely to be unemployed and less likely to have jobs in management, professional, and related occupations (Donnelly, 2006). Within this context, Hawaiian culture-based schools seek to address historical injustices and current challenges facing Native Hawaiian students.

Culture-based schools focus on the strengths of Hawaiian students. Historians and scientists have long doubted and discredited the accomplishments of Native Hawaiians and have largely influenced the construction of knowledge around Hawaiian history. Kana'iaupuni (2005) recognized cultural biases in the construction of knowledge due to limited historical information. She called for strengths-based educational models by Native Hawaiians that work against stereotypes of inherent inability. Such strengths include a "special sensitivity to the world around them," aloha, and the expertise of kūpuna (Kana'iaupuni, 2005, p. 30). Focusing on strengths rather than deficits also serves to reduce prejudice due to incorrect perceptions of Hawaiians. Strengths-based approaches are often the framework by which kula kaiapuni and Hawaiian-focused charter schools develop and operate (Tibbetts et al., 2007); they comprise a form of education that many Hawaiian students prefer (Kahakalau, 2004).

The first Hawaiian immersion school was founded in 1983 amidst a movement to reclaim Hawaiian culture (Kawai'ae'a, Housman, & Alencastre, 2007; Warschauer & Donaghy, 1997; Wilson & Kamanā, 2006). In 1986 the Hawai'i Department of Education's Ka Papahana Kaiapuni Hawai'i began the first two Hawaiian language immersion programs in public schools. At that time only 1,500 native speakers remained (most of whom were over age 50), and as a result a major goal of the program was to revitalize the Hawaiian language among the younger generations in the K-12 institutional setting (Kawakami, 2004). Kula kaiapuni, Hawaiian immersion schools, seek to provide "quality education based on knowledge of Hawaiian language and culture as the foundation upon which individuals become responsible, sensitive, and productive adults who contribute significantly to all levels of Hawaii's community" (Office of Instructional Services, 1994, p. 4).

Kula kaiapuni are more than English-medium programs translated into Hawaiian. The worldview of a Hawaiian speaker is not the same as the worldview of an English speaker (Wong, 1999). Teachers in kula kaiapuni seek to transmit both language and culture, and for many of them, teaching in such a context is a part of a transformation in their own Hawaiian identity as they develop deeper relationships with students and learn more about Hawaiian culture (Yamauchi, Ceppi, & Lau-Smith, 2000). As such, Hawaiian language schools are one way that Hawaiians are taking control of their futures and the education of their children (Benham &

Heck, 1998; Warner, 1999b; Yamauchi et al., 2000). In conventional public schools in Hawai'i where Hawaiian/Part-Hawaiian students constitute the largest ethnic group, Hawaiians only account for 9.9% of teachers (Hawai'i Department of Education, 2006).

Students enrolled in kula kaiapuni learn subject matter through the medium of the Hawaiian language; English is introduced in the fifth grade to ensure fluency. Warner (1990) found that students can learn a second language through total immersion without detriment to their English abilities. He reviewed literature on non-Hawaiian immersion programs and found that immersion students consistently perform at the same level or better than their peers on assessments of English. Being that English and Hawai'i Creole English ("Pidgin") are the dominant languages of Hawai'i, many people have called for increased intergenerational and community use of Hawaiian language, which often requires political support through policy changes (Warner, 1999a; Wong, 1999).

As of 2006, there were 22 Hawaiian immersion schools or programs within schools, including 2 stand-alone schools, 15 schools-within-a-school, and 5 charter schools. Additionally, there was 1 partial immersion charter school and 7 Hawaiian culture-based (but not immersion) charter schools ('Aha Pūnana Leo, 2006; Charter School Administrative Office, 2006).

An element of HLCB schools that may influence academic achievement is the high level of family involvement. Ledward and Takayama (2008) found that HLCB schools such as kula kaiapuni and Hawaiian-focused charters integrate family and community into the learning environment at higher rates than that of conventional public schools, Western-focused charters, and private schools involved in the study. Parents have been strongly involved in kula kaiapuni since their inception by lobbying of the Board of Education and state legislature, participating in fundraisers to supplement teachers' budgets from the Department of Education, and even cutting and pasting Hawaiian translations into English books (Kame'eleihiwa, 1992).

On the basis of previous research on Hawaiian and charter schools, I hypothesize the following: On standard tests, Hawaiian students achieve comparable or higher levels in HLCB schools (kula kaiapuni and Hawaiian-focused charters) and show greater movement out of the Well Below proficiency status than in regular public schools. The literature is unclear of the effect of school type on non-Hawaiian students, so no hypotheses are made regarding their achievement and growth.

METHOD

Participants

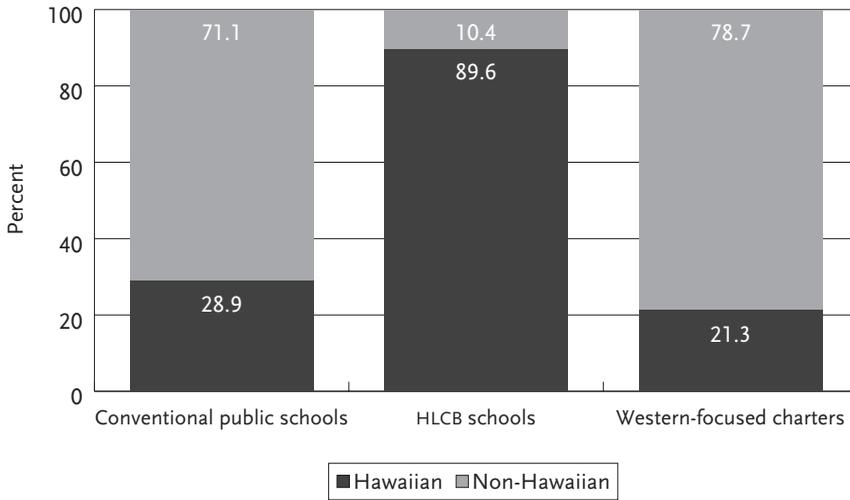
To assess Adequate Yearly Progress under the No Child Left Behind Act of 2001, the state of Hawai'i requires students enrolled in Hawai'i public schools to take the HSA. Beginning in school year 2004–2005, students in Grades 3–8 and 10 were required to take the tests; in prior years, the HSA was only administered to students in Grades 3, 5, 8, and 10.

