Culturally Responsive Health Education in the Pacific: Lessons Learned in American Samoa

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Abstract: American Samoa is a unique Pacific region with alarmingly high obesity and Type 2 diabetes mellitus percentages. American Samoa is also an unorganized and unincorporated United States Territory with a comprehensive ecological system that is complicated by over 100 years of affiliation with the United States. The history of US colonial influence on education in American Samoa is described to establish the unique and important consideration of context and place when designing health interventions. Given the negative effects that colonization and modernization have had on Pacific Islander health, decolonization health education is a logical ecological approach to combating escalating obesity and diabetes rates. Innovative health interventions need to continue to be explored to impact the escalating negative health trends in American Samoa. This exploratory qualitative study contributes to the literature on cultural translation and implementation science health intervention by providing an additional autoethnographic vantage point of place-based and culturally responsive pedagogy in American Samoa from the discipline of health education. The self-study by university health educators produced five potential place-based and culturally responsive health interventions perceived to be effective within the cultural context of American Samoa. Participants perceived to value health interventions a) aimed at the community rather than the individual; b) experienced as cooperative and reciprocal; c) designed as holistic; d) rooted in Samoan cultural values; and e) distinguished as placed-based.

Keywords: Culturally Responsive Pedagogy, Obesity, Type 2 Diabetes Mellitus, American Samoa

Introduction Background

Obesity has reached epidemic proportions globally with the most extreme cases emerging in the Asia-Pacific region. For example, Samoans have demonstrated an alarming increase in obesity and type 2 diabetes mellitus percentages over the past thirty years and this trend is projected to continue. According to Lin et al. (2016, 654):

> Over 1978–2013, Type 2 diabetes mellitus prevalence increased from 1.2% to 19.6% in men (2.3% per 5 years), and from 2.2% to 19.5% in women (2.2% per 5 years). Obesity prevalence increased from 27.7% to 53.1% in men (3.6% per 5 years) and from 44.4% to 76.7% (4.5% per 5 years) in women. Type 2 diabetes mellitus and obesity prevalence increased in all age groups. From period trends, Type 2 diabetes mellitus prevalence in 2020 is projected to be 26% in men and women. Projected obesity prevalence is projected to be 59% in men and 81% in women. Type 2 diabetes mellitus period trends attributable to BMI increase are estimated as 31% (men) and 16% (women), after adjusting for age.

Western colonialism has negatively impacted health in Samoa and it appears that standard western colonial health interventions have not achieved desired results, as the percentages of Samoan population with Type 2 diabetes mellitus and obesity are alarmingly high.

The World Health Organization "Asia-Pacific Perspective: Redefining Obesity and its Treatment" (2000) suggests the use of an ecological model (Bronfenbrenner 1992; Egger and Swinburn 1997) as a potential model for understanding obesity as a normal individual physiology within a pathological social environment. This shifts focus away from the individual toward a

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COMMON GROUND

focus on multilevel socio-cultural environmental factors. Thus, a new aim of health interventions is to create culturally responsive environments that promote healthy diet and exercise behavior.

Further, in their case study of diabetes care in American Samoa, health researchers have suggested using cultural translation and implementation science as frameworks for exploring effectiveness of health interventions in a real-world context (DePue et al. 2010). Translation research is applied research to explore solutions to place-based healthcare delivery problems and to learn about the transferability of these interventions to different settings, with the goal of maintaining effectiveness, efficiency, and local sustainability (Narayan et al. 2004). The process of cultural adaptation brings further elements to translation research, and integrating culture with the translation research process is called cultural translation. A related research approach is implementation science, which aims to bridge health disparity gaps in developing countries through applications across real-world contexts to explore how health interventions might be modified to positively impact local communities (Madon et al. 2007). Both of these approaches, cultural translation and implementation science, advocate for new health interventions that align with different cultural contexts. This exploratory qualitative study contributes to the literature on cultural translation and implementation science by providing an additional autoethnographic vantage point of culturally responsive pedagogy in American Samoa from the discipline of health education.

