

Intersections between Pueblo Epistemologies and Western Science
Through Community-Based Education at the Santa Fe Indian School

by

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ABSTRACT

In order to examine the concept of Pueblo Indian epistemology and its relevance to western science, one must first come to some understanding about Pueblo Indian worldviews and related philosophies. This requires an analysis of the fundamental principles, perspectives, and practices that frame Pueblo values. Describing a Pueblo Indian worldview and compartmentalizing its philosophies according to western definitions of axiology, ontology, epistemology, and pedagogy is problematic because Pueblo ideas and values are very fluid and in dynamic relationship with one another. This dissertation will frame a Pueblo Indian epistemology by providing examples of how it is used to guide knowledge production and understandings. Using the Community-Based Education program (CBE), at the Santa Fe Indian School in Santa Fe, New Mexico, I will demonstrate how this unique epistemology guides the CBE philosophy by creating meaningful hands-on learning opportunities for students. What sets this program apart from typical formal schooling classes in schools in the United States is that the local Pueblo communities define the curriculum for students. Their participation in curriculum design in the CBE process enables students to participate in seeking solutions to critical issues that threaten their Pueblos in the areas of environment and agriculture. This program also supports the larger agenda of promoting educational sovereignty at the Santa Fe Indian School by giving the Pueblo tribes more control over what and how their students learn about issues within their communities. Through the community-based agriculture and environmental science programs, students study current issues and trends within local Pueblo Indian communities. In two linked classes: Agriscience and Native American Agricultural Issues, students work with community farms and individual

farmers to provide viable services such as soil testing, seed germination tests, and gathering research for upcoming agriculture projects. The policies of the governing body of Santa Fe Indian School mandate the use of CBE methods throughout all core classes. There are steps that need to be taken to ensure that the CBE model is applied and supported throughout the school.

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CHAPTER 1

BOOK CHAPTER

TESUQUE PUEBLO EPISTEMOLOGY

Introduction

As a young boy I was fortunate to grow up near my Uncle Martin in the Pueblo of Tesuque. My Uncle Martin was very influential in helping to shape my worldview as a young Pueblo boy. Uncle Martin was the son of Martin Vigil Sr., a very influential Pueblo leader whose accomplishments included leading a group of Pueblo Governors in a successful campaign to defeat the Bursum Bill which was legislation intended to allow non-Indians to gain control of Pueblo lands.

Uncle Martin was a gentle man. He lived with my Aunt Evelyn approximately a quarter mile from my house where they raised chickens and turtles. When I was about ten years old, I would walk to their house through the sandy arroyo bottoms and through the thick juniper forest. The walk to his house was an adventure in and of itself. Lizards, rabbits, and scrub jays and many other interesting distractions seemed to easily grab the attention of a ten-year-old boy and would often sidetrack me. After completing my wilderness adventure I would arrive at Uncle Martin's house to find the table set for three. Although Uncle Martin and Aunt Evelyn lived alone, they came to expect my visits and therefore would set a place for me at the table daily. After a fine breakfast of fresh eggs, tortillas, and orange juice, Uncle Martin and I were on our way out the door for our daily adventures.

Uncle Martin and I spent a great deal of time in our juniper forest. Most of our adventures included wandering the reservation exploring and walking. Uncle Martin

could walk and walk and walk and walk! We explored hilltops, riverbeds, small plateaus, and ridgelines. As we searched our reservation's juniper forests, he would stop and show me plants. I remember clearly how he would explain to me how our people used particular plants. I learned about plant dyes, medicines, and the plants that could be used to fashion tools. I also learned about places. Important places exist all around our reservation and define our relationship to our land, our resources, and our people. Uncle Martin would tell me that *we are* the trees, the river, the rocks, the birds, and the plants. It did not make much sense to me at that time, but now I can better understand his wisdom.

Like most elderly Pueblo Indian men, Uncle Martin had a shed. That shed seemed to contain his entire life and included his prized possessions. Old gas station signs decorated the walls while Hills Brothers coffee cans contained everything and anything you could possibly imagine. I looked forward to entering his domain where I was allowed to freely explore and ask questions. On a rack near the door were always several freshly cut sticks that would soon be fashioned into slingshots. He also always had a slingshot in his back pocket, and his expert application often resulted in the demise of any bluebird or robin that dared to get too close.

My favorite adventure with Uncle Martin was going out to collect new slingshot materials. We searched the juniper trees in our forest for hours hoping to find that almost perfect branch that formed a "Y". We often collected several because, as a novice, I quickly learned they sometimes break. Uncle Martin always made sure that we only harvested one branch from each tree. He would explain how the trees were alive, and we were taking their arms to make our tools. I eventually learned to make my own

slingshots, and now my marksman's skills are a direct result of shooting alongside an old pro like Uncle Martin. Our quarry was primarily bluebirds and robins with an occasional furry rabbit providing a larger target. Robins were my favorite prey and the juniper berries provided an abundance of food for the robins thus making our backyard a robin hunter's paradise. After a successful hunt we would cook the robins on an open fire and sprinkle them with salt for a delicious meal.

It usually was in the spring when the first bluebirds arrived that we would begin to collect our preferred materials for making bird traps. Uncle Martin showed me how the wild sunflower stalks were perfect for traps because of the soft pith in the middle that could easily be removed to hollow out the stalk. After harvesting an armload of stalks from last year's garden, we would then collect Four Winged Saltbush branches that, because of their flexibility, would become the trigger arm mechanism for our traps. The trigger itself was made from the gum-weed plant whose hook like bracts hold the noose in place. Traditionally, horsetail hairs were used to create the noose, but Uncle Martin and I would "cheat" and use fishing line for its superior holding power. A sunflower stalk approximately four feet in length was used as the foundation for the trap. One end was hollowed out to allow the trigger mechanism to sit within the stalk. A small noose was then held in place atop the stalk using a small gum-weed branch. Once complete, a dozen or more stalks were placed upright in the fields where they resembled perches to unsuspecting bluebirds. When a bluebird landed on the stalk, it triggered the gum-weed branch and the noose ensnared the feet. This system of harvesting bluebirds allowed us to release the female birds that Uncle Martin taught me would ensure that we would have

more for next year's ceremonies. With the passage of time, the days I spent with Uncle Martin become more valuable to me.

Uncle Martin passed away on my fifteenth birthday. It was a very emotional day for me as a young man. The knowledge that he left with me will last for the rest of my life. To me it was about a relationship with my uncle. It was a relationship that was fostered by our view of the land. When viewed within the context of Pueblo Indian Epistemology, Axiology, and Ontology, my relationship with Uncle Martin provides a clear example of how we function on a daily basis within Pueblo Indian realities. Because Pueblo people live their lives in a way in which the foundations are fluid, my story of Uncle Martin reveals some of the most important aspects of Pueblo Indian worldview. The teachings of my uncle embody the core values that frame how we live our lives as Pueblo Indian people and reveal some of ways in which Pueblo notions of axiology, ontology, epistemology and pedagogy are realized. They also offer some insight into the foundations of a Pueblo Indian consciousness.

The cosmology of the Tewa people is based on place. The place where we live is defined through the Tewa names given to the various parts of the cosmos and include the places or regions sacred to the Tewa. These places and the associated living beings including animals, plants, and humans are highly valued within the Tewa world duality where everything in the cosmos has a spiritual component. The Tewa strive to achieve a balance among the various elements and this balance is achieved by observation of the events, respect for all that exists, and by adapting in a fluid and changing world. It is these knowledge systems that are the foundation for a Tewa consciousness.

The Pueblo People

The Pueblo people are descendants of the Anasazi. The Pueblo people are “traditional,” in that they still continue to participate in ceremonial activities and celebrate feast days by dancing and praying through songs that have survived for thousands of years. A feast day for each Pueblo varies but usually consists of dancing, food preparation and sharing in order to honor and pray to the spirits for a good harvest and a healthy community. Although each of the Pueblos has varying populations, they comprise a significant amount of New Mexico’s overall demographics. Most of the Pueblos house their own school systems with preschool and elementary services provided by Bureau of Indian Education (BIE), or by the tribe. The focus of this paper is the worldview of the Pueblo people of New Mexico. More specifically this paper focuses on Tesuque Pueblo epistemology. The nineteen Pueblos of New Mexico are geographically located close to the Santa Fe Indian School where the CBE program operates. I live in Tesuque Pueblo and am active in the culture and religious events of Pueblo. In addition, I bring the perspective of a former Tribal Councilman. In my Pueblo, the religious leaders appoint Councilmen to office and service is required for one year. Pueblo history is complex because of the interaction first with the colonial Spanish government, then the interaction with the Mexican government, followed by the New Mexico territorial government and finally the United States Government and the New Mexico State government. Each government affected Pueblo people and landholdings through various decisions regarding the ownership of Pueblo lands, the legal status of Pueblo people, and the court decisions of the various governments. The following is a very brief introduction to the Pueblo people.

Felix S. Cohen (1979) described how the word “Pueblo” came into existence and how it was applied to the various Native villages in New Mexico.

“When the Spaniards entered the Rio Grande Valley in the sixteenth century they found certain Indian groups or communities living in villages and these Indians they designated “Indios Naturales” or Indios de los Pueblos” to distinguish them from the “Indios Barbaros”, by which the nomadic and warlike Indians of the region were designated. The Indians who were called Pueblo Indians were not of a single tribe and they had no common organization or language. Each village maintained its own government, its own irrigation system, and its own closely integrated community life” (383).

There are currently nineteen pueblos that still exist in the State of New Mexico. These Pueblos are subdivided by linguistic group. Sando (1992) describes these linguistic groups in his Pueblo Indian history.

- A. The Tanoan language, which includes the three dialects of Tiwa, Tewa, and Towa:
 1. The Tiwa speakers are the Taos, Picuris, Sandia, and Isleta Pueblos.
 2. The Tewa speakers are the San Juan, Santa Clara, San Ildefonso, Nambe, Tesuque, and Pojoaque Pueblos.
 3. Towa is spoken only by the Jemez.
 4. The Keresan language is spoken, with few changes, by the Acoma, Cochiti, Laguna, San Felipe, Santa Ana, Santo Domingo, and Zia pueblos.
 5. The Zuni language is spoken only by the Zunis (8).

As previously mentioned, Tesuque Pueblo is one of the Tewa speaking communities and is located just north of Santa Fe, New Mexico. Edelman and Ortiz (1979) describe the Pueblo:

“Tesuque is the southernmost of six extant Rio Grande Tewa Pueblos and the closest to Santa Fe, New Mexico, which is nine miles south... The village is situated on the Tesuque River in the approximately center of Tesuque land holdings, which consist of 17,024.41 acres...” (p. 330).

The population of Tesuque Pueblo is estimated at approximately 500 persons. The land base consists primarily of rolling hills and arroyos (dry water courses that swell after rainstorms) and the dominant vegetation consists of pinon-juniper woodlands

interspersed with plants at the shrub level including four wing saltbrush, rabbitbrush, and mountain mahogany. There are cottonwood galleries that line the Tesuque River and provide habitat for numerous bird and mammal species such as bobcats, deer, northern orioles, finches, owls, hawks, and doves. The agricultural area follows the Tesuque River because in the past the river was the only source of water for the crops that the people planted and raised. Today, crops are also irrigated from an artesian well as well as from the river when there is sufficient water flow.

Edelman and Ortiz (1979) reported that subsistence living was based on certain crops.

“Tesuque, like all Pueblos, was a sedentary society with a subsistence economy traditionally based on an agricultural-hunting cycle. Precontact crops included corn, squash, beans, and some cotton and tobacco. The Spanish introduced in the sixteenth century wheat, chili, peaches, and melons along with horses, sheep, and pigs...” (330).

This combination of precontact and introduced crops is now considered by the people to be the traditional crops.

