

Indigenous Knowledge and Education in Chiapas, Mexico: An Intercultural Method¹

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Abstract

We review two related intercultural education projects designed from the bottom-up, *Laboratories Socio-naturales Vivos y Milpas Educativas* (Living Socio-Natural Laboratories and Educational Milpas) and *Laboratorios para la Vida* (Laboratories for Life, a school garden project). Both projects involve activities outside the classroom, using the Intercultural Inductive Method, discussed here, and a syntactic concept of culture; a method and a concept that make it possible to formalize indigenous or community pedagogies implicit in the *savoir faire* of local community culture.

Keywords: Intercultural education, Community pedagogies, Indigenous knowledge, Indigenous epistemologies, Intercultural method.

Introduction

Independent social movements in Latin America have been the source of much recent innovation in education (Barbosa, 2015; Baronnet, 2012; McCune, Rosset, Cruz Salazar, Morales, & Saldívar Moreno, 2017; Meek et al. 2017). In the context of the 1994 Zapatista uprising in Chiapas, many indigenous communities promoted a long-awaited reform in their local schools. They dismissed their federal teachers and elected young people from the community as primary school teachers. This new responsibility motivated many newly named teachers with merely a secondary school education to seek additional training. It was a number of such teachers from Tzotzil, Tzeltal and Ch'ol Maya communities that formed the Unión de Maestros de la Nueva Educación para México (UNEM), a group that has pioneered the development and spread of the Inductive Intercultural Method referred to in this paper (UNEM, 2009; Vargas-Cetina, 1998)

With the exception of the Rural Normal Schools, which are gradually being eliminated, official education in indigenous regions of Mexico is imparted through federal schools affiliated

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with the General Directorate of Indigenous Education (DGEI), state-level education agencies and various community centers of the National Council for Educational Development (CONAFE), as well as some emerging programs such as the Program of Indigenous Community Educators (PECI), created by the government of Chiapas in 1994.

However, public education practices differ in their attention to diversity in the difficult balance between educational equity and relevance, and although the DGEI reports that gaps in school performance between indigenous and non-indigenous peoples have declined considerably in recent years (Morales Garza, 2015), the quality of education as a life project is very low. These practices deal with linguistic and cultural aspects but do not support productive activities within the students' own territories that could result not only in more meaningful learning, but also in the improvement of the quality of life.

The latest results of the National Institute of Educational Evaluation (INEE) regarding the very low performance of Mexican basic education students - in general, both non-indigenous and indigenous - in the areas of language, communication and mathematics could be explained by the low social relevance of teaching methods and educational content. These results seem to indicate that these areas of knowledge are not taught in the cultural and functional context that characterizes situated learning (Rogoff, Paradise, Mejía Arauz, Correa-Chávez, & Angellilo, 2003).

From a history and ideology that permeates the educational environment and its contribution to the construction of imagined national communities, the school in its liberal and neoliberal versions has generated waves of 'modernization' and urbanization through which the nation and the state measure their strength by their ability to collaborate and legislate in the name of citizens whose individual and collective rights are increasingly subordinated to the interests of transnational capitalism. These interests promote labor flexibility and the development of devastating and extractive projects that affect social territories and common goods, especially in regions inhabited by peasant and indigenous peoples.

Boaventura de Sousa Santos (Santos, 2009) describes as "abysmal" the thinking that sustains this educational project. In the field of education, he writes, "abysmal thinking consists in granting to modern Western science the monopoly of the universal distinction between true and false" (p. 162) to the detriment of alternative bodies of knowledge. To correct this abysmal thought and its effects on educational institutions, this author proposes the ecology of knowledge, a dialogue between forms of knowledge which "is based on the idea that knowledge is inter-knowledge. A post-abysmal thought would be based on the idea of the epistemological diversity of the world, the recognition of the existence of a plurality of knowledges" beyond (though including) scientific knowledge (pp. 182-183).

In many areas of social life, modern science has attempted to demonstrate unquestionable superiority over other forms of knowledge when, in fact, other interventions in the real world today are valuable even when modern science has not been a part of them. For example, the pres-

ervation of biodiversity is often an achievement of rural and indigenous forms of knowledge that, paradoxically, are under threat from the increase in science-based interventions (Nigh & Rodríguez, 1995).

As Marco Calderón maintains, official indigenous education continues to have an urban bias, an abysmal thought that the city is synonymous with civilization and progress, as well as the standard by which to measure the indigenous condition (Calderon, 2013). And recently, the limits of educational diversity in much of the American continent seem to be defined by neoliberal reforms that measure the mastery of 'global competencies' by teachers and students, who are evaluated on the basis of testing standards established by international agencies. The values of the latest reforms not only in Mexico, but in the United States and other countries of the American continent, have to do with individual mastery of global quality standards and an over-regulation with respect to their efficiency and effectiveness, with implications for labor 'flexibility' and the weakening of teachers' unions.

