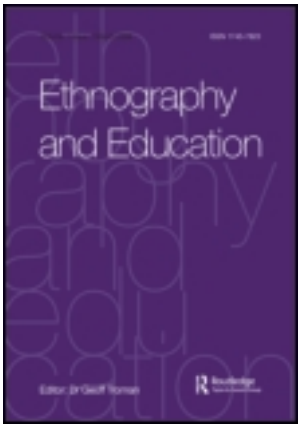

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Feeding pigs and looking for güembé: the local production of knowledge about the natural world of peasant and indigenous children in San Ignacio

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Feeding pigs and looking for *güembé*: the local production of knowledge about the natural world of peasant and indigenous children in San Ignacio

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Ever since the first ethnographic studies, the question about how people learn in different contexts was an essential element of research. Studies in anthropology of education have increasingly focused on schooling. Nowadays, however, the traditional topic of learning in out-of-school contexts recovers its relevance because the development of technologies, globalisation and inequality create new contexts for knowledge. Peasant and indigenous children's productive activities in countryside are frequently defined as children's labour, tending to emphasise the obstacles to attending school and ignoring the production of knowledge about natural world. In this article, I will use concept of legitimate peripheral participation to identify situated learning outside school walls. This category allows me to describe the understanding of natural and social world that peasant and Mbyà-Guaraní children in rural areas of San Ignacio (Misiones, Argentina) achieve in their everyday learning experiences. Information about plants, insects, animals, birds, their customs, food preferences, reproduction methods and environment are learned by observing and doing, while science lessons usually ignore such familiarity.

Keywords: learning in practices; peasants; indigenous people; anthropology of childhood; knowledge production

1. Introduction

Peasant and indigenous children habitually carry out productive activities in the forest and countryside as part of family reproduction. However, both scholars and common sense do not usually recognise these activities as implying knowledge. In this article, I will use the concepts of legitimate peripheral participation (Lave and Wenger 1991), communities of practice (Wenger 2001) and ethno-science (Ellen 2004) to identify situated learning outside school walls. These categories allow me to describe the knowledge of the natural and social world that peasant and *Mbyà-Guaraní* children from rural areas of San Ignacio (Misiones, Argentina) attain in their everyday learning experiences. Information about plants (their characteristics, properties and uses), and animals (food preferences, reproduction and environment) are learned by observing and doing, while science lessons usually tend to ignore such familiarity.

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However, I will also explain how this local knowledge is decreasing in the learning experiences of new generations, as productive activities decline. In the last decades, the concentration of land ownership has increased in this area; although this situation has roots in an unequal distribution of land, which began in the last decades of the nineteenth century, forest exploitation and a recent crisis in the yerba mate industry have had dramatic consequences on families' ways of living. On one hand, this situation has restricted the mobility of *Mbyà-Guaraní* people even more, due to the fact that land is now highly valued for forest exploitation, and communities usually do not have legal documents of ownership. On the other, many peasant families have been forced to abandon territories that they have used for generations, or have also been compelled to sell their properties – if they have them. Urban migration has been dramatic for peasants: unemployment is high in San Ignacio, a city of 10,000 inhabitants, whose main income is generated by tourism.

My fieldwork shows that among some peasant families (tenant farmers and small landowners, which have been able to remain in the countryside), children can still learn to take care of farm animals and to carry out agricultural tasks, although such activities tend to decrease from one generation to another. Because some farmers and most *Mbyà* communities do not have legal ownership of the land where they live, they often have to move and their horticulture is highly affected. Among indigenous families, limited access to the native forest has damaged the transmission of expertise on to new generations, especially knowledge regarding animals and plants traditionally recognised for nutrition, health and craft. Nevertheless, *Mbyà-Guaraní* people persist in their forest incursions and political struggle for territories, ensuring their subsistence with some customary practices of crop growing, hunting and gathering, activities that they supplement with State assistance.

This article is based on fieldwork conducted since 2008 in a zone defined by the highest concentration of M*byá* communities in San Ignacio Department (Centro de Trabalho Indigenista [CTI] 2008), including 9 of 16 small villages with a population between 20 and 100 people. These villages are located near the city (no more than 40 km away), so they are in a rural space undergoing considerable transformations because of economic activities.

Despite having information regarding eight of nine villages (Andresito, San Ignacio Miní, Katupyry, Kokuere'i, Pindoity, Ñu Porá, El Tacuaral and Ivy Poty), this article focuses on the first of them: Andresito. This community is relevant in educational terms because its children are attending a rural school, which peasant children also attend (most of *mbya-guarani* communities have their own schools in their villages). As a result of this process, half of the students of this school are *mbya* and the rest identify themselves as *colonos* (people who live in the frontier areas). The school is functioning with three teachers for basic education (multigrades), one for kindergarten, and two indigenous teacher's assistants; they have almost 90 students.

As with *mbya guaraní* villages, for the *colonos* I have defined a zone to be studied near the city head of Department of San Ignacio. There are eight major towns in this department, most of them founded in the 1950s along the traces of a national route, but two cities are older: San Ignacio was founded in 1693, and Corpus in 1882 (Gobierno de Misiones 2008). Almost 60% of the population of San Ignacio is urban, but this study is located in the rural area, at *las colonias* (place where the *colonos* live). The peasants mentioned in this article live in *las colonias* nearest San Ignacio town, known as Aparicio Cue e Invernada.

