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B Singer

Judith van der Elst

J Garcia

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Digital tools, Strategic Alliances, and the Protection of Traditional Knowledge

B. Singer

Professor, Department of Anthropology and Native American Studies, University of New Mexico

J. Garcia

Iberoamerican Science Technology and Education Consortium, University of New Mexico

J. van der Elst

Ph.D. Candidate, Department of Anthropology, University of New Mexico

Abstract

In today's society the development of Information Communication Technologies (ICT) is imminent yet, large segments of the world remain marginalized. Our contention is that peer-to-peer and inter-institutional networks can be used to connect local with global systems to close this divide. Using today virtual and digital technologies the gap can be bridged using collaboration platforms using different knowledge systems that do not simply replicate the same information. The suggested model represents forming strategic alliances for information sharing and collaboration to empower and support local systems. The examples discussed show our efforts toward an inclusive approach with communities in full partnership, resulting in: 1) providing technical language necessary to negotiate with alliance partners, 2) creating new collaborative ways to incorporate cultural knowledge that can be shared locally and globally based on different metaphysical foundations, and 3) create ways by which communities can protect their traditional knowledge.

Introduction

This paper describes a multi-ethnic effort toward designing novel ways of using digital tools for communicating and maintaining different knowledge systems. It is our contention that the globalization of social and collaborative networks offer new educational and research opportunities. It also challenges homogeneous ways of thinking. Our work is focused on developing educational models that integrate theory and practice by approaching solutions from multiple perspectives. The authors of this paper present an overview of issues that have hindered their individual research efforts and has led to a strong realization that knowledge is the product not only of scientific method based on reason, but in large part to memory and imagination witnessed by and through the lives of community systems. This should be reflected in the way digital tools and knowledge building could be interrelated by including cognitive and communicating abilities different than our own. To understand and employ these sources to address global challenges, we need to develop research and educational models that value and incorporate these sources. First we will outline the suggested model, which is based on the Triple Helix model, as developed by Etzkowitz and Leydesdorff (1997). This model provides a framework for communication protocols for networks and actors associated with the university-industry-government complex. The Triple Helix was developed to master innovation flow and the differentiation between modes of knowledge production of the academic system and other

institutions, i.e. government and industry. Whereas the mode of academic knowledge production is characterized by researchers working in isolation and leads to fragmentation of knowledge, knowledge production associated with industry and government is associated with application and utilization. The Triple Helix model is based on the premise that society at large will benefit from innovation, development, and capitalization taking place within the Triple Helix of development as a trickle down effect, it remains contested (Sales, Fournier, Sénéchal 2007). In order to achieve development that limits social and academic disparities, we suggest to expand the Triple Helix model of development to the Quadruple helix model of collaboration so Indigenous and local communities can be brought in as partners in the development process of knowledge creation and innovation.

I. Theoretical background

Traditional knowledge, indigenous knowledge, and local knowledge based on our work and refer to long-standing traditions and practices of indigenous and local communities. Scientific knowledge is generally based on propositional knowledge and is set apart from other knowledge. Even though the methodological bases for upholding this distinction that implies scientific knowledge as ranked higher is problematic, as is clear from philosophical discussions within the academy itself (Wautischer – others), acceptance of traditional/indigenous epistemologies as supporting equal knowledge systems appears to remain marginal. Efforts to validate truth claims of traditional knowledge are often focused on exposing political motives of dominant epistemologies. Wautischer, even though acknowledging this as a factor, argues that this has dominated postmodern critique at the expense of investigating the philosophical underpinnings of the diverse claims to truth (Wautischer, 1998). Within the current academic culture interest in multiplicities viewpoints is one of the important features associated with postmodern thinking, however, along with its inherent relativism, the role of political power in control of knowledge tends to be overemphasized whereas other human traits tend to be forgotten in the comparison of different knowledge systems (Bender ed 1993., Wautischer 1998). Several scholars have discussed ways in which different knowledge systems can be compared from a philosophical perspective, but these efforts remain minimal. For instance, “the epistemological function of narratives is underappreciated in western cultures as relevant device for human interaction. (Wautischer) Recent investigations have recognized the importance of stories in human spatial cognition (Paelke and Elias 2007). In addition, the comparison of the different knowledge systems often overemphasize differences that are presented as dichotomous relationships, such as stressing the community aspect in traditional knowledge as opposed to the importance of the individual in western cultures. Several scholars have addressed the notion of Self, and individuality within non-western cultures to counter this narrow focus (Edge 1998, Rýser 1998). The Self, however, emerges from communities and social conditions present in her or his immediate locality. In this regard Indigenous and local communities that continue to live in localities rely on traditional knowledge and natural resources to provide a sense of Self because their histories and knowledge accumulated over long period of time is remnant of knowledge accumulated from learning to manage local ecosystems. (Agrawal, 2002)

Scientific practice often supports the rhetoric of development that has long been characterized by a focus on economic growth and technological innovations as its motives. Today’s focus however on sustainable development has many reconsider the value of traditional knowledge,

previously considered an obstacle to development now often seen as essential for sustainable practices. (Agrawal, 2002) This shift in focus is long overdue, but also presents new problems in the relationship between indigenous and local communities and other knowledge producing institutions. For instance, methods of representation, preservation, and commodification of knowledge are increasingly indicated as points of contention because for Indigenous Peoples and local communities the intrinsic value of knowledge remains between the social, political, religious, cultural and existential understanding that community members in traditional societies have about the Self and their close environments.

In this regard, traditional knowledge has long been studied within the discipline of anthropology by recording and representation of that which took place within a general mindset of changing or disappearing cultures that needed to be preserved. These ethnographies served either as descriptions of assumed earlier stages or used to attack philosophical traditions. The treatment of traditional knowledge within that framework sets traditional knowledge apart as more embedded in their environments and being primitive and not the result of analytic reason that is rooted in a larger –dualistic- framework underlying most western scientific endeavors. In a way, knowledge is then objectified and ‘frozen’, in similar ways as tangible artifacts that are collected from that environment and preserved in museum settings.

Global warming and related climatological issues affecting societies around the world have spurred an interest in the development of sustainable –environmental- practices and technologies. Traditional knowledge is considered an important component that can contribute to the understanding of environmental processes, issues concerning biodiversity and sustainability efforts. As discussed by Agrawal (2002), the preferred strategy, similar to earlier anthropological approaches, is *ex situ* conservation, encompassing documentation and storage in international, regional and national archives and –digital- databases. Due to the dynamic nature of traditional knowledge this seems a defective strategy, as argued by Agrawal, because the end goal of documenting traditional knowledge is to identify specific features that can be generalised and applied more widely in the service of more effective development and environmental conservation. (Agrawal, 2002) It is considered suitable knowledge and information conservation within –western- scientific and governmental modes of knowledge, and therefore likely to benefit more powerful constituencies, but undermining access, rights and ownership to traditional communities. If the goal is to create societies that are fair and democratic, then how do we achieve a state in which policies that also protect indigenous peoples who continue to live within ancestral lands? To do this, we need to review and reconsider existing development models that advocate for the advancement of our scientific and technological society. One such model is the Triple Helix for development.

