

# CULTURE, CHAOS & COMPLEXITY

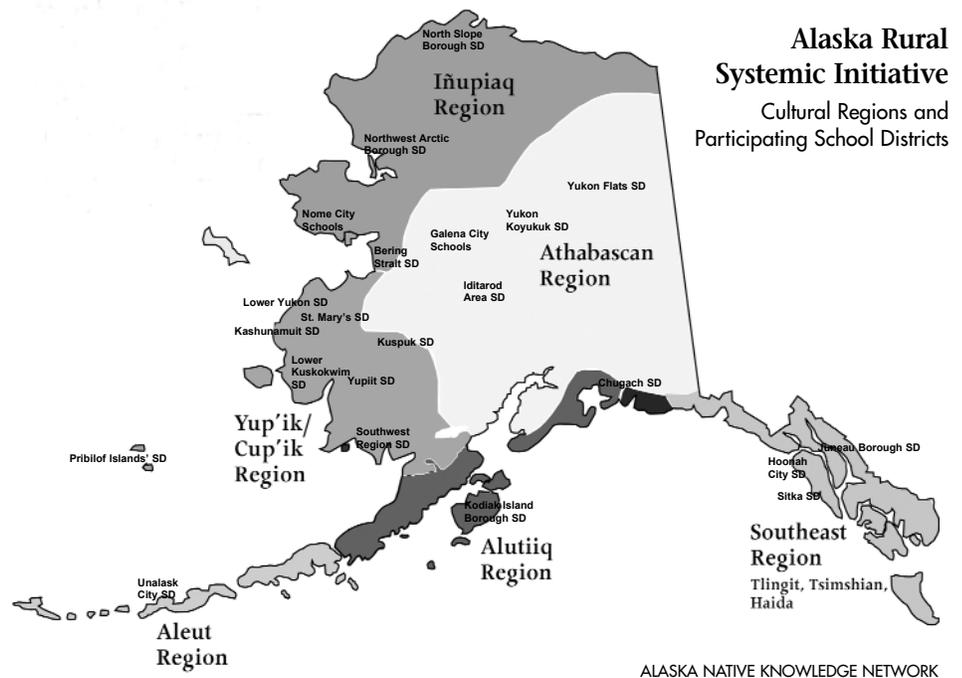
## Catalysts for Change in Indigenous Education

*By Ray Barnhardt & Anagayuqaq Oscar Kawagley*

Education in one form or another has been an essential ingredient contributing to the cultural and physical survival of the indigenous peoples of Alaska for millennia in an oftentimes harsh and inscrutable arctic environment. The accumulated knowledge systems, worldviews, and ways of knowing derived from first-hand engagement with that environment were integrated into the fabric of the indigenous societies and were passed on seamlessly from one generation to the next in the course of everyday life. Education was an integral part of a self-sustaining cultural system.

With the arrival of the early explorers, traders, missionaries, and teachers, a collision of worldviews occurred, including the introduction of competing ways of learning, thus disrupting the balance in the traditional system. Gradually, a new form of education was introduced in the form of "schooling," operating on the assumption that the introduction of Western ways through Western institutions would transform Native people into citizens of the "modern" world. But after 100 years this Western system is inadequate on the river banks and ocean shores that Alaska Native people call home, providing for neither the cultural nor the academic well-being of most of the Native students entrusted to its care.

As a result of many years of frustration and broken promises at the hands of outside educational experts, Native people are now asserting their own ideas for transforming schooling into a more culturally adaptive form of education, and they are finding ways to improve the quality of education for all students in the process. Schools throughout Alaska are being refocused by bringing together the deep traditional knowledge of Alaska Native people with Western-based constructs, principles, and theories—particularly those emerging under the banners of the newly established sciences of chaos and complexity (Waldrop 1994, Gleick 1987). The insights derived from the study of complex and adaptive physical, biological, and economic systems



are being applied to people's understanding of the dynamics associated with the convergence of diverse cultural and educational systems (for example, schools in indigenous communities). The principles of self-organization associated with the study of complex adaptive systems are being brought to bear on education in rural Alaska through the educational reform strategy of the Alaska Rural Systemic Initiative (AKRSI).