Pueblo Indian worldviews

In order to be able to begin to contextualize the concept of a Pueblo Indian epistemology, one must first come to some understanding about Pueblo Indian worldviews and related philosophies. Kawagley (1998) refers to the term worldview as a means of conceptualizing the principles and beliefs-including the epistemological and ontological underpinnings of those beliefs-which people have acquired to make sense of the world around them. To do this requires an analysis of the fundamental principles, perspectives, and practices that frame Pueblo values. Describing a Pueblo Indian worldview and compartmentalizing its philosophies according to western definitions of

axiology, ontology, epistemology, and pedagogy is problematic because Pueblo ideas and values are very fluid and in dynamic relationship with one another. In this critical personal narrative essay, I draw from learning experiences with my Uncle Martin and from my experiences as a tribal student, farmer, hunter, tribal councilman, parent, and educator to show how our worldview as Pueblo Indians affects our daily practices.

Although it is very difficult to describe the values of all Pueblo Indian tribes due to variation from community to community, there are some fundamental similarities in the basic principles that are defined in western academic settings as epistemology. This paper examines some of those similarities, particularly the concepts of land, language, stewardship, and spirituality, and explores the relationships between them. My goal is to identify how these values relate to the creation of an educational foundation that can benefit Pueblo students and their communities. By using the Community-Based Education program at the Santa Fe Indian School, I will demonstrate how this can effectively be achieved. If education is going to be used as a tool for strengthening tribal self-determination and tribal capacity, tribes must seek new ways to educate indigenous students from positions that counter the colonizing history of American Indian education. Brayboy and Castagno(2008) state, “The unique status of tribal nations as political and legal entities with the U.S. means that issues of Indigenous education must be understood, researched, analyzed, and developed in ways that take into account the sovereign status and self-determination goals of Indigenous communities” (788). This paper presents a brief description of a methodology for educating indigenous students who can become engaged in critical issues facing their tribes with their cultural values as the foundation.

Tesuque Pueblo Epistemology

In the Tewa world, there are the concepts of “wowa tsi”, “tsimuyeh”, and “naimbi khuu”. “Wowa tsi” (way of life) addresses the ontology of Tewa life and the relationships within communities, individuals and with nature. “Tsimuyeh” (the advice) is comparable to the concept of axiology. As a noun, it describes the body of knowledge essential to existence as a Tewa. As a verb, it describes the process and methods of teaching and transmitting knowledge. This teaching can occur at community events by tribal leaders as well as by parents at home and through peer learning in everyday interaction among adults and children. “Naimbi khuu” describes the specific tasks and actions that are necessary to carry out the advice and the way of life and a Pueblo consciousness. This concept is comparable to the concept of epistemology.

Simply beginning the process of outlining Tesuque Pueblo beliefs into a western theoretical framework becomes very problematic for several reasons. First, the concepts of wowa tsi, tsimuyeh, and naimbi khuu are fluid and build upon each other in important conceptual ways. For example, wowa tsi embodies the importance of maintaining a lifestyle that fosters relationships with all living things in a way that promotes harmony and well-being. Likewise, the concept of tsimuyeh embodies the body of knowledge that guides the Tewa worldview. Within this body of knowledge is the emphasis on the maintenance of harmonious relationships with the living, non-living, and supernatural forces that exist. Naimbi khuu provides the guidance as to how one should go about maintaining these relationships. So although each is a unique concept within the Tesuque Pueblo belief system, the concepts are linked through their theoretical underpinnings. Attempting to contextualize a Tesuque Pueblo worldview under western conceptions of

axiology, ontology, epistemology and pedagogy is also problematic in that a large part of a Tesuque Pueblo worldview is the recognition and inclusion of spirituality. The inclusion of spirituality makes compartmentalizing aspects of a Tesuque Pueblo worldview into the definitions of axiology, ontology, and epistemology nearly impossible because western definitions do not account for spirituality. Yet in a Tesuque Pueblo worldview spirituality is an important element in cultural orientation.

There is a tendency in tribal communities to focus on the great ceremonial events as evidence that the Tewa way of life is still strong and continuing. Although the ceremonies and dances are important prayers and demonstrations of faith, they represent but a small fraction of time commitment in the life of a Tewa person. The Tewa man, woman, or child is taught that how they live their daily life is what determines whether that person is living the Tewa life. The Tewa understand that the *tuu tsimuyeh* is not only advice on how to live the Tewa life but also describes the history and religious principles of the community. Thus, it also contains the concepts of “*naimbi khuu*” and “*wowa tsi*”. The same fluidity holds true for “*naimbi khuu*” and “*wowa tsi*”. *Naimbi khuu* describes specific tasks and responsibilities for a Tewa way of life and this includes the “*tuu tsimuyeh*”. Listening to the advice and accepting the advice being given is important for the Tewa person. Yet, the *tuu tsimuyeh* also contains advice on how to live “*naimbi khuu*” and the relationships contained in “*wowa tsi*”. Each of these concepts can stand-alone but are also part of the other two concepts. The context in which the speaker provides information determines how the concept is to be understood. For instance, *tuu tsimuyeh* could happen when a parent is teaching a child some specific behavior such as how to speak to an elder they might meet in the village. But, *tuu tsimuyeh* could also be

the broader advice given to the people at a communal gathering and might include how people should perform their religious duties which are part of wowa tsi and naimbi khuu.

In order to further explain the constructs used to explain the Pueblo Indian worldview, the following sections will provide brief summaries of some of the major concepts that emerge and guide Pueblo Indian philosophies. I will also show how these principles are fluid and in constant relationship with one another and can ultimately lead to new explorations in modern indigenous education.

Axiology- Tuu Tsimuyeh-The Advice

The natural world provides the context in which important values and lessons are premised and therefore must be considered when outlining a Pueblo Indian epistemology. Cajete (1994) states, “There are a number of elements that characterize Indigenous educational processes. These elements characterize Indigenous education whenever and however it has been expressed” He further states that, “A sacred view of nature permeates its foundational process of teaching and learning”. The land as a central component of Pueblo Indian worldview translates into a living reflection of an individual’s self and community. From birth, ones connection to land is reaffirmed in the naming process. A child is given a series of names that are generally derived from the natural world. It is very common for people to be named after places such as mountains or lakes. Equally as common is the naming of people after plants, animals, or other natural phenomenon such as rain or lightning. The central emphasis within Pueblo culture is on maintaining harmonious relationships with the entire cosmos because it is perceived as a living being. Recognizing something as alive means that the cosmos and its components have an intrinsic value and suggests an axiology based on a close

relationship with the natural world. Each element within the cosmos is imbued with a life force that must be acknowledged, respected, and treated with humble reciprocity. The critical recognition of the intrinsic value of all things in the nature and in the cosmos translates into lifelong obligations on the part of the Tewa people not as caretakers of nature but as an integral part of nature with awareness of the impact of human action on the cosmos.

The act of naming becomes a reminder of the close relationship and implied stewardship an individual has to the land. According to Wilson (2008), “The responsibility to ensure respectful and reciprocal relationships becomes the axiology of the person who is making these connections” (p. 79). This concept is an important part of the Tuu Tsimuyeh that informs a Tewa axiology.

The close relationship to land and the processes located within Pueblo interrelationships with land are reflected in the ways that these relationships are maintained and celebrated within each of the Pueblos. The corn dance is an example of the celebration of these relationships. All Pueblo communities perform some version of the corn dance. The version performed at Tesuque Pueblo involves men, women, and children. There are upwards of a hundred dancers who keep in rhythm to songs from a choir of men and the beat of a lone drummer. The dancers are arranged in two long lines with men and women alternating in the lines. Little children as young as four years old form the rear of the lines while the older members of the community are at the front of the lines. The choreography can be complex and dancers and singers must practice for hours in preparation for the event. They follow the songs and the beat of the drum and the dance can be very tiring and demanding. Male corn dancers wear a dark slip of river

mud and carry an evergreen bough and a rattle. Brightly colored parrot feathers adorn the head of male dancers while women wear elaborate headdresses decorated with turkey feathers and symbols of rain and corn. The men wear ceremonial kilts fastened around the waist with a long sash. The women wear black mantas, which are traditional dresses that cover one shoulder and they perform barefoot. The songs themselves acknowledge Pueblo relationship to the land by referring to the coming of the rain, the blossoming of flowers, and the emergence of ceremonial crops as important cultural markers in time.

These important connections between Pueblo peoples and land are also evident in the teachings of my Uncle Martin. We used the traditional traps to capture our bluebirds because they allowed us to release the female birds unharmed. This was important because in the springtime the female birds are building nests and raising young. Our method of harvesting bluebirds acknowledged our relationship to our land by demonstrating stewardship over the bluebird population. Viewing the natural world as imbued with a spirit implies that, as a Pueblo Indian person, it becomes your cultural obligation to maintain harmonious relationships with the natural world.

The concept of stewardship is applied quite broadly within Pueblo communities and depending on the context. The term itself, within the western context, is usually associated with land and land management. When viewed within the Pueblo Indian context, however, it begins to take on a much broader definition. The maintenance of relationships often translates to maintaining stewardship over not just the land, but also the language, culture, traditions, and values of the community. Stewardship, in this sense, applies to caring for families, for children, for the elderly, and for the sick. From the perspective of tribal leadership, stewardship signifies watching over people's lives, as

well as the continuation of the ceremonial cycle for the betterment of the entire community. Community then becomes a very important defining unit within the context of Pueblo Indian communities. Although one's traditional name in a particular Pueblo language may be an important identifying marker within the Pueblo, it is at the community level that most people identify themselves. Whether engaging Native or non-Native people, Pueblo Indians will typically use their community or the name of their Pueblo to identify themselves.

Within Pueblo community and culture, birth, life, and death are all celebrated communally. There are also other important customary events that require a Pueblo person's participation. These include ditch cleaning days, community clean up days, and ceremonies. "Acequias" is the Spanish word for ditches that are channels for the water that irrigates the crops and pasture. These ditches must be cleaned annually in the springtime before planting begins. The Spanish introduced this method of irrigation and it is widely used in many Pueblos. Male members of the community shovel dirt and debris out of the channels and young male children carry water for the workers. The women of the community prepare meals that are carried out to wherever the workers may be in the cleaning of the ditches so that the men can continue the work without having to stop and return home to eat. The tribal officials determine the schedule for community cleanup generally in the days before a ceremonial dance. Just prior to a major celebration, tribal officials issue the call for the cleaning of the village proper. Men and women cut weeds and sweep in the communally owned areas including the main plaza. The younger men collect and remove the accumulated trash piles and discard the material in areas designated for trash. The tribal officials also determine the dates for ceremonies

and they select the individuals who will perform in those dances. Selection is an honor and dancers must prepare their outfits and attend practice sessions prior to the dance.

Progression from childhood into adolescence and adulthood are also communally recognized and celebrated. In line with the teachings of my late Uncle, the responsibility to maintain a harmonious relationship with the living community is an obligation for Pueblo people. The concept of community, then, also means the community of the winged creatures, the four-legged, and those that swim. This concept of community is an important aspect of Pueblo Indian axiology. As a result of this shared understanding, I propose that land, stewardship, relationships, and community are important foundations for understanding the Tewa concept of Tuu tsimuyeh and are a large part of a Tewa axiology. These key elements, embedded within the traditional orientation and philosophy of Pueblo people, can also function as a structure in the development of educational methods for indigenous students. These educational methods also can be influenced by the way of life concept of the Pueblo people. This precept is examined in the following section on the ontology or the Pueblo concept of the way of life.

Ontology- Wowa tsi -Our Way of Life

In beginning the discussion of the important ontologies that define a Pueblo epistemology, it is crucial to understand that the relationship between Pueblo axiology and ontology are fluid. Concepts that help to shape Pueblo Indian core values also help to shape Pueblo ontologies.

According to Basso (1996),

For whenever the members of a community speak about their landscape- whenever they name it, or classify it, or tell stories about it- they unthinkingly represent it in ways that are compatible with shared

understandings of how, in the fullest sense, they know themselves to occupy it. (p. 74)

In accordance with the teachings of my Uncle Martin, Pueblo *ways of being* are expressed through the enactment of rituals that demonstrate the balance of reciprocity.