This study compares academic achievement by school type for Native Hawaiian and non-Hawaiian students in Hawai'i's public schools. To help ensure equitable comparisons, I limited the conventional public schools sample to students enrolled in small schools (defined as 60 or fewer students per grade). These small schools are ethnically mixed and constitute what I believe to be the most reasonable comparison group for the charter schools. The largest ethnic groups in the small public schools are Hawaiian/Part-Hawaiian (28.9%), Filipino (17.4%), Caucasian (14.5%), and Japanese (10.4%). Hawaiians comprise the majority of students in HLCB schools (89.6%), whereas Caucasians are the largest ethnic group in Western-focused charters (35.4%). Compared with conventional public schools, Filipino and Japanese students are underrepresented in HLCB schools and Western-focused charters. Schools with a mix of Hawaiian immersion programs and English-medium programs were excluded from analysis because there is no current indicator from the Hawai'i Department of Education databases to identify students who are enrolled in a *kula kaiapuni* within a conventional public school.

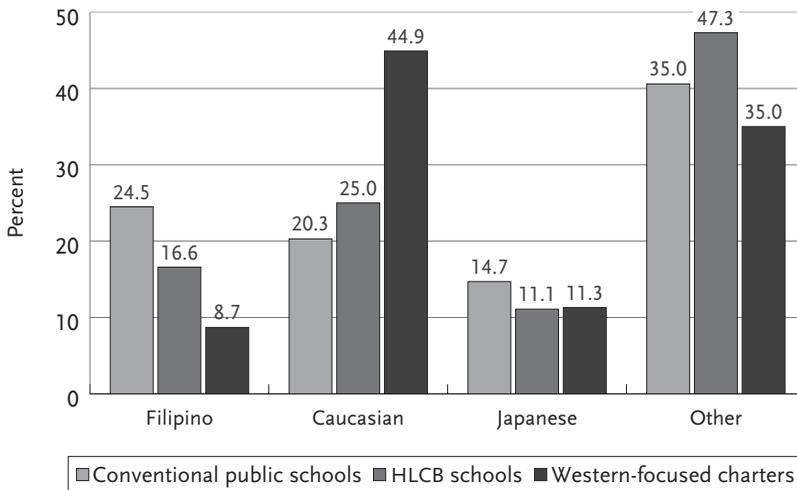
Western-focused charter schools tend to enroll a lower proportion of students with various risk factors when compared with other school types. Students receiving free/reduced lunch account for one in four students (27%) in Western-focused charters (the lowest percentage of the three school types) but account for nearly two of three students (65%) in HLCB schools. The rate of enrollment of special education students in Western-focused charters (5%) is less than half that of conventional public schools (11%) and HLCB schools (12%). (See Figure 1.)

FIGURE 1 Native Hawaiian and non-Hawaiian ethnicity and risk factors in Hawai‘i’s public schools by school type

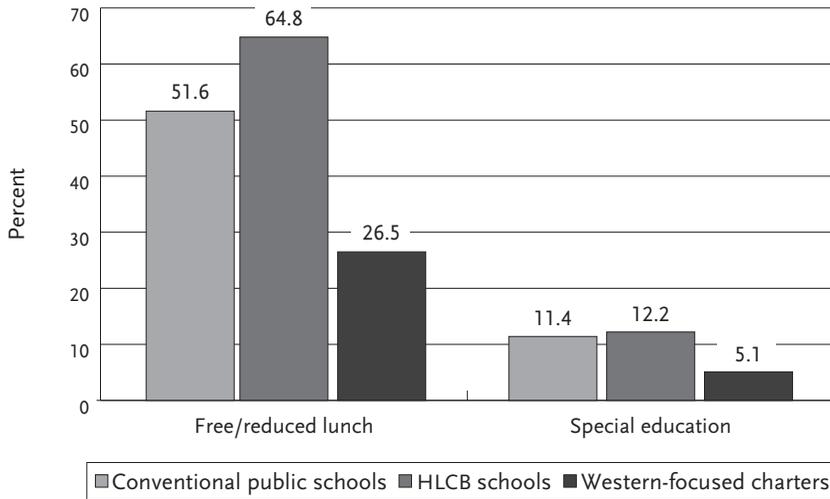
a. Hawaiian ethnicity by school type



b. Non-Hawaiian ethnicities by school type (as % of non-Hawaiian students)



c. Risk factors by school type



For the purposes of this study, I examined the scaled scores of students in Grades 5, 7, and 10. These three grades were selected as indicators for elementary, intermediate/middle, and high schools, respectively. As mentioned earlier, students are assigned to one of four proficiency levels based on their HSA results. Movement out of the Well Below proficiency status over 2 school years was examined for three aggregated cohorts progressing two grade levels (i.e., Grades 3 to 5, 5 to 7, and 8 to 10) between school years 2001–2002 and 2005–2006. To increase sample size and the robustness of the findings, the study aggregated 3 cohorts of students moving from Grades 3 (in school years 2001–2002 to 2003–2004) to 5 (in school years 2003–2004 to 2005–2006), 2 cohorts of students moving from Grades 5 (in school years 2002–2003 to 2003–2004) to 7 (in school years 2004–2005 to 2005–2006), and 3 cohorts of students moving from Grades 8 (in school years 2001–2002 to 2003–2004) to 10 (in school years 2003–2004 through 2005–2006). The discussion of student characteristics in this section reflects data for all the cohorts examined (see Table 1).