AKRSI was established in 1994 under the auspices of the Alaska Native/Rural Education Consortium, representing more than 50 organizations involved in education in rural Alaska. The institutional home base and support structure for the AKRSI is provided through the Alaska Federation of Natives in cooperation with the University of Alaska, with funding from the National Science Foundation. The purpose of AKRSI is to implement a set of initiatives that systematically document the indigenous knowledge systems of Alaska Native peoples and develop pedagogical practices that appropriately integrate indigenous knowledge and ways of

knowing into all aspects of the education system. In practical terms, the most important intended outcome is an increased recognition of the complementary nature of Native and Western knowledge, so both can be more effectively utilized as a foundation for the school curriculum and integrated into the way educators think about learning and teaching.

The educational initiatives themselves are implemented on a rotating cycle, organized specifically for each major cultural region that makes up Alaska, so that the educational components can be tailored to fit the particular cultural context in which they are situated.

The central focus of the AKRSI reform strategy is to foster a connection between two functionally interdependent but largely disconnected systems—the indigenous knowledge systems rooted in the Native cultures that inhabit rural Alaska, and the formal education systems that have been imported to serve the rural Native communities. Within each of these evolving systems is a rich body of knowledge and skills that, if properly used, can strengthen the qual-

ity of educational experiences for students throughout rural Alaska.

## Indigenous Knowledge Systems

The 16 distinct indigenous cultural and language systems that still exist in rural communities throughout Alaska have a rich cultural history that still governs much of everyday life in those communities. For over six generations, however, Alaska Native people have experienced recurring negative feedback in their relationships with the external systems that have been brought to bear on them. The consequences have been extensive marginalization of their knowledge systems and continuing dissolution of their cultural integrity. But despite being diminished and often in the background, much of the Native knowledge systems, ways of knowing, and worldviews remain intact and in practice, and there is a growing appreciation of the contributions that indigenous knowledge can make to Western contemporary understanding in areas such as medicine, resource management, meteorology, biology, and areas of basic human behavior and educational practices.

Indigenous societies, as a matter of survival, have long sought to understand the irregularities in the world around them, recognizing that many unseen patterns of order exist under the surface. Out of necessity, Alaska Natives have learned to decipher and adapt to the constantly changing patterns of weather and seasonal cycles. Native elders have long been able to predict weather based on observations of subtle signs that presage subsequent conditions. The wind, for example, has irregularities of constantly varying velocity, humidity, temperature, and direction due to topography and other factors. There are non-linear dimensions to clouds, irregularities of cloud formations, anomalous cloud luminosity, and different forms of precipitation at different elevations. Behind these variables are patterns such as prevailing winds or predictable cycles of weather phenomena that can be discerned through long observation.

The new sciences of chaos and complexity and the study of non-linear, dynamic systems have helped Western scientists recognize this order in phenomena that were previously considered chaotic and random. These patterns reveal new sets of relationships that point to the essential balances and

diversity that help nature to thrive. Western scientists have constructed the holographic image, which lends itself to the Native concept of everything being connected. The relationship of each part to everything else must be understood to produce the whole image (Wilber 1985). With fractal geometry, holographic images and the sciences of chaos and complexity, the Western thought-world has begun to focus more attention on relationships among elements rather than on elements in isolation. Thus there is a growing appreciation of the complementarity that exists between what were previously considered two disparate and irreconcilable systems of thought.

Among the qualities that are often identified as inherent strengths of indigenous knowledge systems are those that have also been identified as focal constructs in the study of the dynamics of complex adaptive systems. Michael McMaster, a management consultant who has applied the science of complex systems to management practices in organizations in Great Britain, indicates that "Complexity theory is about identity, relationships, communication, mutual interactions."<sup>1</sup> These qualities focus on the processes of interaction between the parts of a system, rather than the parts in isolation, and it is to those interactive processes that the AKRSI educational reform strategy has been directed. In so doing, however, attention must extend beyond the relationships of the parts within an indigenous knowledge system and take into account the relationships between the indigenous system as a whole and the external systems with which it interacts, the most critical and pervasive being the Western formal education systems that now impact the lives of every Native child, family, and community in Alaska.

## The Formal Education System

Formal education is still an evolving system in rural Alaska, thus leaving it vulnerable and malleable in response to a well-crafted strategy of systemic reconstruction. From the time of the arrival of Russian fur traders in the late 1700s up to the early 1900s, the relationship between most of the Native people of Alaska and education in the form of schooling (which was reserved primarily for the immigrant population at that time) may be characterized as two mutually independent systems

with little if any contact.