Ethnographic fieldwork included participant observation and interviews; some classes of children between ages 10 and 12 were observed, but also I used some experimental techniques in order to work with children and their everyday activities: drawings, photographs and video, free listing. All families of the aforementioned school were visited in order to interview adult members and reconstruct economic activities. *Mbya-guarani* leaders of the community of *Andresito*, indigenous teachers and school staff, local authorities and state administrators were interviewed as well.

2. San Ignacio: productive activities in the forest and countryside for family reproduction

San Ignacio is 1 of 17 departments of the province of Misiones (in the Northeast of Argentina). It borders Paraguay and Brazil, and is nowadays the region with the largest density of *Mbyà-Guaraní* people in the country: about 4083 members of this indigenous community, according to Complementary Survey of Indigenous People conducted in 2004–2005 by the National Institute of Statistics and Census (Instituto Nacional de Estadística y Censos [INDEC] 2010).

The Guaraní occupation of the current territory of Misiones is very early: historical data suggests that at the beginning of the sixteenth century this ethnic group was going through a geographical and demographic expansion, with a population of over two million.[1] Their population spread through the delta of the Río de la Plata in the current territories of Argentina and Uruguay, the shores of Santa Catarina and Paraná, Curitiba and Mato Grosso do Sul in Brazil, and largely in the current territory of Paraguay. From the first contacts with Europeans towards 1513, the population diminished dramatically because of the introduction of infectious diseases, regional wars and slavery (Noelli 2004, 17).

The Guaraní, considered the cultural, linguistic and demographic foundation of the region's contemporary indigenous population, include four subgroups traditionally named *Mbyà, Pai-Taviterá, Avá-Chiripá y Aché-Guayakí.*[2] The current *Mbyà* are thought to descend from the populations that remained independent from the Jesuit colonial experiment between the sixteenth and eighteenth centuries, by building small communities in the forest that involved the construction of a social identity defined by the confrontation and contrast with the Spaniard conquerors first, and their *mestizo* descendants later (Bartolomé 2004).

Subsequently, the establishment of the *Mbyà* in current Argentine territory took place in interrelation with the expansion of the national society's frontiers during the nineteenth century and the first decades of the twentieth century, causing a progressive dispersion and reduction of the villages throughout time. This dispersion however, has not prevented the recognition of a political adherence to a distant authority in some cases (Gorosito 2005). This political dimension is closely related to the current economic constraints on the reproduction of families and thus, to the intergenerational transmission of resources. As we will see below, a dynamic process of creation of small *Mbyà* villages is currently taking place in the area of San Ignacio. These villages stem from other larger ones, and frequently emerge in smaller extensions of land, generating new political leaderships.

The history of the peasant settlement in the area is connected to the aforementioned process of frontier expansion: during the last decades of the nineteenth century, a colonisation process organised mainly by the State took place

in the area of Misiones, on the lands leftover after a massive sale to 40 large buyers. However, the occupation and exploitation process that began as an agricultural frontier was not completed only through the colonisation organised by the State; it was also a spontaneous process, where the settlement of land took place in association to companies with forestry operations, which allowed the land to be used after the extraction of wood was completed (Ricotto and Almeida 2002).

Until 1930, farmers only produced yerba mate; in turn they incorporated tung –a tree used for extracting oil to industrial purposes, tobacco and tea, which were grown at the same time forest exploitation was practiced, first of native species and later of exotic ones. In this way, an agrarian society developed in Misiones during the twentieth century, formed by peasants and squatters (household agricultural producers with 1–10 hectares [ha], of *criollo* origin or Brazilian or Paraguayan immigrants);[3] farmers (with 25–50 ha, mostly of Northern and Eastern European origin);[4] stockbreeders (with land between 100 and 1000 ha) and large extractivist landowners (Bartolomé 2000; Jaume et al. 1989; Otero 2008; Reboratti 1979).

If we use this reconstruction to analyse the information provided by the National Agricultural Census from 2002, we observe that, nowadays, in the department of San Ignacio almost 30% of the productive area corresponds to typical squatter, peasant and farmer properties, more than 45% to realties defined as stockbreeding ranches and over 25% to large estates (Gobierno de Misiones 2008, 340–41).

The current situation is based on the structure of the Misiones agrarian society consolidated during the twentieth century, and it reflects the changes that took place in the last decades. Different studies show that these changes had to do with the fracture of the institutional political structure, and with the capitalist accumulation process of the Argentine society installed in 1976. This process led to an agricultural crisis and a decline of the peasant economy – along with changes in the concentration of land ownership – that accelerated the process of depeasantisation (Cragnolino 2006; Manzanal and Rofman 1989). In the last years, along with the repositioning of agricultural products in the world market, the predominant economic model shifted towards agro-industrial production, affecting small producers and indigenous populations differentially in their access to resources, work and survival (Bidaseca and Mariotti 2001; Sili 2005).

The agro-industrial complex had been expanding significantly in the province of Misiones since the 1980s, especially in the tobacco industry. The tobacco chain involved farmers and squatters that currently grow this crop, while maintaining certain productive diversification – stockbreeding, forestation, production of yerba mate and horticulture. Despite the growth of the agro-industrial area, these producers have become impoverished due to the process of concentration of manufactures and the commercialisation of crops by stockpilers and millers, both in the case of tobacco and *yerba mate*. In addition, in the last 20 years conflicts with the owners of native forests have multiplied. These owners had once facilitated the use of their land to farmers and squatters; however, with the development of a timber industry of exotic species led by concentrated capital, they claim the highly valued land (Schiavoni 2008).