TABLE 1 Student characteristics by school type

Variable	Conventional public schools		HLCB schools		Western-focused charters	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Ethnicity						
African American	279	2.6	—	—	11	1.8
Caucasian	1,574	14.5	9	2.6	222	35.4
Chinese	375	3.4	—	—	16	2.6
Filipino	1,895	17.4	6	1.7	43	6.9
Hawaiian	454	4.2	130	37.6	19	3.0
Part-Hawaiian	2,693	24.7	180	52.0	115	18.3
Hispanic	299	2.7	1	0.3	13	2.1
Indo-Chinese	78	0.7	—	—	2	0.3
Japanese	1,137	10.4	4	1.2	56	8.9
Korean	114	1.1	—	—	5	0.8
Native American	57	0.5	1	0.3	6	1.0
Portuguese	255	2.3	5	1.5	6	1.0
Samoan	293	2.7	5	1.5	5	0.8
Other	1,392	12.8	5	1.5	109	17.4
Free/reduced lunch	5,577	51.6	223	64.8	165	26.5
Special education	1,236	11.4	42	12.2	32	5.1
Female	5,298	48.6	178	51.5	322	51.3
Grade						
3–5	9,949	91.0	63	18.2	315	50.1
5–8	527	4.8	119	34.4	116	18.4
8–10	463	4.2	164	47.4	198	31.5
No. of schools						
Grade 5	84		9		9	
Grade 7	10		12		8	
Grade 10	7		11		6	

Note: Small schools only, school years 2001–2002 to 2005–2006, for students who progress two grade levels where data are available for relevant grades.

The low number of students taking the HSA and progressing from Grades 3 to 5 in HLCB schools is reflective of the fact that students enrolled in Hawaiian language immersion programs take the Hawaiian Aligned Portfolio Assessment (HAPA) in Grades 3 and 4.³ Despite the fact that the HAPA and HSA are both aligned to the Hawai'i Content and Performance Standards, the two tests are very different. Therefore, students taking the HAPA are not included in this study, and the findings for the elementary school cohorts are reflective of Hawaiian-focused schools alone.

Measures

DEPENDENT VARIABLES. This study used data from the HSA to measure achievement in mathematics and reading based on the Hawai'i Content and Performance Standards. This study reports results on four dependent variables: level of achievement in reading and mathematics as represented by scaled scores at Time 2 and movement out of Well Below proficiency in reading and mathematics as represented by HSA proficiency levels. Scaled scores aggregated over the 2003–2004 through the 2005–2006 school years were used to compare achievement across school types and student ethnicity. The possible range of HSA scaled scores is 100–500.

Longitudinal matching of test results from Time 1 to Time 2 (see Table 2) was used to determine movement out of Well Below status. A scaled score below 200 indicates that a student's achievement is Well Below proficient, and a score of 300 indicates that a student is proficient in the respective subject (i.e., Meets or Exceeds proficiency). For the purpose of this study, proficiency was recoded as two levels: (a) Well Below and (b) not Well Below (Approaches, Meets, and Exceeds).⁴

TABLE 2 Hawai'i State Assessment administration by cohorts studied

Cohort	Time 1	Time 2
Cohort 2006	Grade 8 (2002)	Grade 10 (2004)
Cohort 2007	Grade 8 (2003)	Grade 10 (2005)
Cohort 2008	Grade 8 (2004)	Grade 10 (2006)
Cohort 2009	—	—
Cohort 2010	Grade 5 (2003)	Grade 7 (2005)
Cohort 2011	Grade 3 (2002)	Grade 5 (2004)
	Grade 5 (2004)	Grade 7 (2006)
Cohort 2012	Grade 3 (2003)	Grade 5 (2005)
Cohort 2013	Grade 3 (2004)	Grade 5 (2006)

Note: Small schools only, school years 2001–2002 to 2005–2006, for students who progress two grade levels where data are available for relevant grades.

INDEPENDENT VARIABLE. The analysis of variance (ANOVA) results reported here use one independent variable: school type. Schools were coded into three independent groups: conventional public schools, Western-focused charters, and HLCB schools (kula kaiapuni and Hawaiian-focused charters). There are 14 Hawaiian-focused charters and 2 stand-alone kula kaiapuni.⁵ Western-focused charters are not specifically Hawaiian language and/or culture-based, and other research asserts that all schools transmit instruction via a cultural lens, which by default tends to be a Western perspective (Kana'iaupuni, Ledward, & Takayama, 2009; Ledward & Takayama, 2008).

SAMPLING VARIABLES. The Hawaiian ethnicity and grade variables, described below, were combined to create six samples: Hawaiian Grade 5, Hawaiian Grade 7, Hawaiian Grade 10, non-Hawaiian Grade 5, non-Hawaiian Grade 7, and non-Hawaiian Grade 10. In this study, independent analyses were conducted for six samples on each achievement level variable (scaled scores for reading and mathematics) for a total of 12 analyses.

Because the number of students who could be included in the analysis for movement out of the Well Below status was limited to those who had test scores at both Time 1 and Time 2 and who scored in the Well Below range at Time 1, Hawaiian ethnicity was not used to create the samples for these analyses. As a result, a total of six independent ANOVAs were performed to assess the relationship between school type and movement out of the Well Below status: three samples (one for each grade level at Time 2) by subject area (reading and mathematics).

HAWAIIAN ETHNICITY. Each student is classified into 1 of 13 ethnic groups in the Department of Education system: African American/Black, Caucasian/White, Chinese, Filipino, Hawaiian, Hispanic, Indochinese, Japanese, Korean, Native American, Part-Hawaiian, Portuguese, Samoan, and Other. The low numbers of students of non-Hawaiian ethnic groups in certain school types prevent reliable analyses by specific ethnicities. For the purposes of this study, students classified as Part-Hawaiian or Hawaiian were coded as Hawaiian; all others were coded as non-Hawaiian.

GRADE. The variable grade is based on the student's grade level at Time 2.

Procedure

Twelve one-way ANOVAs were performed to test the relationship between school type and achievement levels at Time 2 in reading and mathematics. Following the ANOVAs, post hoc least significant difference (LSD) *t* tests were used to identify statistically significant differences in average reading and mathematics scaled scores for each pair of school types. Means and standard deviations are presented for both ethnic groups within a grade.

Another six one-way ANOVAs were performed to assess movement out of the Well Below status. The percentages of students moving from Well Below at Time 1 to not Well Below at Time 2 were used to identify significant differences between school types. To protect student confidentiality, I left blank any cell with 10 or fewer students, which effectively eliminated Western-focused charters from these analyses. Likewise, I was also interested in movement *into* the Well Below proficiency level and between other proficiency levels, but small sample sizes in certain school types prevented reliable analyses.

