

CHAPTER 2

IMMIGRANT CHILDREN LEARNING MATHEMATICS IN MAINSTREAM SCHOOLS

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1. IMMIGRANT CHILDREN LEARNING MATHEMATICS IN MAINSTREAM SCHOOLS: A TRANSITION PROCESS

We understand the schooling of the immigrant¹ children as a transition process, because when they arrive into a new country they have to cope with the many changes involved in moving from one culture to another. In particular, they have moved from one school culture into another, if they have attended school, or perhaps they have moved from a 'no-schooling' culture into a school culture. We regard immigrant students as having the need to build a bridge from the meanings of their initial situation to those of the present one. All of them have the right to be offered the opportunity to develop their potentialities to the full, regardless of their country of origin or the reasons for their migration. We believe that school should contribute to help them create a continuity between their home and the host culture's meanings. From that point of view, and not avoiding the researchers' commitments to society and particularly to teachers and students, the goal of our study is to find teaching approaches that contribute to co-construct the students' transition in order to make it as smooth as possible.

We say 'co-constructing the transitions' because a one-sided construction would not be complete, since the meanings a child brings to a situation, as Bruner states, 'are not to his own advantage unless he can get them shared with others' (1990, p. 13). Everyone involved in the dynamics of the mathematics classroom has to participate in the negotiation of the meanings associated with the diverse situations, in order to ensure a real sharing of them (Kao & Tienda, 1998).

¹ In our study, the word 'immigrant' is considered as taken in Ogbu's classification of minorities (Ogbu & Simons, 1998). Therefore, we take into account voluntary immigrant minorities, who are supposed to have moved willingly to Catalonia, and involuntary immigrant minorities, such as refugees, migrant/guest workers, undocumented workers, and binationals, including descendants or later generations. Even though there can be different types of minority status among these groups, all of them have in common, to some extent, the need for a social adjustment and equal educational opportunities in their school performance.

Smoothing the student's transition would require, in particular, making the cultural conflicts something positive, both for immigrant and local students. When analysing the meanings that a child brings to a school situation, it has to be taken into account that those are constructed in relationship not only with the sociocultural context of the learning, but also with his or her emotions, values and beliefs. Immigrant students cannot establish reference points with which to direct themselves, without the guidance and the acceptance of people belonging to the host culture, the teacher and their classmates, among their 'significant others'.

In this chapter we present the analysis of the immigrant students' process of transitions, from their home and school culture to the school culture that hosts them, and we shall focus on the mathematics classroom, and understand the construct 'culture' in its broadest sense. By focusing on the cultural conflicts that arise in a mathematics classroom, we study the transition processes both as they are understood by the teachers and as an external manifestation of how the students themselves adapt to the changes, by constructing new meanings and values and adapting the old ones. In particular, we will refer to the social and sociomathematical norms, and the norms of the classroom mathematical practices.

We take as our starting point the definition of culture by Geertz (1973) and we analyse the context of the transition process, being predominantly the mathematics classroom, but we consider it within the school, and within the educational and social structures that frame it, and condition what is possible and what is desirable. We consider the main interest of our project to be knowing more about how the significant persons that influence the learning process as a transition process, essentially the teachers, understand these processes. As our research is not only interpretative, but also has the intention of promoting change, we have been designing, experimenting with, and analysing, different classroom situations that are potentially useful for making explicit and positive the cultural conflict which is often invisible in the mathematics classroom.

We understand the construct 'transition' not as a moment of change but as the experience of changing, of living the discontinuities between the different contexts, and in particular between different school cultures and different mathematics classroom cultures. The construct 'transition' is, in our understanding, a plural one. Transitions arise from the individual's need to live, cope and participate in different contexts, to face different challenges, to take profit from the advantages of the new situation arising from the change. Transitions include the process of adapting to new social and cultural experiences, and students need to be helped to understand the meanings of the new experiences and to reinterpret them and construct new ones based on their own individual meanings and values.

Researchers and teachers can only see the external part of the transition process and they only have the means to interpret it. As it is a private and personal process, and most of the time hard to exteriorise, one can just interpret what is going on in the student's transition process through its external manifestation. The mathematics classroom is a social and cultural scenario and, as in every educational situation, it has its social dynamics and its social interactions. The various moments of those dynamics have different meanings for the different participants in them and these

differences can create cultural conflicts (Bishop, 1994). On the other hand, as Bishop remarks, there is an unavoidable part of cultural conflict in every educational situation.