Neoliberal educational policies are generating great waves of despair, migration and poverty. Rather than rootedness, the official school encourages youth to abandon their ancestral homes and submit to de-territorialization. In a nation such as Mexico, diverse not only linguistically and culturally but also territorially and biologically, with obvious inequality in rural regions, this type of schooling is not relevant. Social and environmental problems, after decades of government programs aimed at alleviating poverty, have only increased; in 2013, federal programs such as Opportunities and Food Support were allocated to more than 1.5 million homes in eminently indigenous localities, while the official school encourages emigration.

In 2014 these programs were transformed into the PROSPERA Social Inclusion Program, and the Crusade Against Hunger; between 2015-2016, the national education evaluation agency (INEE) not only established mechanisms to evaluate and support teaching performance, but also to achieve what the Ministry of Public Education (SEP) defines a "school at the center" based on leadership and autonomy in school management as well as the participation of parents in school boards.

In this essay we take issue with this educational model. Knowledge, values and cultural meanings of indigenous communities relate to their quality of life and are implicit in the productive activities they conduct in their territories. This knowledge and meanings are reduced in the latest educational reforms to homogenous and decontextualized teaching methods seeking 'competitiveness'.

What we object to is that this new school does not take into account the practical and productive activities of children in their families and communities, which could be: (i) means of instruction, (ii) sources of values and prior knowledge for the achievement of significant, situated learning for individual and collective well-being and iii) sociocultural indicators for a relevant and locally-based evaluation process.

The Intercultural Inductive Method (MII, Método Inductivo Intercultural)

In this essay we consider a set of intercultural education projects designed from below using the Intercultural Inductive Method (forthwith referred to as MII, for its name in Spanish) and a syntactic concept of culture (Gasché, 2008; Trapnell 2003). Among a variety of intercultural and bilingual educational approaches, this method and concept make it possible to formalize indigenous pedagogies and the values, knowledge and implicit meanings (Hernandez, 2013; Pérez Pérez, 2003) objectified in indigenous cultural know-how. Our concern is not to critique the method itself, but rather to demonstrate the way in which the syntactic concept of culture is pertinent to the goals proposed by the Union of Teachers of the New Education for Mexico (UNEM) of the state of Chiapas for a relevant indigenous peasant education and to provide some examples of how the method has been applied in Chiapas and other territories of Mexico.

The UNEM was created in 1995 by Maya indigenous educators of the state of Chiapas when the families of many indigenous communities, impatient with the low educational quality of their schools and provoked by the violence and irresponsibility exercised by some mentors, expelled many teachers from their communities and assigned this position to the best-educated of their youth. All this occurred after a long history in the region of dispossession, violence and deceit that typified the relationship between the Ladino ranchers and indigenous peasants, as well as a delayed and unfinished agrarian reform that ended with the gutting (in 1994) of Article 27 of the Constitution and its devastating impact on to the *ejido* common property regime (Mora, 2008; Vargas-Cetina, 1998).

Consequently, the objective of the New Education of the UNEM that finds in the MII a fundamental resource is:

(...) that the indigenous communities of Chiapas design the education provided in their schools, contributing to the restoration and development of indigenous cultures, as well as to the improvement of the quality of life in communities and the renewal of production, recovering our soils and forests and seeking independence with respect to international agrochemical corporations and economic middlemen (UNEM, internal document, 1995).

The proposal contrasts with official intercultural education, that separates issues of quality of life and cultural and linguistic rights of indigenous students from the conditions of territory and economic production in which they live, in order to enmesh them in relations of power and political confrontation. The projects inspired in the work of the UNEM involve unconventional literacies that, like territorial literacy (Bertely, 2014), opened channels for the development of new projects, in particular the *Laboratorios Socionaturales Vivos*, *Milpas Educativas* and *Laboratorios para la Vida*. Some principles, such as MII and territorial literacy, shared by both these initiatives are that they: i) establish a close relationship between education, local cultural activity,

ecological awareness and territorial literacy, ii) revitalize the relationship between language and culture through the care of biodiversity and derived activities, iii) articulate and expand indigenous knowledge, values and meanings derived from the integration of society and nature with Western scientific knowledge, iv) encourage activities carried out by children in school gardens and educational *milpas* and, especially, iv) recognize that the dialogue of knowledge is not free of conflicts.

The term 'milpa' refers to the ancient Mesoamerican agricultural and resource management system. A field is usually cleared within the forest to plant annuals in a polyculture centered on maize accompanied by beans, squash and other crops from a basket of over one hundred domesticated and semi-domesticated plants (Torres, 1985). After several years of cropping, perennials gradually replace annuals, and the field is managed for secondary succession to regenerate tall forest. In the tropical lowlands the entire cycle takes 20 to 30 years, and in the highlands a bit longer. The activities of the *milpa* cycle embody millennia of practical experience and knowledge and are thus an ideal opportunity for creative pedagogy (Ford & Nigh, 2015; Terán & Rasmussen, 1994)

We want to emphasize here the aspects of the MII that allow a dialogue of knowledge arising from territorial mediators (McCune, Rosset, Salazar, Saldívar Moreno, & Morales, 2016) and 'natural resources', as they are denominated by the Western tradition. It is knowledge implicit in activities carried out by the community members in their own territories, where such resources are appropriated and transformed with various techniques and instruments for specific social, productive and ceremonial purposes. This implicit knowledge is what Jorge Gasché defines as cultural syntax (Gasché, 2008), which is expressed in the MII, by an 'iconic sentence' adapted by our Maya collaborators to structure local culture-based schoolroom content. Our indigenous collaborators enunciate this sentence as follows:

Nosotros vamos a nuestro territorio
a pedir un recurso que trabajamos
para satisfacer nuestras necesidades sociales

We go to our territory
To request a resource that we work with
To meet our social needs

The sentence suggests a structure for organizing classroom projects according to MII. This approach generates pedagogical strategies based on practical community activity, making explicit the values, knowledge and meanings encoded implicitly in the cultural syntax involved in carrying out the activity. These are activities linked to specific territories, with the active

participation of the parents, the teachers and the students. To take advantage of this implicit knowledge pedagogically, the above sentence implies a curricular structure that analyzes these activities from the four variables of the Integration of Society-Nature: Territory / Nature (where and at what moment of the annual cycle will the activity be carried out?), Natural Resource / Product (what resource will we ask of Mother Earth?), Work / Technique (with what and how will we transform this resource?), and Social Purpose / Activity (what is the social, productive, ceremonial or spiritual purpose of the activity?). These variables are involved in the planning of the classroom project: a) Research and inter-learning, conducting the activities with the participation of parents (and grandparents), teachers and students, b) Expansion and explanation of values, knowledge and meanings, c) articulation of these with scholarly knowledge, and d) return to and involvement of the community in the results.

Starting in Chiapas, these projects have been promoted in other states of the Mexican Republic and Brazil, with indigenous teachers who speak languages other than Spanish or Portuguese and who have been able to apply the MII through various practical experiences as well as the design of various educational materials, including calendars, cards, maps and stories, to make their own knowledge, values and meanings explicit. Thus, the UNEM evolved into the Network of Intercultural Education, REDIIN (*Red de Educación Inductiva Intercultural*), with over three hundred participating educators. Recovering community know-how enables the situational application of relevant peasant and indigenous human rights, exercised in the daily struggle for self-determination and autonomy (Bertely, 2007). The knowledge, values and meanings derived from investigating community activities in the school helps ensure the integrity of society and nature based on a cultural concept that is not only syntactic but practical, where political motivation is fundamental (Gasché, 2008).

In the peasant world, from a holistic perspective, the relationship between language and culture has to do with activities that ensure territorial integrity, which has been altered by globalization and the projects carried out by various transnational corporations. Intent on the exploitation of water, minerals and other strategic resources, capitalist enclosure and dispossession of the natural resources of traditional communities affects the relationship between the producer and his means of production where vital resources are found in ancestral territories. The 'original accumulation' that Marx considered as the primordial sign of capitalism, now intensified and permanent (Navarro, 2012) as accumulation through dispossession (Harvey, 2003), affects the practical and experiential sources of knowledge and the values that vitalize the relation between language and culture in indigenous societies.

In contrast to indigenous leaders, intellectuals and brokers, who find in schooling and professionalization ways to strengthen their literate capacities to participate in modern neocolonial society and often become true cultural bosses, or '*caciques*' (Pineda, 1993), small producers and peasants, whose sustenance depends on the *milpa*, the house garden, the edible forest and other natural spaces, find in the new education a way to build a *buen vivir* (right livelihood).

Territorial literacy and its dialogical potential

Just as the world today measures its global progress in terms of so-called media literacy and computer science, which not only refer to the knowledge of a system of signs but a whole cultural system, what we define here as territorial literacy refers to contexts in which unlettered indigenous peoples and peasants participate and learn, specifically to those who apply the MII (Bertely, 2014; McCune et al., 2016).

These contexts are characterized by the presence of activities, situations and problems that derive from the integration of society and nature in a given territory and are the main embodiments of cultural knowledge. The territorial domain reveals indicators and is a resource such that the orchard, the *milpa*, the forest or the lagoon, among many other spaces, become learning opportunities that, in terms of ontological, epistemic, social and productive considerations comprising right livelihood, are much more relevant than 'the ability to read or write a message', the condition that the Mexican state and its schools consider to qualify a person as literate.

In speaking of territory, we refer to an interdependent and integral ecosystem that encompasses not only the physical land but all living and dead beings that inhabit it and coexist according to the rhythms of nature, including the symbolic, ontological, spiritual and cosmological aspects that it encompasses. In Mayan cultures the territory integrates women, men, animals, water, air, soil and *ahauwetik* or guardians, among other natural and supernatural beings that protect and animate nature, as well as the processes observed within it. For this reason, the relationship between territory, language and culture, informal education and *buen vivir* is more visible in the *milpa*, the forest, and the peasant household, than in the school. Thus, the MII has sown its seeds in Chiapas, so that educators willing to accompany learning – rather than just being 'teachers' – may arise in the states of Puebla, Oaxaca, Michoacán and Yucatán, as well as the regions of Roraima and Minas Gerais in Brazil, forming the Intercultural Network (REDIIN). Many other projects point in the same direction, as in Ecuador, where legislation was passed recognizing the rights of Mother Earth, and in Colombia, where not only the term 'ethno-education' was coined but also the Pedagogy of Mother Earth began. We know that we are not alone.