RESULTS

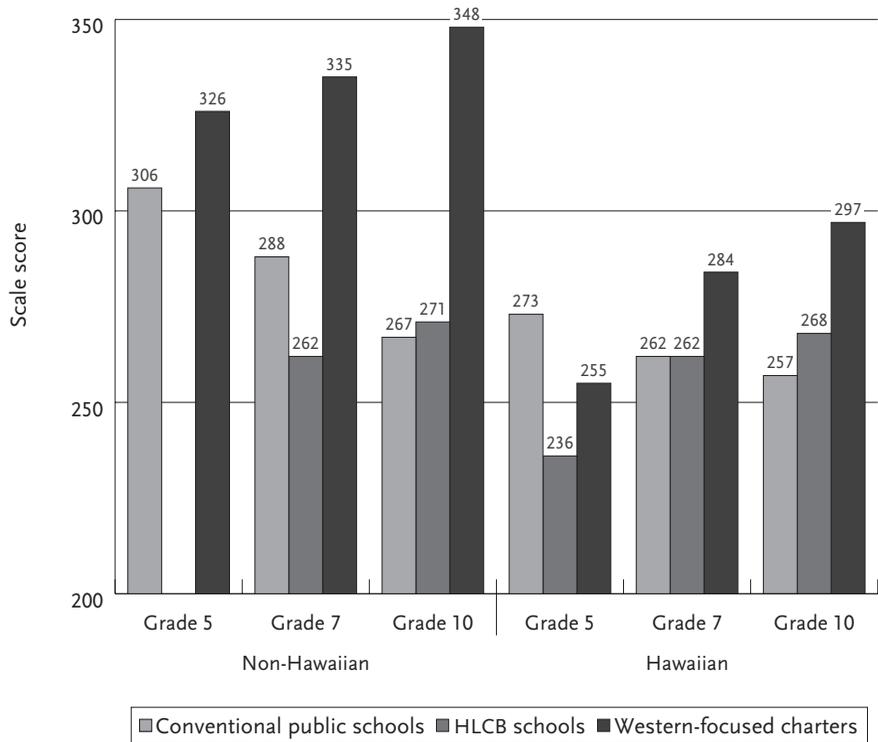
Reading Scale Scores on the Time 2 Hawai'i State Assessment

With one exception, the ANOVA results for the relationships between school type and reading scale scores were statistically significant at the .05 level. The exception was for Hawaiian students in Grade 7. For Hawaiian students in Grades 5 and 10 and non-Hawaiian students in Grades 7 and 10, mean reading scores in Western-focused charters were significantly higher than those of students in both conventional public schools and HLCB schools (see the Appendix, Table A1). For example, among non-Hawaiian 10th graders, students in Western-focused charters scored significantly higher than their counterparts in conventional public schools and HLCB schools (means = 347.8, 266.8, and 270.6, respectively). Non-Hawaiian students in Grade 5 in Western-focused charter schools also scored significantly higher than their peers in conventional public schools. This same comparison could not be performed for non-Hawaiians in HLCB schools because the number of students was too small for reliable analysis.

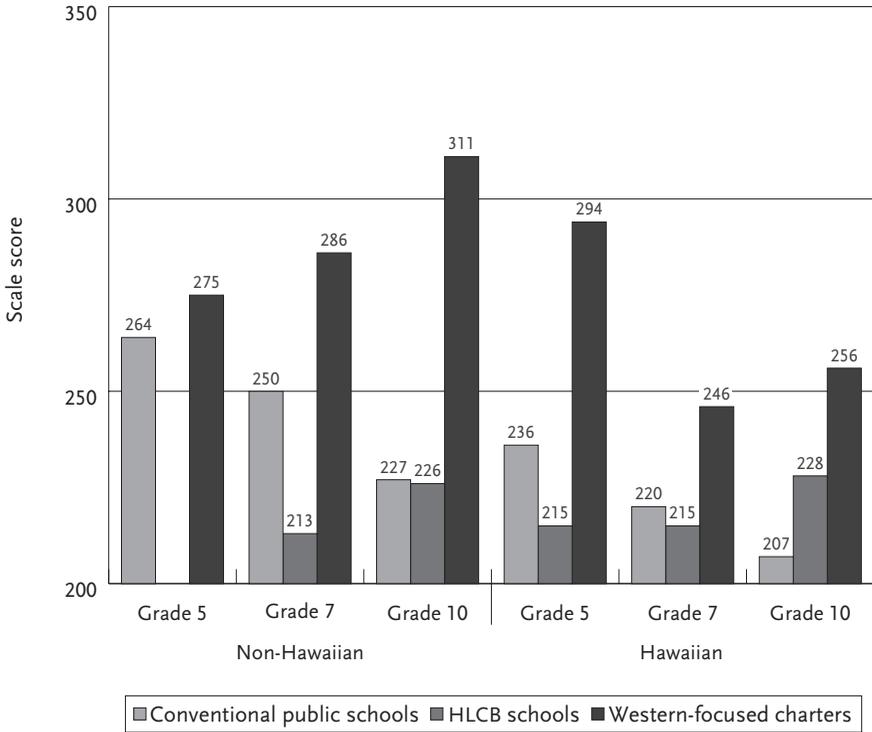
For all grades studied, there were no significant differences in reading scores for non-Hawaiian students in conventional public schools and HLCB schools. Among Hawaiian students, 5th graders in conventional public schools scored significantly higher than those in HLCB schools (with average scores of 273.3 and 235.9, respectively). Like non-Hawaiian students, Hawaiian students in Grade 10 in HLCB schools outperformed their counterparts in conventional public schools. Although the difference is not statistically significant, it does exceed the conventional threshold for a small effect (a difference greater than .20 standard deviations; see Figure 2a).

FIGURE 2 Reading and mathematics mean scores on the Hawai'i State Assessment, school years 2003–2004 to 2005–2006 aggregated

a. Reading



b. Mathematics



Mathematics Scale Scores on the 2005–2006 Hawai‘i State Assessment

The ANOVA results for the relationship between school type and mathematics scale scores were statistically significant at the .05 level. For both Hawaiian students in Grades 7 and 10 and non-Hawaiian students in Grades 5, 7, and 10, mean mathematics scores were significantly higher in Western-focused charters than in both conventional public schools and HLCB schools (see Figure 2b). As with reading, a comparison of the performance of non-Hawaiians in HLCB in Grade 5 schools could not be completed because the number of students was too small for reliable analysis.

