

Ethnomathematics and Political Struggles

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Abstract: The paper analyzes and discusses a research study in an ethnomathematics approach, which was developed in a Movimento Sem-Terra (Landless People Movement) settlement in Brazil. The research study is organized as a pedagogical project with peasants, students, teachers and technicians experiencing the construction of an educational process in which local and more global knowledge interacts and where native and technical knowledge are confronted and incorporated. The project allowed the production of a double movement of making community life penetrate the school at the same time as knowledge produced during the pedagogical process pours out from the school space. The approach used in the pedagogical work developed in the Itapuá settlement focused on problems of practical and material needs. They were not transmuted into symbolic control problems, indicating other possibilities in the field of ethnomathematics, especially in mathematics education which is carried out with social movements such as the Landless People Movement. Based on her research, the author emphasizes that ethnomathematics finds its most relevant expression when it exposes its social engagement, when it does not treat cultural questions as exotic and unrooted elements, with no commitment to political struggles widespread throughout the world.

Kurzreferat: *Ethnomathematik und politischer Kampf.* Der Beitrag analysiert und diskutiert eine Forschungsarbeit um einen ethnomathematischen Zugang, der in einer Siedlung der Bewegung landloser Menschen entwickelt worden war. Diese Studie ist als pädagogisches Projekt mit Kleinbauern, Schülern, Lehrern und Technikern organisiert, die das Entstehen eines Bildungsprozesses erfahren, in dem lokales und eher globales Wissen interagieren und in dem ursprüngliches und Fachwissen miteinander konfrontiert und integriert werden. Das Projekt ermöglichte zweierlei: zum einen das Eindringen des Gemeindelebens in die Schule, und zum anderen das Überspringen des im pädagogischen Prozeß gewonnenen Wissens nach außerhalb der Schule. Dem in der Itapuá-Siedlung entwickelten Zugang lagen Probleme praktischer und materieller Bedürfnisse zugrunde. Diese wurden nicht in symbolische Kontrollprobleme umgewandelt, sondern zeigen andere Möglichkeiten auf dem Gebiet der Ethnomathematik auf, insbesondere in der Mathematikausbildung, wie sie in sozialen Bewegungen wie der Bewegung landloser Menschen praktiziert wird. Auf der Grundlage ihrer Forschungen legt die Autorin dar, daß die Bedeutung der Ethnomathematik am besten in ihrem sozialen Engagement zum Ausdruck kommt, wobei kulturelle Fragen nicht als exotische Elemente ohne ihre Wurzeln behandelt werden, aber mit Engagement in den weltweit verbreiteten politischen Kämpfen.

ZDM-Classification: A40, C60

1. Introduction

The present paper analyzes and discusses elements of a research study in the field of mathematics education which I have been developing in the South of Brazil since 1991, with Movimento Sem-Terra – MST (in English, Landless People Movement). This is a nationally organized movement involving approximately 800 thousand peasants. At the center of their struggle is the implementation of a land reform which will contribute to the democratization of

wealth in a country with the largest concentration of land in the world. One of the dimensions of this struggle for social justice is precisely education, where MST has made an original contribution to the trajectory in which Brazil is internationally renowned, thanks mainly to the ideas of Paulo Freire, beginning in the sixties.

MST today represents the new, both as regards forms of popular organization and in terms of education. Further, the organizational dimension of the struggle for land could be said to be so amalgamated to education which is carried out in this process of struggle that both reinforce each other mutually. It was the very impasses that arose in the struggle for land that indicated the need to set education as one of the priorities. Thus, we are now facing a social movement which, while struggling for land reform, a structural struggle, takes on as one of its priorities the education of its members. It is an education which takes place during the struggle, to strengthen the very struggle, mainly involving the challenge of showing that collective production in the settlements is a feasible solution from the economic standpoint, producing new social and cultural conditions.

Considering the lack of attention that has been given to questions of education by the Brazilian government agencies, it is far from surprising that a social movement involving thousands of youths and adults who are still illiterate, and children that are outside the schooling process, takes onto itself the task of education. Even more than this: aware that the education currently provided in Brazil does not fulfill the concrete needs of life in the camps and settlements¹, MST is pressured to seek pedagogical alternatives which will attempt to overcome the limitations of traditional teaching, both for those who have not yet had access to education, and for those who, while still in school, do not have their intellectual needs fulfilled and their culture valued.