These processes that took place in the last 30 years also affected *Mbyà* communities: while villages could remain in relatively less exploited areas of the forest, they could articulate their trade relations with the regional society and maintain relative control of their own organisational processes and mobility.

Nowadays, the changes in the social and economic structure of the province, as well as the relations with the State in the last two decades, have lead to a significant multiplication of loosely established autonomous residential units, with weak political organisation alliances and an increased dependence on the regional economic structure (Gorosito 2005).

Depending on the proximity to non-indigenous populations, *Mbyà* communities located in the territory of Misiones currently carry out diverse subsistence activities that include the hunting of small animals, fishing, seasonal gathering, vegetable garden production and rearing of fowl and pigs. In some communities members also participate in salaried work in agriculture and in activities linked to tourism – such as selling crafts, tour guides through the woodland and visits to villages (Cebolla Badie 2005).

Despite the weakening of political organisation caused by the aforementioned dispersion, the last years have witnessed a gradual acknowledgement of indigenous communities. They claim and exercise citizen rights as a particular political community, thus producing shifts in the economic, political and formative activities of younger *Mbyà* generations. Among these changes, Wilde (2007) points out how environmentalism and indigenism as political articulations present tensions in Misiones: occasionally, an incongruity is presented between the 'ecologically noble savage' – a stereotype defended in environmental discourse – and the inevitable commercial insertion of many indigenous groups. This incongruity is linked to the misguided assumption that communities are a homogeneous whole, represented by leaders of unquestioned legitimacy.

In addition to land claims, one of the main demands of indigenous populations refers to forest exploitation control. Following the extractive process of native species – which is currently regulated by the State – land is usually treated with herbicides, and pine plantation follows. These processes affect indigenous dwellers, farmers and squatters by polluting watercourses and because the progressive deforestation restricts the hunting and gathering activities of the *Mbyà*. Moreover, large-scale productive activities use scarce workforce, so there are limited opportunities for salaried work as a resource for survival.

3. Legitimate peripheral participation and situated learning outside school

Children's participation in household productive activities can be understood as a formative experience if educational processes are conceived as contextually situated, in a way that learning is produced through communities of practice and legitimate peripheral participation (Lave and Wenger 1991; Wenger 2001).

The concept of legitimate peripheral participation is closely related to the concept of guided participation (Rogoff et al. 1993, 6). The latter, drawing from Vygotsky's developments, has lead to the reformulation of the study of children's knowledge in different sociocultural contexts. According to this perspective, children's understanding grows by means of a creative process through which they transform what they know and their own world, while progressively participating in their communities' activities.

Meanwhile, legitimate peripheral participation refers more directly to knowledge by doing, based on a reformulation of the term apprenticeship. This concept stems from the debate on the nature of learning in the late 1980s, and assumes that learning

is always situated: this implies not only that learning takes place in time and place, with other people, or depending on the context in which it is produced; it also emphasises its character as a situated activity. Therefore, the concept of legitimate peripheral participation describes the involvement in social practices that are themselves constituted by learning processes, and not vice versa (Lave and Wenger 1991, 33).

According to the above, even so called general knowledge – which is usually presented as opposed to situated knowledge – emerges from abstract representations that acquire meaning in a context, and that are themselves achieved in specific circumstances. Hence, the notion of community of practice allows the discussion of dichotomies between action and knowledge: the process of participating in a practice always involves the whole person, who is acting and knowing simultaneously. Manual activity is not unreflexive and mental activity is not incorporeal; all social subjects are understood as carrying theories and ways of understanding the world. Communities of practice are the places where these are developed, negotiated and shared (Wenger 2001, 72–3).

In addition, the idea of communities of practice, where participants can occupy centre and periphery positions, also implies that these processes involve power and hegemony relations: full participation entails a strong dominion of collective knowledge or practices that must have accessible degrees of attainment for novices. Nonetheless, the peripheral character refers to a progressive access to sources of understanding through growing involvement (Lave and Wenger 1991, 37).

It is not only about the ability of engaging in new activities or mastering new information, but also about establishing new relationships enabled by that dominion. Through these relationships the individual takes place in the production and reproduction of the structures of the communities of practice in which he participates. Like Rogoff et al. (1993), Lave and Wenger (1991) draw these ideas on learning in its individual and structural dimensions, from studies inspired by Vygotsky's notion of zone of proximal development. These concepts enable the revision of common-sense ideas that understand educational processes as non conflictive transmission and internalisation of knowledge; in this sense, it is more pertinent to understand learning as an appropriation process (Rockwell 1995, 56–7), in that it refers to the conflictive nature of social practices, in a way that the relationships between apprentices and those who are experienced are part of social transformation processes that take place on an everyday level.

With this conceptual framework, Lave and Wenger's notion of apprenticeship differs from the classic approaches to the concept, where it was understood as an activity linked to craftsmanship on an individual basis or in small groups, the use of simple tools and tacit knowledge, the division of labour based on individual adaptation and the prevalence of traditional protection codes. For Lave and Wenger, apprenticeship assumes diverse historical forms, cultural traditions, and can be found in different modes of production; it is neither inherently egalitarian nor exploitative; the point is to analyse the form of political and social organisation under which it develops in each context, and the formative principles under which it is articulated and carried out (1991, 62–3).