Culturally Responsive Pedagogy

A culturally responsive approach to education has been described as a multicultural approach (Banks 1993), culturally-responsive pedagogy (Erickson and Mohatt 1982), culturally relevant teaching (Ladson-Billings 1995; Maina 1997), and culturally responsive teaching (Gay 2002; Rhodes 2013). Ladson-Billings (1994, 382) defines culturally relevant teaching as "a pedagogy that empowers students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes." While these practices have been and continue to be embraced in Hawai`i and American Samoa, they are also becoming more widely accepted in mainstream US education communities. For example, Equity Alliance (2015), the U.S. Department of Education's equity assistance center, promotes the use of cultural responsiveness as one assessment of teachers, principals, and communities in establishing the conditions for equitable educational outcomes for all students. Furthermore, research shows culturally-responsive curriculum positively impacts student achievement by respecting learners' home-community cultures, and integrating these cultural experiences, values, and understandings into the teaching and learning environment. (Au 2007; Banks 2004; Brown-Jeffy and Cooper 2011; Gay 2002; Ladson-Billings 1995; Maina 1997; Montgomery 2001; Rhodes 2013). Culturally responsive pedagogy facilitates students' academic success while maintaining their cultural identity (Ogbu 2003). The University of Hawai`i is ranked 86th in the world by the Times Higher Education 2018 World University Rankings (College of Education 2018) and is emerging as a leader in these types of place-based and culturally relevant pedagogy in the Pacific regions. The motto of the University of Hawai`i College of Education is "A Sense of Place. A Sense of Purpose."

One way Pacific educators have promoted culturally relevant teaching is through place-based pedagogy. Smith (2007, 190) states "in classrooms or schools where place-based education is well-established, inquiry into local concerns and problem-solving shape teaching and learning activities more than a standardized curriculum." Smith goes on to describe five domains of place-based education, including "a) cultural and historical investigations, b) environmental monitoring and advocacy, c) real-world problem solving, d) entrepreneurialism, and e) involvement in public processes" (Smith 2007, 191). In Hawai`i and American Samoa health education, the main domains were cultural and historical investigations and real-world problem solving, which focus attention on students' connections to place.

Gruenewald (2003) argues for a "critical pedagogy of place" in which education examines how colonization affects a particular place and its people. It is through place-based pedagogy that educators and students can challenge the perspectives of standardized education that have been detrimental to so many, but especially those in the Pacific Islands. Gruenewald (2003) refers to this as "decolonization" and defines it as "unlearning much of what dominant culture and schooling teaches, and learning more socially just and ecologically sustainable ways of being in the world" (Gruenewald 2003, 9). Given the negative effects that colonization and modernization have had on Pacific Islander health, decolonization education is a logical ecological approach to combating escalating obesity and diabetes rates. The two University of Hawai`i instructors in this self-study embrace Gruenwald's (2003) ideas of place-based pedagogy as social justice and have engaged in qualitative autoethnography to describe their perspectives on the effects of decolonization pedagogy on health education in American Samoa. Early European explorers to Samoa described the indigenous people as singularly strong and healthy when they were living traditional cultural norms (Gray 1960). The goal of place-based decolonization pedagogy in Samoa is to inspire a return to healthy indigenous exercise, nutrition, and overall community health.

The University of Hawai`i College of Education has a thirty-nine-year partnership with the American Samoa Department of Education to facilitate professional development of teachers through the Territory Teacher Training Assistance Program (TTTAP). Emergent qualitative themes from instructor self-study conducted across University of Hawai`i TTTAP health education courses describe five potential culturally-responsive health interventions that teacher candidates perceived to be effective within the cultural context of American Samoa. Participants valued health interventions a) aimed at the community rather than the individual; b) felt as cooperative and reciprocal; c) perceived as holistic; d) rooted in Samoan cultural values; and e) distinguished as placed-based.

Literature Review: Background Education Context

The University of Hawai`i at Manoa and American Samoa have a multicultural teacher education partnership. The emergent themes and lessons learned through this transnational partnership are bound by a unique teaching and learning context that cannot be generalized to other research contexts. Indeed, American Samoa, whose population has the highest rates of obesity on the planet, is a geographic and cultural location in high need of health education interventions. Decision-making about launching and developing global health education programs can be informed through critical reflection on the University of Hawai`i at Manoa and American Samoa Department of Education exploratory qualitative autoethnographic study.