The act of hunting provides an example of the Pueblo concept of reciprocity. Hunting the wild turkey, for example, requires a Pueblo hunter to mentally prepare by acknowledging a close kinship to his prey and the need to respectfully treat the animal during and after the hunt. After a successful hunt, all of the turkey is used. The hunter in turn, extends his appreciation through prayer and ceremony in which he acknowledges the animal that gave its life in order that we prolong ours. He further expresses his gratitude by not wasting the animal that he has harvested. Cajete (1999) summarizes this point accurately when he states,

Whether it was hunting in the southwest or the far north, an intimate relationship between the hunter and the hunted was established. There was an ecological understanding that animals transformed themselves, and that while this may not be a literal transformation, indeed it is an ecological reality. (p. 8)

Thus, a reciprocal relationship is established between the hunter and the hunted, and this relationship is celebrated through this consciousness. The focus is not on the death of the animal, but the celebration of the ability of the Pueblo to continue its ceremonial cycle through the harvest of the animal. It becomes a reciprocity based on survival in both a physical and spiritual sense. This argument is exemplified by Cajete (1999) who further states,

The hunter of a good heart was a bringer of life to his people: he had to have not only a very intimate knowledge of the animals he hunted, but also a deep and abiding respect for their nature, procreation, and

continuance as a species. While he tracked the animal physically to feed himself and his family, he also tracked the animal ritually, thereby understanding at a deeper level his relationship with the animals he hunted. The hunted animal became one of the guides of relationship and community in Indigenous education. (p. 9).

The maintenance of a close physical and spiritual connection with prey animals in turn obligates the hunter to become a caretaker and steward of those same animals. In this way, in the Pueblos, life is actually celebrated through death.

The concept of reciprocity can also be extended to Pueblo Indian agriculture. In the agricultural methods practiced in the Pueblos, and the philosophies that guide those methods, establishing a reciprocal relationship with nature is a defining concept. In an arid environment like New Mexico, an agricultural practice such as planting corn is in and of itself an art. Merriam Websters Desk Dictionary defines art as skill acquired by experience or study or as an occupation requiring knowledge or skill (Merriam Webster, 1995). The Pueblo farmer applies his knowledge of the weather, soil conditions, the nature of the seed, watering cycles, pest control, harvesting techniques, and processing and storage to provide sustenance to his family. He must monitor growing conditions and understand how to harvest and process with a minimum of loss. He must understand and apply the art of growing to the corn plant at its various stages of development and properly reap and store the crop.

In order to be successful, particular strains must be planted at certain times in order to ensure that they receive enough moisture to survive the hot summer heat. Planted too late, certain varieties of corn do not have ample time to germinate in order to receive the benefit of the early monsoons, if there is one. In order to ensure a bountiful harvest, a farmer must establish an intimate relationship with his plants, his field, and the

processes that affect them. In examining corn planting among the Pueblos and its relationship to Pueblo identities, Cajete (1999) states,

For the Pueblo people, corn became a sacrament of life, that is, a representation of life itself and the connection that Pueblo people feel towards that plant world. Corn is reflected in their art forms and their ways of understanding themselves as people (p. 12).

This relationship between corn plant and people calls for the acknowledgment of the spiritual forces that impact the success of farming. The success of a corn crop depends heavily on the rain and snow cycles that affect the life cycle of the corn. Prayers for rain conducted within rituals and ceremonies are a major part of the agricultural philosophy that help to shape and develop reciprocal relationships in the agricultural practices. This specific knowledge serves as a major cultural orientation as it does in many indigenous cultures.

Sumida Huaman (2009) in her comparative educational research on both the Cochiti Pueblo in New Mexico and the Hantan Shonko in Peru concluded that

As community education is intertwined with Indigenous ecology, so are both formal schooling and community education intertwined. At its most basic, Indigenous children come from community, and they must attend school. In summary, what is useful to recognize is that the agriculture traditions, including farming, occupy two interrelated levels of meaning for community members: Farming is a microcosm of activity linked with ancestral traditions, language and ecological teachings, offers learning opportunities and meaningful exchange between community members (p.16).

She further states, “The second level of meaning is that agriculture is an expression and practice of a larger vision of ecology, requiring community-wide efforts towards engagement with the natural universe” (p. 16).

Furthermore, in his classic book *Wisdom Sits in Places*, Basso (1996) asserts,

The knowledge on which wisdom depends is gained from observing different places (thus to recall them quickly and clearly), learning their Apache names (thus to identify them in spoken discourse and in song), and reflecting on traditional narratives that underscore the virtues of wisdom by showing what can happen when its facilitating conditions are absent (p. 134).

Although his reference is to the Western Apache, this could also hold true for Tewa knowledge that is place-specific. Both agricultural and hunting beliefs and practices within the Pueblo Indian worldview embody the concepts of reciprocity. My Uncle Martin taught me that as a hunter you only harvest what you need from the land, and in turn the land will continue to provide for you. It is equally important as a farmer that you care for the land by rotating crops so not to diminish soil fertility, and the chances of a successful crop. In the next section, I will examine the Pueblo concept of epistemology and the potential for affecting educational methods practiced in formal educational efforts.

Epistemology–Na imbi Khuu-Our Consciousness

Uncle Martin unknowingly helped me to learn and understand the elements of Pueblo Indian epistemology. In his book, *Research Is Ceremony*, Shawn Wilson (2008) states, “An indigenous epistemology has systems of knowledge built upon relationships between things, rather than on the things themselves” (p. 74). Uncle Martin taught me that we are caretakers of the land, of the trees, and of the birds, while farming has taught me that we also depend on uncontrollable natural forces such as rain events. Wilson (2008) further states, “It is important to recognize that the epistemology includes entire systems of knowledge and relationships. These relationships are with the cosmos around us, as well as with concepts. They thus include interpersonal, intrapersonal,

environmental and spiritual relationships, and relationships with ideas” (74). Just as we are dependent on the land for our continued survival as a tribal nation, we are equally obligated to honor our relationship to it by being caretakers of the land. As with Pueblo axiology and ontology, our epistemology is also fluid: Tewa consciousness is based on a close relationship with the land and the processes that occur within it. According to Cajete (1999),

“They understood and expressed themselves in relationship to the land and the animals upon which they depended for their survival. In the desert southwest, Pueblo Indians became dry land farmers and likewise venerated the cycles of water, earth, wind, and fire—all environmental elements essential to life and to the continuance of the Pueblo people in their place” (p. 5).

Defining Pueblo epistemology here then also means understanding the importance of relationships. Wilson(2008) also summarizes this when he states, “Therefore reality is not an object but a process of relationships, and an Indigenous ontology is actually the equivalent of an Indigenous epistemology” (p. 73). What this means for notions of Pueblo epistemology is that our reality is not and should not be quantifiable or objectified, but rather translates into ways of understanding our world and the consciousness that guides how we live our lives.

The following sections apply the constructs that have been outlined using both western and Tewa terms to Indigenous education policy, curriculum, and practice by demonstrating how they are being used at the Santa Fe Indian School as a means for creating meaningful educational opportunities for indigenous students.

Toward an Indigenous Pedagogy

An indigenous pedagogy is fundamentally different in a number of ways from the western pedagogies that are used in contemporary times to educate students. Kawagley (1998) stated,

Western scientific knowledge has become so specialized that it is often difficult to take the whole organism or the whole system into account. Western culture segregates science from other realms of knowledge and even subdivides science in to various categories, so that a scientist specializing in one field may well lack a basic understanding of other scientific and nonscientific fields (p. 138).

Western science can study only that which can be measured. Therefore, the subject under study must be segregated and subdivided to meet the strict terms of the scientific method. Scientists apply their special knowledge to the subject under study and develop a high level of expertise that cannot easily translate into other fields. The Tewa worldview is that nature and the spiritual world cannot be segregated and must be considered within that duality along with the actions necessary to promote harmonious relationships among all things. As is evident with the teachings of my late uncle, the land is the primary focus in teaching important lessons. For Pueblo Indians, nature is an extension of the tribe and of oneself. According to Cajete (1999), “American Indian traditional relationship to and participation with the landscape includes not only the land itself but the way in which they have perceived themselves and all else” (p. 3). These traditional philosophies about nature are reinforced through the advice giving by extended families, elders, and other members of the tribe.

The sharing of important tribal knowledge about nature often involved the use of storytelling and oral tradition to teach the important lessons about nature. Many of these lessons were intended to teach appropriate and acceptable behavior with regard to nature.

One of the most important foundations for Native American perspectives of the environment is that of interrelatedness and an emphasis on community. All tribes recognize that they have a direct relationship and connection with their natural environment and are a part of a larger community that includes plants, animals, mountains and rivers. Cajete (1994) states, “Guided by this metaphysical principle, Indian people acknowledge that all living and non-living entities of nature have important inherent meanings within the context of human life” (p. 74). This understanding leads to ways of existing upon a landscape that promote the long-term sustainability of the tribe and the resources that are required for survival. Pueblo Indian traditional knowledge about nature, then, refers to a consciousness that is the basis for a sacred ecological perspective which forms the foundation for an indigenous pedagogy.

Battiste raises some important questions regarding efforts to implement an Indigenous pedagogy,

On the road to educational reform, there are three important questions that need to be answered: (1) how do First Nations people transform educational institutions to allow the individuals within them to restore Indigenous knowledge and their inner selves? (2) How do we create spaces in education for making meaning and achieving respect for Indigenous knowledge? And (3) How do we bring a better balance in our lives? These questions explore and sustain Indigenous knowledge, spirituality, authenticity, and wholeness.

Although these scholars have been admonishing educators about the need for Indigenous education, the problem of stereotypes of natives, both positive and negative, inhibit real discussion about native education. Lomawaima and McCarty in their study of Native American Education addressed the problems caused by stereotypical notions of Indian people and their intellects,

“Some myths do not flatter Indian people or intellects; others cast a rose glow on Indians as “natural” artists, athletes, or ecologists. Some myths justify practices used to diminish students: Indians are visual, just show films; or Indians are nonverbal, debate is not culturally sanctioned.”

These questions and points of discussion are are very important and need to be addressed in various ways in the Santa Fe Indian School Community Based Education Program (CBE).

Bringing Indigenous Pedagogy Home: An Example

At the Santa Fe Indian School where I teach Agriscience in the Community Based Education Program, a very unique approach is being implemented that attempts to accommodate indigenous pedagogies and philosophies. According to Hyer (1990), “One of the school’s strongest features is its relationship with parents and tribal communities” (p. 83). The concept of the Community-Based Education Program (CBE) program reflects indigenous pedagogies in that the overall structure of the curriculum is much different with regard to the rest of the institution. This style of pedagogy embodies what McCarty and Lee (2014) define as Culturally Responsive Pedagogy, where educational sovereignty, the reclaiming and revitalization of the disruptions and displacements caused by colonization, and the recognition of the need for community-based accountability form core ideas about how indigenous students are educated.

The CBE program was established at SFIS through grants received from the Intel Corporation and the Department of Energy in July of 1995. The program was introduced to students in grades ten through twelve in order to engage students and tribal communities in issues and problems related to the environment, natural resources, and

agriculture. SFIS has established formal relationships with the Pueblos of Jemez, Cochiti, Tesuque, Santo Domingo, and Santa Clara to establish and encourage mutual interaction in the development of curriculum in the areas of math and science. What distinguishes this model from other programs is that it draws upon circles of wisdom that exist within tribal communities. The program combines that knowledge with experiential learning to work towards the resolution of community issues and problems. This program allows tribal members to take the role of teacher and student, thereby, fostering mutual learning between students and community members and in doing so, closely models Pueblo Indian pedagogy.

Students are allowed to engage in the CBE program for a block period of time that encompasses two regular class periods.

Table 1.0: Community-Based Education Schedule 1997-2003

Monday	Tuesday	Wednesday	Thursday	Friday
1 st period Core Class	2 nd period Core Class	1 st period Core Class	2 nd period Core Class	1 st period Core Class 2 nd Period Core Class
3 rd period Core Class	4 th period Core Class	3 rd period Core Class	4 th period Core Class	3 rd period Core Class 4 th Period Core Class
5 th period <i>Environmental Studies</i>	6 th period <i>Tribal Government</i>	5 th period <i>Environmental Studies</i>	6 th period <i>Tribal Government</i>	5 th period <i>Env. Studies</i> 6 th period <i>Tribal Govt</i>
7 th period <i>Field Studies</i>	8 th period <i>Communication</i>	7 th period <i>Field Studies</i>	8 th period <i>Communication</i>	7 th period <i>Field Studies</i> 8 th period <i>Communication</i>

The classes in italics represent CBE classes. During the time period between 1997 and 2003 students who participated in the CBE program enjoyed the opportunity to participate in four classes that would enable them to begin to become aware of environmental issues that face their communities. Classes offered included *Environmental Studies*, *Field Studies*, *Tribal Government and Communication* allowing students to take an interdisciplinary approach to studying environmental issues. Students were seen by CBE instructors on a daily basis, which enabled them to explore their research topics in depth and from a multitude of perspectives. Thirty students participated in the program that allowed for the creation of four separate study groups and created the opportunity to visit multiple Pueblos and engage in multiple projects on the same day. Groups were assigned to Tesuque Pueblo, Santa Clara Pueblo, Cochiti Pueblo and Jemez Pueblo.

