

## Organic Video Approach: Using New Media to Engage Native Youth in Science

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Can storytelling—a revered teaching tradition in many Native American cultures—be used to generate enthusiasm for science and technology among indigenous children and address the achievement gap that exists between Indian and non-Indian children?

The Tribal Youth Science Initiative (TYSI) is an innovative new media project for young people, ages nine to fourteen, held at the community college on the Lac Courte Oreilles (LCO) Indian Reservation (Ojibwe) in northern Wisconsin. The participants in the one-week informal science project are local middle-school-age children who live within the LCO community. Each participant is part of a video production team whose objective is to produce a science-related news story that becomes part of a combined multimedia report for a fictional local news station, the “WLCO Science Report.” In the program, the video production process becomes a vehicle for science and media skill development. Local community elders and community-based natural-resource scientists from the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) generate science topics. Instructors from the University of Wisconsin—Madison Department of Life Sciences Communication and faculty from Lac Courte Oreilles Ojibwe Community College (LCOOCC) use pedagogies that incorporate indigenous knowledge systems.<sup>1</sup> In its inaugural year, the program and production areas focused on culturally significant resources like wild rice, fish, water, and the Chippewa flowage.

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This article explores the underlying failures of Western approaches to science education for tribal youth and offers a new informal science-education model, an organic video approach (OVA) within TYSI, in order to convey scientific principles to Native children in a way that is culturally relevant and engaging.

### SCIENCE DEFICIENCIES, IDENTITY STRAIN IN EDUCATION

American Indians/Alaska Natives (AI/AN) are the most underrepresented group in science and technology fields. By all measures, AI/AN employment within these fields ranks well below their percentage of the US workforce.<sup>2</sup> At the same time, American Indian health, environmental degradation, and decaying community infrastructure continue to plague Indian communities. The net result is a disproportionate dependence on outside experts to address local issues that are scientific or technical in nature. Keith James attributes the disparity to power struggles in education, the destructive nature of stereotypes, the challenge of merging Native and academic identities, and the inadequacies of mainstream pedagogy.<sup>3</sup> Native pedagogists agree that mainstream schools fail American Indian pupils.

In a statistical sense, the American Indian example is similar to other nonwhite students. A National Education Association report indicates that 15 percent of Native youths sixteen to twenty-four years old had no diploma or General Educational Development equivalent, which is similar to black youths but twice that of white youths the same age (6%).<sup>4</sup> Only Hispanic students had higher dropout rates. Lumping American Indian students with other minority student statistics is always perilous because it seems to ignore the major distinctions between the two: namely issues of sovereignty, political affiliation, and a historic legacy of assimilation and cultural assassination under the guise of education for the betterment of the Indian condition.

In this study about an informal science program for Ojibwe youth, the authors recognize the progress of many scholars who are working to understand the disparity and sources of academic struggle for minority youth, in general, and science, in particular. We have chosen to employ identity and narrative frameworks to ground our observations of the Ojibwe community and the program participants. We could not ignore the literature linking identity strain with academic apathy among minority students or the empirically grounded relationship between narratives and identity development.<sup>5</sup>

The tension that arises when ethnic identities conflict with academic identities is well documented.<sup>6</sup> Signithia Fordham and John Ogbu recorded how academically successful black students felt the need to become “raceless” and had to “act white” in order to accommodate and facilitate their success.<sup>7</sup> Black students had to adjust their descriptions of themselves while holding on to strong beliefs about the dominant school setting: that to succeed, one must assimilate into the ways of the dominant culture.

When the classroom or field of study incorporates the need for particular rhetoric, like that in a science classroom, the opportunities for cultural conflict are increased.<sup>8</sup> Bryan Brown’s observations of minorities in science

classrooms confirms this identity dissonance, which he attributes to the cultural appropriations required in order to become fluent in the so-called culture of Western science. Observations of the discourse among Ojibwe youth, scientists, and elders of the same community offer a unique opportunity to witness identity affiliation within a science context without the danger of assimilation into a non-Native group.

For the American Indian student, cultural appropriation and identity positioning are outcomes not only in interpersonal exchange but also in what Na'ilah Nasir and Geoffrey Saxe call "positioning within social history."<sup>9</sup> Given that the American public school system has a long legacy of attempts to assimilate Native people into the dominant culture, a Native student positioning him- or herself as academically successful has to weigh the costs. Either the student must resist cultural appropriation—often a painful proposition—or adopt the dominant paradigm.