Among non-Hawaiians in 7th grade, students in conventional public schools scored significantly higher than those in HLCB schools (means = 250.5 vs. 212.8). In 10th grade, however, there were no significant differences, with means differing by less than 1 point.

For Hawaiians in the 5th grade, students in HLCB schools scored significantly lower on average than their counterparts in conventional public schools (with mean scores of 214.9 and 236.0, respectively). However, in the 7th grade, the scores of Hawaiian students in HLCB schools were not significantly different from those in conventional public schools. And, in the 10th grade, Hawaiian students in HLCB schools scored significantly higher than their counterparts in conventional public schools (with mean scores of 226.7 and 206.7, respectively). See the Appendix for means, standard deviations, and significant differences across school types.

Movement out of Well Below Status

The analyses examining movement out of the Well Below proficiency status aggregated non-Hawaiian and Hawaiian students together because of the small sample sizes of non-Hawaiian students progressing 2 years in HLCB schools. Additionally, Western-focused charter schools dropped out of the analyses because of small sample sizes.

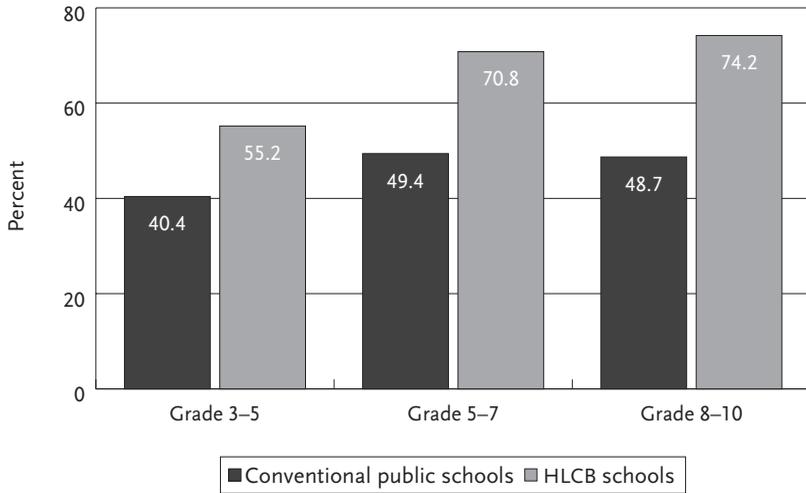
For all three grade levels examined, a significantly greater proportion of students in the Well Below proficiency level for reading at Time 1 in HLCB schools moved out of that status at Time 2 when compared with students in conventional public schools. For example, from 8th to 10th grade, 49% of students in conventional public schools moved out of the Well Below status, compared with 74% of students in HLCB schools (see Figure 3a).

For mathematics, there were no significant differences between conventional public schools and HLCB schools in movement out of the Well Below status for Grades 5 and 7. However, for Grade 10, differences were significant. In conventional public schools, 48% of students in the Well Below category at Time 1 moved out of that status at Time 2, compared with 62% of students in HLCB schools (see Figure 3b).

Figure 4 shows that for students moving from Grade 8 to 10, HLCB schools start with a higher percentage of students in the Well Below status at Time 1 than conventional public schools, but at Time 2, a smaller percentage of students remain in this same status.

FIGURE 3 Percentage of students moving out of the Well Below proficiency level for reading and mathematics