II. Development models: 3H vs. 4H and the protection of traditional knowledge

In an article discussing Maori epistemology, Roberts and Wills (2000) draw upon one of the few studies that have compared traditional knowledge systems and western science by Horton (1967, 1971,), who listed a number of general attributes fundamental to all epistemologies. Using these as guidelines Roberts and Wills conclude that Maori knowledge for all considered attributes contains theoretical models that are comparable to modern science. For instance, fundamental in Maori epistemology is the use of metaphor, a characteristic that is also underlying western –

scientific- thinking (Lakoff and Johnson 1980, Forceville and Urios-Aparasi 2009). The main difference assumed between these knowledge systems is their characteristic of being ‘closed’ or ‘open’, whereas “in traditional cultures there is no developed awareness of alternatives to the established body of theoretical tenets; in scientifically oriented cultures on the other hand, such an awareness is highly developed.” (Horton as quoted by Roberts and Wills) Roberts and Wills however show that this strict boundary is blurred on both sides, arguing that science has become ‘a way of doing’ instead of ‘way of seeing’ and no longer subject to philosophical inquiry. Traditional knowledge, as exemplified by Maori epistemology, is said to be dynamic while maintaining its epistemological foundation (Roberts and Wills).

It is this dynamic characteristic of traditional knowledge systems, stressed within this paper, that has lead to employing innovative digital technologies to maintain and disseminate traditional knowledge in new ways, and most important in ways that it can be used to support internal processes within localities. The end goal of using digital technologies should be to augment the dissemination of traditional knowledge so it can be passed on from generation to generation and enriched with scientific knowledge acquired through collaboration. (Rahman, 2000) Because this knowledge is “embedded in the experiences of indigenous or local communities and involves intangible factors, including their beliefs, perspectives, and value systems (Rahman, 2000), then the act of preserving it using digital technologies and databases should not be to assume that “indigenous knowledge is an under-utilized resource in the development process” as the World Bank assumes (Agrawal, 2002), nor should we work under the assumption that traditional knowledge “has become a commodity that attracts investors from the North who benefit financially from the appropriation of the profitable elements of traditional knowledge,” as Raseroka warns us (2008, 245) because if we do not understand that traditional knowledge should be protected for reasons beyond the needs of the market forces. Our understanding of these matters is important to avoid supporting the colonization process of indigenous peoples and their most valuable asset, their traditional knowledge. Our goal instead should be to support the development process of indigenous and local communities so they can identify and use their traditional knowledge for their own development. The support should not only include technology and information transfer, but also training in ways that their knowledge can be protected from being not just capitalized, but also from being “separated from those other knowledge’s, practices, milieu, context, and cultural beliefs in combination with which it exists” (Agrawal, 2002, 290) so it can support and be supported by the development process.

In 1997, Etzkowitz and Levdesdorff developed a communication protocol that has been used as an ideology to support communication links between industry, academia, and government. Their goal was to promote the development of strategic alliances for development. This model of social communication has been known since as the Triple Helix of development. Also, in 2003 the World Summit on the Information Society (WSIS) created a vision for ‘a people-centred (sic) inclusive and development orientation Information Society, where everyone can create, access, utilize and share information and knowledge enabling individuals, communities and people to achieve their full potential to promoting their sustainable development and improving their quality of life.’ (Raseroka, 2008, 246) So if the most important challenge of our time is to support individual and communities to achieve their full potential, then we have to go beyond advocating that “excluded populations collectively enter the labor market as service providers contracting with public and private sector organizations for cleaning and other tasks” (Dzisah

and Etzkowitz, 2009), and go beyond by enticing them to be full participants and beneficiaries of the development process. Because the Triple Helix model for development does not entirely represent a solution to the challenge posed by WSIS, in our view, the model needs to be reviewed so it can be more responsive and inclusive of the spheres that make up our entire society.

The Triple Helix development paradigm is a socio-linguistic paradigm that promotes and allows sharing of information, resources, and knowledge between industry, academia, and government. This paradigm has been propitious to develop the information society and the advancement of the information communication technologies that now make possible telecommunications and the connection of millions of people throughout the globe. Even though this paradigm has been instrumental to develop the information society, it has not been able to level social differences, and in turn we still experience major disparities between those who have meaningful access to ICT's and those who do not. In order to change this disparity, our argument is that we need to expand the social paradigm from a Triple Helix of development to a Quadruple Helix (See annex A). The major difference in these paradigms is that the Triple Helix establishes communication and collaboration links between three entities on a two dimensional axis; in contrast, the quadruple helix uses a multidimensional axis in which industry, academia, government and international NGO/multilateral organizations are connected to the core of the formation and as the parts support the development of the core (our society) – the result is that the entire formation grows in unison.

In the case of the Triple Helix model of development, this model fails to include the role that local communities should play to determine development policies that will ensure direct benefits in the development process. Our argument to augment the Triple Helix to a Quadruple Helix is to ensure that the development process includes actors that should play a greater role in the conceptualization of the development process, especially when it comes to the use of traditional knowledge to spur new economic development. In the case of the conceptualization of the Quadruple Helix, we argue that the traditional notion that the development spheres revolve around industry, academia, and government should be changed to include multilateral organizations and that Indigenous and local communities should be at the center of the development process as direct beneficiaries. We advocate for “the use of digital media [and information transfer] that is not disassociated from the production of culture and those who produce it, which in most cases are local communities and their continuous use of the cultural precepts attached to their local histories and cosmovision about the world (van der Elst, Richards-Rissetto, Garcia, in press).

The development models differentially affect the way in which traditional knowledge is considered, and who benefits from it. To ensure that partnerships are forged based on equality and accountability, the role of traditional knowledge needs to be positioned in relation to the benefits that it can bring foremost to knowledge holders (indigenous and local communities), as well as the eventual benefits its derivatives can bring to our society. Therefore, a process by which knowledge holders from indigenous and local communities are supported to document, use, and preserve their traditional knowledge needs to be put in place so they can be trained and supported in the process of documenting and protecting their traditional knowledge; so if they “license it” they can be sure that it would be protected and they would be compensated for it. In

this regard in the process of academic mode of knowledge production, the epistemological basis for equality needs to be addressed for successful academic-community partnership, in this way universities and other educational institutions can pioneer the democratization of knowledge by helping local communities preserve, protect, and use their knowledge as a valuable asset. In terms of industry and government modes of knowledge production the discussion is largely on political and economic grounds, and thus it is about power to determine who and how benefits are shared. The goal in this regard is to make government and industry responsible so they can be true catalyzers and supporters of development that emerges from the bottom up. If these two spheres are not aligned in the effort to support new and innovative ways of engaging communities as true partners, then the result is that the tendency to dictate research outcomes will not change. In this regard relations of power with indigenous and local communities will continue to be marked by simply studying knowledge valuable to the markets and once traditional knowledge “is in the public domain it can be refined and privatized through the existing system of patents and intellectual property rights.” (Agrawal, 2002, 294) Although the process of legal appropriation of traditional knowledge through its study and refinement to subtract key elements that serves the purposes of development (Agrawal, 2002) might be beneficial to develop new markets, it is detrimental to the survival of indigenous and local communities. The case of the *Neem tree*¹ is just one of many instances in which indigenous peoples knowledge is circumvented by appropriation by “re-naming it and claiming it.” Industry, government, and academia are unassailable social institutions, which in most cases depend on social benefits to subsist, therefore their role within the Triple Helix of development should adhere to the quest to “meet the needs of the present [generations] without compromising the ability of future generations to meet their own needs.”² As traditional knowledge and the epistemologies continue to be eroded and renamed and are not protected from commercialization, society risks losing subtle and intricate knowledge that has purpose in the balance of sustainability (LaDuke, 1999)