American Indian education scholar Gregory Cajete described the culture of Western science as very distressing to AI/AN students.<sup>10</sup> Cajete argued that Western science has been poorly taught in public schools, especially to AI/AN students, who, no matter what indigenous language they may speak, lack even an appropriate translation for the word *science*.<sup>11</sup> In later work, Cajete defined the internal conflict that the Native student experiences when the cultures of science clash with his or her own ethnic identity, a conflict he described as "ethnostress":

Ethnostress is primarily a result of a psychological response pattern stemming from the disruption of a deeply held cultural life and belief system. Such a disruption may be abrupt or occur over time and generations. Its initial effects are readily visible, but its long-term effects are varied, usually affecting self-image and an understanding of one's place in the world.<sup>12</sup>

Ethnostress is the stress that occurs when a Native student attempts to reposition a sense of self in an Anglo-dominant environment while being fully aware of his or her historical and cultural connections and significance to Native identity.

TYSI attempted to ease the identity strain of Western science settings by placing the students in an all-Ojibwe domain. It promoted science discourse among Ojibwe youth, community scientists, and elders through digital storytelling, specifically a five-minute science narrative about a natural resource topic relevant to their community. Ultimately, we were hoping to observe whether the students would engage in science discourse, create a relevant science narrative, and assert an identity that was consistent with their own group membership.

### ODAAWAA ZAAGA'IGANING—THE LAC COURTE OREILLES COMMUNITY

Odaawaa Zaaga'iganing (the LCO Reservation), located about 150 miles northeast of Minneapolis and eighty miles south of Duluth, comprises more than seventy thousand acres of forested lands, lakes, and rivers. The Treaty of 1854 created the LCO Reservation. It was the last of three major cession treaties in which the Ojibwe ceded to the federal government roughly the northern third of what became the state of Wisconsin. At the time of the treaty signings, the Ojibwe reserved the right to hunt, fish, and gather in the ceded territory, a right affirmed by the US Supreme Court after a contentious and sometimes violent twenty-five-year legal struggle.<sup>13</sup>

LCO's environmental activism can be traced to the 1920s, when, over tribal objections, federal officials authorized construction of a dam on the reservation. The dam, intended to provide power to white landowners downstream, flooded thousands of acres on the reservation and destroyed most of the tribe's wild rice and much of its sugar maple resources. In 1971, the year the lease on the dam was to be renewed, tribal members and activists from the American Indian Movement (AIM) occupied the dam site and successfully forced concessions. A commemorative gathering, which grew into the "Honor the Earth Pow Wow"—the nation's largest environmental powwow—has been held on the LCO Reservation ever since.

LCO's environmental awareness and the presence of several key resources made it an ideal community in which to establish a unique science initiative. In 1982, the tribal legislature established LCOOCC as an agency of the tribe. This associate degree-granting institution has a student body of about four hundred and employs sixty-five faculty and staff. A dozen other LCOOCC instructors and staff work at satellite campuses on four other Ojibwe reservations in Wisconsin. Among the associate degrees offered are agriculture and natural resource management, science, food and nutrition, natural resources and field methods, and renewable energy.

In 1997, tribal leaders established the LCO Boys and Girls Club on the reservation. Like other nonprofit clubs across the nation, it is incorporated through the state and offers experiential learning in a safe environment. During the school year, the LCO Boys and Girls Club offers afterschool educational and recreational activities. In the summer, the club accommodates approximately two hundred students. Children on this sprawling reservation are transported by bus from their homes to the club, located a few hundred yards from the college, where they enjoy activities much like those offered at a summer camp.

An important science education resource on the LCO Reservation is the GLJFWC. During the aforementioned treaty-rights struggles, eleven bands of the Lake Superior Tribe of Chippewa Indians in Michigan, Minnesota, and Wisconsin joined together to establish the commission, which "provides natural resource management expertise, conservation enforcement, legal and policy analysis, and public information services."<sup>14</sup> The member tribes are the Bay Mills Indian Community, Keweenaw Bay Indian Community, and the Lac

Vieux Desert Band in Michigan; the Bad River, Red Cliff, Lac du Flambeau, LCO, Sokaogon, and St. Croix Bands in Wisconsin; and the Fond du Lac and Mille Lacs tribes in Minnesota. GLIFWC has an office at LCO and provides technical assistance to the tribe on inland fisheries, wild rice reseeded, and water-quality issues, to name a few.