Given that reflection on the relationship between knowledge and social practices, it is important to note that the opposition between scientific knowledge and other ways of knowing – defined as indigenous, local, traditional, intuitive, ordinary,

technical – rests on the epistemological distinction that originally constituted anthropology as a discipline, that confers truth to science over religion and superstition. Ellen (2004, 411) states that this distinction conceals the various ways in which predictive knowledge about the material world is produced, through distinctive configurations of cognitive and technical developments that are produced through historically constituted social practices. From his point of view, it is important to distinguish not whether certain knowledge is scientific or not, but rather between more versus less skilled thinking: it emerges facing difficulties or mysteries, understanding that most of the time social subjects use broadly shared answers, that have important historical depth and are effective for daily needs (Ellen 2004, 426).

In view of the above considerations, in the daily social practices of children that will be presented in this article it is possible to analyse certain attributes that are frequently ascribed to scientific practices and which are mistakenly used to distinguish them from traditional and empirical knowledge. One attribute is suspension of beliefs, which consists of events where there is no mechanical application of existing knowledge, but where people exchange differing points of view which, in turn, enable the acceptance that the world is different in some of its features. Other attributes are connection of classifications with different concepts of causality and the use of framework – not specific theories. Finally, three attributes are interesting: (1) networks of understanding – that relate individual species to specific contexts and landscapes, not isolated species; (2) experimentation – that enables the assessment of data for a series of explanations, including a methodology to collect them; and (3) construction of narratives, from which ideas emerge by analogy or other procedures (Ellen 2004, 426–28).

Finally, it is important to consider that in practices of knowledge about how the world is constructed and can be analysed, nature is a convenient fiction (in terms of a human construction and narrative), where there is an ambiguous relationship between what can be empirically observed and what is represented. This issue, which is inscribed in the aforementioned dualisms regarding the concrete and the abstract, body and mind, has been solved in the convergence of cognitive and symbolic approaches in Anthropology, by recognising that human populations apprehend both the social and the natural worlds, one in terms of the other: this is why the metaphoric extension from one to the other is not problematic and, in contrast, it is productive in terms of understanding how the world can be thought (Ellen 2004, 430–31).

With the identification of natural and social knowledge that peasant and indigenous children attain in their daily practices we do not intend to portray them as 'little scientists': science can be defined as a material practice that combines representational conscious and embodied knowledge, is carried out by adults with sophisticated instruction and explicitly produced with those ends, it involves certain processes that are not verified in the children's daily activities, such as the lexical codification of knowledge, its textualisation, inscription and formalisation, nor its application in instruments – that allow for it to be recorded, its experimental recreation, simulation and analogy (Ellen 2004, 440–41).

In this article, I will hold that this distinction between local and scientific knowledge – as well as its continuities – is relevant in terms of the development of the formative potential of children's daily experiences in the school context, because in

its routines it constituently includes many processes that are distinctive of scientific practice, especially textualisation and formalisation. Recognising the possibility of inscribing formative experiences produced on a daily basis outside school, allows them to be transformed, incorporating processes of skilled thinking that are not usually identified in the productive context but that are significantly based on it.

4. Everyday lessons: knowledge of the natural world of peasants and *Mbyà*-Guaraní children by their participation in productive activities

4.1. Living species in relationship

Sebastian is 11 years old; he is the second of four children and has three sisters, one that is older than him (who attends high school in another town) and two younger ones. Marta, age 10 and Alicia, age 7.[5] Their father owns a truck and hires labourers to chop and load wood, which is why he is out of the house Mondays through Fridays. The mother and her three children stay at the farm, of 200 ha, where they currently have a pine and chinaberry tree plantation intended to revitalise a family sawmill, as well as a small farm where they have 30 cows, a herd of pigs and hens. They plant cassava (*Manihot esculenta*), corn, pumpkin and sugar cane which they use both for their own consumption and for the animals; they also grow a small garden of mainly leaf vegetables for household consumption (lettuce, chard, onions, parsley, radish, carrots).

When they arrive at home from school and after lunch, Sebastian and Marta devote approximately an hour and a half to activities on the farm, generally feeding the pigs and a few cows that are occasionally tied because they are sick or because they are meant for the production of milk for family consumption. The animals are fed with cassava and corn, which the children extract from the plantation on a daily basis.

Although this routine does not seem to involve challenges in terms of notions regarding the natural and social world, I would like to show how Sebastian and Marta deal with knowledge that comes from situated learning in communities of practice. This knowledge allows them to carry out certain tasks autonomously, drawing from their previous peripheral participation in different tasks in order to do so. The predictive capacity regarding the material world that the children handle is based on networks of understanding attained during the course of their activities, where the relationship between what is empirically observable and what is represented is integrated through narratives. Skilled thinking develops when faced with difficulties and queries; in this process, school can play an interesting role in the lexical codification, inscription and formalisation of experiences.

When observing the children's daily routine, the first thing noticed is that they do not need to consult their mother because they know which of the available foods on the farm are good for pigs: mainly corn and cassava, and to a lesser extent pumpkin and yams. Although the children pointed out that pigs like corn the most, they have not asked themselves about this preference, nor can they state the reasons for it. However, they do create a contrast and a causal relation in reference to another animal that they take care of daily and that they feed in a different way. Sebastian resorts to a narrative to contrast the feeding of pigs and cows: he recalls that when releasing a pregnant pig from her pen in order for her to give birth more comfortably,

he saw that the animal actually ate grass but fattened less. For this reason, though he feeds cows with grass, he does not do so with the pigs.