This enables students to visit local Pueblo tribes to examine issues that directly affect their communities using environmental science and agricultural science as themes for the study. Early in the school year, students meet with tribal leaders from each Pueblo to formalize a relationship and to begin discussions over critical issues facing the Pueblo. According to Brayboy (2008), “The ramifications on education for Indigenous youth are both wide and deep in scope, but they include-at a minimum-that tribal nations have inherent rights to determine the nature of schooling provided to their youth ” (p. 788). Through this unique educational program students then become active participants in researching issues and developing recommendations and solutions to tribal environmental and agricultural managers, which are meaningful to them and their communities. In doing so, students also develop skills that span multiple western

educational disciplines, such as science, mathematics, language arts, and history and apply them by using them in real life situations. Students also develop critical thinking skills that also benefit them in other core classes. For example, a CBE student engaged in a CBE-rich program experienced learning about water rights and water adjudication while on a visit to a Pueblo. The student then used his new knowledge to create his Senior Honors Project. These are the rich types of learning experiences that the CBE program strives to create for all students involved in the program.

A typical day in the CBE program involves traveling to the designated Pueblo to work alongside tribal leaders and professionals on issues that require students to engage in a variety of activities. For instance, environmental science students often monitor water quality and quantity using state of the art equipment to assist in the development of a comprehensive water quality program. Students also conduct riparian assessments, neotropical bird studies, erosion control projects, and elk monitoring studies. In Agriscience, students assist tribal farmers by providing information and demonstrating new techniques while simultaneously learning Pueblo Indian philosophies about farming from tribal farmers. Students write their research findings and report back to tribes at the conclusion of the projects. Agriscience students also operate a modern greenhouse facility in which traditional crops are grown for redistribution in the Pueblo communities. Students studying the impacts of genetic modification of plants have started a seed bank at SFIS where only traditional seeds from local Pueblos are stored. Other Agriscience students studying food security started a farmers market on campus where Pueblo Indian farmers can come and sell their produce. These are strong examples of Indigenous pedagogy. Battiste (2002) states, “Aboriginal pedagogy is found in talking or sharing

circles, and dialogues, participant observations, experiential learning, modeling, meditation, prayer, ceremonies, or story telling as ways of knowing and learning” (p. 18). These are typical activities for the CBE program at the Santa Fe Indian School and are designed using indigenous pedagogy and core values as the foundation for teaching and learning. When discussing the integration of western and aboriginal sciences, Aikenhead (2001) states, “Some students discovered that they already possessed some of this Aboriginal knowledge because it was taught at home, but was not highly valued as legitimate knowledge for school” (p. 342). In many ways, the Community-Based Education program at the Santa Fe Indian School has given validity to the knowledge held within Pueblo Indian communities, and situations like the one described by Aikenhead (2001), play out in this program regularly within the existing school schedule.

The decision by some students to become employed in natural resource related fields after graduation is one indicator of the success of the CBE program because the goal is for students who are from tribal communities like the Pueblos to become engaged in their communities in ways that contribute to real environmental issues and to develop the training necessary for them to do so meaningfully. This is a measure of success for the program because we are creating a cohort of young Pueblo people who have the awareness, motivation, and skills to begin to address the multitude of environmental issues that Pueblo communities must face.

For instance, this year, upon graduation, at least one Agriscience student will be hired by his Pueblo to work within the Office of Environmental Protection as an Agricultural Specialist. Two other students will serve as summer interns in Cochiti Pueblo through a partnership with the Youth Conservation Corps as environmental

technicians. The program has not only been successful in using Pueblo Indian core values, including the concepts of sharing, reciprocity, and accountability, as the foundation for achieving student success within the disciplines of Environmental Science and Agriscience, but other areas as well. For example, in reference to the Comprehensive Test of Basic Skills, a standardized test administered that measures academic achievement, Hyer (1990) states that, "In general, the scores shown that steady gain every year and far exceed those of Native Americans in New Mexico's public schools" (p. 84). In a time of educational self-determination for tribes, this model is proving to be a success on many levels, and the model is being disseminated in some ways.

The concept of community-based education is being implemented beyond the CBE program to include all disciplines. Throughout the year, Santa Fe Indian School teachers of all disciplines are required to include a community-based lesson that allows students to explore issues within their own communities and using the appropriate strategies and methods. These often include having students visit Pueblos to engage tribal leaders, tribal professionals, and elders in their projects. The school also requires all seniors (12th grade) to complete a Senior Honors Project (SHP) in which students spend an entire semester researching a critical issue within their community. Based on recommendations made by their Pueblo communities, students research their topics and then develop solutions that can be utilized by their tribes. Topics have included big game management on tribal lands, water rights, the impacts of genetically modified organisms on tribes, the impacts of historical trauma on education, and renewable energy possibilities for tribes. These types of educational opportunities provide students with a

wide array of experiences that provide them with tools to become critical thinkers and leaders within their own communities.

Power, Indigeneity, and the New Trajectory in Contemporary Indian Education

In an effort to move towards self-determination Pueblos have begun the process of taking control over important aspects of their lives. Historically, the inability of tribes to control critical areas of their lives has been supported by federal policies that sought to eliminate tribal autonomy and reinforce the colonial and paternalistic agenda of those policy makers. According to Ladson-Billings (1995), a culturally relevant pedagogy is defined as “A theoretical model that not only addresses student achievement but also helps students to accept and affirm their cultural identity while developing critical perspectives that challenge inequities that schools (and other institutions) perpetuate” (p. 469). With the passage of the 1975 Indian Self-Determination and Education Assistance Act, tribes were finally able to gain limited control over education, economic development, and cultural preservation strategies that would affect Indigenous youth. Hyer (1990) points out that, “The Indian Self-Determination and Education Assistance Act signed by Gerald Ford in 1975 gave tribes the right to contract with the Bureau of Indian Affairs to administer programs” (p. 72). Hyer (1990) states, “Self-determination was an opportunity for the Indian people to do for themselves-an opportunity to contract with the Federal Government to manage, administer, and to be responsible for activities that the government had been responsible for in the past” (p. 72). This can be seen in the educational philosophy of the Santa Fe Indian School. Santa Fe Indian School considers itself as a sovereign educational community building upon its rich cultural legacy to be the leader in Native American education. However, this concept is not clearly defined in

any written statements. In my opinion, it means that the Santa Fe Indian School has the power to make determinations that are important in the education of Indian children. In his interview with Hyer (1990), former Superintendent Joseph Abeyta (Santa Clara Pueblo) stated,

One hundred years ago Indian education prepared kids for American or Spanish ways of life. When Indians talked about education, they were saying ‘we want an education that is going to prepare our kids to learn to read and write, to manipulate numbers, to be able to survive in your world’ (p. 87).

Pueblo leaders and faculty at the Santa Fe Indian School have generally recognized the relationship between the historical colonial agenda that used education as a tool for assimilation and the need for autonomous control of Indigenous educational institutions. Former Superintendent Abeyta shared his thoughts when he stated that survival as Indians was an important matter for people and that a true Indian education system has to prepare kid to survive as Indians in an American world. He further states that the Indian way of life, society, and culture need to important parts of the instructional programs when tribes take over schools. In Hyer, (1990), Abeyta states:

I think that it’s changing more and more, people want their kids to survive as Indians. For that to happen, the Indian way of life, society, and culture have to be critical parts of the instructional programs when we take over institutions of learning. A true Indian education has got to be a system that prepares our kids to continue their own way of life and to survive as Indian people in an American world (p. 87) .

Abeyta emphasized even further,

The most important aspect is control. Control is the essential factor for change in any change situation. Obviously, Indian people have been in control of the education in their communities that continues their culture,

but they were never in control of institutionalized American education prior to the Self-Determination Act. Control is a critical factor (p. 88).

At the Santa Fe Indian School, control is vested in certain formal positions that include the school board, superintendent, and the principals. The School Board or Board of Trustees as they are officially known, are appointed by the Tribal Governors with each Board member representing a specific group of Pueblos and their Governor. They then select the superintendent who in turn hires the High School and Mid High School Principal. They have the power to make decisions about policies, staffing, resource allocation, scheduling, and hiring and firing. Decisions about the school curriculum including the teaching of native culture and tradition are also entrusted to the people in these positions. Externally, there are decision makers such as tribal officials as well as the agencies that make decisions about funding, oversight, and what is to be taught. Parents can also influence these decisions through activism and participation in groups such as parent organizations. This control extends into the classroom where teachers can affect the instructional program through their decisions as to how to teach, the extent to which subjects may be covered, and the myriad other decisions that go into the daily life of a classroom. This is significant as not all classroom teachers or even school principals are native. It cannot be assumed that native teachers also have the understanding of CBE and indigenous knowledge. Establishing oversight and accountability in this setting is an important aspect of control.

Lomawaima (2000) argues that American Indian education is a battle for power and has historically not been in the control of native parents or their communities. Tribally controlled schools now have the opportunity to redefine education to address the

colonial history and agenda that have dictated the education of native children. Teaching students from a position of strength rather than vulnerability and the use of native cultural orientation and worldview has enabled the Santa Fe Indian School to implement the concept of Community-Based Education effectively. This model at the Santa Fe Indian School serves to benefit other tribally controlled schools that wish to pursue a similar educational agenda for indigenous students.

In order to truly understand how the Pueblo Indian worldview can become a central component within Indigenous education requires an analysis of Pueblo Indian axiology, ontology, and epistemology. The diversity and uniqueness of each Pueblo makes it difficult to categorize the beliefs, customs, and orientations into well-defined boxes. In this paper, I have outlined some concepts that I feel are shared by the entire Pueblo Indian community to show how they can be used to facilitate the creation of a curriculum that uses culture as the foundation for creating an educational program that truly builds capacity within Pueblo communities. The creation and implementation of such educational programs and curriculums is long overdue and is necessary if Pueblo people are to take more control of the ways in which Pueblo children are educated. In her book, *Decolonizing Methodologies*, Smith states, “Imperialism and colonialism are the specific formations through which the West came to see, to name, and to know, Indigenous communities” (p. 60). If Pueblos are going to actively begin the process of taking control of how, why, and by whom education is done in a manner that helps to promote self-determination and survival, a pedagogy that accounts for Pueblo worldviews will provide for the exploration of issues and ideas that are important to Pueblo tribes. Wilson and Smith (2008) point out that it is crucial for Indigenous people

to be able to speak for themselves in spite of the effects of colonial history. Tribes have had limited power to speak for themselves when it comes to education and we must live with the consequences of those decisions. As an educator there are major implications for my work with regard to decolonizing Indigenous education and creating structures that emphasize Indigenous models of teaching. As Ka opua (2013) states in her book, *The Seeds We Planted*, “Rather a growing international community of Native educators and scholars are designing and implementing schools and systems highlighting the political stakes of indigenous education, and creating epistemological space for Indigenous knowledge’s and social relations to flourish” (p. 28). At the Santa Fe Indian School’s Community Based Education program we are striving to accomplish this. We are striving to be the leader in Native American education using Indigenous axiology, ontology, epistemology, and pedagogy in reaction to the colonial structures and perspectives that were historically used to educate native children. It is reclaiming our right to educate our Pueblo children in ways that we know are consistent with our beliefs and worldviews.