We see this expansion from the Triple Helix to the Quadruple Helix as an inevitable trend that has the potential to help mitigate future issues, controversies, and problems surrounding the development, preservation, and sustainable use of traditional knowledge. Stronger links between the parts of the Quadruple Helix will also promote novel ways of learning, teaching, and knowledge creation. The collaboration between academia and local communities, in particular, will enrich digital heritage networks and break down old, knowledge, (and power) structures. New structures and collaboration efforts will not only benefit and expand the way knowledge is created and managed, but in the long run it can also create critical lines of communication and collaboration between all the partners of the Quadruple Helix. In other words, it is possible under our paradigm change to become more susceptible to the needs of the world, out of this concern we can then satisfy the needs of the market, but not the other way around. Our goal under this notion of relationship making based on models that are balanced is to ensure that indigenous and local communities are not just regarded as providers of traditional knowledge or consumers of technology, but that they are an integral and important partner in the process to “enhance creativity, ideas and skills” (Dzisah and Etkoizwitz, 2009). If our goal is just to provide social paradigms to promote movement between actors of the Triple Helix then we are

¹ Internet source: <http://www.twinside.org.sg/title/pir-ch.htm>

² Internet source: http://psychology.about.com/od/developmentcourse/f/dev_faq.htm

only expanding the frontiers of colonialism to benefit those who already benefit from the development process.

Especially in light of recent recommendations of national taskforce and workshops focused on the development of sustainable environment, the need to collaborate is obvious.³ Recommendations and outcomes of this report however are largely based on the Triple Helix model, and even though the need for community collaboration is expressed, it is done so in vague terms. For instance, it is stated that development of data sharing policies for programs involving community data should be encouraged. However, it is not clear who benefits from these data sharing policies, as the goal is to make these data available to ‘the public’.⁴ We believe that these issues should be more explicitly defined for all partners involved. The Quadruple Helix model provides the structure to do so.

The underlying assumption that determine partners in such taskforce efforts seems to be that communities are passive recipients and benefactors of digital data stewardship. The examples discussed below provide a different view, substantiating our argument that traditional communities need to be equal partners in the use of ICTs, especially as it increasingly moves toward the use and appropriation of traditional knowledge for the development of socio-economic development among indigenous peoples.

III Discussion of these issues through known examples

Indigenous peoples having their own stories of creation and connections with land and earth-based philosophies that bond them together in communal entities on every major continent provide evidentiary support that indigenous peoples understand established systems of manipulation and the interest in access to their communities made by corporate, government and institutions for development. Furthermore, Indigenous lives are separated by more than a technological divide which is a spiritual connection with actual living differences that are in conflict with ‘the way one is suppose to live’ according to progressive standards of national wealth, education, politics, and health especially when national support is tied to compromise their rights. It is imperative to note this relational difference in creating so-called models of collaboration for purposes of research, education, economic development, or any combination thereof intended to engage Indigenous peoples with digital technology. Identification and brief exploration of competing Indigenous worldviews are presented in four selected examples where digital technology has intersected with indigenous communities. The examples highlight the background and nature of the collaboration.

Inuit Access

By the 1980s, the move to connect the world through technology reached a then younger Zacharias Kunuk from a village outside of Igloolik, a town within what became Nunavut Province in Canada in 1990. Kunuk was selected to receive training in television production from the Inuit Broadcasting Corporation (IBC)¹ of Canada. He became an employee of IBC and produced a number a short programs for and about Inuit peoples. His acquaintance and collaboration with Norman Cohn, a white Canadian filmmaker from Montreal with whom he

³ Internet source: <http://www.brif.sdsc.edu>

⁴ Internet source: <http://www.arl.org>

shared a kindred yearning for independence from ‘bureaucracy’ was what led to their partnership as co-founders of Igloolik Isuma Productions in 1990. Isuma Production films went on to earn global acclaim and numerous film awards entirely based on Inuit stories, culture and participation which Isuma’s home page website states is “young and old work together to keep our ancestors memory alive.”ⁱⁱ The history and background leading to Isuma Productions’ success is aligned with the Inuit Broadcasting Corporation from whom Zacharius Kunuk received his television broadcasting knowledge and skills. The IBC itself was a derivative of Canada’s national Radio-television and Telecommunications Commission (CRTC). In 1979, the CRTC developed a satellite broadcast project known as Inukshuk. Rudimentary television production facilities were installed in six northern communities from where satellite feeds could be transmitted while teams of Inuit were recruited for operating television broadcast equipment and program development. In spite of the short lived nature of the Inukshuk Project, only eight months, the impact of its’ programming was widespread among very remote Inuit communities in northern Canada who recognized the value of broadcasting and teleconferencing in the Inuit language. Inuit understood the power of broadcasting to discuss their own issues and exchange information, which led Inuit leaders to leverage the Canadian federal government for an Inuit-based network television license from the CRTC.

In 1981, a network license for the Inuit Broadcasting Corporation was granted to the Inuit Tapirisat of Canada. Inuit Tapirisat or the Inuit Brotherhood in English that became Inuit Tapiriit Kanatami (ᐅᐅᐅᐅ ᐅᐅᐅᐅ ᐅᐅᐅᐅ) representing over 50,400ⁱⁱⁱ Inuit, while its headquarters are at Ottawa, Ontario also the capital city of Canada they cover Inuit living in four northern regions: Nunatasiavut (in Labrador), Nunavik (in Northern Quebec), Nunavut, and the Inuvialuit Settlement Regions of the Northwest Territories/Yukon. This story highlights three issues of relevance in the use of media technology by Indigenous Inuit: access, training and leadership. The introduction of television programs with dominant Euro-Canadian and sometimes U.S. programs into Inuit communities was a milestone but more significant was how the Inuit rapidly used their training in television broadcasting a step further. They began producing programs to promote Inuit language and culture believing the influence of English-only TV programs was not entirely a positive on youth in particular who began imitating non-Inuit behavior and speech. Guided by Inuit ambition and ingenuity was especially apparent when they moved to secure their own television broadcast license. A principal feature in their story is that of isolation in the Artic where they have lived continuously for millennia. The introduction of technology was recognized as an outside intervention by the Inuit who organized themselves to contain its’ influence and within a short period of time sought to control the use of it. A closer look at the timing in the 1970s and 1980s with the introduction of broadcast television among the Inuit, considered an uninformed and disconnected people because of their remote location in the Artic, coupled with the training and education to produce broadcast television programming happened alongside the early coalescence of Canada’s First Nations leaders to force the Canadian federal government to acknowledge the impact of colonial policies that denuded many Aboriginal peoples of lands and rights. Inuit people who saw the opening of an opportunity was Zacharias Kunuk and Paul Apak whom brought together a core of creative and talented storytellers and writers to begin making their own films and were joined by Norman Cohn, a non-Inuit, and together made history with their first film, the epic story of “Atanarjuat: The Fast Runner” in 2001. Kunuk was awarded the First Director Prize at the Cannes Film Festival in 2001. The film is entirely in Inuktitut with English subtitles and is framed in a pre-

European narrative about two brothers whose fate intersects with ancestral Inuit stories about relations that split their loyalty. The name Isuma chosen by the filmmakers for their production company means ‘to think,’ and their productions feature Inuit narratives that position viewers to hear their language and actively participate in viewing Inuit living and thinking that has developed in the land and space they inhabit that is vastly different for anyone who is not from Inuit territory.