Prior to the epidemics that wiped out over 60 percent of the Alaska Native population in the early part of the 20th century, most Native people lived a traditional self-sufficient lifestyle with only limited contact with fur traders and missionaries (Napoleon 1991). The oldest of the Native elders today grew up in that traditional cultural environment and still retain the knowledge and language that they acquired during their early childhood years. They are also the first generation to have experienced significant exposure to schooling, many of them having been orphaned as a result of the epidemics. But schooling was strictly a one-way process at that time, mostly in distant boarding schools whose main purpose was to assimilate Native people into Western society. Given the total disregard (and often derogatory attitude) toward the indigenous knowledge and belief systems in the Native communities, the relationship between the two systems through the 1950s was limited to a one-way flow of communication.

By the early 1960s, elementary schools had been established in most Native communities, and by the late 1970s, a class action lawsuit had forced the state to develop high school programs in villages throughout rural Alaska. In 1976, the federal and state-operated education systems were dismantled and in their place more than 20 new school districts were created to operate the schools in rural communities, placing the rural school systems serving Native communities under local control for the first time. A new system of secondary education that students could access in their home community was established as well. These two steps—along with the development of bilingual and bicultural education programs under state and federal funding and the influx of the first generation of Native teachers—bridged the cultural divide by incorporating the knowledge base from within the local communities in their teaching. These new school systems created the potential for schools to become more than one-way conduits for Western ways. The doors were opened for the beginning of two-way interaction between the schools and the Native communities they served.

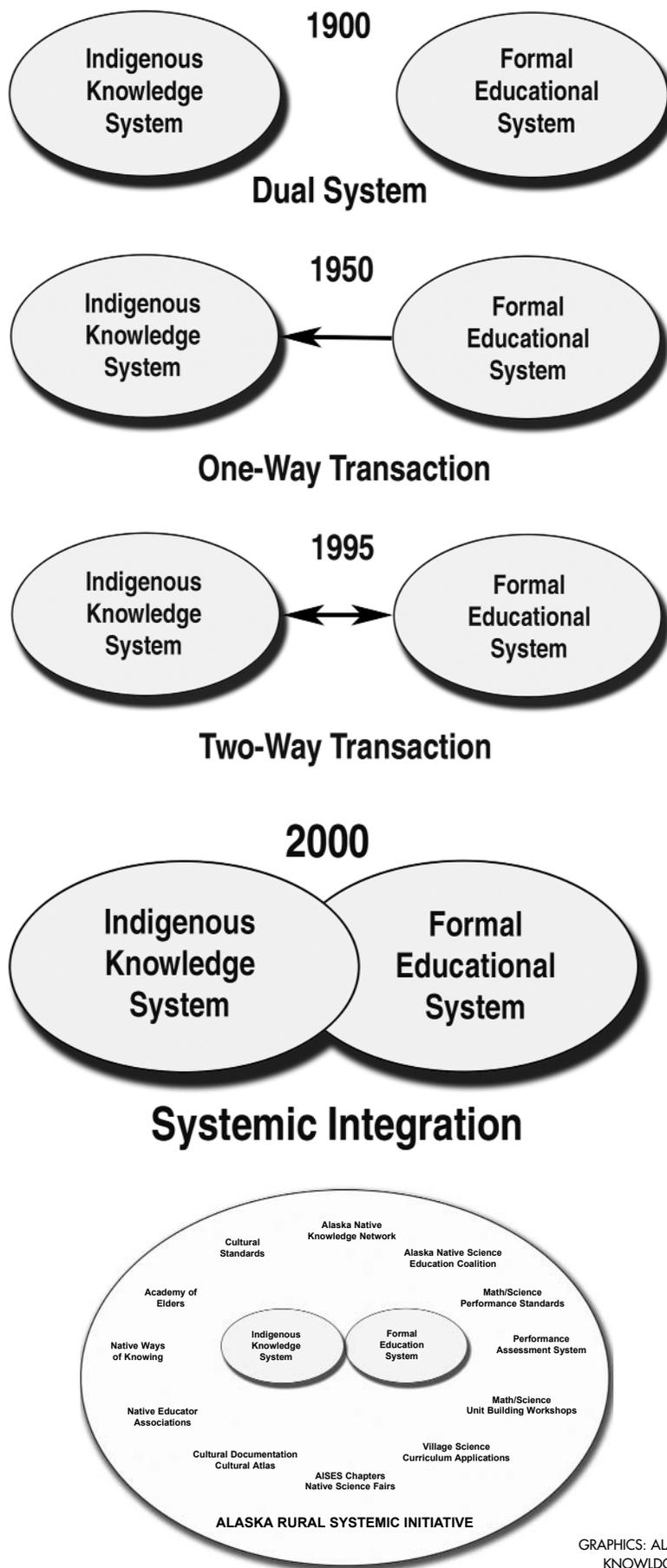
Despite the structural and political reforms that took place in the 1970s and 1980s, rural schools have continued to