CHAPTER 2

JOURNAL ARTICLE

Community-Based Education at the Santa Fe Indian School

Reclaiming Indigenous Education: The Santa Fe Indian School Potential

At the Santa Fe Indian School (SFIS), where I teach agriscience in the Community-Based Education Program, a unique approach is being implemented that attempts to accommodate indigenous pedagogies and philosophies while addressing critical tribal needs. The concept of the Community-Based Education Program (CBE) program reflects indigenous pedagogies in that the overall structure of the curriculum contrasts with mainstream pedagogy that characterizes formal schooling even at SFIS, which although a tribally-controlled school is still dictated largely by nationalizing policies of education uniform for all students in the United States. The style of pedagogy that counters mainstream pedagogical methods embodies what McCarty and Lee (2014) describe as their perspectives on indigenous culturally responsive pedagogy. In indigenous culturally responsive pedagogy, ideas of educational sovereignty, loosely meaning control over the curriculum and giving value to indigenous knowledge, include addressing the disruptions and displacements caused by colonization and the recognition of the need for community-based accountability, thus forming core ideas about how indigenous students are educated. This is an important premise within the CBE program and a key element within the CBE curriculum.

Furthermore, the historical colonial agenda behind American Indian education is inescapable, as part of foundation of what Indian education has become in the United

States, which has ultimately been successful in unraveling the social fabric of many Native American communities across the United States. According to May (1999), “Indigenous community-based education has developed in recent years as a response to the long historical colonization, subjugation, and marginalization of indigenous peoples” (p. 1). At the Santa Fe Indian School, while acknowledging the history of colonization and its impacts on Pueblo and other tribal student populations and their communities, the concept of community-based education is proving an effective means of actually reclaiming indigenous education by empowering local tribes to become active participants in the educational experiences that their students receive.

Description of the Santa Fe Indian School

The Santa Fe Indian School (SFIS) was established in 1890 and is located in Santa Fe, New Mexico. The school serves students from the 19 Pueblos of New Mexico as well as the Jicarilla and Mescalero Apache communities. SFIS also serves a number of other tribal students from across the United States but due to its placement in the region, history, and early establishment, the school is owned and operated¹ by the 19 Pueblo Governors of the state of New Mexico.

Community members, students, faculty, staff, and administrators often describe SFIS internally as a special place where local community involvement is high, and students are the priority. For example, the very architecture of the school is representative of the Pueblos from which the students come with two story adobe style dormitories. Students receive three meals daily from the friendly cafeteria staff who are from the same Pueblos as the students. Students are privileged to the use of state of the

¹ For more information about the SFIS, the school history, its current operating structure, trust land, and current programs, see the school website at www.sfis.org

art classrooms and computer labs where they engage in their academic studies. Many of the teachers at SFIS are also from the same Pueblos as the communities, which carries multiple educational advantages. Those teachers that are non-Native may often share the same enthusiasm and dedication to providing a quality education that holds their home communities in high regards. The Santa Fe Indian School strives to provide a quality western education for indigenous students from New Mexico and the Southwest using tradition and culture as the foundation for redefining how Pueblo Indian students are educated.

However, Sumida Huaman's (2009) work on the form and content of Indigenous education adds some critical observations to these descriptions. She asks how mainstream education differs from peace education and indigenous education and points out that in indigenous education,

The desire for social transformation may be present but the purposes of schooling, structures, and methods used to achieve those purposes are not aligned with social justice or multiple dimensions of Indigeneity—including philosophies, languages, and cultural traditions. (p. 245)

Furthermore, the history of the Santa Fe Indian School is a troubling one that is rooted in early assimilative and destructive policies towards Indian children that swept the United States and Canada in the 1800s and worldwide in other national contexts around the world with significant indigenous populations. Historically, the hidden agenda of assimilation led the mission to educate Pueblo Indian students. It was believed that by removing indigenous children from their families and cultures that they would be more susceptible to the assimilation process. O'Brien describes the process of assimilation as practiced by the federal government,

According to Obrien (1989), “The government favored boarding schools over days, realizing that assimilation would occur more rapidly if a child were separated from his or her family, tribe, and culture. While boarding schools never outnumbered reservation schools, they did represent the trend of the 1880s. BIA agents often forcibly removed children from their homes and send them boarding schools” (p. 76).

Grinde stated that

In conclusion, it was clear by the 1920s that coercive educational policies had not only failed but also actually continued the genocidal practices that marked the U.S. government's relationship with Native peoples from the outset. The overall American Indian population had dropped from about 500,000 in the 1880s to 250,000 in 1934 when these policies were formally abandoned under the Indian New Deal.

It may be argued, however, that this process was unsuccessful as indigenous and Pueblo people today continue to practice their cultural identities. Perhaps the failure to fully destroy indigenous peoples and cultures was also due to a shift in federal Indian education policy in the 1960s and 1970s, along with the resilience of Native Americans. At SFIS the Community-Based Education program is an example of how Pueblo leaders, Pueblo educators, and Pueblo Communities are taking control of how their children are educated. Lomawaima and McCarty contend that indigenous knowledge systems incorporate both formal and informal aspects of education. Native systems are formalized, they further argue, and include education according to strength, gender, age, leadership, clan or rank, and survival as the ultimate test of the effectiveness of the Indigenous Knowledge system. These arguments certainly point in the direction of the inclusion of Indigenous Knowledge in the school system.

Description of the Community-Based Education Program at SFIS

The CBE program was established at SFIS through grants received from the Intel Corporation and the Department of Energy in July of 1995. The program was introduced to students in grades ten through twelve in order to engage students and tribal communities in issues and problems related to the environment, natural resources, and agriculture. Originally the program offered classes in Environmental Studies, and SFIS established formal relationships with the Pueblos of Jemez, Cochiti, Tesuque, Santo Domingo, and Santa Clara to encourage mutual interaction in the development of curriculum in the areas of math and science. The development of these relationships is crucial to the success of the CBE program in part due to the fact that students learn about contemporary environmental and agricultural issues that face their community.

Tribal leaders of these Pueblos suggested that the CBE program work directly with the established environmental protection offices within the Pueblos to provide students hands-on learning opportunities that would benefit the tribes. What distinguishes this model from other school-based academic programs is that it draws upon circles of wisdom that exist within tribal communities and it holds tribally defined priorities as curriculum priorities. CBE combines tribally-identified priorities with experiential learning opportunities for students to work towards the development of a curriculum that meaningfully engages students in solving problems within their own communities. This program allows tribal officials, tribal professionals and tribal members to take on the role of teacher and student, thereby, fostering mutual learning between students and community members and in doing so it closely models Pueblo Indian pedagogy, meaning ways that children are taught in Pueblo Indian communities.

Students are allowed to engage in the CBE program for a block period of time that encompasses two regular class periods. This enables students to visit local Pueblo tribes to examine issues that directly affect their communities using environmental science and agricultural science as themes for the study.

Early in the school year, students meet with tribal leaders from each Pueblo to formalize a relationship and to begin discussions over critical issues facing the Pueblo. This process is natural in terms of Pueblo protocols of relationship building and is also supported in the literature by scholars including Brayboy (2008) who argued that, “The ramifications on education for Indigenous youth are both wide and deep in scope, but they include—at a minimum—that tribal nations have inherent rights to determine the nature of schooling provided to their youth” (p. 788). Through this unique educational program students then become active participants in researching issues and developing recommendations and solutions to tribal environmental and agricultural managers, which is meaningful work to them and their communities. In doing so, students also develop skills that span multiple western educational disciplines and apply them by using them in real life situations. They also develop critical thinking skills that also benefit them in other core classes and throughout their studies.

The CBE program at SFIS is built upon a framework that is the amalgamation of important core values that legitimizes that important knowledge resides within Pueblo communities while simultaneously resisting against colonizing and assimilative policies. Sumida Huaman (2009) argued this point,

The way in which education was constructed for Indians mimicked the broader national plan for dealing with its ‘Indian problem.’ This Indian problem as outlined in federal language towards American Indians was

often viewed as resolvable through education, which ultimately meant the assimilation of Indians into U.S. society (p. 71).

As such, CBE recognizes the needs as well as the strengths of Pueblo Indian communities in solving their own problems and uses this clear recognition as one of its strengths to address the colonial agenda that western education imposed—the effects of which we are still dealing with today.

By outlining the theoretical underpinnings of the CBE program, the relationship between this innovative program and its success becomes evident: First, the Pueblo communities served by the CBE program define curriculum priorities. Second, there is mutual interaction fostered by the program through allowing students direct interaction with community members, which is similar to the way that indigenous students are taught important cultural lessons within their communities. This process therefore provides a pedagogical style that is familiar to students. Third, the CBE program allows for the combination of western scientific principles with indigenous knowledge systems and tribally- specific knowledge. Fourth, the CBE program, by its nature, is a critical step in exercising educational sovereignty for the tribes and students who participate because for the first time tribes are in control of content and curriculum. These elements have made the CBE program a recognized model program for other tribal schools.

In New Mexico, Pueblo Indian tribes are at a critical stage where the struggle to maintain cultural identity is entangled with the contemporary struggle to create economic development opportunities, provide health care, social services, environmental protection, and educational opportunities for tribal members. As owners of the Santa Fe Indian School, Pueblo tribal leaders have expressed the need for their students to be culturally

grounded and well versed in their Native languages while simultaneously obtaining a quality western education. Extensive and in-depth research has not been conducted on what tribal leaders might refer to when they discuss the goals of Pueblo students being culturally-grounded and well-versed in their Native languages, so this remains an area of exploration yet to be determined. At the same time, what I can offer here is my view of what those things might mean from an educator perspective and my experience on the Tribal Council at Tesuque Pueblo. Tribal leaders are sometimes unsure of the relationship between the teaching of native language and culture and the school program. Thus, they are unsure of the results they should expect. Moreover some leaders and communities are very wary of their language and customs being taught outside of the community. Some knowledge in the communities is secret in nature and leaders express concern that this knowledge may be revealed to the wrong people.

The CBE program attempts to address these concerns by combining western scientific principles with cultural knowledge to create meaningful experiential learning opportunities for all involved. Gulibert (1998) states, “Uniquely different, the CBE program extends opportunities to SFIS students which engage them first in learning that is relevant to their lives, particularly because they take an active role in benefitting their communities, a powerful influence for their continuance of participation in learning” (p. 110). This means allowing tribes to define curriculum priorities. This is in contrast to standard core classes where curriculum priorities are defined by state standards and requirements.

Community-Based Needs

The needs of Pueblo Indian tribes are as diverse as the Pueblos themselves creating a multitude of educational opportunities for Santa Fe Indian School students. Some of the areas that tribes have defined as areas for study include mapping projects, water quality monitoring assistance, riparian restoration, erosion control, seed saving, seedling production, and greenhouse management. Although these areas of concern generally remain consistent from year to year, new environmental issues are constantly arising within reservations that require attention. For example, as a result of the 2011 Las Conchas fire in the Jemez Mountains, the Pueblos of Cochiti and Santa Clara suffered devastating losses to tribal lands in the form of lost cultural resources, such as [sacred sites]. The destruction continued when summer rains caused unimaginable flooding and erosion issues for these communities. These tribes have since been actively working with the CBE program to provide meaningful learning experiences for students while seeking solutions to the losses created by the fire. CBE students have visited these newly created burn scars to begin erosion projects that will help to mitigate the effects of erosion that affect these Pueblos. In Santa Clara Canyon students assisted the Santa Clara Tribal Forestry Department in creating single-rock check dams and Zuni-bowls, both effective means for controlling erosion. In Santa Clara Canyon students also helped to collect pinecones and extracted seeds so that they can be germinated and replanted within tribal burn scars. CBE students will also use the greenhouse on the campus of the Santa Fe Indian School to further expand tribal capacity by assisting Santa Clara Pueblo in the production of pine seedlings. When they return to campus CBE students also use Global Positioning Satellites (GPS) and Geographical Information Systems (GIS) to further

investigate the Las Conchas Fire. Students are able to use this technology to create maps that show the impacts of the fire, but it also requires students to understand the important concepts of watersheds, fire regimes, fire management, erosion, and restoration. This process of learning allows for experiential learning that incorporates a multitude of disciplines, which is a requirement under the Common Core State Standards (CCSS). Currently, the State of New Mexico has not completed the task of defining CCSS for Science, but, the staff at CBE is certainly aware of the need to meet state standards and is preparing to align when the science standards are completed. The only standards that have been completed so far are the ones for Mathematics and Language Arts.