One of the relevant aspects of the educational proposal of MST (expressed as one of its pedagogical principles) refers specifically to the question of valuing popular culture. Here are continuities with the positions advocated by Freire since his first studies: the ways in which people produce meanings, understand the world, live their daily life, are considered as relevant, even central elements of the educational process. In this sense the positions presented in the official documents of the education sector of MST converge towards Freirian theorizations. However, there is no exacerbated relativism, no naïve approach to the potential of such popular knowledge in the pedagogical process. Herein, the interrelations between popular and academic knowledge are qualified, allowing the adults, youths and children who participate in it to concurrently understand their own culture more profoundly, and also to have access to contemporary scientific and technological production.

Even in such a “hard” area as mathematics, there has been an attempt to provide education which will be able to deal with the permanent tension between local and more general knowledge. In this sense there is a tendency to guide the work towards the perspective of ethnomathematics, as I have discussed in other studies (Knijnik 1996, 1997b). I refer to a tendency to indicate that the process

is slow, with advances and withdrawals, considering the difficulties found in teacher training, material conditions at the schools, and resistances encountered in the school community, to mention just a few of the limiting factors found in the processes of formal education linked to MST. When the question is considered in terms of education performed at the camps that do not even have a school, these limiting factors become even greater. The pedagogical projects that I have been developing from the ethnomathematics perspective seek to contribute to the implementation of the MST education proposal, at the same time as they constitute empirical material to take a deeper look at what I have been discussing about the theory of ethnomathematics.

2. Theoretical roots

Ethnomathematics² is a relatively recent area of mathematics education, beginning with the contributions of the Brazilian educator Ubiratan D'Ambrosio (1990, 1997). Its constitution as a field of knowledge covers a broad, heterogeneous spectrum of approaches, among them mine, based on the pedagogical work I have been constructing with MST. When I did my first research projects at MST (Knijnik 1996, 1997c) I enunciated it as: the investigation of the traditions, practices and mathematical concepts of a subordinated social group (subordinated as to the volume and composition of the cultural, economic and social capital) and the pedagogical work which was developed in order for the group to be able to interpret and decode its knowledge; to acquire the knowledge produced by academic mathematics and to establish comparisons between its knowledge and academic knowledge, thus being able to analyze the power relations involved in the use of these two kinds of knowledge.

This concept, opposing an ethnocentric view with which the popular cultures have often been treated, seeks to articulate the relativistic and legitimistic perspectives in examining the mathematics practices of the socially subordinated groups. In fact, as I have put forward in other texts (Knijnik 1997a), I have sought to incorporate the interpretation and decoding of native knowledge in pedagogical work, stressing its internal coherence, trying to describe it from a point of view which is not external to the context in which it is produced, so that the values, codes which give it meaning, and in turn, give meaning to such mathematics, can be described within their own logic. In this sense, what I have been developing within the ethnomathematics field is aligned with a relativistic perspective of popular cultures. However, I have been watchful to avoid exacerbated relativism which would end up by producing what Grignon (Grignon/Passeron 1992), properly called "ghettoization of the subordinated groups". In the case of MST, a social movement in permanent interaction with the dominant groups, this ghettoization process would occur if the pedagogical process were limited to the recovery of native knowledge, leading to a possible glorification of this knowledge, with the consequent reinforcement of social inequalities. This type of operation, i.e. incorporation of the legitimistic perspective in pedagogical work, must be avoided. It is a question of examining the cultural

differences not only from the anthropological standpoint, but also of seeking to understand them sociologically, in what differences constitute inequalities. It is in this sense that pedagogical work, as proposed in my above conceptualization, examines the power relations produced in the confrontation between popular culture, here understood as the native mathematics knowledge, and the socially legitimated culture, here understood as academic mathematics.³

Summarizing, these theorizations were present at the conceptualization of the ethnomathematics approach I had been using up until recently to perform my mathematics education work at MST. This conceptualization was increasingly broadened when, from 1996 onwards, I began a new research project at MST. In this research, the centrality of the discussion of power relations remained, but now they are analyzed in the pedagogical work where *different* native knowledge interacts at the same time as it confronts technical knowledge, in a process which does not take the former only as a point of departure for the acquisition of the latter. Thus, new elements begin to be integrated in what I call the ethnomathematics approach. The first of these regards power relations. Previously, power relations were examined from the external standpoint, i.e., when popular knowledge interacted with academic knowledge, in an operation which sought to articulate the relativistic and legitimistic perspectives. Now I examine the power relations also from the internal standpoint, seeking to problematize what Skovsmose and Vithal properly pointed to as one of the fragilities of ethnomathematics production. The authors said:

"The ethnomathematical practice, generated by a particular cultural group, is not only the result of interactions with the natural and social environment but also subjected to interactions with the power relations both *among* and *within* cultural groups. Ethnomathematical studies have shown how this has been played out between the Eurocentrism of academic mathematics and the mathematics of identifiable cultural groups, but have not equally applied this analysis to an analogous situation that occurs *within* an identified cultural group." (Skovsmose/Vithal 1997, p. 11)

It is these power relations which will now become the subject of analysis in my formulation of the ethnomathematics approach. The latter takes over a second element previously absent as an object of study: the analysis of power relations instituted in the interaction of native knowledge with the use of technologies. More precisely, it is to examine the repercussions of a work in education which at the same time as it looks carefully at the social practices that do not involve the use of "new" technologies – such as those connected to what I have been calling Popular Mathematics (Knijnik 1997a, 1997c) – incorporates in its analyses those that are produced by the appropriation of contemporary technological resources.⁴ The introduction of the techno-culture dimension – as mentioned by Skovsmose and Vithal (1997) – in the ethnomathematics perspective, had as sources of inspiration two matrices which, although coming from very different "places", ended up by reinforcing each other.

The first matrix is located on the level of the academic debate about ethnomathematics. Authors such as Skovsmose and Vithal (1997) argue about the "ghettoization"

operation that is implemented by ethnomathematics when the latter is restricted solely to the studies of “native” knowledge of the different cultural groups, and that in this sense, ethnomathematics would come to constitute an approach that above all reinforces social inequalities. Ethnomathematics, according to this argument, deals with the connections between culture and mathematics, between “daily practices” and school curriculum, circumscribing these connections to an exclusively “local” culture, and to a daily life which is understood exclusively as an experience acquired in material, immediate, present concreteness, narrowly configured by this “local” dimension.

The second matrix which inspires the incorporation of the techno-culture dimension in what I call an ethnomathematics approach, appeared in 1996 when the project “Lumiar” (in English, “Threshold”) was established – a joint effort of MST and the “Institute of Colonization and Land Reform”, a government agency. From this occasion on, new social actors began to participate in settlement life, with the implementation of specialized technical assistance to the peasant families, a process whose educational dimensions are also included in the sphere of schooling for the youth and children. The presence of technical knowledge in communities which had so far been producing in an artisanal manner, without any technical guidance, is leading to repercussions in different dimensions of life in the settlements. What are these repercussions? What is the ecological, economic and social impact of the introduction of these “new” technologies? What are their effects in terms of power relations? How will the “encounter” (or “disencounter”) of this world which had previously been characterized by popular knowledge, be when it encounters the world of science and technology? How do the settlement schools participate in this process? What effects will this participation have on the school curriculum? On this scene – which until then had been marked exclusively by popular knowledge which now confronts technology and technical knowledge – these questions are very fruitful from the theoretical standpoint, broadening the ethnomathematics approach which I have sought to construct.

This approach is closely connected to the field of cultural studies, first of all due to the fact that the work I am performing with the MST and the theoretical analysis I am developing based on this work are cultural and political interventions. As Lawrence Grossberg (1993, p. 90) says:

“Cultural studies is obviously a set of approaches that attempt to understand and intervene in the relations of culture and power, but the particular relationship between theory and context in cultural studies is equally central to its definition. Cultural studies neither applies theory as if answers could be known in advance nor is empiricism without theory. (...) Furthermore, cultural studies is committed to contestation, both as a fact of reality (although not necessarily in every instant) and as a strategic practice in itself.” (Grossberg 1993, p. 90)

The ethnomathematics approach, as I am formulating it for now, has points of intersection with the field of cultural studies also because I have taken for analysis daily school life in a community constituted by peasants who are members of a social movement, taking as a premise

that this group is not a homogeneous whole. Thus “more than treating minority groups as homogeneous entities, we emphasize the contradictory interests, needs and wishes which inform their political, cultural and educational behavior” (McCarthy/Cricholow 1993, p. xix). Finally, the above mentioned ethnomathematics approach is connected to the field of cultural studies insofar as I take as subject of investigation a process in which I myself am involved, and concurrently make an effort to produce a distance which will allow me to analyze practices in which I myself participate.