Zeichner and Conklin (2008) suggest we pause to consider the contexts in which teachers and their students operate. To facilitate place-based professional development of health educators, the context in which the health educators will teach must be the first consideration. Transnational education programs must adapt instruction and curriculum when the context of the participants differs from the host. The context of the transnational partnership between American Samoa and Hawai'i will be discussed as background to this autoethnography because it is critical that political, cultural, geographic, and fiscal issues are intentionally studied to create effective health education programs that meet local professional development needs. The transnational partnership between the University of Hawai'i and the American Samoa Department of Education was created over three decades ago to provide undergraduate and graduate education degrees to teachers in American Samoa. This program offers a Bachelor's degree in Elementary Education (BEd) with dual certification in Early Childhood and Special Education, a Master's degree through the Department of Curriculum Studies, and a distance-learning doctoral degree program. The American Samoa undergraduate BEd degree is part of the Institute for Teacher Education and managed through the Territorial Teacher Training Assistance Program (TTTAP) grant. Health education courses are part of these bachelor and master education degree programs.

The question of how to best prepare high quality health educators in American Samoa is complex. Shifting contextual issues, such as distance communication, high staff turnover, politics, grant funding, and cultural diversity influence high quality health teaching in this international teacher education program.

According to Bronfenbrenner (1992), an educational institution is an organization existing in and interacting with a macro ecological system. The American Samoa ecological system is complicated by over 100 years of affiliation with the United States (Allen 1962; Reid 1986). American Samoa is an unorganized and unincorporated United States Territory. American Samoans are US "nationals who cannot vote in national elections in the United States and have no representation in the final approval of legislation by Congress" (United States General Accounting Office 1997, 9). However, they enjoy the privilege of non-restrictive travel to and from the United States (Zuercher and Yoshioka 2012) and may qualify for Medicaid Program healthcare benefits (Feagaimaali'i-Luamanu 2017).

The History of Teacher Education in American Samoa

The unique history of US colonial education in American Samoa provides the background setting for current health education initiatives. The first public school was established in American Samoa in 1904 by naval officers (Sutherland 1941). The American Samoan school system has been influenced by the United States Federal Department of Education for over 100 years. Indigenous Samoan scholar Reid (1986) categorized the development of teacher education in American Samoa into four distinct phases: Phase I (1904–1952)—The United States Navy Administration; Phase II (1932–1960)—The Barstow Foundation Efforts; Phase III (1962–1971)—The Educational Television ETV Era; and Phase IV (1972–1986)—The Samoanization Movement (Reid 1986, 20). Zuercher and Yoshioka (2012) termed Phase V (1979–2012) as the University of Hawaii Transnational Partnership Era. The University of Hawaii continues to partner with the American Samoa Community College in providing courses leading to a Bachelor's Degree in Elementary, Early Childhood, and Special Education. The American Samoa Community College is now Western Association of Schools and Colleges (WASC) accredited for a four-year Elementary Education degree. Recently Argosy University opened a campus in American Samoa and a private Christian college is under construction. These post-secondary options will continue to impact education in American Samoa. Each phase brought unique western education elements to the island nation of American Samoa with lingering effects on its school system.

The first wave of western influence on American Samoan education (1904–1952) might be summarized as missionary then military (Zuercher and Yoshioka 2012). In 1830, missionaries arrived in American Samoa and used the follow evangelical strategies: a) training Samoan preachers, b) using Samoan vernacular, c) aligning Christian concepts with Samoan cultural values and traditions, and d) integrating church meetings with the traditional Fa'a Samoan system of the family, matai (chief), and village life (Reid 1986). The military influence on American Samoan education followed in 1904 when the U.S. Department of the Navy was assigned to govern the American Samoan islands (Sutherland 1941). Samoan students were taught in English using curriculum materials modeled after those used in America in the naval schools. Formal teacher education began in 1921 (Reid 1986). The hegemonic naval administration did not consider the native culture of the people. Rather, the schools and the training of teachers reflected naval philosophy; many aspects of American school structure and student expectations were in direct violation of the values and customs of Samoan culture (Reid 1986). In particular, the Naval Administration missed a key component of Samoan culture, which is the communal concept of family ("aiga") and village governance over problem identification and solution (Haleck 1996; Mead 1928, 1969; Shore 1977, 1982; Sutter 1980).