a. Reading



b. Mathematics

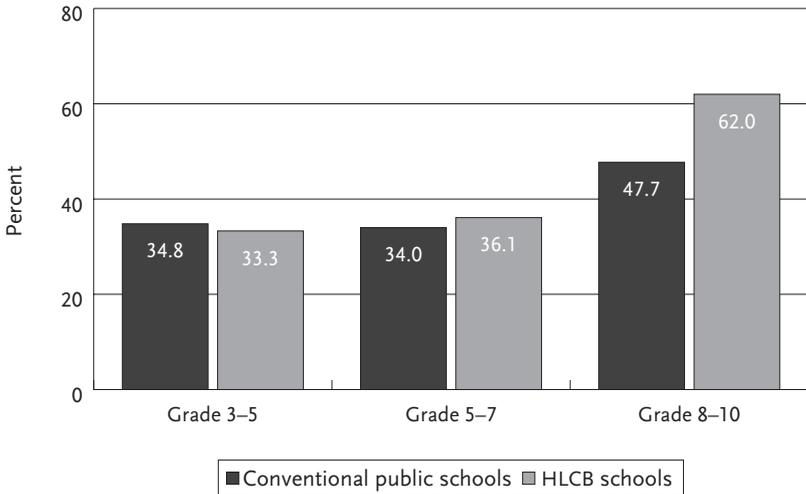
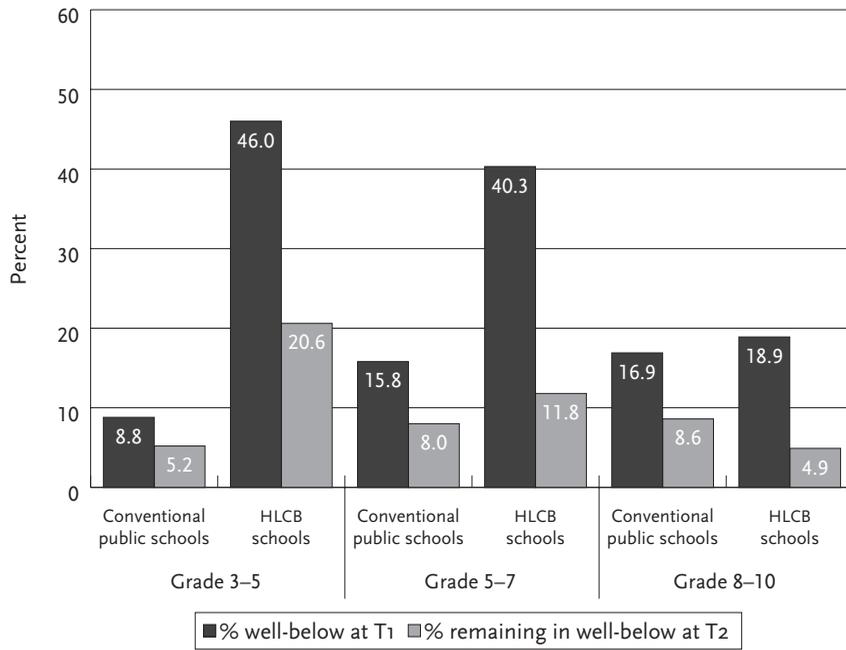
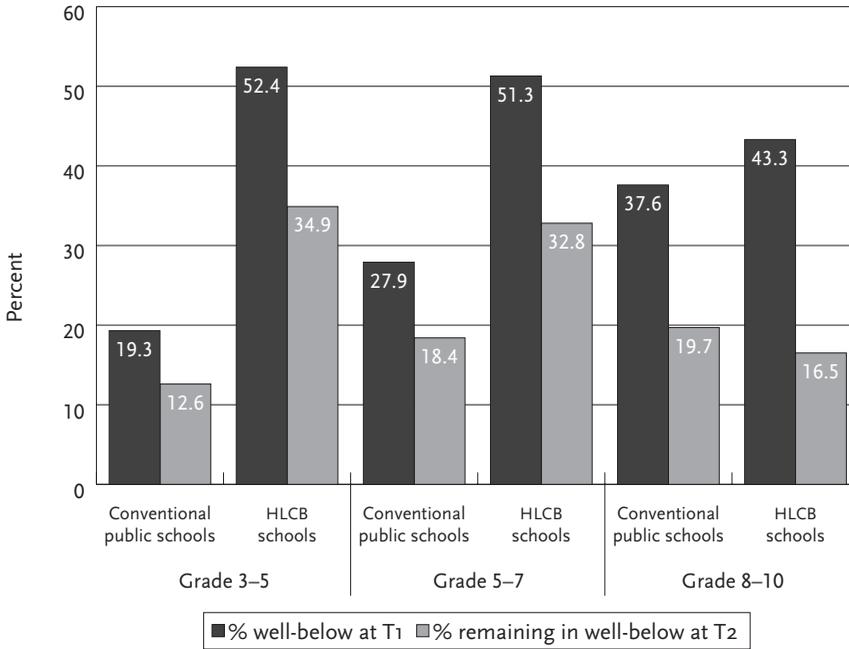


FIGURE 4 Percentage of students moving out of the Well Below proficiency level for reading and mathematics

a. Reading



b. Mathematics



DISCUSSION

Examining cross-sectional test scores on the HSA revealed that test scores were consistently highest in Western-focused charters in all grades studied for both Hawaiians and non-Hawaiians. However, students and families self-select into charter schools, and they may do so for reasons owing to preexisting high test scores as indicated by low rates of students in the Well Below proficiency level at Time 1. Additionally, high performances in Western-focused charters are, in part, explained by lower rates of low-income students and students in special education—commonly accepted predictors of lower academic achievement. Multivariate regressions are needed to control for these variables, as well as school size and ethnicity.

The fact that most of the one-way ANOVAs run in the study revealed no significant differences between HLCB schools and conventional public schools may suggest that there are no academic losses for those who choose Hawaiian immersion

schools or Hawaiian-focused charters schools as a preference over, or alternative to, traditional public education. While students in conventional public schools may have scored significantly higher than HLCB schools in lower grades, in higher grades either there were no significant differences or students in HLCB schools scored significantly higher. Additionally, the gap between students in conventional public schools and HLCB schools lessened from elementary to high school, where scores in HLCB schools even surpassed those in conventional public schools among non-Hawaiian students for reading and Hawaiian students for reading and mathematics.

Examining movement out of the Well Below status level across school types revealed that HLCB schools consistently showed greater movement out of Well Below status in all grade levels studied for reading when compared with conventional public schools. For mathematics, movement out of the Well Below status was significantly higher in HLCB schools than conventional public schools from Grade 8 to 10, with no significant differences from Grade 3 to 5 and Grade 5 to 7. HLCB schools thus seem to be a promising means of moving students out of the lowest achievement levels toward approaching and achieving proficiency for reading at all grade levels and for mathematics in higher grade levels.

In addition, there may be other benefits to HLCB schools that influence Hawaiian and non-Hawaiian students and families to choose these learning environments over conventional public schools. These include increased Hawaiian language ability, cultural knowledge and practice, positive school relationships, and a high level of family involvement.

The results of the study indicate that HLCB school types may make a significant difference in the academic achievement of Hawaiian students while not having significantly negative effects but rather having positive effects on non-Hawaiian students. The fact that over 80% of students enrolled in kula kaiapuni and Hawaiian-focused charters are Hawaiian may be evidence of Kana'iaupuni and Ishibashi's (2003) claim that Hawaiian-focused schools are important for reducing stereotypes and ethnic bias, and as a result, increasing academic achievement. Additionally, culture-based curricula and settings used by HLCB schools may increase school engagement and cultural identity through more relevant educational strategies that have direct and indirect influences on standard test scores. Ongoing work through the Hawaiian Cultural Influences in Education study from Kamehameha Schools in partnership with the Hawai'i Department of Education and Nā Lei Na'auao

alliance of Hawaiian-focused charter schools is currently linking Hawaiian culture-based educational strategies to student outcomes such as academic achievement, self-esteem, and cultural connectedness (see <http://www.ksbe.edu/spi/cbe.php>).

While HLCB schools show positive outcomes for Native Hawaiian students, they may bestow benefits to non-Hawaiians as well. Research shows that there is no trade-off between Hawaiian culture-based educational strategies and Western research-based “best practices.” Rather, culture-based education seems to parallel the principles of best practices while delivering instruction in culturally relevant and specific ways. School types that incorporate culture-based philosophies and methods more frequently (kula kaiapuni, Hawaiian-focused charters, and Hawaiian-medium charters) also integrate five standards set forth by the Center for Research on Education, Diversity and Excellence at the University of California, Berkeley at higher rates (Kana’iaupuni, Ledward, & Takayama, 2009; Ledward & Takayama, 2008). Additionally, non-Hawaiian students who may feel alienated by Western education systems may benefit from more relevant and applied learning environments as offered through HLCB schools.