The debate on ethnomathematics has gained international visibility. There are growing demands to inquire and problematize it. Not in search of the “true” truth, the last instance where will be decided what, after all, is “good” and “evil” in the field of ethnomathematics. What is at stake is the academic debate which will point out its possibilities and limitations. In order to implement this, it is necessary to build concrete pedagogical experiences – which will offer us empirical material for reflection – and new theorizations which will make it possible to feed the discussion. The next section of this essay proposes to contribute toward this.

3. Empirical research

The projects I have been developing with MST have constituted empirical research material. Collecting this material has involved methodological procedures which seek to compatibilize ethnographic techniques such as direct and participant observation, interviews and field diary with a specific pedagogical process in the field of mathematics, guided by the ethnomathematics perspective. The project to which this article refers is underway at a school in the settlement of Itapuí, 43 km from the capital of the southernmost state of Brazil.

The school has approximately 150 students, distributed in 9 classes, from pre-school to 8th grade. After a period in which the faculty was restructured – as a consequence of the school community “squat” in the School District Office and a statewide teachers’ strike – currently there are 11 teachers at the school. Among them are members of MST and female and male teachers “from outside”, a nomenclature used by the group to describe those who although they do not belong to the Movement teach at settlement schools. Although it is a state public institution, and its curriculum and administration are therefore directly connected to the guidelines of the State Department of Education, there is a relative autonomy in the direction of pedagogical work performed there, strongly influenced by the educational proposal of the education sector of MST.⁵

This proposal which is being constructed for a social movement from the same movement, has contributed significantly, in many ways, to the trajectory of education of the socially subordinated groups in the country (Knijnik 1998). The MST elaboration process is supported by a set of pedagogical principles, three of which are particularly relevant to the current project: “Reality as a base of production of knowledge”, “Organic connection between educational processes and economic processes” and “Organic connection between education and culture”. The dis-

cussion regarding the relevance of the rescue of popular knowledge, which has often resulted in the pedagogical cliché “beginning with reality” lies currently on another level in the official MST documents, as the following argument well shows:

“What we must not lose sight of is the higher goal of all this and which regards not a simple rescue of the so-called popular culture but mainly producing a new culture; a ‘culture of change’ which takes the past as a reference, the present as the experience which can at the same time be fulfilling in itself and is also an anticipation of the future, our Utopian project, our horizon.” (MST 1996, p. 19)

Here the current understanding of the concept of “reality” and “culture” becomes clearly explicit also within the sphere of MST. The pedagogical principle of “reality as a base” includes the concept that techno-culture must necessarily be the subject of studies in pedagogical work, either as a reflection and learning of the immediately present reality, or announcing a future which is being constructed. Obviously there is tension between this present that is loaded with the past, and a future which must be “hurried up”, since, as a peasant said when referring to the need for technological advances: “There is historical urgency”.

This “urgency” has been dealt with at unequal rates in Brazil. In fact, the pedagogical principles of MST have so far constituted *guidelines* for the work developed in its schools, guidelines which have been very heterogeneously incorporated in the different educational instances of the Movement, rather configuring a pedagogical trend than a closed set of principles proper. Since it is necessary to follow up the proposal for education in the most distant points of the country, at the same time as qualification is achieved, actions are being implemented involving universities and the education collectives of MST. The implementation of the project I describe and analyze below constitutes one of these actions.

4. The debt profile and production planning

In the last few years, there has been growing concern in MST with the young people, since it is found that many of them are seeking cultural and work alternatives in the cities, thus moving away from the specific struggles of the Movement. In fact, this “second generation” of Landless People – the children of those who lived in tents for years and years in the camps and since childhood learned the harshness of struggles – now that their material needs are reasonably fulfilled, pressure for new possibilities of work and leisure. The media seduces them with the charms of the city and dreams of consumption and the traditional school, rooted in urban culture, remaining silent about the rural life, reinforces this feeling that the only way out is to migrate to the city. It is in this context that MST has sought to implement new projects involving the settlement youths, in a process that produces new forms of living and signifying the rural culture and the struggle for land.