In all cultures we have found that all indigenous peoples say that the earth is our Mother and that all the beings who inhabit Her are Her children, because we depend on Her in every instance of our life. Likewise, the structure of our body is equal to that of the Earth. Therefore, we consider that it is important that education be from there, so that we can protect it and be aware that our heart is linked to it. In order to change our behavior toward nature, our body must be equal to it, like the air we breathe, the water we drink, the Sun that warms us and the plants and animals that give us sustenance (Valiente, 2013).

The processes of 'acquisition of competences' and the stages of cultural development are different according to the context, especially if we consider what rural versus urban environ-

ments demand from a person. In many peasant and indigenous regions, before the age of 14, boys and girls are already experts in food production and preparation, construction activities, and in various trades and chores required for survival--unusual qualities for young urbanites. The cultural basis of this contrast becomes clear when indigenous girls and boys who have migrated to the city seem more capable of assuming adult responsibilities than non-indigenous youths. This cultural knowledge is not acquired in school and, in fact, many 'grandmothers and grandfathers' as well as 'illiterate', 'ignorant', 'unlettered' and 'untested' parents command knowledge that is transmitted to the next generations in a little-understood process of 'informal education', from which both family and community socialization, as well as effective territorial literacy, are derived.

If we look closely at this process of intergenerational transmission, we notice that it is totally different from so-called formal education. To learn how to make a *milpa*, the father does not sit his son in front of a blackboard or give him textbooks, but takes him to the activity. In order to know if he has learned, he does not apply a multiple-choice test and, if we reflect a little, it is evident that this child could pass with high marks a test on the *milperos* knowledge and become a 'qualified expert' without knowing 'how to make *milpa*' in practice. The child learns not only by doing, tacitly, but also by observing the activity of adults and gradually integrating with it, thus demonstrating his abilities. This style of learning is known as "intent participation", which implies that the child observes with the intention of becoming directly involved in the activity (Rogoff et al., 2003). Learning is achieved while carrying out the activity, in an education for life, and not as simple schooling to pass tests of performance, as is currently the focus of the evaluations proposed by the Educational Reform.

In the communities collaborating in these intercultural projects, besides differences in age, level of bilingualism and the agrarian condition of the participants, there are distinct sociocultural styles of learning (Bertely, 2000; Macías, 1987; Maurer, 1977). We observe differences in the goals, values and knowledge learned in the integration of society-nature implicit in the social, productive and ritual activities carried out by the people in their territories. In these varied social situations that participate in the construction of positive identities, indigenous languages are alive or can be revitalized. Based on the experience of these projects, the verbalization of these values, knowledge and meanings implicit in indigenous languages and their subsequent translation to Spanish favors both oral and written bilingualism.

The substance of this process of transference - not only of competences, but of cultural meanings - lies in the "*Cultural ABC*" that is embodied in the first *Tarjetas de Autoaprendizaje* (Bertely, 2004) and the booklet *Los Hombres y las Mujeres del Maíz: democracia y derecho indígena para el mundo* (Bertely, 2007) (Self-Learning Cards and Men and Men and Women of the Maize: Democracy and Indigenous Rights for the World) designed by indigenous Maya peasants and educators of the UNEM of Chiapas. Later, the self-learning and inter-learning cards (Bertely,

2012) produced by other indigenous teachers from the other states were accompanied by pioneering and more experienced educators, demonstrating the political and pedagogical potential contained in peasant know-how (Bertely, Saltorello, & Arcos, 2015).

The knowledge of an indigenous community is not available in written form. We cannot retrieve it from a library or the Internet to integrate it into a school curriculum. The sources of knowledge are the social, productive, ritual, and recreational *activities* that people in the community perform in their daily lives: the social processes through which children, teachers, mothers, parents and elders construct their knowledge collectively through interaction with their natural environment. The art of “fishing for knowledge” is proposed by Jorge Gasché as a means for making explicit the values and knowledge implicit in the activities carried out by any community, as first approximated in the MII, the collaborative design of the *Calendario Socionatural* (Socio-Natural Calendar) (Gasché, 2008).

The activities carried out in rural indigenous communities reveal an intergenerational know-how that is vulnerable and that now is not always transmitted and much less updated, in view of current times and realities. The wisdom contained in traditional activities is almost always hidden or denied even by the people themselves, who give little importance to their own daily know-how regardless of its importance for their livelihoods. Such knowledge is valued even less by schools and urban people. Official education has not given due importance to this practical knowledge and, in some cases, not only ignores it but actively disqualifies it, with little regard for the prior knowledge children bring with them to the classroom.

Living Socio-Natural Laboratories and Educational *Milpas* (*Laboratorios Socionaturales Vivos y Milpas Educativas*)

The Center for Research and Higher Studies in Social Anthropology (CIESAS) and the DGEI possessed a solid background in the field of teacher training and intercultural education and bilingual programs. Based on this collaborative experience, in an initiative for indigenous teachers, CIESAS and DGEI offered the training courses: ‘Explication and Systematization of Indigenous Knowledge’ and ‘Certification of Competencies for the Design of Intercultural and Bilingual Educational Materials.’ This initiative was developed within the REDIIN, and in the case of Puebla with the direct support of the state government. Graduates began to promote new formats in the form of laboratories for the training of teachers in intercultural and bilingual education at the pre-school and primary levels.