Chiapas Media

By 1990, global development projects funded by multinational corporations sought to access vast land holdings for genetically modified seed farming, hydroelectric development, and deforestation of what remain of the world’s old growth forests. In 1994, a neo-Zapatista resistance was declared by the Zapatista Army of National Liberation also called EZLN, which was parsed by Internet from the Chiapas highlands in the southern most state of Mexico in response to the corporate-through-governmental siege of Indigenous occupied lands in Mexico. Led by a self-styled resistance movement leader in the manner of Che Guevara, and calling himself subcomandante Marcos, was not Indigenous, but notably trusted by the Indigenous peoples’ in Chiapas he spoke for in the philosophical speech culture of social activism sparked a widespread and militia-armed resistance to the policies and practices of the modern nation state of Mexico demanding that Indigenous rights be recognized by the Mexico’s Constitution. At the outset, the world’s interest was intensified yet stymied by “a mask” worn by those identifying with this Zapatista Movement. Two types of masks worn by men and women alike in the movement was a woolen-type black face and head cover worn to protect one from extreme cold, also called a ski mask, and the other mask, a cotton scarf tied around the head covering one’s nose and mouth. It was the mask that heightened public imagination while shielding the identity of Zapatista organizers from the authorities as much as it aided their resistance movement. The organization of the Zapatista resistance emerged with military precision to some extent and the headquarters of the movement remained secluded in the Chiapas highland mountains and inaccessible to outsiders with the exception of international journalists who were granted an interview by Marcos. The government of Mexico was caught in a media feast about its’ position with regard to Indigenous rights. Owing to the Zapatista resistance movement use of the Internet to alert the international community and human rights watch advocates for support, the Mexican government waged a covert military assault by arresting Indigenous community leaders, many who were not members of EZLN while hired paramilitary troops attacked villages effectively paralyzing them with fear for their survival. Nahua photographer Francisco (Paco) Vasquez from Mexico City and Alexandra Halkin, filmmaker and feminist rights advocate from Chicago in the U.S. Halkin’s knowledge of the situation in Mexico came through her acquaintance with the U.S. based Mexico Solidarity Network. This movement was formed in response to the attacks on the Indigenous in Mexico but it was also concerned with helping to document the aggression by the Mexican government of innocent individuals who were imprisoned and/or killed while in prison. While independent of the Mexico Solidarity Network, her travels to Mexico brought her in contact with autonomous Zapatista Indigenous communities who asked her to assist them in helping them to access technology with computers and cameras to document their stories during this tumultuous period.^{iv} Vasquez was aware with the Indigenous video making workshops sponsored through Mexico’s defunct government agency for Indigenous people, Instituto Nacional Indigenista (INI) under the auspices of Instituto Nacional de Antropología and Historia (INAH). Pairing her skills with Paco’s intimate knowledge of Mexico and his language

facility matched with Alexandra's film making advocacy work and organizational ability produced a bi-national partnership known as the Chiapas Media Project (CMP) in 1998. Halkin is the Founding Director/International Coordinator who garnered broad based support for the Chiapas Media Project/Promedios. Whether to call the Chiapas Media Project a success is difficult to say with regard to the continued struggle among Indigenous in Mexico, but the ideal conditions for training and providing video cameras and editing equipment to local autonomous Zapatista communities provoked the production of quality video programs about themselves in their own words and images. The timing for the CMP was near perfect, as the inaccessibility to technology and electricity was non-existent to the municipalities of the Highlands of Chiapas where Tzotzil, Chol, Tojolabal, Mum and Tzeltal Maya use video to share their struggle for survival with the world. The Chiapas Media Project is currently distributing 26 Indigenous productions worldwide through their touring at film festivals and by invitation to universities, museums, and programs with interest in Zapatista and Indigenous of Mexico. Among the titles of their productions are "A Very Big Train Called The Other Campaign," "Letters For Our Words: Steps Towards Autonomy," "Water and Autonomy," and "Xulum Chon: Weavers in Resistance from the Highlands."

Community Prophets of Australia

Indigenous youth globally are witnesses to a changed history and social landscape fueled by technology that can do one of two things, disentitle or give power. A project named Community Prophets –Walk the Talk is directed by a celebrated human rights lawyer and award winning film director David Vadiveloo, with Aborigine ancestry from Alice Springs, Australia, who partners with marginalized communities around the world to foster and create high production value screen works. Since 1998, the Community Prophets 'model' evolved through a highly sought after program of digital and interactive media workshops for at risk youth in Australia, Canada and the U.S. Vadiveloo was a key producer for Us Mob, a major digital storytelling initiative under the Australian Film Commission and ABC New Media and Digital Services AFC/ABC Broadband Production Initiative (BPI), which supports dynamic projects for broadband delivery on ABC Online in Australia. Us Mob was produced in association with the Aborigine Tangentyere Council.^v "Werde! Welcome to Us Mob" is the welcome for guests to the website featuring the stories and learning modules based on "adventures" with four youth (teenagers) from Hidden Valley, one of the Town Camps for Aborigines in Alice Springs, located in Australia's central desert. The website seeks to engage visitors to interact with the world of these youth suggesting to the visitor they can choose their own story endings, play games, activate video and text diaries created by the Aborigine youth, and upload 'your own' stories. It is remarkable how the display of colorful photographs of the youth works with the energy to entertain and lure audiences to enter the website 'to engage with' these Aboriginal youth. This invitation however requires that your computer has the latest application plugin of Flash which you can download through the website. A note to teacher's is one of the features on the homepage called "Teacher's Information" that explains the objective of Us Mob that "uses online characters and friendships to spark an exchange of culture, creativity and experience between non-Indigenous and Indigenous young people."^{vi} The experience and exposure to Aboriginal youth through this web-based project is carefully planned as a cultural mapping and exposure to Aboriginal lives that claims "to encourage sensible and accurate discussion about Indigenous and non-Indigenous issues without a focus on 'educational' or curriculum based outcomes." The authors of Teacher's Information further state Us Mob is an online environment