It was these social, cultural and political needs that inspired the project which began at the Itapuí settlement with 7th graders, involving from its conception the joint action of peasants, students, teachers and specialists (agronomists and veterinarians), of the Lumiar project, in constructing

pedagogical work in the field of mathematics, focused on productive activities in the settlement. These activities are organized by groups of peasants who, collectively, carry out all stages of production, from planning to commercialization.

Initially the students – guided by the agronomist and by the teachers – analyzed the previous projects and bank loan contracts of each group of settlers, to configure the profile of each debt. This was the first opportunity this youth had had of looking at official documents which, in order to analyze their complexity, required understanding dynamics of financial mathematics and previously unknown mathematical tools, such as compound interest. The profile of the debt, produced by analyzing the contracts, was presented at meetings with each group of settlers. For the peasants – many of whom were illiterate and most of whom with at most 4 years schooling – this was the first time they had access not only to the final amount to be paid to the bank, but to the details (albeit simplified) that produced this result.

The meetings to discuss the debt profile supplied the elements required for each group to be able to plan the production they would develop, having as parameter their ability to pay. Difficult situations occurred where it was found that there was no way to pay past debts. One group, for instance, seeing what the young people pointed out, decided to get rid of the truck they were using to transport their crops; another group questioned the advantages and feasibility of requesting a new loan to pay the harvest (even if it were given at relatively low rates of interest), since, as one settler explained “it is better to be free of debt, since an ox free of its yoke finds it easier to lick itself”.

The participation of the youth in these meetings had an effect on life in the settlement. The first effect refers to the participation of women who had been absent from collective discussion in the group and now began to take part. A second repercussion concerns the qualification of planning settlement production. In fact, the pedagogical work which was constructed – from the initial analyses of contracts to their discussion with the community – at the same time as it allowed situated learning (in the sense of Lave 1988) of new mathematical tools, favored a more qualified discussion of financial aspects of settlement activity. This qualification had as its central element the incorporation of techno-culture in pedagogical work. Techno-culture is here defined as the use of calculators and more sophisticated planning processes, which had been previously unknown to the young people. This educational approach also allowed new decisions to be taken about production, integrating the youth in the work world of their families. As a girl said, referring to her father: “I have never talked with him about this. It is only now that I have taken an interest in what is happening to us”. This interest was valued by the adults who are aware of how important it is that the new generation participate more actively in the productive process. This participation is directly related to the education given in the settlement schools, particularly as regards the dimension of its mathematics education.

5. Traditions and “translations” in rice-planting

The first stage of the project, focusing on the discussion of the debt profile of each group in the settlement triggered other stages. Each of them involved the problematization of the production of a specific crop which was analyzed in multiple dimensions. During the analytic process pedagogical work was constructed from an ethnomathematics perspective. This is what happened for instance, beginning at a joint meeting of the agronomist, students and teachers with the settlers of the “Rice Group”. This group consists of peasants coming from a region far from the one where they are established today, (in which soybeans, maize and bean crops predominate) and of former employees of the farm which after expropriation by the State gave rise to the Itapuí settlement. The characteristics of the soil render it appropriate for rice crops, which are in fact its main agricultural activity. Thus, in the group there are women and men for whom rice production is part of their life trajectories and those for whom it is a foreign element with which they still have difficulty in dealing. As Seu Arnaldo explained: “I am from elsewhere, I have been here for ten years but I have not yet caught up with the pace”. The presence of the Lumiar project agronomist in the settlement and the pedagogical work which is being developed seeks to understand this “pace” to which the peasant refers, attempting to speed it up by technical qualification.

During the first meeting organized with the group of settlers in order to plan the rice crop (in which students and teachers participated), one of the questions initially raised concerned the amount of land which would be planted. In fact this information would define the remainder of the plan. One settler suggested that 30 *quadras* could be planted, another showed the possibility of planting “up to one *colônia*”. When they heard these terms, one of the students interrupted the discussion to ask how many *quadras* there were in a *colônia*.⁶ The settler answered: “Look, I deal in *quadras*, they in *colônia*”. The dialogue continued:

Agronomist: One *quadra* is 1.7 ha, i.e. 17424 meters.

Seu Hélio (settler): That is saying it in meters, in *braças* it is 3600 *braças*.

Márcio (student): What is *braça*, Seu Hélio?