In addition to identifying the crops, the children are familiar with the appropriate procedure while feeding the pigs: they partially peel the dry corncobs and throw them to the animals, stating that it is not necessary to strip them completely because they have observed that pigs can do it themselves with their teeth. Also, given that the corn husks do not rot quickly, the animals have enough time to nose the leaves out of the pigpen, or the sows can use them in creating their nests before farrowing – we will comeback to this later. Regarding cassava, the children know that grown pigs are fed with the whole vegetable, whereas it must be cut into small pieces for the piglets, otherwise it is too difficult to swallow. Even though the children are not aware of its toxicity, they note that the piglets do not eat the skins alone: possibly this information has emerged from the attempts to profit from the waste leftover from human consumption of the vegetable, and from seeing that adult animals do eat the cassava with its skin.

Marta, the oldest of Sebastian's sisters, is in charge of chopping up the cassava for the piglets. In doing so, she trains in the use of the *machete*, an instrument used frequently on the farm, which requires skilful training due to its dangerousness. Because the child has not yet acquired the necessary skills, her older brother takes over when the machete is needed for cutting the stems of the sugar cane or for separating the stems of cassava and unburying the tubers. Sebastian occupies two crucial positions for the organisation of household work, and in relation to them he acquires specific knowledge: he is the eldest child in the house and he is a boy, therefore he is in charge of the tasks ascribed to the male role, which require greater physical strength.

The link between gender, age and agricultural tasks is naturalised, hence the widespread assumption among peasant families is that girls must learn and take care of gardening, while boys – especially older brothers – must know how to take over the farm. Where this prescription is not confirmed, it is presented more as an idealised past, with which the array of particular circumstances that a family can face are confronted: in the abovementioned case, the father's work outside of the home leads to a situation where the mother is in charge of training Sebastian – and later Marta – in the use of the machete, starting with the appropriate movements but applied in the garden, where the plants are fragile and small.

The use of the *machete* requires not only specific movement skills, but also knowledge regarding the precise places each plant must be cut in ways that allow the growth of new specimens. Thus, Sebastian can show the distance from the ground that sugar cane must be cut, so that in a month's time the plant will grow back again. Or the length the cassava must be extracted, in order to preserve the stems for drying and subsequent sowing, but at the same time keeping a long enough portion of the trunk so as to extract from the ground the root and tubers that are used for family consumption and animal feeding (see Figure 1).

Sebastian and Marta's practical knowledge of the natural world that can be drawn from the aforementioned facts is in fact deeply hidden at school. In the beginning of my fieldwork and before visiting any farm, I ask the children in school to draw and write about animals they have in their homes. Sebastian draws a pig and wrote the following:

Figure 1. Two photos of Sebastian cutting and extracting cassava.

Pigs from my house
In my house we have pigs, and we have them for killing and raising.
We have a black sow that is pregnant and a piglet and a little sow that it is for raising and to have piglets to sell.
Pigs eat corn and cassava and chicory.
The sow is about to give birth next June.
Pig's Eye
Pig's eye is small and black with brown
The head is big and furry
Ears are big, furry and thin.
Los chanchos de mi casa.
En mi casa tenemos chanchos y los tenemos para matar y criar.
Tenemos una chancha negra que está preñada y un cachazo y una cachacita que está para criar y que tenga cría para vender los chanchitos.
Los chanchos comen maíz y mandioca y achicoria.
La chancha está por tener en Junio.
El ojo del chancho.
El ojo es chiquito y negro con marrón
La cabeza es grande y peluda
Las orejas son grandes peludas y finites

A description followed regarding legs and the way they sleep. As can be noted, when the children are asked about farm animals in a classroom context, they tend to refer to isolated species, using some brief phrases that describe them (colour of the skin, size, basic products with which they are fed) and an unspecific tree or fence as context, even though I asked them many guiding questions (e.g., where the animals live or what they usually eat). However, when analysing the children's routine we notice – just as the most recent versions of textbooks suggest – that the knowledge they have regarding which vegetables nourish certain animals is also related to information on the reproduction of those crops, the links between animal and human nutrition, and the feeding capacities of animals in different stages of their lives. In other words, they do not have knowledge on a particular species that can be exhaustively expressed, but knowledge on the relationships between species that are relevant to immediate needs.

On the other hand, it must be noted that Sebastian's observation on grass as an inadequate food for pigs, does not emerge from a process of systematic exclusion of alternatives, but from recalling a particularly conflictive situation in the process of

animal rearing: parturition. Although children's participation in this situation is extremely peripheral (the child has watched his mother help the sow in difficult farrowing situations) its formative impact is far-reaching: in addition to the information presented above – that is incidental to the animals feeding routines – the child draws knowledge regarding the precise moment to release the pigs so they can give birth more comfortably. This information emerges from the ability to observe and interconnect: the enlargement of the udder is a sign for Sebastian that the sow is about to give birth, because she is ready to suckle.

As pointed out earlier, when asked at school about the pig's nutrition, the children tend to make generalisations about animal nutrition, and they do not mention feeding cycles, or differences whether the animal is male or female. However, in Sebastian's routine we can see he includes the stems and leaves of the cassava when he is about to finish his daily feeding routine of the sow. Asked about the reasons for this difference, the child explains this is done particularly during pregnancy, because the sow crushes the stems to make a more comfortable place for giving birth. This statement is interesting because it shows how practical knowledge is more complex than the knowledge the child deploys in the classroom context. It involves both an appropriation of information regarding other farrowing experiences, and accepting that animals 'nest' when they give birth to their young as general behaviour.