that is sensitive to author bias and possibly have cultural relevance to Indigenous audiences alone. They seek to inspire young Indigenous people to use the web and develop skills in new media technologies and committed to training and employment opportunities for Indigenous youth to maintain the site. As one begins to explore the website after reading the requisite history, mechanics and sponsor background, which is not extensive and youth-friendly, click your computer keyboard to enter the website for the character story series content. One must however, register to enter. While an obligatory practice in web development, the explanation on the homepage states: “Everyone who wants to play with us on the Us Mob website needs a permit. It’s the same as if you came to Alice Springs and wanted to visit me and my family, you’d have to get a permit to come onto the Town Camp. Once you have a permit you can visit us at any time to chat, play games, learn about Aboriginal life and share stories.”^{vii} The manner of introducing guest permits to visit their website as related to their actual community where the Aboriginal youth reside in Australia is an informational lead lightly touching the surface of a history of colonial Aboriginal oppression which they continue to experience under the Australia government into present day. It is noteworthy as well, that given the youth who worked on the web project were teenagers at the time, as stated on the homepage, “Everyone who wants to play with us...” imparts a childlike tone, not typically associated with teenagers. As such, this website project has plenty of grist for discussion with regard to the partnership between a mega media corporation, ABC TV in Australia with a ‘marginalized’ Aboriginal community. The terms of which we do not have access, but we can examine the content from the experience of Indigenous peoples whose stories are often presented in polished stereotypes for tourism purposes but also, for rare cultural content from ‘the bush’ of Central Australia luring Internet users “to play” with virtual Aboriginal youth on the web. Returning then to Community Prophets and its’ creative team of digital technology experts who offer workshops to youth from underserved and undereducated communities also Indigenous in origin, continues a pattern of intermediation that bring technology home. Based on Vadiveloo’s access to the model employed by ABC TV used to create and produce Us Mob, he found opportunity to recreate in Aboriginal terms a direct commitment to community youth that led to the formation of Community Prophets which “specialises in delivering media based engagement and empowerment programs for youth that often lead to the production of high-end film, television and interactive content.”^{viii}

IV. How these issues have been addressed and advanced in the work of the authors

Il Ngwesi Maasai Savannah

Enhancing communication capacities of Indigenous peoples according to UNESCO are needed in the 21st century to help Indigenous peoples present and document their stories. Such potential has implications to re-vision Indigenous peoples as vital participants contributing solutions to dilemmas affecting humankind through the use of media technology. Indigenous prophecies provide directives about how and why from a historical lens relations with the earth as Indigenous peoples are globally aligned with similarity of thinking about the big questions of survival and how to value the spirit of ancestral knowledge also referred to as ‘traditional knowledge.’

Communication or media projects identified as ‘intercultural dialogue with indigenous peoples’ such as UNESCO’s ICT initiative to enhance communication capacities of indigenous communities have appeared on the international horizon with limited critical notice. Among the

factors for their relative anonymity intersects with the intent and implementation of the productions resulting in a mixed message in the work produced. Rising to the surface are broader tensions that question what intercultural dialogue actually intends and how the deployment of media actually facilitates communication, bridges distances, or develops relationships between Indigenous peoples' to allow them to share perspective differences, and promote understanding of their concerns to the world. Current research among Indigenous scholars is focused on *decolonizing methodologies* based on the critical work by Maori educator Linda Tuhiwai Smith (Smith, 1990). Her outline of a corollary relationship between colonial experiments and western research that had been used to displace, subjugate and supplant Indigenous peoples livelihood and appropriate Indigenous knowledge and practices in order to advance their own lives, knowledge and practices was impetus for change in the way research is appropriated. Taking her lead, the opportunity to employ a kind of media especially with regard to film and video decolonization is timely as Indigenous peoples remain at the forefront of global crises on all living fronts including climate, economics and politics. My (co-author of this paper, Beverly Singer) indirect participation and observation of the UNESCO ICT project and independent producer of Indigenous video for two decades became the entrée for employing an Indigenous video pragmatism through a partnership between myself, from an Indigenous Tewa community New Mexico, U.S.A., Joseph Nijalis Shuel from a Maasai community of Il Ngwesi in north central Kenya, and Yvonne Owuor, a Kenyan writer. Shuel and Owuor directly participated in the UNESCO ICT.

After our initial meeting at a UNESCO ICT sponsored workshop we remained in email contact for three years, as we became friends almost immediately upon our first introduction. Through the Internet communication, we came to rest upon co-creating first voices-in-video narratives from *Il Ngwesi Maasai*. This project is completely independent of UNESCO and supported solely by our individual efforts of grant funding and through our respective academic affiliations, Singer with the University of New Mexico and Owuor's with the Aga Khan University. The UNESCO initiative was a demonstration and a step in the direction of inviting Indigenous communities to participate in sharing their stories through video by partnering Indigenous community representatives to work with professional non-Indigenous filmmakers to help train and co-produce their story. Though, after watching the UNESCO sponsored ICT Kenya production, "Without Boundaries: The Quest of Pastoralist People," they did not really tell their own story, the filmmaker assigned to train them seems to have told his story about them. For twenty-five years of participation as a video producer and weighing in on film methodology and filmmaking by Indigenous peoples,' that letting go of control, the story is given the freedom to tell itself.

Shuel, Yvonne and I have a life-long intention to integrate a collective vision for intercultural dialogue between us as Indigenous peoples first, in the work of knowing and sharing with each other not for teaching, public education, or even as a contribution to the field. It was borne from a personal desire we have to share and spend time contemplating as Indigenous peoples ideas and experiences planted in us as a children through our families who loved sharing stories for purpose of telling and being part of one's community. An instinctive knowing that our introduction through the UNESCO came by way of our ancestors gives power to our work together. What we are shouldering is rooted in the lands that we come from and in our mutual interest in each other as people from different places with similar connections and affectations

for sharing our with one another about many things possible for Shuel's community, an Indigenous community in transitional vulnerability.^{ix} The meeting in Andorra, for Shuel Njalis was important for Il Ngwesi not only in terms of contact made with other indigenous groups grappling with survival and continuity, but also in terms of Shuel recognizing and building on opportunities to utilize the ICT process that support structures to ensure that the larger community vision which includes the creation of a globally accessible cultural knowledge and experience repository with sound, image and narrative archives that can be developed.^x The initial phase of recording the narratives using digital video was begun in August 2009 and is expected to continue through 2010, the first narrative about the Il Ngwesi Eco-Lodge^{xi} will be completed early in 2011.

2) The Acequia Project

In 2006 the Hopi tribe held a run from their land in Arizona to Mexico to pray for water and for unity among indigenous peoples. This run coincided with the 4th World Water Forum that took place in Mexico City in 2006.⁵ The following year, indigenous peoples from Mexico ran from Mexico City to Hopi land to share their sacred fire. These runs took place because ancient prophecies inform them that they should reunite at this time to protect and nurture their historical and cultural connections.⁶ These spiritual runs represent what Wilma Mankiller (2009) views as an act of caring for the environment, not as "an intellectual exercise," but rather, as "a sacred duty" that in our time needs to be upheld with the legal instruments available to protect and preserve it for the sustainable living of future generations. This is what the Convention on Biological Diversity is pretending to do.