Seu Hélio: One *braça* is 2 meters and 20 ... is a *braça*, see? Let's say: *cuba* here, *cuba* there ... 60 *braças* like this, the four strips here: see, 60 there, here, 60,60,60,60, to see how it makes a *quadra*, we will have exactly the 3,600.⁷

Initially, it appeared that the answers given by the agronomist and the settler were enough for the youth. But when they returned to the classroom the explanations proved unsatisfactory and required more detailed study. The discussion began with what the specialist said, explaining that in the rice plantation, peasants deal mainly with the *quadra*: there are also those who use “*colônia*” as a measure, but he does everything in hectares in order “to keep things straight in my mind”, since the bank loan contracts are in hectares. Several questions were thus arisen: What kind of “translation” occurs when *quadra* is

expressed in hectares instead of *braças*? How is *colônia* translated into *quadra*? And how do both connect to hectare? How can one establish bridges and shifts between these knowledges? What are the effects, in terms of power relations, of these “translation” processes, which occur in the Rice Group and in the community?

The pedagogical work sought to problematize these questions. It was not a matter of performing “translations” which would be limited to numerical equivalencies, reducing the study to the demonstration that if a *braça* is 2.2 meters, then 60 *braças* are 132 meters, and therefore a *quadra* is 17424 square meters, i.e., 1,742 ha. An approach which limited itself to this kind of operation would precisely be reducing the work to the formal academic mathematics in which, as Walkerdine argues, “the practice operates by means of suppression of all aspects of multiple signification” (Walkerdine 1988, p. 96). Following this author, I emphasize that “the position which I have adopted is that the object world cannot be known outside the relations of signification in which objects are inscribed” (Walkerdine, 1988, p. 119).

At the Itapuí settlement, such relations of meaning are produced in a process where different cultural traditions meet and confront each other, recalling what Stuart Hall well described as an oscillatory movement between tradition and “translation”. For the author the concept of “translation”⁸:

“describes those identity formations which cross and intersect natural borders constituted by people who were dispersed forever from their native land. These people retain strong ties to their places of origin and their traditions. But without the illusion of a return to the past. They are obliged to negotiate with the new cultures in which they live, without simply being assimilated by them and without completely losing their identities. They carry with them the traits of the cultures, traditions, languages and specific histories which marked them.” (Hall 1997, p. 96)

Among these traits are the use of specific surface measures, expressed also based on specific units whose meanings are culturally constructed. The history of imposing a standard of specific surface measures was not the result of a consensus produced by the supremacy of their precision, nor by arguments of universalization. On the contrary, examples of popular revolts such as the one which became known as the “Kilo Revolt” which took place in Brazil in 1871 (Souto Maior 1978). This revolt, which had as one of its causes the imposition in the country of the French metric system, shows the rebellion of colonized groups and some of their forms of resistance. This part of the history of popular struggles in Brazil, usually not mentioned in the school curriculum, was present in the work developed at Itapuí, allowing the construction of bridges between the history (of mathematics) and the perspective of ethnomathematics. The past and the present were understood as culture,

“the site of the struggle to define how life is lived and experienced, a struggle carried out in the discursive forms available to us. Cultural practices articulate the meanings of particular social practices and events; they define the ways we make sense of them, how they are experienced and lived.” (Grossberg 1996, p.158).

The past and present cultural practices were examined in the dimensions of conflict, of the struggle to impose meanings, in a dynamics in which non-official knowledge, vocalized by peasants coming from different regions of the state, whose life experiences are marked by different traditions, were recovered and confronted amongst themselves and in their relations with dominant knowledge, vocalized by the agronomist. In this process the traditions – *quadra*, *braça*, *hectare* and *colônia* – were also translated.

6. Final remarks

The project begun in 1996 in the Itapuí settlement, under an ethnomathematics perspective, has pointed to several questions which could possibly be relevant in other social contexts. Peasants, students, teachers and technicians are experiencing the construction of an educational process in which local and more global knowledge interact, where native and technical knowledge are confronted and incorporated, in a dynamics where the school is not turned inwards, with its back to the community of which it is part. On the contrary, pedagogical work has overflowed the school limits, extrapolated its borders, producing the double movement of making community life penetrate the school at the same time as knowledge produced during this process pours out from the school space. What was at stake, in carrying out this two-way movement was the construction of ethnomathematical work which would not be limited strictly to the school space, and would end up by constituting, above all, a perspective that would only reinforce the hegemonic ways of learning and teaching mathematics marked by the Western, white, urban male culture (Knijnik 1996). Such a perspective runs counter to the arguments presented by Nick Taylor (1993) in his criticism of ethnomathematics, based on Valerie Walkerdine's theorizations. In fact, Taylor identifies the "dilemma of ethnomathematics" precisely in the focus used by the author in approaching the discussion on context and transference. Criticizing her he says:

"(...) The end goal in working from a specific bit of local knowledge – one metaphorical manifestation – to the underlying metonymic principle (Walkerdine 1982), is formal mathematics. It is hard to square this mathematics as a central repressive mechanism of modernity (Taylor, 1991). It is hard to reconcile the connection she draws between the metaphorical and metonymic elements of knowledge, with her postulation of a disjuncture between 'problems of practical and material necessity versus problems of symbolic control' (Walkerdine 1990, p. 52)." (Taylor 1993, p. 132)

The approach used in the pedagogical work developed in the Itapuí settlement focused on problems of practical and material needs. They were not transmuted into symbolic control problems, indicating other possibilities in the field of ethnomathematics, especially in mathematics education, which is carried out with social movements such as MST. The connection between the struggle for land and the perspective of ethnomathematics is mediated by the dimension of the social, the cultural and the political. Ethnomathematics finds its most relevant expression when it exposes its social engagement, when it treats cultural questions as non-exotic and rooted elements, when

it shows its commitment to political struggles widespread throughout the world.

7. Annotations

¹ Camps are places where the MST families stay, after squated on a previously selected unproductive large estate. Land squats are usually violently repressed by the police forces, sometimes resulting in deaths. Squats have constituted one of the strategies used by MST to pressure the State into carrying out land reform. The stay in the camps is used to prepare for the next stage of the struggle: settlement. In this new stage, female and male peasants receive the official, definitive possession of the land from the State.

² In referring to ethnomathematics, in this initial approach to the topic, I explain it through what is today already considered their classic "conceptualization": "(...) ethno refers to identifiable cultural groups, as for instance national-tribal societies, unions and professional groups, children in a certain age group, etc. And includes cultural memory, codes, symbols, myths and specific ways of reasoning and inferring. Just as mathematics is also seen in a broader manner which includes counting, measuring, reckoning, classifying, ordering, inferring and modelling" (D'Ambrosio 1990, p. 17–18).

It should be stressed that the use of the classic term "conceptualization" does not mean to constitute an element which will fix the meaning of ethnomathematics. If I did so I would be opposing a non-essentialist concept of knowledge which I accept, in which there is no sense in asking about "what is, for once and for all, ethnomathematics", and it is also not appropriate to ask about the "essence" of mathematics.

³ Following authors such as Grignon and Passeron (1992) I have stressed that the articulation between relativist and legitimist perspectives of culture is not a simple operation. However, not doing so is also problematic.

⁴ Here I would like to emphasize a key argument presented by Arthur Powell and Hartmut Köhler, when they read the draft version of this paper. They both argued the importance of stressing that "old" ways of producing, mainly centered in manual work, are also technologies. This sort of approach puts clearly our understanding that traditional communities did and still do produce technologies and, at the same time, reinforce the importance of avoiding the glorification of "new" technologies, examining critically their ecological, economic and social impact.

⁵ The documents published by the education sector of MST, in particular the Cadernos de Educação, present a detailed description of the above mentioned proposal. An analysis of the proposal is found in Knijnik 1996, 1997b.

⁶ The expression *colônia* is used with different meanings in the Brazilian rural areas. In this situation the settler was using it to signify 2.5 hectares.

⁷ Seu Helio was saying that one *quadra* is the equivalent of the area of a square of 60 *braça* on each side, i.e. a square of 3600 "*square braça*". The use of measures such as *braças* in the Brazilian rural environment has been examined by authors like Guida Abreu (1989) and Helena Oliveira (1997). The latter study also analyzes the introduction of the French metric system in Brazil from the historical point of view, and has been used in pedagogical work in the settlement of Itapuí.

⁸ Stuart Hall (Morley/Chen 1996, p. 393) argues that he uses "translation" in quotation marks to emphasize that it is "a continuous process of re-articulation and re-contextualization, without any notion of primary origin".

8. References

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