It is important to remember, however, that test scores are only one means of assessing student learning. Standardized tests may be inherently culturally biased toward certain groups. Given that HLCB schools may validate alternative forms of knowledge, certain outcomes may not necessarily be captured through standard tests. For example, written and oral communication in the Hawaiian language are not evaluated through standardized tests, nor are environmental stewardship, civic responsibility, and abilities to perform in the workplace.

Implications and Recommendations

This preliminary research shows that, in general, there are no academic losses in Hawaiian-focused charters and Hawaiian language immersion schools for students of Hawaiian and non-Hawaiian ethnicities. Cross-sectional data show that in lower grades, students of both Hawaiian and non-Hawaiian ethnicities in HLCB schools may score significantly lower than their counterparts in conventional public schools, but in higher grades there are no significant differences or scores are significantly higher in HLCB schools. Additionally, results suggest that HLCB schools are more effective than conventional public schools at moving students out of the Well Below proficiency status for reading at all grade levels and for mathematics in higher grade levels.⁶

Financial and political support for HLCB schools could affirm and encourage the positive movement toward achieving proficiency on academic standards. Policymakers and educational leaders may look to these schools as examples of educational reform to serve the needs of diverse students and increase the movement toward academic proficiency. Since HLCB schools appear to draw more students of Hawaiian ethnicity while still having positive outcomes for non-Hawaiian students, their models of integration of culture and education may be beneficial in other public schools as well.

More research is needed to identify specific characteristics of schools and school types (e.g., teaching strategies and school structure) that contribute to increased achievement by students of various ethnicities. However, at the time of the analyses the HSA tests were not vertically scaled, which prevents reliable growth analyses. Further research is needed to collect data on transitions between school types and length of duration in charter and HLCB schools to investigate this hypothesis.

Furthermore, other educational outcomes could also be measured, such as school engagement, school relationships, and the ability to apply knowledge to relevant contexts, in order to assess other goals such as school persistence. Multivariate analyses controlling for demographic and school characteristics to predict these outcomes are needed to further examine issues presented in this article.

Hawaiian language immersion programs have been in existence in Hawai'i for over 20 years. Two kula kaiapuni are stand-alone schools that operate out of physical sites represented by unique school codes in the Hawai'i Department of Education records. However, the majority of kula kaiapuni are schools-within-a-school, sharing a location and school code with a mainstream English-medium program. Given this reality, there is no reliable system in place to track students enrolled in kula kaiapuni outside of the stand-alone schools. Kula kaiapuni, many of which are also charter schools, operate as nonconventional schools and are often scrutinized for funding; yet, data are not systematically available to track the progress of students enrolled in these settings. I recommend that the Hawai'i Department of Education add a variable to its student records to distinguish between students who are enrolled in kula kaiapuni and those who are not. Such a marker could be greatly beneficial to schools that have a mix of both English- and Hawaiian-medium programs to track outcomes for kula kaiapuni and English-medium students.

Race and ethnicity are complicated labels that are not clearly defined, and they are complex, multidimensional constructs that have unclear boundaries (Phinney, 1996). Even Hawaiians and Part-Hawaiians should not be viewed as a homogeneous group because of what Ledward (2007) identified as “multidentity,” or mixed heritage. In Hawai‘i, the issue is further complicated with high rates of multiethnicity. According to the 2000 Census, over one in four people in Hawai‘i self-identify with more than one race/ethnic group (see Figure 1.2 in Kana‘iaupuni et al., 2005). Following the trend that younger generations are increasingly identifying as multiracial, this percentage is probably even higher for those younger than 18 years old (Population Reference Bureau, 2005). With growing multiethnicity, it is important to allow for such diversity to be captured in research data. However, the only indicator of multiethnicity from the Hawai‘i Department of Education is in the value “Part-Hawaiian,” which is distinct from “Hawaiian” alone. However, such a value does not reveal other ethnicities/races of a student. Students who have multiple ethnicities may report only one ethnicity to the Hawai‘i Department of Education, or they may choose “Other.” To accommodate the unique multiethnic population of Hawai‘i, the Hawai‘i Department of Education could follow the lead of the United States Census Bureau in allowing students (or their parents) to select more than one ethnicity/race.

That a full 12.5% of students list “Other” as their ethnicity may indicate an additional problem. Students who may not identify with the 12 labels provided would presumably select “Other.” For example, Micronesian and Tongan students would most likely select “Other” for lack of an appropriate label. Among those reporting only one race in the 2000 Census, Vietnamese make up 0.6% of Hawai‘i’s population, Guamanian/Chamorro 0.1%, other Asians 3.5%, and other Pacific Islanders 1.3%. In addition, certain groups that are relatively small in the overall population are more highly represented among school-age children and may be more concentrated in certain areas, making data tracking and assessment more difficult. A more comprehensive selection of ethnic categories for students that reflect Hawai‘i’s increasingly diverse population could alleviate this problem.

Limitations of Study

In certain school types, small sample sizes prevent reliable analyses. For example, analyses with school types with fewer than 10 cases were dropped. As such, data comparing school types and related findings may be inconclusive.

Another limitation of this study concerns the sample of schools in the analyses. By limiting the sample of schools to a relatively small size, conventional public schools are narrowed to mostly rural schools. However, many HLCB schools and Western-focused charters are dispersed in rural areas as well. For example, Hawai'i Island has several HLCB schools and Western-focused charters. Ke Kula 'o 'Ehunuikaimalino located in rural Kealahou is one of only two stand-alone kula kaiapuni. Five of the 14 Hawaiian-focused charters are located in rural areas on Hawai'i Island as well.

Additionally, while there are Hawaiian language immersion programs within regular public schools, available data do not designate whether students are enrolled in one of these programs. As a result, in this study, conventional public schools with a mix of students enrolled in Hawaiian language immersion programs and English-medium programs are dropped from analyses, which may affect generalizations to school-within-a-school kula kaiapuni.