Perhaps the most important educational resources are the LCO elders, who, within the traditional Ojibwe educational framework, are responsible for passing on knowledge to children. The LCO team identified four respected elders—two women, two men—and asked permission for the children to interview them. One of them, a respected medicine man, had done an extensive interview with GLIFWC several years earlier. This interview was digitized onto a disk for use as a “back up” in case this culture keeper was called away to conduct ceremonies, which frequently occurs. Another elder edits a national newspaper published from the reservation and is quite familiar with the history of the flowage and the controversy over reserved treaty rights. A third elder directs the Cultural Healing Institute, where water is often used in ceremony. The fourth elder has extensive knowledge about wild rice.

#### THE TRIBAL YOUTH MEDIA APPROACH

In many ways the TYSI resembles the growing number of youth media arts organizations (YMAOs) around the globe. The digital media growth has made the sharing of personal stories by using sites like YouTube and My Space relatively cheap and easy. YMAOs have emerged as purposeful sites where youth are encouraged to master media skills in order to reveal more complex video performances of their lives, often facilitating the experimenting or “trying on” of multiple roles or identities.<sup>15</sup>

The approach used in the TYSI represents a unique assembly of pedagogy, epistemology, and methodology we call an organic video approach. It is organic because it is rooted in the natural and cultural landscape of the Native community. It relies on indigenous knowledge systems, which not only involve observation, instrumentation, and other tools used by Western sciences but also include “complex models based on ritual formulas, in which forms, symbols and representations express Indigenous cosmology, philosophy and Native intelligence.”<sup>16</sup>

Embracing the ethnographic approach, an OVA incorporates participant observation, in-depth interviews, video and audio analysis, self-reflection, and feedback procurement. It employs reflexivity, a distinctly self-conscious process of inquiry familiar to filmmakers and visual anthropologists. Young campers are encouraged to reflect upon their roles as producers and on the product, as well as on their relationships to the experts from whom they are learning. In this case, the experts include elders and Native scientists with whom they have kinship ties.

The OVA process is empowering. Participants are free to use their Native language to define the issues and objects of exploration, explore science in a cultural context, and reflect upon the ways in which the environmental issues on their reservation affect them as tribal members. The result is a learning

experience that promotes activism and encourages children to see themselves as agents of change. Anthropologist Jay Ruby wrote, “To be reflexive is to structure a product in such a way that the audience assumes that the producer, process, and product are a coherent whole.”<sup>17</sup>

Because the program is designed to meet community needs and improve science literacy, many of the observations made during planning and camp execution are a matter of insurance. The authors are active in the camp process at all stages and are not passively watching the program unfold. Rather they are actively able to tweak and adjust the program in an attempt to keep it on par with preestablished goals. Therefore, nearly every observation has an evaluative component. Questions like “Are the elders able to respond comfortably in front of a camera?” or “Is the scientist able to weave cultural underpinnings with ecological principles?” are measures used to inform the status of the camp.

#### VIDEO NARRATIVES REVEAL IDENTITY, RELEVANCY, AND SCIENCE DISCOURSE

Twentieth-century LCO identity assertion is perhaps most strongly illustrated with the histories of the Chippewa flowage and the treaty-rights struggle of the 1980s. Two of the four science-video stories, *Our Fish* and *The Chippewa Flowage*, specifically focus on these two legacies and use them as the backdrop for a science report.

The Fish team, comprised of older campers (twelve- and thirteen-year-olds), framed its story within the context of treaty-based fishing rights. The video begins with violent boat-landing demonstrations in the late 1980s in which tribal spearfishers were harassed by angry sport fishermen and resort owners. The team interviewed an elder who communicated the tribe’s environmental principles of sustainability and protection of the resource. It also interviewed a biologist who described tribal fish hatcheries and the efforts of GLIFWC’s member nations to restock speared lakes on and off the Ojibwe reservations.

The Flowage team’s video was equal parts science and history. Created in the 1920s over fierce tribal opposition, the flowage was a man-made impoundment designed to provide electricity to non-Indian communities. It flooded more than fifteen thousand acres, destroying an entire town, three cemeteries, nearly all of the tribe’s wild rice, and many of its sugar-producing maple trees. During the Indian civil rights movement of the 1970s, Winter Dam became the site of a successful protest by AIM and local supporters to reclaim management of the flowage. This is the story the Flowage team told, focusing on the challenges of reseeding the fragile rice (actually an aquatic grass) in an impoundment with fluctuating water levels.

The Flowage team was comprised of all boys, who had demonstrated high energy throughout the week, sometimes to the point of disruption. In an effort to harness the energy, the camp’s cultural instructor creatively framed the history of the flowage as an environmental struggle involving Ojichidaa, the Ojibwe word for *warrior*, or those who protect the community. This was a concept the boys embraced and worked into their story.