4.2. The interaction of contexts

Although practical knowledge is hidden at school, children's learning experience is conducted across the two situations, so knowledge from one context has consequences upon the other, even when that interaction has not been explicitly fostered by adults. During my fieldwork, I benefited from a circumstantial event: an indigenous assistant teacher, who lives on school premises, had received a fawn as a gift after visiting another *Mbyà* community. In an activity conducted with students in my initial days at school (which consisted in making lists of animals and plants they know and to write them on the blackboard), peasant and indigenous children had recognised this animal as native to the area; however, because it is a woodland animal – and access to the forest is currently very restricted – it is unusual for children to have contact with it. Thus, the gift was an opportunity for exploring children's knowledge about forest animals.

The assistant had built two yards, one for the fawn and the other for a herd of pigs. I asked the children to observe the animals and draw them, to discuss their physical features, nutrition and habits, and to write an informal text about them. Sebastian chose to draw the fawn, but he then claimed that he could not write about these animals because his family does not usually hunt woodland animals and because of that, he does not know about their habits. I suggested that he speak to the indigenous assistant's eldest son – Andrés, of whom we will speak later on. He did so, and added an epigraph to the drawing: 'it eats *reviro* (a flour paste that is also used for human consumption) and sweet potato leaves'. The following day, I visited Sebastian's house. While he chopped cassava to feed the pigs, he found deer prints (Figure 2). He showed them to me and we covered an area of the cassava plantation where the child identified prints of different sizes – which he ascribed to animals of different ages. That same day he asked both his mother and father how they should deal with the presence of these woodland animals in the plantations. They both

Figure 2. Sebastian's drawing of a fawn and Sebastian showing fawn's footprints.

agreed that the plantation was not at risk, so it would not be necessary to release the dogs during the night.

This event triggers a reflection on the construction of knowledge about the natural and social world in productive and school contexts in different ways: first, after observing and speaking about a species at school, the child's ability to detect hints that signal the presence of these animals – that otherwise would have gone unseen – seems to have increased. The reconstruction of the presence of deer, on the other hand, was complex: he looked for the prints and analysed them on the ground – their size and depth; he observed the leaves in order to determine – according to their partial or total damage – their height and age, the number of specimens and the possible moment they had entered the plantation.

In the second place, this situation led Sebastian to inquire about the interrelation with the newly detected species: did it represent a danger for man? And in this case, did it threaten their plantation? Although the query was fully solved by the adults, Sebastian's peripheral participation in a community of agricultural practice was crucial in detecting a complex situation that the parents were unaware of: the entrance of woodland animals in the plantation. Therefore, the ability to transform the social and natural world, even for a novice, is significant: through Sebastian's discovery, the definition that his family establishes with the native woodland is re-enacted.

In the third place, and linked to the process mentioned above, the fact that *Mbyà* families catch and eat woodland animals while Sebastian's *criollo* family does not, represents for the child an insurmountable practical limit. Although eventually Sebastian could ask himself about the socially created nature of nutrition practices, the classification of animals for human consumption is working here as a mark of cultural difference, probably this situation prevents questions regarding transformation of practices. Thus, scientific knowledge, with cross cultural validity, gives intercultural education a base for particular and relevant developments in this context where traditional knowledge of peasant and indigenous people are presented as mutually exclusive, scientific knowledge in school settings can promote new questions and practices.

Finally, it is interesting to consider how knowledge generated through the identification of the animal in the productive context, emerges in a school situation, but this institution does not create a context that would allow Sebastian to move forward in the process of acquiring knowledge through inscribing and formalising his experience. Maybe recording and analysing similar situations can be a starting point to combine school and productive knowledge, challenging the children with new questions about the world, through the recovery of their experiences in both contexts.

Therefore, this is not just a reflection on processes of learning natural sciences: knowledge of the world is crossed by living conditions and daily practices of household reproduction. In the case of Sebastian, Marta and their family, we observe dilemmas regarding an extractivist production and management of the native woodland. There is no doubt that the peasant's knowledge could benefit from work in the school context and from *Mbyà* indigenous knowledge, whose complexity is rhetorically recognised, but not translated in socially relevant practices such as the school *curriculum* or local economic development policies. Finally, it is important to acknowledge the relevant role played by children in generating locally relevant and scientifically validated knowledge: through their peripheral participation in productive activities, and the inscription and formalisation of these in the school context, a space of skilled thought is enabled. This thinking can question adults in their beliefs, practices and knowledge about the world.

4.3. Observation capacities and community of practices

It is in these contrasts between formative experiences where it is relevant to analyse the contributions of Andrés, the *Mbyà* child consulted by Sebastian about the fawn's nutrition. Andrés is 13 years old and he is the eldest of José's children. As was mentioned before, José is an *Mbyà* assistant teacher that lives on school premises. The child lives with his mother, his father and his siblings: he is followed by Hernán, age 11, and Paola, age 9. In addition to their house and the two yards mentioned above – where the children observed the pigs and the fawn – José cultivates a small vegetable garden where he has planted spring onion, chard, onion and in another area, cassava and sweet potato. He has plans to begin beekeeping activities, because of training and previous practice in his native community located nearby.