Some features of the teacher training processes promoted in these courses were:

Inter-learning among indigenous people. This experimental practice was given among REDIIN indigenous trainers, peasants and educators who field-tested the method. Teachers shared a willingness to decolonize their pedagogical knowledge and to be trained in the management of the MII through theoretical, practical and experiential activities.

Live Socio-Natural Laboratories that reveal knowledge and values related to territorial literacy.

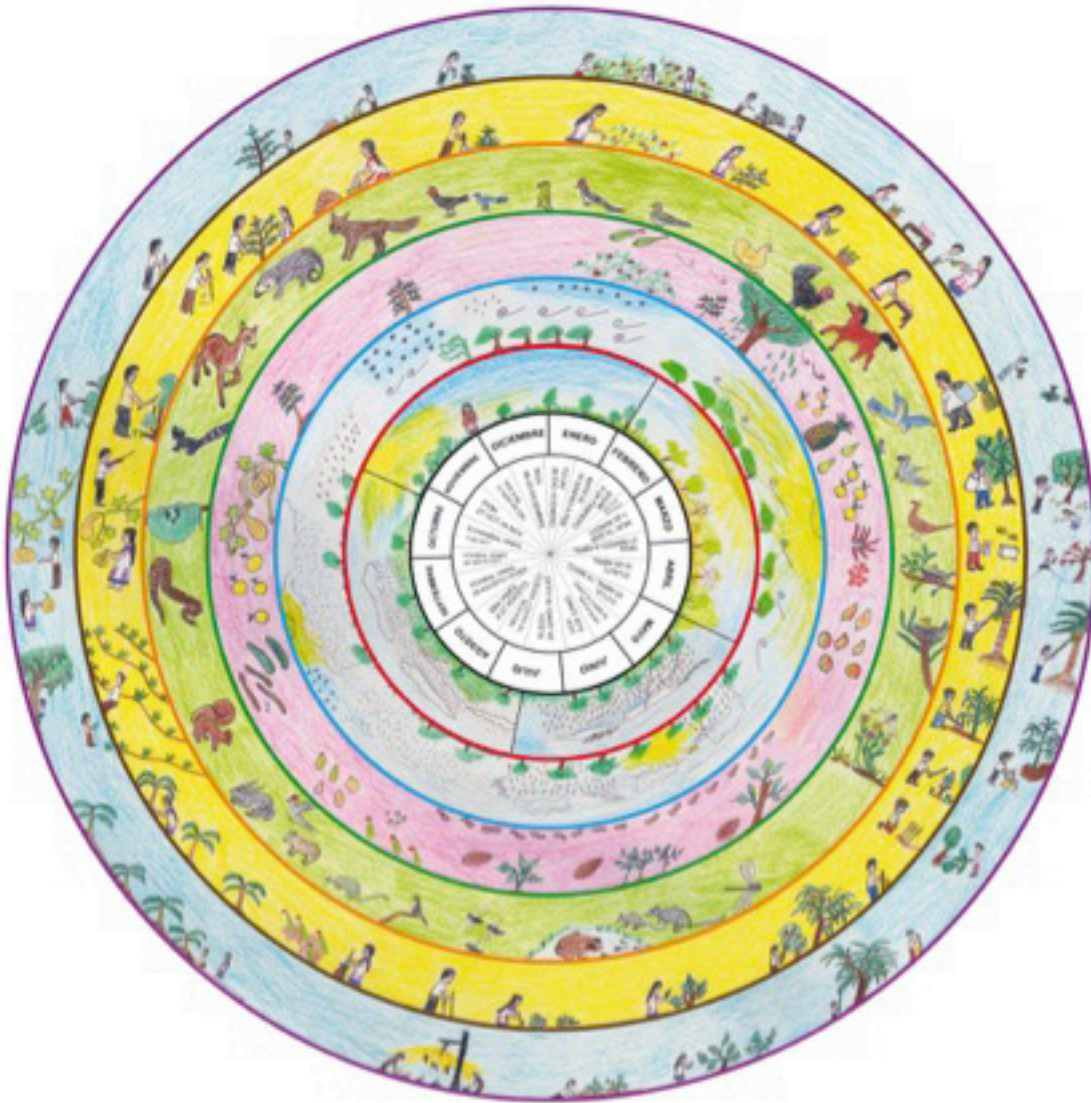
The subversion of power relations in inter-learning with academics and professionals. The laboratory dismantled the roots of the false power normally exercised by academics over non-students. This power is objectified in institutionalized skills that are often mistranslated as 'abstract capacities' that impose themselves as 'true' knowledge in relation to other sources of knowledge. In the Live Laboratories this formal power is put at the service of the substantive power of political and epistemic mediation exercised by indigenous and non-indigenous students, in particular, the processes of cross-cultural co-theorizing (Bertely, 2013; Saltorello, 2014).