The Barstow Foundation phase (1932–1960), overlapped the Naval Administration phase by twenty years. Private Frederic Barstow lived among the Samoans and when he died in 1931, a

foundation was begun in his name to preserve the Samoan culture and help the Samoan people (Bank of Hawaii 2018). Reid (1986) summarized the 1932 Barstow Foundation for American Samoan education philosophy:

> An objective which recognizes that much in Samoan ways and life is good in itself…but that American Samoa is undergoing change, especially through the influence of western civilization. In view of this changing condition…the objective of education should be to conserve the acquaintance with the great intellectual tools and social concepts and institutions of the west to the end that Samoans may maintain respect for their native heritage and skills in their traditional arts and crafts and at the same time, they may learn to meet on equal terms with other people the conditions of the modern world. (Reid 1986, 25)

Noteworthy, the Barstow Foundation advised that Samoan language should be used to teach American Samoan students in grades one to three and Samoan history was added to the American Samoan public school curriculum (Reid 1986). The Barstow Foundation also attempted to meet the needs of the Samoan classroom teachers. In 1948, the Feleti Teacher Training College and Feleti Memorial Demonstration School were established with emphasis on bilingual Samoan and English instruction and preservation of the Samoan way of life (Allen 1962).

The administration of American Samoa was transferred from the Department of the Navy to the Secretary of the Department of Interior in 1951. The election of President Kennedy in 1960 brought Phase III (1962–1971), the Education Television Phase, to American Samoa (Reid 1986). The Kennedy administration appointed Rex Lee as Governor of American Samoa, and the Department of Interior significantly increased federal funds to American Samoa from $2.1 million in 1961 to $9.5 million in 1962 (Pirie 1976). This funding brought improvements to transportation and communication infrastructure like roads, a jet runway, and electricity. American Samoan students and teachers were forced to participate in a massive educational experiment during the Lee administration of American Samoa. The hegemonic decision to use Education Television as the means of instruction greatly changed the nature of public schooling: a) mainland teachers had to be hired to teach the tele-lessons, b) housing was needed for these mainland teachers, c) new schools needed to be built, d) roads had to be built in order to build and access the schools, e) electricity and television transmission devices had to be installed in every village, and f) indigenous Samoan teachers became teaching aides to the television classroom monitors (Reid 1986). In the elementary schools, students had core twenty-minute lessons via television for language arts, science, social studies, math, music, art, and Samoan language while Samoan teacher aides were provided with worksheets to correspond with the tele-lessons (Reid 1986; Zuercher and Yoshioka 2012). A major problem with the Education Television system was that the "teachers hired from the mainland on two-year contracts were not necessarily devoted to making significant accomplishments" (Allen 1962, 213). Furthermore, American Samoans lost all sense of ownership for teaching in their classrooms (Reid 1986).

The use of Education Television greatly influenced American Samoans' allurement to American lifestyle. American entertainment and propaganda were streamed into every village via forced television hookups and transmissions (Reid 1986). "In the past, American Samoa was a classic example of retarded economic development compounded by remoteness and miniscule size…A sudden massive infusion of outside capital and technical assistance has propelled the territory towards prosperity, sustained economic growth and eventual self-support at a high level" (Pirie 1976, 500).

The Samoanization Phase IV (1972–1986) launched in 1972 when John Haydon was elected Governor of American Samoa. Haydon dismantled Education Television and returned the responsibility for classroom teaching back to the hands of indigenous Samoan teachers. "The inadequate involvement of Samoan teachers, in particular, must have signaled possible dangers.

There is no record that classroom teachers were brought into the initial planning. Just as had been the case before television, policy making and administration were kept tightly in the hands of U.S. stateside personnel" (Schramm 1981, 65). The massive and costly Education Television experiment was halted after only seven years of implementation and a task force was appointed to make education reform recommendations. The task force surveyed 243 American Samoan teachers and administrators and advised that classroom teachers be given autonomy on how to teach in their classrooms (Reid 1986). There are few or no televisions in American Samoan classrooms today (Zuercher and Yoshioka 2012).