In what became a vivid example of science steeped in Ojibwe epistemology, the team documented the cultural history of the flowage and framed it within the principles of Ojichidaa. It chronicled the struggle over the resource and explored the community's obligation to protect it. This digital narrative explored how the people of LCO have come to know the flowage and how they understand its significance.

The Water team interviewed a tribal elder who was involved in cultural-healing programs in which water was used ceremonially. During the interview she repeatedly referred to the "sacredness" of water. This interview resonated with another archived interview with the community's culture keeper to which the team had access. Team members also interviewed a biologist who explained nonsource point pollution and other threats to LCO's water quality. He discussed water testing and monitoring efforts and explained the remediation processes GLIFWC and its representative tribes use to improve water quality on Ojibwe reservations.

The Water team used these interviews to create a project in which three of the children—all girls—shared narration responsibilities and appeared on camera. Initially the three had stated that they did not want to be in front of the camera. However, their reticence disappeared as they became more comfortable in the camp environment. It was clear that their newfound media skills and increasing science competency had empowered them. The following is an excerpt from the water video:

CAMPER 1: Before this week, we really didn't think about water as sacred.

ALL THREE CAMPERS: In fact, we didn't think too much about water at all.

CAMPER 2: We swim in it.

CAMPER 3: We drink it.

CAMPER 1: We play in it.

CAMPER 2: We hope it's clean, but what if it's not?

Following an interview clip with the biologist in which he discussed unseen contaminants, Camper 3 delivered the following narration on camera with an "over-the-shoulder" graphic added in postproduction.

CAMPER 3: Some of those invisible pollutants include acid rain, mercury, or other chemicals.

The Wild Rice (*manoomin*) team had perhaps the most daunting task. The sacredness of *manoomin* required extraordinary care when portraying and describing its importance within a video segment. At the same time, the authors hoped each team would take ownership of the story and encouraged the students to be creative and not be mired in too many anxious perceptions.

One student, who excelled at music score composition, admitted her nervousness before sharing her final soundtrack for the wild rice story. Naively thinking that she would use the Native American loops collection for

a more traditional sound, she surprised the larger group when she played a funky rock-style piece. Seeing the surprise on the faces of her audience, the student slouched in her chair, perhaps embarrassed or interpreting the reaction as disappointment. On the contrary, her addition was enthusiastically supported and eventually adopted.

The wild rice example indicated the students were fully aware of the sensitive nature of the material while willing to add a modern and personal element to the videos. The production process for all the videos included several humbling moments—too numerous to include. Yet it was the humility, sense of truth, respect, and responsibility that added a dimension to the Ojibwe science topics often absent in Western science venues.

All four videos explored science in a cultural and sometimes historical context. The videos were shown at the dedication of the new tribal library, an event attended by three hundred community members, nationally prominent American Indians, and state dignitaries. Each video received thunderous applause, especially as credits containing the names of each camper were revealed. Camp instructors distributed copies of the videos and certificates of participation to each camper.

#### FEEDBACK

At a traditional feast following the premiere, many community members expressed how proud they were of the students and how impressed they were with the level of professionalism demonstrated by the videos. Participants sought out the instructors to say how much "fun" they had. One of the younger students asked, "Can we do this all summer?" Another told us: "You should just come back next week."

The program's premier week received significant attention in tribal and mainstream media. News stories about the project appeared in *The Sawyer County Record*, *Wisconsin Week*, Superior Broadcast Network, WOJB Radio, *News from Indian Country*, *Tribal College Journal*, and E-CALS (the electronic newspaper published by the University of Wisconsin College of Agricultural and Life Sciences).

A story about the program also appeared in *Mazina'igan*, the quarterly journal published by GLIFWC. After viewing the videos online, participating scientists indicated that they were impressed, not only by the professionalism of the videos but also by the level of scientific understanding demonstrated by the campers. The most encouraging feedback, however, came several months after the project week. In a follow-up phone conversation with the mother of one of the older students (now in high school), instructors learned that the girl, who is interested in molecular biology, had enrolled in a one-week science camp to be held on the University of Wisconsin—Madison campus the following summer.

The Ojibwe community at LCO, like many tribal communities, is plagued with health issues, degraded infrastructure, and natural-resource pressures. The community's desire to address these problems of its own accord at every level is consistent with a legacy of sovereignty and self-determination. The

TYSI reminds community members that science is cultural and relevant; the project reminds members that the ability to communicate about science, with each other and the larger community in an "Ojibwe way," is empowering and integral to Anishinaabe self-determination.