Most of the Pueblo tribes that work with CBE are now consistently identifying the decline of traditional agriculture as a major threat to cultural survival. Historically Pueblo Indian tribes depended on agriculture as the means for providing sustenance, and more importantly for providing cultural orientation. In the Pueblo Indian worldview, the act of planting a seed and nurturing that seed to maturity is a spiritual experience with many important protocols and lessons. The cultural implications of engaging CBE students in the revitalization of Pueblo Indian agriculture are enormous. Sumida Huaman (2009) makes this point when she states, "Education is not solely "the formal education of Pueblo students," but incorporates specific Pueblo community knowledge into curriculum by working with Pueblo community members to make formal schooling culturally relevant to Pueblo life and Pueblo-identified community needs (p. 88).

As another example of Pueblo-student interaction around Pueblo environmental priorities, CBE students have been an integral part of the Tesuque Natural Farm located in Tesuque Pueblo. The farm began in 1982 and is now a leader in the organic farming

movement. Tesuque Natural Farm staff and tribal farmers have introduced to CBE students the importance of culture as the basis for traditional farming, while providing students with modern lessons in water management, orchard management, seed saving, composting, crop rotation, and soil development. Through guided-inquiry students actively participate on the farm and therefore learn through experience how and why these topics are important in maintaining traditional agriculture. At Tesuque Natural Farms, CBE students assisted in the construction of a seed bank using sustainable building techniques such as adobe making, mud plastering, straw bale and tire bale construction. The seed bank is intended to store traditional heirloom seeds that have existed within Pueblo communities for generations. Throughout the construction process students learned about important agricultural related issues that tribes face in contemporary times. During breaks in adobe construction, groups of muddy students received structured lectures on the importance of seed saving and the threats of genetic modification of those seeds. Students also learned important issues regarding water rights within their communities and how these rights impact agriculture.

In the Tesuque program, there are other important lessons to learn. The Tesuque Farms project actually began out of the necessity to protect the Pueblo's water rights. Fields that had been planted lay dormant as breadwinners began to seek wage work to meet the demands of raising a family. The remedy devised by leaders at the Pueblo was to create a tribally owned and managed farm to put fields back into production. Since the farming area was subdivided into parcels owned by individuals and families, the Tribal Council made agreements with these owners to use their farm plots in return for fruit and crops from the fields. Another very important part of this program is the relationship

between the Tribal Farms and individual farmers. The Tribal Council did not want to supplant individual farmers but also encourage them. Thus, the Tribal Farms provides support to these individual farmers in various ways. Among these ways are plowing and disking of plots, provision of seeds and implements if needed, and irrigation scheduling and ditch maintenance. If an interested individual does not have any field to plant, a community area is defined where people can use farmlands to plant their crops.

CBE students are taught the organizational concepts of the Tribal Farms to individual farmer relationship so that the students may learn ways to encourage and support farming in their respective community. The crops that are normally planted by both Tribal Farms and individual farms include corn, beans, melons, and chili. However, the Tribal Farms has expanded into other areas include orchards with apples, pears, and plums. In addition, there are other cash crops including herbs and medicinal plants. Some of the seeds from these plants are sold to seed bank companies. CBE students are taught these marketing methods.

Another aspect to the Tribal Farms is the distribution of chili, asparagus, corn, peaches, and other crops into the community for individual use. The crops are distributed also to the Senior Citizens and Tesuque Day School meal programs. CBE students learn about the sharing aspects of farming and how this is a traditional value.

There is a need for research data on the environment within the Pueblos. Tribal environment departments have requested student assistance with various projects such as water quality monitoring, riparian assessments such as wetlands mapping, bird population and migratory studies, and erosion control using methods such as thinning and planting with native grasses. Other projects have included invasive species mitigation including

the salt cedar and russian olive infestations along riparian areas. These infestations are controlled by cutting and chemical treatment. Some Pueblos have begun the introduction of native species such as desert quail into the grassland project areas. Desert quail help disperse the seeds of the gramma grasses that are important in keeping soil intact so that rainfall is retained on site in what is known as the watershed effect.

Some of the projects require the development of study areas known as control plots so that there can be comparison between treated and non-treated areas. CBE students are trained in the use of GPS technology and can supplement data gathering and analysis using computerized mapping software. One of the biggest needs is for environmental program staff to evaluate the data through statistical software and interpret the results of their analysis.

Another requisite that impacts the CBE program is the timing of needs. Most of the environmental activities have to occur in the springtime and summer months. For example, neotropical bird nesting studies must be conducted when the birds are actively nesting. This time period extends from roughly mid-May to the end of July. However, students are already on summer break by the end of the month. The extension of CBE activities into the summer break would need to be addressed if students are to have an opportunity to learn during this time period.

The following matters would have to be addressed in order for this to be possible:

A. Students would need permission from their parent or guardian. This is important as students may have responsibilities at home including wage work or work in the fields or at home.

B. Additional resources are needed to expand the program. Travel, housing, meals, supplies and equipment costs need to be covered. Additional sources of funding would be needed and require proposals to various funding sources such as non-profit organizations.

C. Teacher availability is an issue. Teachers trained in CBE techniques and with an understanding of community protocols need to be available and willing to work during the summer months.

D. Community involvement needs to be considered. Environmental and farming personnel are busiest at this time of the year and their availability to work with CBE may be questionable.

But, it is desirable to solve these matters since a summertime CBE program would provide opportunity for expanded learning in an intense and concentrated manner.

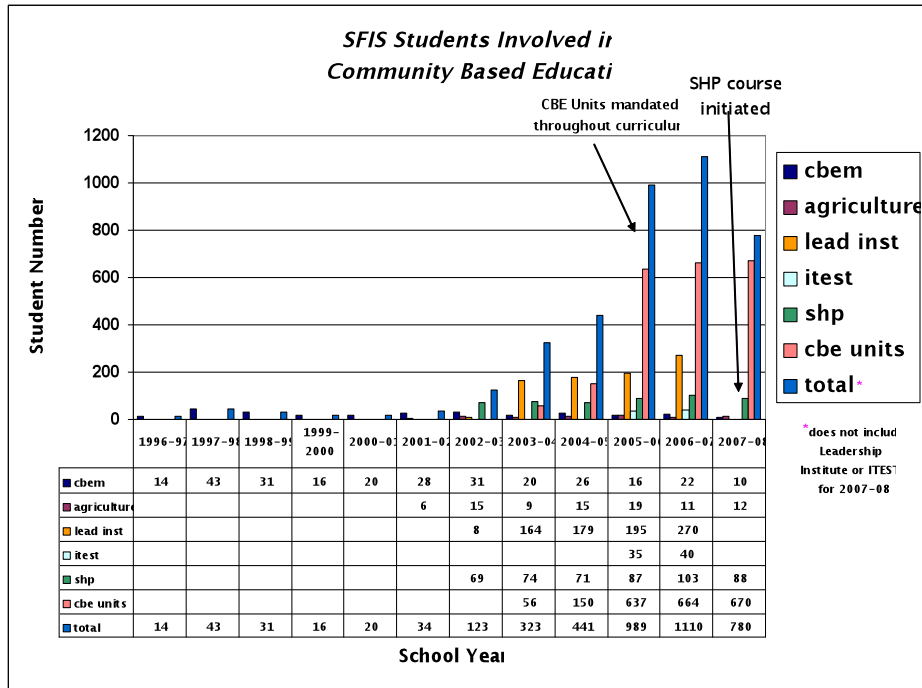
Community-Based Education: Theory meets Practice

The concept of community-based education and the implementation of the CBE program at the Santa Fe Indian School have proven to benefit indigenous students in numerous ways. Yet, with all of its successes, the CBE program is still must operate within the larger institution of the Santa Fe Indian School. That means that the program must function within the system of ringing bells that dictate the order of a student's day and requires them to switch learning from one subject to another. Students are still required to switch learning between required disciplines. For example, although students participate in the CBE program they are still required to take a traditional science course because they only receive an elective credit for participation in the program. This means some students participate in the CBE program, yet are still required to take a standard

Biology or Chemistry class in order to meet graduation credit requirements. It would greatly benefit the CBE program to have the Santa Fe Indian School seek innovative ways to give science credit to students who participate in the CBE program. One of the underpinnings of educational sovereignty as defined by the Santa Fe Indian School is the ability to decide what courses students receive credit for. I would argue that the CBE program through its environmentally-based inquiry nature actually requires students to utilize a multitude of disciplines, engage in critical thinking skills, experiential hands-on learning, learning important issues facing tribal communities, while including indigenous knowledge systems. In doing so the CBE program meets and exceeds content standards by combining multiple disciplines while addressing important community needs.

In examining the matter of theory meeting practice, the information contained in Table 2 reveals some surprising trends with regard to CBE at Santa Fe Indian School. The numbers of students treated to community based education consists of the Community Based Education Model (CBEM), agriculture, Leadership Institute, Itest (a math and science program), Senior Honors Project, and the CBE units taught throughout all school programs. The graph charts the number of students over a time period ranging from 1996 to 2008. This chart demonstrates the growth in the number of CBE units offered at Santa Fe Indian School throughout that time period

Table 2.0: Community Based Education Involvement



An examination of the graph and shows that the total number of students in the time period from 1996 to 2008 enrolled in the CBEM program was 277. The average number of students per school year in the CBEM program is approximately 23 per year. However, in the school year 2007-2008 there was a decline in the number of CBEM students to 10 students. In 2005-2006, all teachers were mandated to add CBE units to their classes; thus, the number of students at 637 is the student enrollment figure. This number remains consistent throughout the remainder of the period examined in the graph. Oddly, all of the programs listed continued to show an increase in CBE except for CBEM and agriculture.

The reasons for this decline in students in CBE are varied but one of the primary reasons is that CBE staff is not allowed any voice in the selection of students into the program. The fact that CBE is only an elective means that students are not required to participate in the program. The incorporation of CBE into other core areas of the school curriculum such as the SHP in addition to students now being enrolled in dual credit classes at local colleges have all had an impact on the number of students participating in CBE.

Table 3: Class schedule for School Year 2014-2015

Monday	Tuesday	Wednesday	Thursday	Friday
1 st period Core Class	2 nd period Core Class	1 st period Core Class	2 nd period Core Class	1 st period Core Class 2 nd Period Core Class
3 rd period Core Class	4 th period Core Class	3 rd period Core Class	4 th period Core Class	3 rd period Core Class 4 th Period Core Class
5 th period Environmental Studies/Agriscience	6 th period Core Class	5 th period Environmental Studies/Agriscience	6 th period Core Class	5 th period Env. Studies/Agriscience 7 th period Env. Studies/Ag.

Table 3 shows the current state of the CBE program at the Santa Fe Indian School. The program currently offers environmental studies and agriscience through two block periods every other day. For example on Monday both environmental studies and agriscience students conduct fieldwork in Pueblo communities, but within the current

schedule students cannot return until Wednesday. The block schedule only allows for CBE students to visit Pueblo communities twice per week, whereas at the inception of the program students were visiting Pueblos daily. Under the current schedule it is virtually impossible to take students to a Pueblo community on Friday's because the schedule on Friday is not a block schedule but rather a forty five minute schedule. This disrupts the block schedule and prevents students in CBE from continuing their work within Pueblo communities. I would argue that in order for CBE to be able to meet the needs of communities while providing a quality education for Pueblo students, tribal leadership, the school board, administrators, faculty, parents and students must advocate for a school schedule that facilitates this process.

Community-Based Education Implementation Strategies: Environmentally-Based Inquiry

The culture of Pueblo Indians is intimately tied to the landscapes, which we have existed upon for thousands of years. Each tribe developed unique survival mechanisms that enabled them to survive which was directly connected to nature. According to Cajete (1994), "American Indians traditional relationship to and participation with the landscape includes not only the land itself but the way in which they have perceived themselves and all else" (p. 3). The philosophies of most tribes are directly connected to a sense of place. This sense of place is very important because it translates into appropriate societal behavior for native youth. These traditional philosophies have historically been taught orally by elders of the tribe through the use of the native language of the tribe. The sharing of important tribal knowledge often involved the use of storytelling, and oral tradition to teach important lessons and cultural orientations.