Explication of indigenous knowledge in situ. The MII breaks with approaches that make teachers 'researchers' of their own society to promote instead a collaborative design of Socio-Natural Calendars, Self-Interlearning Cards and other educational materials relevant to the sociocultural, sociolinguistic and socio-educational contexts in which they are produced.

A process of appropriation of the MII and territorial literacy that materializes in activities controlled from below (Bertely, Sartorello and Arcos, 2015), objectified in the different formats that the Educational *Milpas* assume.

Below we include the graphic (Figure 1. Socionatural Calendar of the Tzotzil Maya community of Pacanam, Chalchihuitán, Chiapas), designed by M. de Irma Gómez Hernández (2012) for the preschool level as part of her participation in a REDIIN training program. The drawing is accompanied by the corresponding description as well as a brief testimony of her first attempts to apply the inductive intercultural method in her Educational Milpa.

CALENDARIO SOCIONATURAL PACANAM, CHALCHIHUITÁN, CHIAPAS



COLORES	INDICADORES Y ACTIVIDADES
■	TEMPORADAS
■	INDICADORES CLIMÁTICOS
■	INDICADORES VEGETALES
■	INDICADORES DE COMPORTAMIENTO DE LOS ANIMALES
■	ACTIVIDADES DE LOS COMADEROS
■	ACTIVIDADES DE LOS NIÑOS

On her Socio-Natural Calendar, Irma writes:

The graphic calendar is no more than the representative expression of the circular calendar in its literary version and is intended so that preschool children can interpret it and understand its content through drawing.

To read it the following explanation is offered:

The graphic calendar consists of eight concentric circles that can be read starting from the inside out. The central circle shows how the months with which our grandparents marked the stages of the year are related to the lunar phases of a whole year which guide the planting, weeding, harvesting, and the productive cycle of animals, as well as the social and ceremonial activities of each village.

The second circle shows the months of the year according to the calendar known as Gregorian. This circle clearly marks the beginnings and terms of the Mayan months described above with the intention of having ideas about the times they cover. Everything is done with the purpose of facilitating the reader's understanding of these phases, articulating in a single plane the realities of two worlds that interact. The original (Mayan) calendar has 19 months, unlike the Gregorian calendar, which has 12 months.

Then we find different indicators, starting with the seasons, which for the Pacanam community are four. I describe the cold season, which begins in the lunar phase of the aboriginal calendar month *pom* and ends in *b'ats'ul*, which corresponds to the Gregorian calendar with the end of October and ends in the first days of February. Next we find the climatic indicators that determine the socio environmental moments. This season begins precisely with the beginning of the cold winds, so people should take shelter to avoid diseases of the atmosphere at this time. On other indicators in the calendar drawing, generally clear skies and many stars are observed during most nights of this season. There are very sunny days and only on rare occasions is it cloudy; it rains little.

Also in the drawing are coffee mats that indicate times of maturation of the product characteristic of these regions.

We can see in the coffee orchards the red color of the ripe coffee beans, bringing birds such as the *jex jex*, which feeds on this fruit. This time is also related with the appearance of other birds such as *tuluk' mut* (parrot) and *x-k' ak'et* (wild pigeon), among others. You can hear every day their beautiful and peculiar songs that adorn and rejoice the hearts of the inhabitants of the community.

There are also insects that appear and are attracted by the aroma of ripe coffee fruits. Of course, the whole family at these times is engaged in harvesting. The children consequently do not attend school during these 'holidays' to collaborate in this activity so important for the family economy. For the people of this community the song of some birds is important because it serves to guide them in their activities throughout the day, although during the course of the day the sun is the fundamental element as an indicator of time.

One of the most notable activities of this season is hunting. At this time, because of the abundance of certain plant foods, many of the wild animals - and even the people - are fat. Wild animals such as *vet*, *uch*, *chij* and *me 'el* become complementary food of the community.

The males of the community go to the mountains, fields, streams and various natural spaces accompanied by close relatives carrying a rifle, machete or slingshot, and their hunting dog. They return hours later, if they are lucky, with the prey in their hands. Even though they may return without game, they always bring some edible wild fruits and vegetables that they have found along their way.

In this season women, often accompanied by their sons and daughters, plant chayote in the family plots, digging the earth with a *coa* (digging stick) or machete. The men work on the weeding of the pineapple in their garden plots. The moon must be full when one performs these two activities or you will not get good produce, according to testimonies of the experts of the community.

Also during this time, women and children collect ripe *tomatillo* and *chile*. Men engage in activities that are more complicated and require more physical effort, such as planting and weeding the *milpa*. I do not mean by this that no women do these chores, since there are those who decide to help their husbands. This brief description is but one example to guide the reading of the graphical calendar for those interested in Pacanam.

If we look at the calendar carefully and read Irma Gómez González's description, we can locate a good number of indicators that can only be read by territorially literate people. The teacher talks about the importance of attending to "the moment" and "the lunar phases." And, during the season from the end of October to the beginning of February, she mentions various weather indicators such as cold winds, clear skies and starry nights, very sunny days and little rain. In this season, the red color of the coffee fruits is noted, the fruits and vegetables, including *tomatillo* and *chile*, are ripe, various birds can be seen and their songs heard, and the sun is the main indicator of time. She tells us that in this season wild animals are fat and men go hunting.