In contrast to Sebastian and Marta, Andrés does not tend animals on a daily basis: this is probably linked – among other reasons – to the fact that his father is at home every day, and that their household production is significantly smaller, as is the land for the use of his family. The school has only 1 ha, where José is allowed to produce for family consumption in exchange of looking after its security.

Even in this limited context, Andrés knows how and what to feed the pigs, deer and other woodland or farm animals that they may raise at different times during the year. *Mbyà* children seem to have more relative competences on knowledge of the woodland compared to the information that peasant children handle, even though their knowledge in this area is still significant. Asked about the plants they know, one of the first mentioned by Andrés and his siblings is the *güembé* (*Philodendron selloum*). They know it grows on other trees or on the ground, and has long roots, which they call *guembepy* and that it has textile uses. Moreover, they know that the fruit, which is 15 or 20 cm long and yellow coloured when ripe, is edible.

Güembé is sought according to the needs of craft production. In terms of communities of practice, children follow the adults and learn from them where and how to find this plant, as well as two bamboo species that are used along with the *güembepy*: the *takuapy* (*Merostachys claussenii*), used as a base for textiles and traditionally used for building walls, among other purposes and the *takuarembó* (*Chusquea ramosissima*), used for braiding.

As we explained above, the access of *Mbyà* communities to the native forest is limited, especially in the studied area where *yerba mate* has been produced for decades. Thus, we could hypothesise that the community of practice composed of adults and children, that enters the woodland searching for these plants, is maintained throughout time, in this case, not because the children cannot find and extract the plants, but because they must cover large distances in order to obtain them.

For Andrés and his siblings, Paola and Hernán, *güembé* is not difficult to identify: in the first place and on simple observation, it is a plant with large leaves of singular shape and its aerial roots are easily recognised. In the second place, it is a widespread plant of the area, with multiple uses, which include ritual ones. Its fruit is used in children's naming ceremonies and also has medicinal uses (basically to eliminate parasites).

Andrés and his siblings do not refer to these ritual and medicinal uses, which are specific patrimony of adult knowledge. However, children know how to use *güembepy* for the fabrication of ropes and animal traps (*simbras*), as well as for the main use that these plants have nowadays: the craft production of basketry, bracelets and rings sold to tourists. It must be noted that even if José and his children do not carry out this activity intensively, their home is located 5 km away from the best known Jesuit ruins in Argentina (San Ignacio Miní), an international tourist destination where many *Mbyà* families of the area sell their crafts in a small nearby market.

Therefore, although Andrés and Paola do not search for *güembé* on a daily basis, they know that the most coveted specimens are found in tall trees, where their roots are longer and more can be made out of them. On the other hand, watching the children handle the *güembé* (Figure 3), we see that they know how to make cross section cuts in order to separate the bark, and throw out the internal soft part of the

Figure 3. Guembe plant in the schoolyard and Andres separating the bark.

plant. After this, they dry out the bark in the sun for a few hours, scrape it in order to even it out and, finally, weave it.

Woodland fruits such as *güembé, guayuvira* (*Campomanesia xanthocarpa*), *aratiku* (*Annona squamosa*), *apepu* (*Citrus aurantium*) or *pakuri* (*Rheedia brasiliensis*), call the attention of Andrés and his siblings, not only because they enjoy sweet food, but also for the interest they arise in other living creatures, especially birds. They are widespread in the area and some of them can be trapped when they are young, fed by the family and tamed, and children can get to know them better. After an activity on birds previously carried out at school with children age 10 or more, I suggested Andrés, Paola and their brothers to look at an illustrated encyclopaedia (Canevari et al. 1991) in order to find out which species they could identify.

Paola immediately identified the *arapachay*, the generic term her father translated into Spanish as *lorito* and *periquito* (small parrot). After looking at four pages with 27 species of the Psittacidae Family (parrots, parakeets, macaws) Paola pointed at two of them: reddish-bellied parakeet or *Pyrrhura frontalis* and the blue-winged parrotlet or *Forpus xanthopterygius*. Through a narration, the child and her brother made a connection between the illustration they were observing and their previous experiences, pointing out that their uncle had recently trapped an *arapachay* that was nesting on a very high tree. By climbing it, he captured a young bird, which they then keep in the community. The children know that these birds can be easily found following the intensity of the young screeching for food, and that they eat maize, tangerines, worms and locusts.

If the *arapachay* is trapped to be raised, the children can identify other birds caught as food, such as the *yerutí*. Going through the Columbidae Family (pigeons and doves), where the book showed 25 different species, Paola immediately identified the eared dove (or *Zenaida auriculata*). Andrés and his younger siblings Paola and Hernán showed how small traps are built with twigs that are placed on the ground in spots where they can see a large movement of leaves that indicates a place frequently visited by birds in search for food. Communities of practices allow the children to develop a precise observation technique that detects traces of birds; identify shapes of leaves and patterns of colours in feathers. This is the way in which these children also immediately identified the *akaé* (jay) as a bird trapped to be eaten. The encyclopaedia presented only three species belonging to the *Corvidae* Family, where the plush-crested jay (*Cyanocorax chrysops*) is differentiated from the rest because of its black head, neck and chest, its yellow iris and its cream-coloured bottom parts and end of its tail – while the other species are completely purple or blue.

5. Conclusion

Our analysis suggests that, even though they share the same school place in a social context at first perceived as homogeneous in terms of the structural position of families, children of peasant and indigenous families have significantly different formative experiences, according to adults' opportunities to carry out different productive activities and thus incorporate young generations in legitimate peripheral participation (Lave and Wenger 1991).