Many of these lessons were intended to teach individuals appropriate behavior within tribal societies.

At the SFIS, the inclusion of indigenous knowledge into the lesson plans happens through community-based units that are offered in all core subject areas. This does not mean that the CBE approach is being implemented effectively. According to Battiste (2002), “Preparation for teaching Indigenous Knowledge and languages is the most pressuring issue for teachers. Many Administrators assume Aboriginal teachers are richly endowed with Aboriginal knowledge, language, and relationships, but the reality is Aboriginal teachers feel equally as unprepared as the non-Aboriginal teachers who are required to build Aboriginal content into their classrooms” (p. 25). Many of the non-local and non-Native teachers and staff responsible for implementing these lessons often experience apprehension when doing so. Many of these teachers are fearful about the idea of presenting elements of Pueblo Indian culture when they themselves do not fully understand it. Some feel that it is simply not their place to teach Pueblo culture. There is a need to assist these teachers by creating materials and providing native mentors that will serve as guides when teachers begin incorporating Indigenous Knowledge into the classroom. As a result, our intention is to provide SFIS teachers who wish to engage in a community-based approach with a resource for incorporating Pueblo Indian culture into their curriculum using environmentally based inquiry learning.

Indigenous peoples living in local environments have developed long-standing relationships with their surroundings and as such, often possess a great deal of environmental knowledge. In addition there is now a greater awareness in society as a whole that environmental education is an essential component of school curriculums.

Environmental education that is taught through the inquiry process is most similar to the ways that knowledge is shared within tribal communities. Environmental education has been gaining popularity in schools across the nation as a means of teaching students about important local environmental issues that directly impact their lives. The gain in popularity has arisen from the increased number of environmental problems that face society as well as the need to find place-based or localized solutions to these problems. In the face of these environmental problems, environmental education has been an effective means for creating this awareness, and understanding of how the environment functions and indigenous knowledge is a critical aspect of environmental education that is often overlooked. A fundamental belief amongst Pueblo Indian people is that we are connected physically and spiritually to our environment and the processes that occur within it. In reference to the Western Apache, Basso (1996), states that, “For whenever the members of a community speak about their landscape-whenver they name it or classify it, or tell stories about it-they unthinkingly represent it in ways that are compatible with shared understandings of how, in the fullest sense, they know themselves to occupy it” (p. 74). This concept is true amongst Pueblo Indian people as well. A strong connection to place is one of the foundational principles of both environmental education and of Pueblo Indian epistemologies and both have the potential to positively enhance learning for CBE students when delivered through the inquiry learning process.

The terms environmental education, outdoor education, and conservation education are often confused by people and used interchangeably. According to Judy Braus (1994), “Environmental education is a process aimed at developing a world population that is aware of, and concerned about, the total environment and its associated

problems, and which has the knowledge, attitudes, skills, motivations, and commitment to work individually and collectively towards solutions of current environmental problems and the prevention of new ones” (p. 6). Environmental education can be quite a broad term focused on the total environment. It typically emphasizes the attitude, values, skills, knowledge and motivation, which ultimately will lead students to participate in solving environmental problems. Awareness of environmental problems is an essential component that helps students to acquire a certain level of sensitivity to the natural environment and its problems. It also helps students to foster the ability to refine and extend their perceptions of the environment. Indigenous Knowledge is similar in that creativity and awareness about one’s environment are the foundation for teaching. According to Battiste (2002), “Indigenous knowledge is both empirical (that is, based on experience) and normative (that is, based on social values)” (p. 19). Teaching basic knowledge about the environment helps students to acquire an understanding of how the environment functions and how humans interact with the environment. Within traditional Pueblo Indian epistemologies and pedagogies, there are many of these same lessons. Environmental lessons are always taught in relation to the surrounding environment with an emphasis on maintaining both biological and spiritual relationships. Most importantly environmental education emphasizes how issues with the environment arise, and how they can be solved. In the CBE program this knowledge about the functioning of the natural world is translated into helping students acquire a high standard of moral values and feelings of concern for the environment. These values lead students to become more motivated and committed to participating in the protection and conservation of the natural

world. For native students this also translates to strengthening one's own culture and identity.

The CBE program attempts to help students acquire the skills needed to identify and investigate environmental problems and to contribute to the resolution of these problems through action. Newly developed skills allow students to take thoughtful positive actions that ultimately lead to the resolution of environmental problems within their own tribal communities. Braus (1994) states, "Literacy guidelines are based on the assumption that an environmentally literate person should possess an awareness and sensitivity to the total environment, a variety of experiences in and a basic understanding of environmental problems, a set of environmental values and a feeling of concern for the environment, and the motivation and disposition to actively participate in environmental improvement and protection, and skills necessary for identifying, investigating, and solving environmental problems" (p. 7). For Pueblo Indian people the environment is how we relate to all of creation and the responsibilities that we have as stewards to care for it that are evident in all aspects of Pueblo life. Through experiential learning students in the CBE program are allowed to connect with nature to actively protect natural resources within their communities therefore creating an awareness of the processes that are crucial to the perpetuation of a healthy living environment. According to Cajete (2000), "Through this way of participation, Indigenous peoples receive gifts of information from nature. In Native science, there is an inclusive definition of being alive. Everything is viewed as having energy and its own unique intelligence and creative process, not only obviously animate entities, such as plants, animals, and microorganisms, but also rocks, mountains, rivers, and places large and small" (p. 254).

These are also the foundational principles of the western environmental education movement. Cajete (2000) also states,

“When viewed from this perspective, science is evolutionary-its expression unfolds through the general scheme of the creative process of first insight, immersion, creation, and reflection. Native science is a reflection of the metaphoric mind and is embedded in creative participation with nature. It reflects the sensual capacities of humans. It is tied to spirit, and is both ecological and integrative” (p. 249).

Pueblo Indian epistemology teaches awareness about one’s environment that is lived and celebrated daily and it complements the concept of Community-Based Education at the Santa Fe Indian School.

For Teachers: Some thoughts on implementing Community-Based Education at Your School

The following considerations will help educators to develop and implement a Community-Based Education program that includes indigenous epistemologies and pedagogies, within their classroom or school. First, many educators often link environmental education exclusively with science education. Using the environment and the Pueblos from which students are from as the basis for learning can in fact span across many disciplines. This often leads to skepticism on the part of teachers who are given the task of using environmental education as the basis for teaching indigenous philosophies for several reasons. Most teachers are uncomfortable with the idea of teaching about a culture that they are not familiar with. It is also a pedagogical challenge for teachers of specific disciplines to teach about the environment through another cultures perspective. Although a large part of environmental education does deal with science concepts, it also can be used to effectively teach lessons in topics such as English,

economics, nutrition, math, geography, biology, chemistry, politics, and ethics while simultaneously incorporating Indigenous Knowledge. Community-based lessons should attempt to include the aforementioned disciplines as much as possible in order to give students a full understanding of the issue at hand. Another assumption sometimes made by educators is that you must be a scientist or environmental professional or you must teach biology or chemistry in order to incorporate community-based education into your school or classroom. Environmental education is a compilation of many disciplines as previously mentioned. Environmental education involves values, decision-making, communication skills, creativity, which are skills that are also taught within indigenous epistemologies.

Many of these are the same skills that are taught in Pueblo Indian culture about proper environmental etiquette and our responsibility as stewards of the land and are the focus of learning within the CBE program at the Santa Fe Indian School. The role of the educator is not necessarily to teach specific information that he or she is not comfortable with, but to facilitate learning by incorporating more environmental content into the lesson to facilitate discussions around environmental topics and to support learning activities that are meaningful for students using indigenous knowledge to support learning objectives. Educators also need to realize that community-based education can take many forms.

Whether community-based education is carefully integrated into the school curriculum or more piecemeal where it is slowly integrated into different classes, community-based education will and should vary form from school to school, yet the opportunities for student learning are enormous. The level with which administrators and

educators choose to incorporate community-based education into their school may also vary. This flexibility is a major advantage for educators who wish to tailor an environmental program that meets their needs. My intention with these considerations is for them to be used as a practical guide while developing community-based lessons for indigenous students.

These considerations are intended to assist educators in the development of culturally relevant community-based lessons. These are problematic areas that I have encountered in the western education system and I would hope to help to make educators more aware of the importance of addressing them. By following these simple recommendations, a presenter of tribally relevant views and ideas can ensure that the true integrity of the meaning behind such a lesson is maintained at its highest level. This will ensure that the lessons presented provide for the most meaningful and productive learning to occur.

One of the most successful ways that I feel that Pueblo Indigenous Knowledge can be implemented in schools is through inquiry based environmental education. Cajune (2003) states, "Inquiry based learning is a student centered instructional methodology that empowers students to construct their knowledge through the active investigation of questions addressing significant discipline content" (p. 11). Inquiry based learning basically asks students to analyze the "big picture" or significant concepts, with regards to an environmental issue. Inquiry focuses student learning on a deeper understanding of the most important concepts. According to Cajune (2003), "The emphasis on rote learning in other methodologies is replaced in inquiry learning by synthesis, application, critical thinking, and creativity" (p. 11). Regardless of the type of

scientific concept an inquiry lesson or unit addresses, the goals always remain unchanged.

The development of an inquiry-based lesson that incorporates Indigenous Knowledge should follow the same path that any curriculum development follows. This process is a circular process that educators engage in continuously to optimize learning.

Cajune (2003) provides the following list of essential elements that must be planned and written into the lesson plan:

1. Identification of Learning Objectives-Involves developing a clearly identified set of learning objectives that includes the “big idea” to be analyzed. The objectives also identify the process skills and dispositions that are to be developed.
2. Identification of a Significant Cultural Context for the Big Idea-Refers to the cultural context for teaching the big idea and is a big part of the lesson. The idea is to use the appropriate cultural context of the tribal group being studied when teaching the big idea.
3. Determine the Assessment Types and Opportunities-Refers to educators identifying the types of evidence that provide insight into the students’ progress towards learning the big idea. When appropriate, educators may wish to develop measurement tools in the lesson plan.
4. Describe the Inquiry Activities-An engagement activity seeks to be an activity that introduces the big idea being presented. Its intention is to stimulate student thinking and access student’s prior knowledge.

5. Identify Opportunity for Elaboration and Application-Once students have completed their investigations, and have a basic understanding of the big idea, the next step is to have students elaborate on their findings. This typically deepens and extends the students understanding of concepts, allows them to apply new skills, and improve the transfer of learning.

The format of a plan for inquiry based science lessons differs from the historic lesson plan formats that educators have typically dealt with. The open nature of the inquiry process focuses on the “what”, and not so much the “how”, when students attempt to understand the big idea. The student centered methodologies of inquiry learning dictate that the lessons main activity not be described in great detail within the lesson plan. This is also precisely the way the learning occurs within pueblo communities.

The Future of CBE

In this article I have attempted to identify an effective means of incorporating Indigenous Knowledge into schools using Community-Based Education as the model program for doing so. By discussing the Community-Based Education Program at the Santa Fe Indian School, I argue that this unique program is redefining indigenous education on multiple levels. I have also provided some general guidelines for educators to understand when presenting Native American topics in their classrooms. Due to the immense amounts of traditional ecological knowledge possessed by indigenous people, and in this case Pueblo Indian tribes, there is a great opportunity for significant

contributions to be made with regards to the understanding of the environment. Inquiry based environmental education lends itself well to achieving this goal.

I have also provided some evidence that the CBE program is producing positive results with regard to incorporation into the school program and individual student progress. However, there is still work to be done to move the program forward. Other areas that are still a challenge include the following:

A. Student Selection- Student selection is a large factor in the implementation of the program. Currently, student selection is conducted through the administration but CBE teachers are not involved in the selection process. The student selection impacts the way in which CBE teachers need to teach as in the case of students with Individual Education Plans (IEPs). The CBE staff is not given any participation in the selection of the number of students and the student needs when students are assigned to CBE.

B. Teacher Selection and Training- The teaching staff at CBE is currently stable, but, in the event of staff changes, there needs to be some criteria for selection of replacement teachers. In addition, there needs to be training in the CBE process and the question rises as to who will exactly conduct this training.