Phase V began in 1979, when the University of Hawaii was contracted through a Teacher Corps Program grant to offer a four-year bachelor of education degree in partnership with the American Samoan Community College (Zuercher and Yoshioka 2012). The American Samoan Teacher Corps program (1979–1981) and the Territorial Teacher Training Assistance Program (1981–present) have been the primary degree-granting educational options for elementary teachers in American Samoa. Haleck observed that the University of Hawaii and American Samoa Community College (ASCC) degree articulation partnership and the cohort model of organizing teacher candidates into groups improved teacher education in American Samoa (Zuercher and Yoshioka 2012). These philosophical shifts provided a foundation for culturally responsive pedagogy. The collaboration with ASCC is a reciprocal approach to education rather than a hegemonic approach, and the cohort model fits the communal/village ideology. In the 1983 American Samoa Department of Education annual report, Betham wrote "with the assistance of the American Samoa Community College, and the University of Hawai`i…the teachers, and administrators of American Samoa are afforded the opportunity to obtain quality higher education training, enabling them to address with more confidence the specific educational needs and concerns of our public school children. The program is proving to be highly successful, with many teachers earning undergraduate or post-graduate degrees" (American Samoa Department of Education 1983, 7). This collaborative program has strong potential to positively influence health behaviors of teachers and their students in American Samoa provided the program remains culturally responsive to the perceptions of the participants and addresses place-based problems.

Methods

The methodology used was qualitative autoethnographic research in the field of education. The advantages to using this methodology in American Samoa include: a) naturalistic context sensitivity, b) emergent flexibility, c) empathic neutrality, and e) unique case orientation (Hatch 2002; Patton 2002). The methodology was also informed by indigenous research ethics and processes as outlined by Wilson (2008) and Smith (1999). The research question was "what are University of Hawaii health educators' autoethnographical perceptions of the effects of place-based health education in a teacher candidate health course in American Samoa?" Two University of Hawaii health educators, in a place-based education course setting in American Samoa, reflected on their instructional effects by confidential analysis of teacher candidate work, classroom discussions, teacher conferences, journal responses, and observation. The data in this self-study was typologically coded for emergent themes. All data was kept strictly confidential. The health educators completed required Collaborative Institute Training Institute (CITI) ethics module certificates. They also consulted indigenous research literature and place-based elders as a source for honoring Pacific cultural values when conducting a self-study to explore instructional effects. Autoethnographic research is considered to be exempt research. The major limitation or disadvantage of qualitative autoethnographic research is that due to context sensitivity and purposive sampling, specific findings cannot be generalized.

Findings: Participants' Perceptions of Effective Health Interventions

Typological analysis unmasked five themes describing teacher candidate perceptions of effective health education interventions. The themes correspond with Samoan cultural practices and Samoa, or the Samoan Way of Life.

Theme 1: Participants Value Health Interventions Aimed at the Community Rather than the Individual

Communal structures such as the village and family are strong Samoan cultural values. Candidates appreciate instruction and projects that are collaborative. Samoan poet, Sia Figiel (1999) artistically describes a Samoan perspective of community:

> "I" does not exist. I am not.
> My self belongs not to me because "I" does not exist.
> "I" is always "we."
> Is a part of the 'aiga,
> A part of the Au a teine,
> A part of the Aufaipese,
> A part of the Autalavou,
> A part of the Aoga a le Faifeau,
> A part of the Aoga Aso Sa,
> A part of the Church. A part of the nu'u. A part of Samoa.

The Cohort model of course delivery, where candidates are placed into groups and take all courses together across the program, provides a meaningful communal bond for candidates in American Samoa. This is apparent in that American Samoan teacher cohorts each design a uniform to represent their group, as is the custom in many Samoan organizations like a Samoan village, business, *aiga*, or church community (Zuercher and Yoshioka 2012). Health education is perceived by participants to be more effective when it is targeted at a communal group such as family, school, church or village rather than at individuals.

Theme 2: Participants Value Health Interventions that are Collaborative and Reciprocal

Sharing is a fundamental value in Samoan culture. The lyrics to the Samoan classic "We are Samoa" (Grey 1989) reference the values of humanity and hospitality: "We are Samoa, people from the sun. We are Samoa and our heritage lives on. Teach the world humanity and hospitality." Too often, western health interventions are perceived as unidirectional with visitors depositing information and imposing western values on Samoan individuals. Samoan Poet John Enright (n.d.) writes about imported regulations to American Samoa:

> Regulations
> When you've lived a while within the sound
> Of surf and mosquitoes and swirls of children
> Between blindingly green ridges of jungle
> Emitting birds and bird sounds and moving
> Through the spectrums of saffron and shadow
> And squall-closing grays, when the
> News becomes who is pregnant by whom
> And why who is leaving the island
> Then come to me and talk about your
> Air-conditioned plans for the regulation of
> Whatever it is you've been brought here
> To set straight by mainland standards
> We'll set up a timeline that will most
> Closely resemble a slowly drifting cloud.