In 1992, the United Nations Convention on Environment and Development produced the Convention on Biological Diversity. This Convention builds from the understanding that biological diversity, and traditional knowledge associated to it, represents an economic asset that can be used to alleviate poverty, and thus indigenous and local communities would benefit by sharing it with the world so its derivatives that can be possible sources of economic development can be capitalized. (Agrawal, 2002) The question is - How will ecosystems be protected from the unsustainable manner in which transnational corporations continue to use natural resources, and what could be the measures by which governments enforce legal mechanisms to help protect and preserve the traditional knowledge associated to natural resources in indigenous and local communities around the globe? There are no clear and satisfactory answer to these questions primarily because much of what is said and done within the present set of conditions and forces behind the establishment of international agreement fail to recognize the full ownership of natural resources within the ancestral boundaries of indigenous and local communities. So for the sake of developing sustainable socio-economic systems that supports the implementation of measures that allow indigenous and local communities to protect their natural resources, the question that we need to ask is how will strategic alliances can be nurtured and supported so indigenous and local communities can strengthen traditional leadership formations, facilitate the sharing of information about best practices, develop national and international policies that support the legal protection of traditional knowledge associated to natural resources. In this

⁵ <http://www.iisd.ca/ymb/worldwater4/>

⁶ For more information see: <http://www.thedreammasters.org/hopi/sacredrun.php/>
<http://www.tonatierra.org/treaty.html>

regard, our concern is to promote the development of sustainable systems by supporting the self-determination of indigenous and local communities through the protection of their traditional knowledge and the sustainable use of natural resources.

The historical connections that people possess stem from ancient traditions based on a system of governance and cultural protocol that allow for alternative ways to relate to their communities, and to those around them, with respect to the use and management of shared natural resources. For this to happen effectively, customary law needs to be recognized so that the ruling structure can shift from a top down to a bottom up model, and one that will offer more participation, debate, discussion, and mutual collaboration, so that benefits will accrue to the collective rather than just an individual. In fact, according to Wilma Mankiller, “one of the great challenges for Indigenous Peoples in the 21st Century will be to develop practical models to capture, maintain, and pass on traditional knowledge systems and value to future generations.” To do this, Argumedo et al says that “pre-existing customary rights of traditional farmers and resource custodians also need to be recognized.” Bastida and Encina (2006) pose the following question: “are [indigenous peoples and local communities] in condition to demand the protection of their collective cultural and intellectual rights outside of the legal framework of intellectual property, which governs the terms to access their own knowledge, innovations and practices established in Article 8(J) of the Convention on Biological Diversity?” With respect to legal systems that protect traditional knowledge, the issue is that whereas “a number of legally binding treaties protect the inventions of industrialized countries, no such protection exists for holders of traditional knowledge, or TK, who live mainly in the South” (Argumedo et al.).

Therefore, while ancestral connections are being rekindled, international treaties are being negotiated so that access can be granted to traditional knowledge associated to natural resources to “discover” new forms of socio-economic development. New discoveries also “stand on the assumption that access to natural resources should be granted and that it should be negotiated based on the understanding that the traditional knowledge that comes with natural resources in indigenous and local communities should be protected and respected and that access to their natural resources should be negotiated under the notion that there is benefit from accessing these natural resources and that benefits from using them should be shared with indigenous and local communities.”⁷ If natural resources are to be shared, and if the charter is to “protect and encourage customary use of biological resources in accordance to traditional cultural practices” (Argumedo et al.), then if access to natural resources and to traditional knowledge associated is a given from the stand point of socio-economic development, then the questions that need to be raised to ensure benefit sharing and protection against intellectual property rights are the following: 1) Will the States recognize the sovereignty of indigenous peoples and local communities over the natural resources in those territories and areas in which people have collectively and individually own the rights to their natural resources?; 2) Will government and corporations respect customary law based on the protocols that Indigenous and local communities have developed over time to manage the natural resources?; 2) Will legal frameworks change to incorporate customary law so national and international policies become binding instruments that help and protect indigenous and local communities when negotiating a contract for access to natural resources?; 3) How do we ensure that indigenous and local communities understand the resources and legal frameworks available to protect their traditional

⁷ For more information on the convention see: <http://www.cbd.int/convention/articles.shtml?a=cbd-08>

knowledge and natural resources?; 4) What provisions should be taken to ensure that emerging and existing leaders are trained in international law and customary law so that appropriate educational programs are designed to train leaders from indigenous and local communities so they are familiar with the language, tools, and mechanisms available to reestablish formal systems of governance in order to use and manage local natural resources; and 5) What are the support mechanisms that can be put in place to ensure that strategic alliances are created to support indigenous and local communities in their process of internal reaffirmation as owners of the natural resources in their localities. In addition, what remains to be answered is how we will contribute to the global challenge of protecting traditional knowledge so that accessing natural resources does not further contribute to the marginalization and colonization of indigenous and local communities around the globe. These are some of the challenges that our society phases to protect and preserve natural resources and traditional knowledge for future generations.

To answer these questions, the Iberoamerican Science and Technology Education Consortium (ISTEC),⁸ the Red Internacional de Mujeres en Biodiversidad (RIMB), the South Valley Regional Association of Acequias (SVRAA), and many other organizations and universities from the United States and Latin America are forming transnational collaborating networks to develop strategies and projects that will support indigenous and local communities in the process of protecting traditional knowledge and natural resources. Steps have been taken to create and support projects that protect natural resources and traditional knowledge. One such project is the Governance Project of the South Valley Regional Association of Acequias, which includes the use of geospatial technologies to map and reestablish acequias, and water rights in the South Valley in Albuquerque, New Mexico.⁹

The South Valley Regional Acequia Association (SVRAA) is a community-based organization that seeks to preserve and enhance traditional irrigation practices within the Atrisco Valley in Albuquerque, New Mexico. Many of the acequias and laterals within the South Valley community were constructed around the beginning of the 18th century following the formation of the Atrisco Community Land Grant in 1692.

SVRAA is organizing and restructuring the acequia¹⁰ system in the South Valley because the adjudication process being proposed by the New Mexico State Engineer will forfeit the water rights of those *parciantes*¹¹ who have not legally claimed their water rights. According to this state adjudication process, those tracts of land that were officially recognized as part of the land grant with adjunct water rights prior to 1907 are protected from the forfeiture. The problem is that most of the *parciantes* do not have the technical and legal expertise to prove that their lands fall within the pre 1907 water use provision. The forfeiture of water rights will diminish the water diverted to the South Valley region by one-third. The main repercussions of the adjudication process will be (1) the loss of present and future water access from the Rio Grande to the South Valley and the further abandonment of isolated laterals, which will erode agricultural traditions as well as the possibility to reengage youth in these practices; and (2) a weakening of the community's ability to govern its regional acequia system, and the potential to

⁸ See <http://www.istec.org/events/ga/activities/conferences-and-seminars/indigenous-local-communities/>

⁹ See: <http://www.youtube.com/watch?v=woju8IH7Bwo>

¹⁰ Acequia means a water ditch

¹¹ A *parciante* is a word in Spanish that means water user

create sustainable economic development which can be derived from organic farming. In the long run, this situation will destroy the fabric of the community and affect the ability to re-engage youth and families in the preservation of the traditional knowledge associated with farming and putting water to beneficial use by the local community.

In order to prevent the erosion of local culture and develop the potential for sustainable development in the South Valley, SVRAA and ISTECC created a strategic alliance to conduct an in depth GPS mapping of local acequias that can help collect, store and retrieve data on existing turnouts, head gates, water users, and the agricultural uses along acequias. Most *parciantes* do not have the ability to prove that their lands are within the geographical demarcation that would allow them to maintain their surface water rights as perfected prior to March 1907. Our project is to establish a virtual environment, using social networking platforms and capabilities, that will allow for the creation, storage and retrieval of data such as satellite images, geographical positioning systems and information repositories that can empower *parciantes* and help them protect their water rights.