C. Policy Adoption and Implementation- Policies are adopted at the School Board level with the primary responsibility given to the Superintendent and Principals to implement the policies.

D. Working Relationships with the Partners- This is an important relationship for the community leaders and staffs drive the subject and content of the field learning. CBE teachers need to maintain continuity with the partners and this can be difficult when Tribal Councils change each year and they do so in each Pueblo. The stability of tribal

staff is also important but these staff people tend to stay employed over time. The indigenous learning that arises from the community is dependent on these individuals as they are often speakers of the language and know tribal customs and traditions.

E. Administrative and Support Staff

The support of the administrative staff that includes the Principals, Human Resource, Transportation and Meal Program can create problems if their activities are not properly coordinated and the staff does not understand CBE concepts.

F. Evaluation and Assessment

There is a need for solid research on the methods and results of the CBE program. There have been enough years of CBE and enough students to warrant an in depth look at the program. Such a study can provide invaluable information to the continued implementation and future development of the program. This should be an external evaluation conducted by a qualified firm or individual.

Reflections from the Teacher

As an instructor and mentor in the Community-Based Education program I am fortunate to participate in the implementation of western science and the inclusion of Pueblo Indian knowledge systems to create learning experiences for Native American students. This style of instruction provides an opportunity for Pueblo communities to address the colonizing effects of education by placing tribal needs as the educational priority for Pueblo students. The style of pedagogy that the CBE program emphasizes has garnered support from tribal leaders and tribal community members. This creates an opportunity

for leaders, parents, and community members to become active participants in the education of Pueblo students in a meaningful way.

Another observation is that the CBE methodology gives value and validity to the knowledge systems of Pueblo communities. For example, a former agriscience student won a national essay contest held by the Intertribal Agriculture Council. For the essay contest students were required to discuss their ideas to promote agriculture in their communities over the next twenty years. The student used the traditional knowledge about farming that he gained through community visits along with new concepts and technologies he learned in CBE. In his essay the student explored the dynamics of Pueblo Indian agriculture and Pueblo Indian culture and religion. He also discussed the role of modern technology in the maintenance of an agricultural lifestyle within his Pueblo. Through his participation in the CBE program he learned about the practical uses of greenhouses and solar panels and their application to Pueblo Indian agriculture. He discussed how although these technologies have not been historically used by Pueblo Indian people to support agricultural practices it is time for Pueblos explore the potential to strengthen Pueblo Indian agricultural practices. I am pleased that a student realized the value of modern technology and the role it can play in the maintenance of an important cultural practice such as agriculture.

One of the most powerful aspects of the CBE program is the value placed on community knowledge and the keepers of that knowledge and that includes the elders of the community. The traditional knowledge about agriculture that the keepers share is done in culturally appropriate ways. For example, lessons about when to plant and what to plant and the responsibility and obligation of a farmer to his crops are communicated

in stories. The stories metaphorically compare the relationship between a farmer and his crops to that of a parent to child. A child requires care and nurturing to develop into a productive member of a community, so too do a farmer's crops require the same care and attention to ensure that the harvest is successful. In the dual world of the Tewa, plants also have a spiritual life force and thus must be accorded due respect and care. In return students apply their skills in western science by conducting soil testing for the farmer who shared his traditional knowledge. They report back on the biological and chemical condition of the soil and make recommendations to the farmer based on their findings.

When CBE students visit various Pueblo communities, the dynamics of learning shift dramatically. At a farmer's field in Santo Domingo Pueblo a student from Santo Domingo began to discuss some of the challenges he faces when growing chili in his field. The student described to the farmer that the use of greenhouses such as the one at the Santa Fe Indian School would increase the harvest by enabling the farmer to plant chili earlier in the growing season and increase the quantity and quality of chili produced. The elder farmer also added his insight as to how this new technology could augment his farming practices. Although unfamiliar with this new technology the farmer was receptive and willing to adopt these techniques and in a broader perspective sustain the Pueblo farming culture.

This kind of intergenerational learning also occurs when CBE students assist Pueblo farmers in the harvesting of crops. Farmers teach CBE students traditional methods of harvesting, storage, and processing. In return, CBE students provide information on newer methods of storage as well as value added techniques. Pueblo people view the crops harvested with great reverence. The crops are seen as being the

result of human and divine forces interacting to bring health and well being to the community through physical nourishment and spiritual realization. The farmer should share his bounty with other family and community members so that the spirit of well-being and health can also be bestowed upon them. In this way a farmer's thoughts and prayers provide one of the most basic requirements for survival.

Of particular interest to me as an educator is the ways in which combining western science with Pueblo Indian traditional knowledge has facilitated learning across cultures and generations. Many of the critical issues that need to be addressed in Pueblo Indian communities are not solely "Pueblo" problems. Many of the critical issues that demand attention in Pueblo Indian communities are not isolated to the Pueblos but impact entire regions and both Pueblo and non-Pueblo people. Using western science and Pueblo worldviews has enabled students and communities to explore solutions that employ both systems of knowledge. This approach has also helped students and communities to reevaluate their views and expand them to include new ideas that can perpetuate core Pueblo Indian values.

There is an interesting question that is raised in the communities and at the Santa Fe Indian School by students and teachers. What does traditional Pueblo farming include and exclude? Since the introduction of post-contact with European civilizations, Pueblo farmers have adopted farming methods and cropping patterns that added to the pre-contact crops. The current definition of traditional farming includes the planting of both pre-contact and post-contact crops. I would argue that we can use modern technology to advance our agricultural practices in the same way our ancestors adopted and adapted new methods of farming. Although we are altering some methods, the basic values of the

traditional farmer are being kept intact. We are traditional farmers utilizing the best tools and methods that western society has to offer in an effort to maintain a lifestyle that is an integral part of Pueblo Indian culture and identity.

Conclusion

In this research, I have explained the potential for the development and implementation of the CBE methodology at the Santa Fe Indian School. I further described the program at Santa Fe Indian school and the success and challenges that still exist. The future of CBE is promising. The definition of traditional farming is an evolving one and not rooted totally in the past. Pueblo people have been an adaptable people and the promise of technology with regard to farming is finding acceptance among farmers who would be labeled as traditional. The blending of native knowledge with western concepts is being accomplished in the CBE program in an intergenerational manner when students meet with tribal people in their home and environment. Students engaged in this intergenerational sharing of knowledge are experiencing positive results that include the broadening of their education, positive motivation to help their community, and to dedicate themselves to learning more about the issues and concerns.

However there still is concern that the CBE process is not totally finding acceptance at the Santa Fe Indian School. Declining enrollment in the program is a major point of concern. Although policies are adopted that support and encourage the CBE program, there is still a need for upper management oversight regarding the implementation of those policies. In addition, there is a need for the revival of avenues for participation by parents, staff, community members and other interested parties by re establishing the CBE task force.

Bang and Medin (2010) described the need for a comprehensive approach. They make the point that the foundation of “community-based design” is a product of the comprehensive participation of many people and includes elders, parents, community experts and youth. They also claim that the participation was necessary in all aspects of the research including problem definition, project design and implementation.

A major examination of the entire program including the CBE units that are mandated throughout the school needs to be accomplished. The information from such a study will be valuable in decisions regarding the future of CBE at the Santa Fe Indian School. To look to our future as a program we must look to our past to understand how our decisions today will impact the education of our future leaders.

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APPENDIX A
POLICY BRIEF

COMMUNITY-BASED EDUCATION POLICY AT THE SANTA FE INDIAN SCHOOL:

Due to the historical nature of western education and its impacts on Native Americans it should be of no surprise that the performance of indigenous students in these settings is typically marginal at best. The colonial agenda of western education has negatively impacted Native Americans and left a perception among many tribal elders that western education is dangerous. Federal Indian Education Policy in the United States has evolved to the point where tribes are now realizing more control over where and how their students are educated. The Community-Based Education (CBE) program Santa Fe Indian School is a prime example of this. This model program epitomizes tribal educational sovereignty in that it enables Pueblo tribes to define the curriculum that students engage in. Its success can be seen on many levels yet there is a need for a policy to formally recognize the potential of this program to be implemented within core classes. I recommend this policy be used to guide the further development of the CBE program into the larger school setting. Education has been a tool used by the United States Government as a means to assimilate indigenous people. The loss of language, culture, and core values that were lost through this process have left Pueblo Indian tribes in a position where the revitalization of these important aspects are of utmost importance. Through a shift in federal policy the tribes of New Mexico are now in a position to take control of the education of native students. The effects early western education has proven to be an unfortunate time in the history of Native American people. In order to make education more meaningful tribes must explore innovative methods of gaining control of the education that indigenous students receive. The Santa Fe Indian School's

Community-Based Education program is a model program that gives Pueblo tribes control of the curriculum that their students engage in by identifying critical issues that face the tribe. This model is proving to be a success yet there is a need to further implement this program in other facets of the Santa Fe Indian School so that its successes can be shared by teachers and students who teach outside the Community-Based Education program.

The Community-Based Education (CBE) program at SFIS is proving to be a model program that meets the unique needs of indigenous students by engaging them with experiential learning opportunities within their home Pueblos. Students use Environmental Science and Agriscience as the academic disciplines to study and develop solutions to critical issues facing their home communities. This is accomplished through field-based learning that occurs along side tribal leaders, tribal professionals, and tribal members. The program is producing students who are also highly motivated to take action in creating solutions to help their communities. Currently a student's only exposure to community-based learning comes through their participation in the CBE program. It would benefit SFIS to expand this concept through policy to allow more students to participate in community-based learning. Due to its success as a model program it would be in the best interest of the entire school to expand this concept by formally recognizing its validity through policy.

Policy Statement

“The concept of Community-Based Education program has proved to be a success in the advancement of educational sovereignty at the Santa Fe Indian School by enabling Pueblo tribes to have control over the curriculum that their students engage in. It has also

provided experiential learning opportunities for students that enable them to explore critical environmental issues facing Pueblo tribes. The Santa Fe Indian School recognizes the value of such a program and therefore be it resolved that through this policy the concept of CBE will be included into core classes by all teachers at the Santa Fe Indian School”.

Objectives

- Objective A: Create Community-Based Education Board.
- Objective B: Hold workshops, meetings, and presentations regarding CBE implementation.
- Objective C: Develop materials that will assist in teachers in creating lessons that address critical issues within Pueblo communities.

This policy will guide the implementation of the Community-Based Education approach into core classes at the Santa Fe Indian School. Elements within the state of Montana’s Indian Education for All policy will serve as the framework for this policy. This is a very unique law in Montana which requires schools in the State of Montana to incorporate information about the tribes of Montana into all facets of education including, music, art, social studies, math, and science. It is this policy and its associated standards that will provide the general framework for the development of my policy. I plan to use my familiarity with this Montana policy and my experience as a graduate student in creating outdoor education curriculums in Montana to assist in implementing a policy for the Santa Fe Indian School. I will also outline strategies for SFIS teachers to begin to incorporate a community-based approach to teaching that enables Pueblo tribes to truly be in control of the education of Pueblo students.

My intention is to gain even more support for the Community-Based Education Program by conducting formal presentations to the governing body of the Santa Fe Indian School as well as faculty and students to present the goals of the policy as well as to outline some of the elements within the policy. Most importantly, it will be critical to provide resources and materials for those educators within the institution who are non-native and may feel apprehensive about using Pueblo Indian culture for teaching. Likewise, it will be necessary to provide experiences for current teachers of traditional courses to help them to understand how their specific discipline lends itself to the concepts of community-based education.

To facilitate the development and implementation of the CBE policy at SFIS I recommend that a CBE advisory board be created. The advisory board will be comprised of CBE staff, community members, and school administrators. The Board's primary task will be to facilitate the inclusion of CBE into other areas of the school curriculum. Community members will guide topics that students will engage in their classes and provide the necessary for context for identifying and ultimately seeking solutions to critical environmental issues. This will be accomplished through regular meetings, presentations, and workshops where the CBE Board will help teachers in core classes to design community based lessons that address critical issues in Pueblo communities. These will also be opportunities for teachers to inquire about the CBE approach and its application to their respective disciplines as well as areas of potential growth of the CBE program. The CBE Board will also identify appropriate materials that instructors may use in the implementation of CBE lessons in their classroom.