produce a dismal performance record by most measures, and Native communities continue to experience significant social, cultural and educational dislocations, with most indicators placing communities and schools in rural Alaska at the bottom of the scale nationally. While there has been some limited representation of local cultural elements in the schools (including basket making, sled building, songs and dances), it has been at a fairly superficial level with only token consideration given to the significance of those elements as integral parts of a larger complex adaptive cultural system that continues to imbue peoples' lives with purpose and meaning outside the school setting. While there is some minimal level of interaction between the two systems, functionally they remain worlds apart, with the professional staff overwhelmingly non-Native (94 percent statewide) and with a teacher turnover rate averaging 30 percent to 40 percent annually.

With these considerations in mind, the AKRSI has sought to serve as a catalyst to promulgate reforms focusing on bringing together the formal education systems and indigenous knowledge systems. In so doing, the AKRSI seeks to promote a relationship such that the two systems join to form a more comprehensive holistic system that can better serve all students—not just Alaska Natives—while at the same time preserving the integrity of the individual systems.

### Forging an Emergent System of Education for Rural Alaska

In May 1994 the Alaska Natives Commission, a federal and state task force formed to conduct a comprehensive review of programs and policies impacting Native people, released a report articulating the need for all future efforts addressing Alaska Native issues to be initiated and implemented from within the Native community. The long history of failure of external efforts to manage the lives and needs of Native peoples made it clear that outside interventions were not the solution to the problems, and that Native communities themselves would have to shoulder a major share of the responsibility for carving out a new future. At the same time, existing government policies and programs would need to relinquish control and provide latitude and support for Native people to address the issues in their own way, including the oppor-



GRAPHICS: ALASKA NATIVE KNOWLEDGE NETWORK



Drummers keep the beat at the annual potlatch held at the Old Minto Cultural Camp on the Tanana River in Alaska.

tunity to learn from their mistakes. It is this two-pronged approach that is at the heart of the AKRSI educational reform strategy—Native community initiative coupled with a supportive, adaptive, collaborative education system.

Manuel Gomez, director of a large Puerto Rico systemic reform initiative, indicates his analysis of the notion of systemic change in education in his report for the National Science Foundation: “Educational reform is essentially a cultural transformation process that requires organizational learning to occur—changing teachers is necessary, but not sufficient. Changing the organizational culture of the school or district is also necessary.” This statement applies to both the formal education system and the indigenous knowledge

systems in rural Alaska. The culture of the education system as reflected in rural schools must undergo radical change, with the main catalyst being standards-based curricula grounded in the local culture. In addition, the indigenous knowledge systems need to be documented, articulated, and validated, again with the main catalyst being standards-based curricula grounded in the local culture.

The standards referred to here, however, are not just the usual subject-matter standards established by the state, but also include a set of “cultural standards” that have been developed by Alaska Native educators and elders to provide explicit guidelines for how students, teachers, schools, and communities can integrate the local culture and environment into the formal education

process so that students are able to achieve cultural well-being as a result of their schooling experience.<sup>2</sup> The focus of these cultural standards is on shifting the emphasis in education from teaching about culture to teaching through the local culture as a foundation for all learning, including the usual subject matter.

If we are to abide by the principles of complexity theory and seek to foster the emergent properties of self-organization that can produce the systemic integration indicated above, then it is essential that we work through and within the existing systems. The challenge is to identify the strategies that will produce the most results with the least effort. In the terms of complexity theory, according to Kyle L. Peck and Alison A. Carr, education professors at the University of Pennsylvania, that means targeting the elements of the system that serve as the “attractors” around which the emergent order of the system can coalesce. Once these critical agents of change have been appropriately identified, a “gentle nudge” in the right places can produce powerful changes throughout the system.

The key agents of change around which the AKRSI educational reform strategy has been constructed are the Alaska Native educators working in the formal education system coupled with the Native elders who are the culture-bearers for the indigenous knowledge system, along with the established curricula and academic content standards adopted by the Alaska Department of Education. Together, these components constitute a considerable set of attractors that are serving to reconstitute the way people think about and do education in rural schools throughout Alaska. The role of AKRSI has been to guide these agents through an ongoing array of locally generated, self-organizing activities that produce the “organizational learning” needed to move toward a new system of education for rural Alaska. The overall configuration of this system may be characterized as two interdependent, though previously separate, systems being nudged together through a series of initiatives maintained by a larger system of which they are constituent parts.