These are geocentric and non-egocentric references expressed in climatic, vegetable and animal indicators, as well as in the behavior and activities of community members, where tacit collaboration and the 'sense of we' (Lenkersdorf, 2002) are present. Such sensibility is contrary to the individualism, egocentrism, exploitation of the environment and competition that school promotes.

The *Milpa Educativa* refers to the activities of territorial literacy carried out by children in the company of parents and educators in accessible, safe educational spaces. Irma took up this idea, born from the school gardens prompted by Ronald Nigh since the beginning of UNEM in 1995, when she proposed an orchard for the Preschool Education Center Cuauhtémoc de Pacaman, Chalchihuitán, Chiapas in 2010. There the preschoolers performed, among other activities, playing games with *choch'om* or hazel, playing a game with the flower of the wild *ukum* tree, cutting coffee, collecting cichlids, gathering *kis* or *xicatana*, yucca and sweet potato, picking pumpkins and bananas, collecting vegetables for eating and medicinal herbs, and cooking birds and wild animals.

It is worth mentioning that the idea of the *Milpa Educativa* took shape in Yucatan in 2012, when the educators of the National Council for Educational Development (CONAFE) coordinated by María Ramé and accompanied by indigenous former educators from Chiapas, asked: 'where will we now apply the MII?' They themselves responded: 'in our backyards and gardens,' 'we have what is most important, a bit of Mother Earth that makes us men and women of maize.'

From then on, some characteristics of the Educational Milpas have been:

Support for autonomous and community-based processes. Through activities and a methodology that promotes good food and right livelihood, more than half of the food consumed in the country is produced by peasants (Samberg, Gerber, Ramankutty, Herrero, & West, 2016). "Counting airplanes is not the same as counting beans," explained a Mayan educator of the REDIIN who indicated the necessity to generate an education that was born of the communities for the benefit of families, young people and children.

Healing of intergenerational and family relationships. The program seeks to dignify the *milpa*, the elders and their collective work on the land, thus encouraging young people to make their *milpa*. The health of intergenerational relations is the basis for linguistic, cultural and territorial transmission, and the revitalization of indigenous peoples. Activities where education goes out from the classroom into rural and urban spaces connect peasants, artisans and other agents. Attentive to the rhythms of nature, the educational *milpa* is the way to heal the hearts of our people. It is the way to overcome disillusionment.

Living natural laboratories. Through the MII and indigenous pedagogy, the REDIIN trainers, accompanied by community experts in the activities to be carried out, guide, through practical and ritual processes, the strengthening of the values associated with the *lekil kuxlejal* (Tzotzil for "right livelihood") of each community, as well as knowledge and skills, thus fostering processes of territorial and natural literacy that are not usually imparted in official schools.

Promotion of experiential and meaningful learning. The MII focuses on the work done in backyards, family kitchens, gardens, rivers, mountains, coffee plantations, mines, community markets, waterfalls, rivers, community festivals, cemeteries or sacred spaces of the community, ancient paths, historical sites, places where important natural resources are found and places where animals are kept or raised to feed themselves, to be cured or to contribute to the domestic economy.

Education outside the classroom. *Milpas* promote literacy in territorial and legal values, where not only books, but the sky, the earth, the river, the sound of birds and, in general, the indicators that nature gives us are to be read. It is an education in which the relations of respect, solidarity and reciprocity that nourish the values of the community are strengthened, the problems and conflicts are dealt with in assemblies, and the individual and collective human rights of indigenous peoples are exercised *in situ*.

In this regard, Irma concludes that:

It is important to work with community values in the community, particularly with young people who go out to study and then return to live here. The experience of migration changes them deeply and they no longer want to respect the agreements of the assembly nor the customs that govern community life. It is not the same to live and be educated in the town as it is to study outside. Those who return must understand what it means to be an active member in the assembly and the community. It is a change of mentality for those who left and became accustomed to urban society and then returned to a community based on solidarity and reciprocity that stands against selfishness and individualism. It is a life-changing experience. In this sense the *Milpa Educativa* serves to re-educate indigenous people who left the community and then returned (young people, professionals, bilingual teachers, etc.), to re-learn the values and the customs of the community and to respect the agreements of the assembly (Irma Gómez Hernández, Meeting REDIIN, 2015).

The foregoing demonstrates that, beyond the written word, there are other 'authors, readings and writings' that are produced in peasant agriculture, forestry or fishing- among many other activities - to be read with the educators and the active participation of the family and the community. The knowledge, values, meanings and goals derived from know-how constitute an ABC made up of indicators that, to be legible, require full territorial literacy.

Laboratories for Life and School Gardens

Dramatic changes in the diet of Mexicans over the last three decades are reflected in new patterns of morbidity and mortality in the urban and rural population (Nigh, 2014), which is due in part to a policy that discourages regional peasant agriculture and traditional Mexican food while promoting the entry and diffusion of processed foods or 'junk food' of foreign origin (del Castillo Negrete R., 2013; GRAIN, 2015). The most serious issue is the molding of children's (especially infant's) taste for junk food, high in salt, sugar and calories but of low nutritional value. These foods are sold within the schools, despite recent legal attempts to limit them.