Furthermore, small sample sizes for non-Hawaiian ethnic groups (i.e., Filipino, Japanese, Caucasian, etc.) enrolled in HLCB schools prevent reliable analyses, so the data on these students are aggregated for purposes of understanding achievement of non-Hawaiian students in HLCB school types. However, non-Hawaiian groups, or any group for that matter, should not be viewed as homogeneous because there is great diversity in language, sociopolitical patterns, and socioeconomic status among and within the groups.

CONCLUSION

HLCB schools seem to be a promising means of raising student achievement for both Hawaiian and non-Hawaiian students. Although Western-focused charter schools have the highest levels of achievement, this type of educational success may be due to lower rates of low-income and special education students and high levels of students already achieving at levels of proficiency. Kula kaiapuni and Hawaiian-focused charter schools serve a higher percentage of students with initially low test scores, but positive achievement growth is consistent over time. Such a finding is noteworthy since HLCB schools serve higher rates of special education students and students who participate in free/reduced lunch. While

many students in HLCB schools do not yet show proficiency in reading and mathematics standards, their test scores do not differ from students in conventional public schools, and they demonstrate great progress toward becoming proficient.

Additionally, culturally relevant settings such as in HLCB schools appear to resonate more for Hawaiian students than non-Hawaiian students. Achievement levels are higher for both non-Hawaiians and Hawaiians in HLCB schools in higher grade levels, but only significantly so for Hawaiians in mathematics. This trend may indicate that it is important for Hawaiian students to be educated in Hawaiian contexts, which may also be beneficial to non-Hawaiian students.

Continued financial and political support for HLCB schools encourage the positive outcomes identified in this study. These schools can be looked to as productive models for educating the students of Hawai'i, for whom the integration of Hawaiian culture into school structure and curricula shows great promise in making progress toward Hawai'i's educational goals.

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NOTES

- 1 In this article, Hawaiian words are not italicized. Instead, meaning can be drawn from context since Hawaiian words used are in common usage in Hawai'i. Hawaiian is the ancestral language of Hawai'i; it is not a foreign language and should not be treated as such. If further clarification is needed, I recommend an online Hawaiian dictionary at <http://wehewehe.org/>.
- 2 I assert that no school is culture-free. Rather, I agree with Kana'iaupuni's (2007) claim that schools that do not have a specific Hawaiian focus often have a default Western focus.
- 3 More information on the HAPA and the HSA may be found at <http://sao.k12.hi.us/assessment/index.htm>.
- 4 Samples of students in the Approaches, Meets, and Exceeds proficiency levels in certain schools types were too small for reliable analyses.
- 5 Of the 22 kula kaiapuni in Hawai'i in school year 2005–2006, 5 were charter schools, 15 were programs operated within English-medium schools, and 2 were stand-alone schools (not directly connected with an English-medium school).
- 6 Current data are too limited in sample size to make claims about school types, limiting movement into the Well Below status as well as among the other status levels. More research is needed examining these trends as data become available from the latest HSA tests.

APPENDIX

TABLE A1 Mean scores on the Hawai'i State Assessment, school years 2003–2004 to 2005–2006 aggregated

	Conventional public schools			HLCB schools			Western-focused charters			F	p
	N	Mean	SD	N	Mean	SD	N	Mean	SD		
Reading											
Non-Hawaiian											
Grade 5	7,182	305.6	70.1	0	—	—	242	325.7	58.1	11.8	.0006 ^b
Grade 7	340	287.8	67.1	16	262.0	48.2	85	334.9	59.9	30.7	<.0001 ^{bc}
Grade 10	270	266.8	65.6	15	270.6	47.7	168	347.8	66.5	74.0	<.0001 ^{bc}
Hawaiian											
Grade 5	2,767	273.3	69.2	58	235.9	66.6	73	255.2	62.6	11.6	<.0001 ^{abc}
Grade 7	187	261.9	62.4	103	261.9	59.6	31	283.5	63.6	2.4	.1794
Grade 10	193	256.9	59.2	149	268.2	47.4	30	296.8	68.0	8.8	.0008 ^{bc}
Mathematics											
Non-Hawaiian											
Grade 5	7,182	264.5	65.3	0	—	—	242	274.9	55.6	1.1	.2932
Grade 7	340	250.5	68.0	16	212.8	44.4	85	286.0	66.1	24.7	<.0001 ^{abc}
Grade 10	270	227.1	51.0	15	226.3	28.7	168	311.2	70.2	85.3	<.0001 ^{bc}
Hawaiian											
Grade 5	2,767	236.0	61.3	58	214.9	55.4	73	293.8	63.3	13.1	.0009 ^{abc}
Grade 7	187	220.5	56.3	103	215.2	53.9	31	246.5	59.5	5.8	.0236 ^{bc}
Grade 10	193	206.7	47.4	149	227.7	46.5	30	256.4	68.7	14.6	<.0001 ^{abc}

Note. For non-Hawaiians in HLCB schools, the number of students was too small for reliable analysis.

^a Hawaiian language and culture-based schools significantly different from conventional public schools.

^b Western-focused charters significantly different from conventional public schools.

^c Hawaiian language and culture-based schools significantly different from Western-focused charters.

TABLE A2 Movement out of the Well Below proficiency level, all students, school years 2001–2002 to 2005–2006 where students progress two grades

	Conventional public schools			HLCB schools			F	p
	% Well- below at Time 1	n	% Moved out of well-below	% Well- below at Time 1	n	% Moved out of well-below		
Reading								
Grade 3–5	8.8	900	40.4	46.0	31	55.2	3.96	.0470*
Grade 5–7	15.8	84	49.4	40.3	79	70.8	6.69	.0108*
Grade 8–10	16.9	83	48.7	18.9	33	74.2	7.64	.0067*
Mathematics								
Grade 3–5	19.3	1977	34.8	52.4	35	33.3	.06	.8023
Grade 5–7	27.9	148	34.0	51.3	63	36.1	.14	.7051
Grade 8–10	37.6	185	47.7	43.3	75	62.0	4.59	.0330*

*Significantly different at the $p < .05$ level.