### Cultural Intervention Strategies

The overall structure of the AKRSI is organized around the following five major initiatives, each of which is being

implemented in one of the five Alaska Native cultural regions each year on an annual rotational schedule over a five-year cycle. In this way, the initiatives can be adapted to the cultural and geographic variability of each of the regions, while at the same time engaging the state-level support structures. The initiatives are Native Ways of Knowing/Teaching, Culturally Aligned Curriculum, Indigenous Science Knowledge Base, Elders and Cultural Camps, and Village Science Applications.

Along with the rotational schedule of regional initiatives, there are also a series of cross-cutting themes that integrate the initiatives within and across regions each year. While the regional initiatives focus on particular domains of activity through which specialized resources are brought to bear in each region each year (for example, culturally aligned curriculum or indigenous science knowledge base), the following themes cut across all initiatives and regions every year:

1. Documenting cultural/scientific knowledge
2. Indigenous teaching practices
3. Standards/culturally based curriculum
4. Teacher support systems
5. Culturally appropriate assessment practices

In this way, schools across the state are engaged in common endeavors that unite them while they concentrate on particular initiatives in ways that are especially adapted to their respective cultural region. Each set of initiatives and themes build on one other from year to year and region to region through a series of statewide events that bring participants together from across the regions. These include working groups around various themes, academies of elders, statewide conferences, the AKRSI staff meetings, the Alaska Native Science Education Coalition, and the Alaska Native Knowledge Network (ANKN).

All tasks associated with implementing the various initiatives are being subcontracted out to the appropriate state or regional entities with responsibility or expertise in the respective action area. In this way, the expertise for implementing the various initiatives is cultivated within the respective regions, and the capacity to carry on the activities beyond the life of AKRSI will be embedded in the schools and communities for which they are intended.

The statewide support system for the regional initiatives—which includes a newsletter, a Web site, and curriculum resources—is being coordinated by the AKRSI staff, including three co-directors, along with a regional coordinator for each cultural region to maximize the impact of the initiatives within and between regions.

### **Culturally Based Education and Academic Success are Compatible**

AKRSI has just completed its eighth year of implementation and enters the final two years with a full complement of rural school reform initiatives in place stimulating a reconstruction of the role and substance of schooling in rural Alaska. Students are spending more time out in the community with elders, parents, and local experts. The school curricula are reflecting the knowledge, values, and practices that have been a traditional part of life in the local communities, and teachers are incorporating a more place-based pedagogy that is engaging students in studies associated with the surrounding physical and cultural environment. The Alaska Standards for Culturally Responsive Schools developed by Alaska Native educators have been adopted by the Alaska State Board of Education side-by-side with the state subject area standards, and have become a part of the lexicon of teacher in schools throughout Alaska.<sup>3</sup> The educational reform strategy we have chosen has produced a steady increase in student achievement scores, a decrease in the dropout rates, an increase in the number of Native students attending college, and an increase in the number of Native students choosing to pursue studies in fields of science, math, and engineering.

The AKRSI initiatives have demonstrated the viability of introducing strategically placed innovations that can serve as attractors around which a new educational system can emerge and produce the quality of learning opportunity that has eluded schools in Native communities for over a century. The substantial realignments that are already evident in the increased interest and involvement of Native people in education in rural communities throughout Alaska point to the efficacy of tapping into the cultural strengths of local communities in shaping reform in educational systems.

We are mindful of the responsibilities

associated with taking on long-standing, intractable problems that have plagued schools in indigenous settings throughout the world for most of the past century, and we have made an effort to be cautious about raising community expectations beyond what we can realistically expect to accomplish. We are also mindful of the larger context in which the AKRSI operates and the expectations of the various agencies that have mandates to support initiatives that can contribute to a larger national agenda. Our experience thus far is such that we are confident in the route we have chosen to initiate substantive reform in rural schools serving Alaska Native communities, and while we expect to encounter plenty of problems and challenges along the way, we are capitalizing on a broadly supportive climate to introduce changes that will not only benefit rural schools serving Native students, but will also be instructive for all schools and all students. We welcome the opportunity to continue to explore these ideas and find ways to strengthen and renew the educational systems serving people and communities throughout our society.

1. Wheatley, M. J. (1992).; Stamps, D. (1997).
2. See <http://www.ankn.uaf.edu/standards/>
3. See <http://www.ankn.uaf.edu>

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### The Network in Solidarity with the People of Guatemala

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