To accomplish this goal the Partnership is developing a database / information repository that will store all the information collected. This database will link all geospatial information of the turnouts and headgates with water owners along the acequias. All information was organized and processed with youth from the community who were trained by experts from the Rural Water Association of New Mexico.¹² The first phase of the project included mapping the first acequia (Ranchos de Atrisco) (See Annex B: map of Ranchos de Atrisco and map 2 which includes all the acequias in the South Valley). With the information collected curriculum was developed to provide GIS training workshops to community members and students so they understand the basic functions of the system. The system will be used as a management tool to support *parciantes* to claim and protect their water rights, and thus to establish a process of governance.

In order to make this project a community wide initiative that will strengthen the socio-economic fabric of the South Valley, the project will involve an educational process that will engage community members. Our contention is that if we promote and teach the history and culture of the community, then community members will get involved in the development of policies that will protect their local culture and traditional knowledge. With the development of the communication and information platform, the community will be able to use information and communication technologies to manage their natural resource.

The completion and execution of this project is being possible due to the formation of strategic alliances, under the notion of the quadruple helix that allowed executing a high level project with minimum resources. Government agencies, industry, NGOs, and academia supported the project by facilitating the transfer of expertise, knowledge, information, and technologies to support the South Valley community in its quest to protect their traditional knowledge and natural resource.

3) Education and support

¹² See www.nrwa.org

As briefly discussed above, traditional knowledge has been primarily studied within the discipline of anthropology, and set apart from modern science, either as earlier stages of development (Comte's positivism) or used to attack modern thinking (Wautischer 1998). Either one of these positions is not beneficial for creating and maintaining a dialogue regarding the role and value of knowledge. Educational programs need to adapt and incorporate different ways of thinking *within* the academy as well as create alliances with communities that are based on equality and accountability. In order to venture in this direction question such as: what is the objective of knowledge acquisition; who benefits from knowledge acquisition; in what way do different participants benefit from a project or knowledge, need to be addressed. In other words: within these alliances, how can basic needs and requirements for all participants be met. A community-based project, as described above, has highlighted some of the challenges. Based on principles of participatory research employing geospatial technologies, this project lay bare the need for novel educational models, and especially the need for continuous support and commitment as long-term partnerships between academia and communities.

The governance project of the *acequias* is a community project with at least two goals, one to maintain and share traditional knowledge within and beyond the community, and two to serve as a system for timely information dissemination in state legislative efforts and land and water adjudication processes. The educational component of this project is based on general goals set forth by a movement known as participatory GIS (PGIS). Geographic Information Systems (GIS) are employed widely by government and industry, for planning and analysis of natural resources and demographic purposes alike. Increasingly, communities are invited to provide input in these projects. Geospatial technology is particularly suited for this project as it is able to integrate historic information and demonstrate the benefits, culturally as well as environmentally, of traditional water management systems.

PGIS is described as follows (<http://www.ppgis.net/pgis.htm>):

PGIS practice is geared towards community empowerment through measured, demand-driven, user-friendly and integrated applications of geo-spatial technologies. GIS-based maps and spatial analysis become major conduits in the process. A good PGIS practice is embedded into long-lasting spatial decision-making processes, is flexible, adapts to different socio-cultural and biophysical environments, depends on multidisciplinary facilitation and skills and builds essentially on visual language. The practice integrates several tools and methods whilst often relying on the combination of 'expert' skills with socially differentiated local knowledge. It promotes interactive participation of stakeholders in generating and managing spatial information and it uses information about specific landscapes to facilitate broadly-based decision making processes that support effective communication and community advocacy

Several geospatial 'experts', including myself (Judith van der Elst, co-author of this paper) Heather Richards (University of New Mexico) and Amy Ballard (chair GIS department at Central New Mexico College), were involved in creating a summer course accessible for college students and community members alike. In addition, our community partner James Maestas, who is instrumental in the acequia project in more than one way, provided contextual structure. The course contents were based on numerous discussions, workshops, and field visits. The goals of this course were multiple: first, all students learn basic geospatial skills, second, students learn about local community issues, and third, collect and create data for the *acequia* project. Students therefore are users as well as creators of digital content. In addition, exchange of knowledge

could occur due to the fact that students came from different backgrounds, several students were primarily technically skilled whereas others contributed substantial local knowledge. The specific organization of the course allowed that the content created during the course is owned and maintained by the community. Moreover, a grant from the Center for Spatially Integrated Social Science (<http://www.csiss.org>) allowed for tuition support for community members who participated in the course.

Even though this course can be considered successful in one respect, a number of issues remain to be addressed, especially regarding the objectives, responsibilities of different partners in collaborative projects and how these are defined within larger organizational structures. The immediate needs of the community, garnering information as a basis for negotiation with local governmental institutions, were met, as standard geospatial practices are suitable toward this goal. We contend that better rules and regulations need to be drafted for collaborative projects however. Issues of ownership of data, infrastructural support, accountability and continuity of projects are crucial for community partners, but due to differences in project objectives between partners this is not often guaranteed. We believe that academic partners, whose primary objective is student teaching and research, should address this issue internally, but also negotiate this with for instance funding agencies. As stated earlier recommendations of national committees and taskforces on the subject remain particularly vague regarding this specific aspect.

As the immediate need of data collection was met, the second community objective need of maintaining local knowledge was only marginally addressed during this course, and this may prove to be a bigger challenge. Spatial technologies are based on the idea of universality of spatial concepts, i.e. space and time are universal concepts across cultures and language groups. That this is not the case has been demonstrated through ethnographic and psycholinguistic studies focused on spatial cognition (Mark, Turk and Stea 2007, Levinson 2003). To be able to express and maintain information rooted in a diversity of knowledge systems, new technologies and networks should be based on collaborative design and development in order to incorporate capabilities that can serve multiple knowledge systems and conceptual frameworks.

V. Conclusion: *Identification of future challenges and possible strategies*

Despite the recommendations given in recent taskforce reports on sustainable digital environments, we believe that the role of communities is undervalued, and the definition of 'community' and 'public' is also vague. The examples presented in this paper outline sites of struggle that can be addressed through elevation of traditional communities as sentient partners within a Quadruple Helix model. Community collaboration has resulted in either disempowerment or empowerment thus we view as an ineffective means for changing the digital technology spheres meant to be inclusive. For instance, academic-community collaborations are often funded through large research funding agencies, the main objective of which is to advance and promote research. Often, research interest and expectations diverge from those of the collaborating community. Accountability is often only defined regarding the research component, the benefit for society mostly symbolic. We believe the interest of community partners should be guaranteed honest access to digital tools through strategic alliances that protect their knowledge based on their tradition bound systems. Local community interests must be protected through legally binding contracts, assuring for access and ownership of information, ongoing support of project infrastructure, and educational support among other things. The

challenge before us is to identify and create alliances with institutions that honor the objectives of all partners including memoranda of understanding, grant requirements and the like. These issues, even though initiated by community partners require willing participation of the academy, government, and industry to succeed.