The key to the success of the TYSI and the OVA was the identification of local resources (for example, tribal college, Native scientists, and elders with traditional ecological knowledge on a reservation) and a collaborative, bottom-up approach to the selection of science topics. We offer it as a portable model that can be adapted for use by diverse Native communities.

#### Acronyms used in this article:

AI/AN: American Indians/Alaska Natives  
 AIM: American Indian Movement  
 GLIFWC: Great Lakes Indian Fish and Wildlife Commission  
 LCO: Lac Courte Oreilles  
 LCOOCC: Lac Courte Oreilles Ojibwe Community College  
 OVA: organic video approach  
 TYSI: Tribal Youth Science Initiative  
 YMAO: youth media arts organizations

#### NOTES

1. The college recently changed the spelling of its name from "Ojibwa" to "Ojibwe," a change that is consistent with the spelling the tribe uses. Ojibwe, Ojibwa, Ojibway, and Chippewa all refer to the same group of Algonquian-speaking peoples who inhabit the Great Lakes Region in Canada and in the United States. In addition, there is a Chippewa Cree tribe on the Rocky's Boy Reservation in Montana.
2. Commission on Professionals in Science and Technology, *The Status of Native Americans in Science and Engineering* (Washington, DC: Commission on Professionals in Science and Technology, 2005).
3. Keith James, ed., *Science and Native American Communities: Legacies of Pain, Visions of Promise* (Lincoln: University of Nebraska Press, 2002).
4. National Education Association, *A Report on the Status of American Indian and Alaska Natives in Education* (Washington, DC: National Education Association, 2005).
5. *Identity strain* is a summative term, but in general it characterizes the stress and associated anxiety that comes from being part of a heavily stereotyped group. In particular, we are referring to the cognitive effort associated with merging Native and academic identities.
6. Erik H. Erikson, *Identity, Youth and Crisis* (New York: W. W. Norton, 1968); Tamara Beauboeuf-Lafontant and D. Smith Augustine, eds., *Facing Racism in Education*, 2nd ed. (Cambridge, MA: Harvard Educational Review, 1996).
7. Signithia Fordham and John Ogbu, "Black Students' School Success: Coping with the Burden of Acting White," *Urban Review* 18, no. 3 (1986): 176-206.
8. Bryan A. Brown, "Discursive Identity: Assimilation into the Culture of Science and Its Implications for Minority Students," *Journal of Research in Science Teaching* 41, no. 8 (2004): 810-34.

9. Na'ilah S. Nasir and Geoffrey B. Saxe, "Ethnic and Academic Identities: A Cultural Practice Perspective on Emerging Tensions and Their Management in the Lives of Minority Students," *Educational Researcher* 32 (2003): 14-18.

10. Gregory Cajete, "Science: A Native American Perspective (A Culturally Based Science Education Curriculum)" (PhD diss., International College/William Lyon University, 1986).

11. *Ibid.*, 129.

12. Gregory Cajete, *Look to the Mountain: An Ecology of Indigenous Education* (Asheville, NC: Kivaki Press, 1994), 189.

13. Wisconsin officials, acting on the belief that the off-reservation rights were extinguished when Wisconsin became a state, arrested and prosecuted tribal members who attempted to exercise their off-reservation treaty rights throughout much of the twentieth century. The activities continued, albeit on a clandestine basis. In 1974, two Lac Courte Oreilles (hereinafter referred to as LCO) tribal members openly announced their intention to spearfish on an off-reservation lake and were arrested. The LCO sued the state and were joined in the lawsuit by all five other Ojibwe bands in Wisconsin. Soon Ojibwe bands in Michigan and Minnesota, parties to the same treaties, were drawn into the dispute. In 1999, the US Supreme Court decided the case in favor of the Ojibwe.

14. Great Lakes Indian Fish and Wildlife Commission, "Mission Statement," <http://www.glifwc.org> (accessed 28 July 2008).

15. James Paul Gee, *What Video Games Have to Teach Us About Learning and Literacy* (New York: Palgrave/Macmillan, 2003); Henry Jenkins, Katie Clinton, Ravi Purushotma, Alice J. Robison, and Margaret Weigel, "Confronting the Challenges of Participatory Culture: Media Education for the 21st Century," Building the Field of Digital Media and Learning, <http://www.digitallearning.macfound.org> (accessed 10 December 2008).

16. Patricia Gonzales, "Birth as Ceremony" (PhD diss., University of Wisconsin-Madison, 2007).

17. Jay Ruby, "Exposing Yourself: Reflexivity, Anthropology and Film," *Semiotica* 30, nos. 1-2 (1980): 153-79.