In the first place, peasant and indigenous families own or use heterogeneous parcels of land (between 1 and 200 ha); this significantly determines household production in scope and ability to diversify. Regarding formative experiences and

knowledge about the natural and social world, even though most families carry out productive activities mainly for household consumption or for exchange, they currently make efforts to diversify their production through horticulture, animal raising, apiculture and, in larger properties, forestation. This diversity of experiences is very meaningful in the sense that children interact with different animal and plant species, even when access to the native forest is closed to them or is receding.

Furthermore, children participate differentially in productive activities, according to their position in relation to their siblings, their gender and to the main occupation of the father. Contrary to common-sense assumptions, girls also have broad knowledge of plants and animals, although their insertion is subordinate and their experiences are more limited.

Participation in communities of practice (Wenger 2001) of *Mbyà* children is increasingly limited. In the context, we have analysed, it refers particularly to forest extractive activities, involving knowledge about birds and vegetable species for consumption, medicine and craft production. Apprenticeship related with gathering plants involves recognition of species, ability to extract (methods, time and frequency) and elaborate them (treatments for illness, nutrition of human and domestic animals, weave and carving work). Young people can share these activities with adults but not as everyday activities, so a process of appropriation of cultural knowledge is substantively reduced. In the case of peasants, it is important to note that gathering is also a productive activity, but processes of identification tend to link forest with indigenous people, so these practices are less recognised.

Although loss of local knowledge has been reported by academy, civil society and acknowledged by national states in almost all countries, it is relevant to emphasise also the potential for educational contexts when children can reflect on productive practices in the household, challenging the common sense that assumes an alleged link between environmentalism and indigenism, peasantry and conservationism. Social discourse tends to idealise the protection of the native forest by indigenous people, and the techniques of peasantry as inherently sustainable. This naive representation of the relation between humans and nature therefore contrasts with the practices of consumption of plants and animals of children, which allow skilled thought (Ellen 2004) if they could inscribe, in school, their experiences related to different species of plants and animals. These processes might improve lives of peasant and indigenous people, not only because of technical skills that eventually may evolve, but also because of recognition of their knowledge and capacities as subjects and communities.

Science classes can take from everyday children's experiences the suspension of beliefs, searching for alternative explanations of processes when they locate an everyday interrogation in a broader context of relations. When establishing causalities of good nutrition, thinking in terms of networks of understanding that relate pigs with cassavas, when using experimentation to find a better way to trap a bird and, finally, when constructing narratives of these findings, the children are producing knowledge: these ideas can be questioned by schoolteachers not to discredit, but to improve them by lexical codification of knowledge, its textualisation, inscription and formalisation.

Acknowledging the potential of building on what children know, while relating local and scientific knowledge is not new in pedagogical terms. However, this does not take place as frequently or as intensely as expected. Perhaps this means that it is

still a challenge to recognise and retrieve knowledge derived from social practices, which is not formalised nor expressed as such. This article aims to contribute in that direction, by systematising knowledge that children from peasant and indigenous communities from the Northeast of Argentina have constructed in their out-of-school daily practices.

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Notes

1. Current archaeological research in Misiones shows sites of up to 1200 BP near Yaciretá, and 900 BP in Oberá, even though occupation came as far as the Iberá Marshes and the islands at the mouth of the Paraná river. Dates in nearby Rio Grande do Sul (Brazil) suggest that it is very likely that in Misiones and Corrientes older data could be found, and that early occupation goes as far back as 2000 BP (Noelli 2004, 31–2).
2. Bartolomé points out that these terms are external classifications applied to different ethnic organisational groups belonging to one ethnolinguistic group. This is not a typological problem of mere academic interest; it represents one of the keys for accessing ethnic identifications of members. The term 'Guaraní' applied to refer to them became widespread only in the seventeenth century, when as a result of the type of cultural collectivity constructed by contemporary states, ethnic groups were thought of as totalities in national terms, with the implicit assumption that an ethnic group corresponds to a 'nation', understood as a social community with conscience of self and able to set common goals. However, the 'nation' is a type of collectivity historically constructed by States as of the nineteenth century, which set to develop politically and culturally homogenous social communities. The Guaraní tradition developed without the presence of a broad state formation, that is, without a political apparatus that could unify the different populations and diverse linguistic varieties (Bartolomé 2004).
3. The concept of squatters involves significant diversity. While a minor sector shares many common features with the farmers, most can be defined as peasants who are scarcely integrated into the economic system, and a number of them are semi proletariats that combine salaried work with minimal subsistence agriculture (Baranger 2008).
4. The concept of farmer has been much discussed in the anthropology of this region for many decades. The work of Archetti and Stolen in the North of Santa Fe (1975) and that of Bartolomé in Misiones (1975) discuss the non peasant character of the agricultural producers of the area, using the term *farmer* – on occasions translated as '*granjero*'. This form of production, characterised by the use of domestic labour but, whenever possible, a certain accumulation of capital, lead the farmers to focus their political claims on the access to credit, commercialisation and merchandise distribution (Baranger 2008).
5. Although the names of towns and communities have been maintained with the objective of contributing to the region's economic and social documentation, the children's names have been modified in order to preserve their anonymity. It is important to notice that *Mbyà* children have names in *Guaraní* but they use a name in Spanish for school.

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