Creating collaborative bi-cultural instruction teams, consulting with Samoan elders, and providing avenues for participant voice as an integral part of lessons are perceived as effective health intervention because it is respectful, reciprocal, and responsive to the Samoan culture. *A'o* is the Hawaiian term for this type of reciprocal teaching and learning (Chun 2011). It is essential that the participants' voices are heard and that healthcare providers have an open attitude to learning while teaching. For example, participants voiced the following recommendations as part of course evaluations:

- Add courses in Samoan language and culture
- Schedule classes later in the evening to maximize time with family
- Give even more models of instructional strategies
- Decrease the number of required professional reflections
- Spend one summer on the main campus in Hawai'i
- Facilitate more Samoa field trips and site visits
- Provide transportation to classes and workshops
- Be more lenient with attendance policy
- Promote cohort unity even more
- Add community service projects/increase visibility in the community
- Establish a computer lab for teachers

Theme 3: Participants Value Health Interventions that are Holistic

Given the high percentages of obesity and Type 2 diabetes, it is understandable that healthcare providers primarily focus on physical health when working in Samoa. However, participants perceive that holistic health interventions are more effective because physical health is greatly influenced by emotional, cognitive, and social health in Samoa, as in most environments. *Lōkahi* is a Hawaiian term that connects health to "balance, harmony, and unity for the self in

relationship to the body, the mind, the spirit, and the rest of the world" (KSIPP 2002). In their health education text, authors Telljohann, Symons, and Pateman (2012) share an illustration of a Lokahi Wheel to guide holistic self-assessment (Figure 1). An illustrated and holistic personal Lokahi Wheel is an example of a place-based assignment used in University of Hawaii health courses.

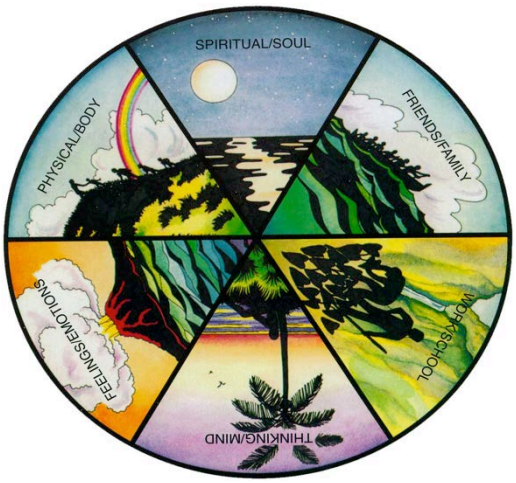

Figure 1: Holistic Lokahi Wheel
Source: Telljohann, Symons, and Pateman 2012

Theme 4: Participants Value Health Interventions that are Rooted in Cultural Values

Traditional Samoan proverbs guide sermons, speeches, ceremonies, and conduct. Participants find it more motivational to connect the reasons why they should exhibit healthy behaviors to *Fa'a Samoa*, the Samoan way. For example, *O le ala i le puli o le tautua* translates in English as "the path to leadership is service." This proverb is often shared to inspire service for the betterment of the community. When healthcare providers use Samoan proverbs and cultural values, participants are more likely to respect the health intervention.

The Hawai`i Department of Education (2016) has adopted an excellent model for grounding behavioral expectations in cultural values through Nā Hopena A'o (HĀ). Nā Hopena A'o (HĀ) is a document that outlines six fundamental outcomes (*Hopena*) to strengthen healthy social connections across students, teachers, staff, administrators, parents, and community members, including a strengthened sense of a) belonging, b) responsibility, c) excellence, d) aloha, e) total well-being, and f) the place of Hawai'i. These six outcomes contain values that are deeply rooted in Hawaiian culture and values (Figure 2).