The school garden is a space where rural and urban children come into contact with nature and with the values of sustainability in their territory. It is also an intercultural space where local knowledge meets scientific knowledge about biodiversity and agroecology, and it is a meeting place between generations and cultures. Finally, it is a space of which young people can be proud, so the school garden is a highly motivating activity. These characteristics apply to all school gardens, urban and rural.

In our project, carried out by El Colegio de la Frontera Sur and CIESAS (ECOSUR / CIESAS 2011-2014 with support from the Kellogg Foundation) in the Highlands of Chiapas, *Laboratorios para la Vida* (LabVida), we have been concerned with the design of the natural and social science curriculum in primary education. Since the beginning of the UNEM the School Garden

has been central to the pedagogical proposal, and it eventually became the *Milpa Educativa*, in an allusion to ancient Maya thought based on the philosophical depth contained in the *Popol Vuh* and the myth of creation of the men and women of maize (Bertely, 2007; Ford & Nigh, 2015).

The activities in the garden create magnificent pedagogical opportunities to motivate the students' interest in understanding the natural world around them. However, taking advantage of those opportunities requires an effort by teachers to adapt the official curriculum to the context of their region and school. In general, they do not receive any support for this effort; on the contrary, their current bureaucratic responsibilities are an impediment. In our project we have looked for ways to support those teachers who are motivated to make the effort. With the integration of the activities of the school garden into the curriculum of teaching science and other subjects, the garden is seen as a support for teaching and not as an extra task.

In a fruitful dialogue between the MII and the territorial literacy of UNEM and REDIIN with other pedagogical approaches that inspire us, the teaching in the school garden seeks to be:

- An opportunity for children to learn to live in and care for their territory and appreciate the regional diet.
- An antidote to official education seeking to guide children towards a globalized life that despises local values and impels them to emigrate.
- A means to involve all members of the community in the education of their children.
- A space that integrates the school into the life of the community, be it urban or rural, to revalue the education of the family as well as community participation.
- A tool to integrate the knowledge held by parents, grandparents, teachers, brothers, sisters and books.
- A playful and creative way to learn (UNEM, 2009).

The school garden serves not only as a natural laboratory and external classroom for teaching the natural sciences, but as a space for meeting and celebration among parents, teachers and students.

As already mentioned, in order to support teachers in the use of the School Garden as a pedagogical instrument we designed a training program short course: *The School Garden in the Construction of Attitudes and Capacities in Science, Nutrition and Environmental Care*. Here we apply the MII to generate the contents of the training; that is, the themes we use to illustrate the pedagogical utility of the garden as a learning space, based on the activities and knowledge of the communities where the teachers work. Our original intention was to focus on basic education at the primary level, but demand from the teachers prompted us to open the course at the secondary and upper levels. The application of the *LabVida* course provided us with the possibility of an initial evaluation by the teachers in order to fine-tune the training strategy. The project

is currently in its second phase (2016-2019), focusing on the training of teachers as agents of change in patterns of consumption and food production through basic education.

Conclusions

Formal education, as opposed to 'schooling', has a purpose beyond acquiring competencies or passing tests. As the experiences described in this article illustrate, it is the work of the teacher and the students to articulate the traditional activities of their community, cosmopolitan knowledge, and the school curriculum contents, as the MII makes explicit. For both *Milpa Educativa* and *LabVida*, one of the main challenges is how to expand and enrich local knowledge with Western knowledge through five transversal axes: agroecology, nutrition, natural sciences, local knowledge, and interculturality. An important function of formal education should be the recognition of the wisdom of communities and the articulation of these values, knowledge and meanings with the contents of cosmopolitan plans and programs. School gardens or places of activity in the community provide the spaces where the dialogue between students and their culture, between school and real life, can occur.

In both projects, the teachers of REDIIN and *LabVida*, rather than thinking of themselves as 'instructors,' have decided to act as companions of indigenous teachers and, above all, of their students in the process of appropriation of MII, dialogue and the articulation of knowledge. Assuming this pedagogical function in order to make the knowledge of the community more visible requires a different methodology than the practice of dominant teaching in contemporary classrooms (Pérez Pérez, 2003). The MII, besides enhancing territorial literacy and explaining and systematizing the knowledge generated in community activities, encourages bottom-up education. The daily activities in which children participate, often in the company of their parents and grandparents, make it possible to articulate their own values, knowledge and meanings with what national educational plans and programs provide.

The MII and the learning generated in the *Milpa Educativa* and the School Garden starts from educational strategies that counteract the junk food and garbage culture among the school children and their parents, foster peasant agriculture and the traditional Mexican diet, educate the taste for natural foods, and recover agro-food traditions and healthy relationships with the environment (Bertely, 2011). It is an opportunity to promote greater awareness among students, parents and teachers of the urgency of agroecological reconfiguration (Gonzalez, 2012). The MII contributes to creating a base of young people motivated to achieve food sovereignty. The role of women, responsible for feeding the family, is key. Activities in the *milpa* and the orchard provide a way to recognize their participation and their knowledge, which have traditionally been relegated to the vernacular economy and 'shadow work' (Illich, 1981).

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