ⁱIBC

ⁱⁱ www.isuma.com

ⁱⁱⁱ Statistics Canada, 2006 Census

^{iv} www.chiapasmediaproject.org

^v www.tangentyere.org.au

^{vi} www.usmob.com.au/teachers.html

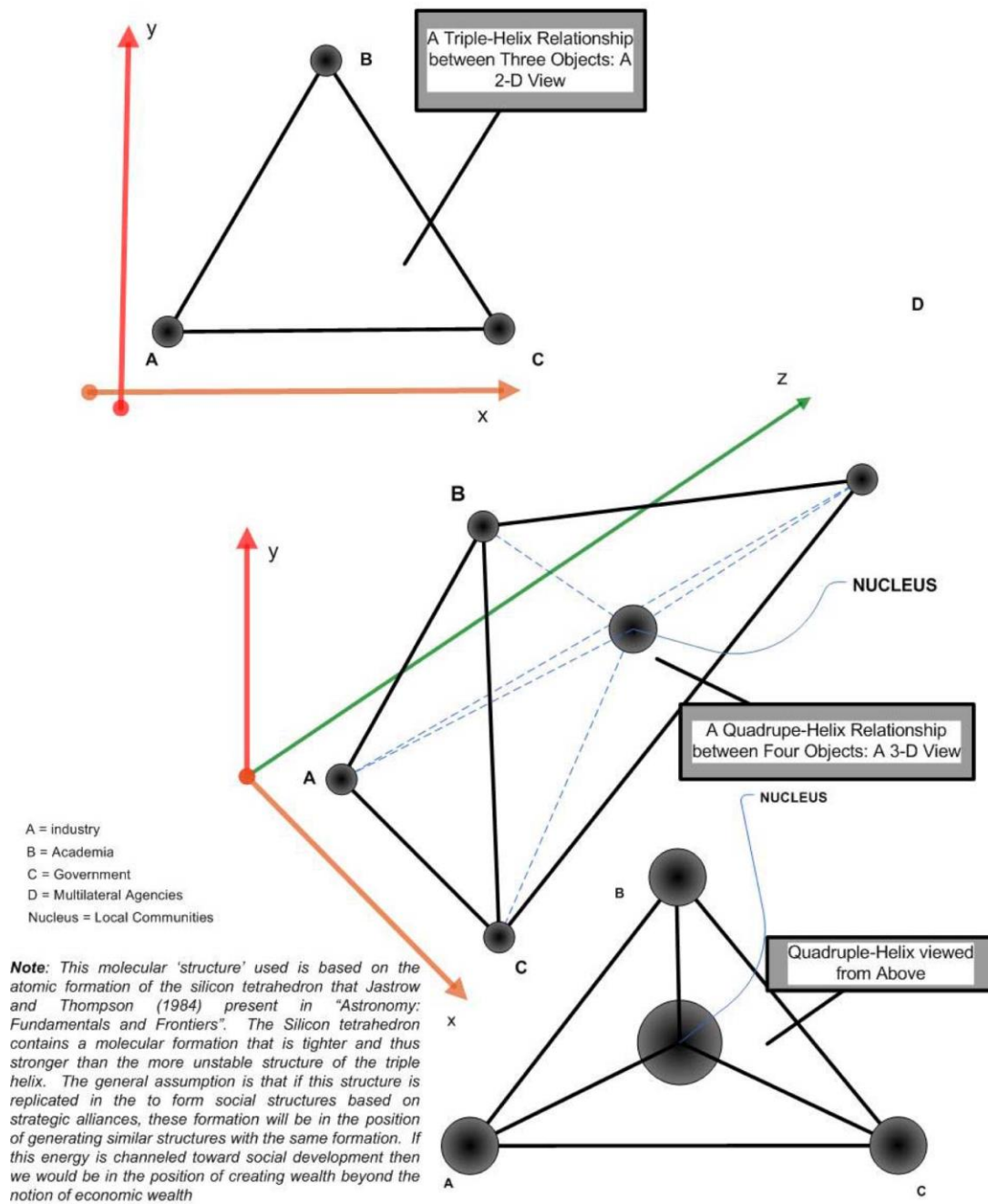
^{vii} homepage at www.usmob.com/au

^{viii} www.communityprophets.com

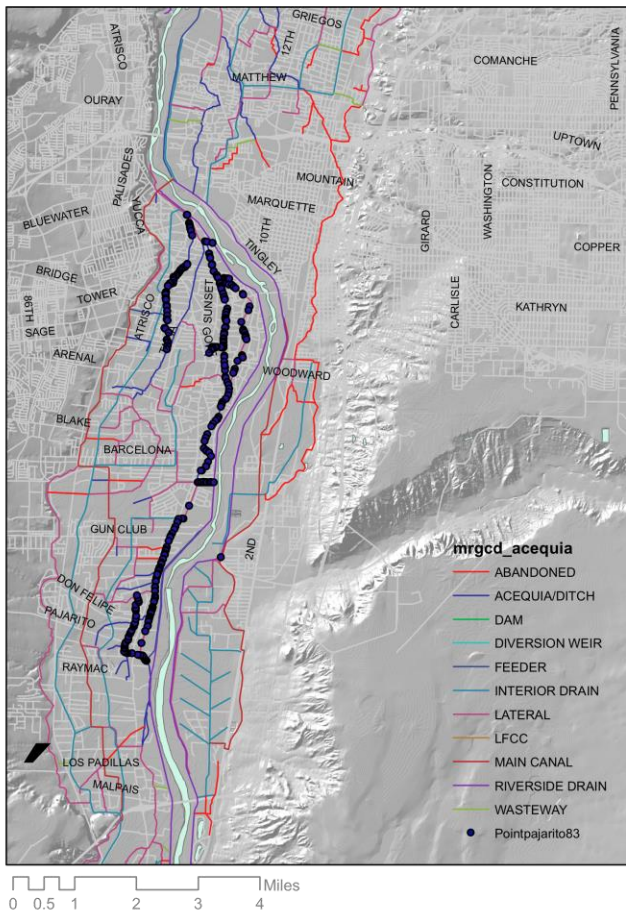
^{ix} “Indigenous communities in Kenya suffer from very similar problems, such as: dependency on natural resources for their livelihoods; a lack of security of tenure; a lack of infrastructure, including schools, health facilities; communication, roads, etc.; and generally a denial of their economic, social, political and cultural rights. Neither do they have the same economic strength, organizational structures and technical capability necessary to seek protection from human rights violations. From The Indigenous World 2007, International Work Group for Indigenous Affairs (IWGIA), North America: Transaction Publishers, 2007, p.468.

^xEmail from Yvonne Owunor in May 2007 about completion of the ICT in Kenya. She was a consultant for the UNESCO ICT4IP in Kenya.

^{xi} In 1996, with a few key grants from U.S. and U.K. sponsors, with locally available materials the Il Ngwesi Maasai community constructed a magnificent tourist lodge in the heart of their African savannah wilderness and manage themselves, using the revenues, deciding as a community how to apply funds to community benefit; and have sent two community members to college to become lodge managers. With no prior contemporary knowledge for eco-lodge management or safari tourism, living as subsistence pastoralists dependent on goats, sheep and cattle while confined within a wildlife conservation area, the Il Ngwesi Maasai symbolically used their lifestyle tensions to creatively find a solution to the problems they faced in the wake of an untenable future.



Annex B: Maps of the South Valley Acequias



0 0.045 0.09 0.18 0.27 0.36 Miles
Parcel Selection



Acequia Mapping Project - progress March 2008

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