Figure 2: Nā Hopena A'o (HĀ)
Source: Hawaii Department of Education 2016

Theme 5: Participants Value Health Interventions that are Place-Based

Teacher candidates report that they feel engaged when they connect with their unique local environments as part of their courses. For example, teacher candidates visited the Agriculture Community and Natural Resources Department at the American Samoa Community College to connect healthy nutrition with local farming initiatives. Candidates were given plants to take home and encouraged to form backyard gardens to supplement the lack of fresh vegetables available in stores. Candidates perceive that nutrition guides that contain images with local foods such as taro, breadfruit, and fish are more meaningful than the USDA's guide at ChooseMYPlate.gov.[2] A similar and supportive insight from diabetes care qualitative research in American Samoa (DePue et al. 2010, 11) stated "focus group participants also reported that images from materials produced for other Pacific Islands were not acceptable because they wanted to see their own people, their own foods, and local examples of physical activities."

Tauiliili (2015) conducted a doctoral study of culturally-based math lessons in American Samoa with teacher candidates engaged in the mathematics of weaving baskets, traditional *siapo* art (Figure 3), making a *salulima* (broom), and ratio and proportion in traditional Samoan foods. D'Ambrosio (1997) describes ethnomathematics as being different from traditional classroom mathematics as it focuses on real people, real problems, and real contexts. Elders, who possess the knowledge and experience, often pass down these cultural practices through models of apprenticeship and oral stories. This important cultural information is not usually documented nor is it included in formal school curriculums, presenting another opportunity for place-based pedagogy. Place-based lessons provide rich opportunities for integration of science, technology, engineering, fine arts, health, and mathematics. For example, geometry and cultural art can be integrated in an ethnomathematics unit plan around *siapo* or traditional Samoan arts (Figure 3).

[2] https:www.choosemyplate.gov/

Figure 3: Samoan Siapo Design
Source: Tauiliili 2015

Themes that emerged in teacher candidates' artifacts revealed this was the first experience they had in learning about or creating a siapo. They also wrote their perspectives on the importance of learning this indigenous art process in order to pass it on to others in their community. Place-based pedagogy has the potential to allow participants to learn cultural traditions like siapo and embrace the wisdom and skills of their ancestors. The balance and symmetry in the cultural siapo art patterns can also be integrated with holistic health concepts such as *Lōkahi* (unity, harmony, and balance). Ethnomathematics provides a model for ethnohealth instruction where new information is built upon place-based cultural practices.

Written Samoan and Hawaiian literature is often in short supply in classrooms, so it makes sense for candidates to create their own place-based stories. Writing local stories has promoted the English teaching standard of expository writing while also making connections to indigenous knowledge about how to make everything from recipes to hunting weapons. Through these written texts, the rich indigenous knowledge of the islands is documented and exchanged as teacher candidates share their books and artifacts about traditions that are meaningful to their family cultures. This activity also serves as a means to integrate technology, through the creation of iBooks or PowerPoint versions of their stories or traditional folktales. In creating culturally-responsive stories, there is potential for participants to learn ways to incorporate narrative story elements, sequencing, and other academic standards relevant to the Common Core academic standards. In particular, this approach of creating rather than using curriculum is needed to address health risk behaviors like alcohol and tobacco use, nutrition, and indigenous exercise by using images and stories that are culturally responsive in American Samoa.

Conclusion

Through engaging in culturally responsive health education using place-based pedagogy, instructors at the University of Hawai`i have found that teacher candidates a) were highly engaged in their learning, b) gained a deeper understanding of their cultural traditions, c) became more involved with the local community, d) felt more confident in their abilities, and e) submitted work of higher quality. These are important elements in any area of education, and some even more so within the context of health education: individual and cultural engagement and high quality work are essential in a context where the stakes are so high. The effectiveness of a health education program depends in no small measure on the extent to which participants perceive that the program is relevant to their lives, is sensitive to their needs, provides information that is place-based (i.e., based in their reality), and advocates interventions that are realistic within the social, economic, political, and cultural context in which they live. As

American Samoan teachers in turn use place-based and culturally responsive pedagogy with students to promote holistic health, such practices will help ensure that the rich cultural traditions of the Pacific Islands will live on to the benefit of the people and the world.

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