Cultural conflicts and disruptions between the various meanings that different persons attach to the same situation are, probably, the most visible manifestations of the transition processes lived by the participants in a multicultural classroom. However, misbehaviour, lack of interest, absenteeism, could be reinterpreted as an external manifestation of a difficult transition process, if the observers were aware of the tensions lived by the students in the new situation. Often, the apparent lack of conflict only means its invisibility to the observers, and when cultural conflict remains invisible it may turn into different types of blockage that can slow or hinder immigrant students' learning process and their participation in classroom community life.

Researchers and teachers also have their own meanings and expectations related to classroom situations. Thus, for instance, teachers find immigrant students to be 'different' from what they expect their pupils to be. When talking about differences in a social situation we mean differences from the 'normality', where this is defined according to the assumptions and expectations of the persons concerned. As Bauersfeld et al. (1988) state: 'social interaction takes place among individuals or subjects, which mutually constitute expectations, interpretations from each other, and test these interpretations by negotiation processes, producing, this way, meanings, structures and acceptance norms and norms to validate' (Bauersfeld et al., *op. cit.* p. 174). When acknowledged, cultural conflict can be assumed as a positive starting point in order to accept the fact of cultural diversity, and making it explicit is the first step to facilitating the students' transition processes. Therefore, for a real sharing of meanings, it is important that the adults involved in the teaching of immigrant students are explicitly conscious of their own. More than that, they should be ready to review them and to change them if they want their students' transitions to be co-constructed: the move has to take place on both sides.

The immigrant students that we have worked with experience different kinds of transition processes. Some transitions are go-and-come-back continuously, following the classification given in chapter 1 we can call them 'collateral transitions', where students participate in the experience of more than one context, for instance, the mathematical practice inside and outside school. These transition processes should contribute to give plural meanings to the signifiers and to mathematical knowledge. The students also experience 'lateral transitions', the transitions resulting from an irreversible change, if not psychological, at least physical, having moved from one country to another where they now have to live. We understand this transition process as being most significant when establishing their path of progress, since it is linked to opportunities and barriers.

However, what is important about transitions, all of them, is that the immigrant students move from a world with particular meanings and values to another world with other meanings and other values. To be able to react to them, by appropriating them, or not, they need to understand and reinterpret them both on the basis of the meanings and values they had in the previous context and on those they perceive in

the new situation. It is also important to take into account that the more difficulties the individuals have to structure the new meanings, the more obligation there is for us as educators to help them to create a continuity bridge. The 'good' students, from a high social and cultural class, even if they are immigrant students, have fewer difficulties in engaging in the process of transition and thus suffer less. The unschooled students, with social, familial and economic difficulties, need to be helped much more to 'organise and structure' their new meanings. The more distant the meanings are from the different worlds, the more need there is for making explicit those in the new situation.

The issue then, in the context of our project, is what are the continuities and discontinuities, their coherence and non-coherence, between the meanings attached to the mathematics learning process by the different participants in it? What are the meanings that teachers and students attribute to learning mathematics, to the different mathematical practices within and outside school, to successful learning, to assessment, to mathematical usefulness? And what are the values associated with these by the different participants?

The more we help to further the coherence, the smoother will the transition be, and the greater will be the opportunities for students to learn mathematics. We are not facing students defined only as 'being from another culture' or another country, but as students who are at a certain moment in time in a continuity between the two cultures. It is one of our goals to try to find ways to help the teachers to contribute to creating this continuity and coherence in the entire educational activity. Continuity cannot be established without the clear intention of acknowledging the student's culture and the culture of the group. History is full of abrupt breakdowns of this continuum, and of curricula imposed artificially that are far from the real needs of the individual.

In our understanding, coherence and continuity are not only necessary from the point of view of educating or helping in the development of every immigrant student as a person, but are 'powerful' social tools. Transitions between different educational cultures have certainly to do with issues of equity and justice. Transitions are related to social progress, and have to do with 'social selection'. Transition is not a matter of 'changing the scenery or the decor' of the educational process but it is about living changes that are linked with chances of success. There are transition processes that are more likely to result in the child succeeding at school and, from the point of view of the system, a 'successful transition process' would be the one that enables the student to get 'good results' within the system. However, the transition process must also be a positive one for the person, one that is lived as enrichment. What for some people will be a benefit, for others could be a loss. Furthermore, we would argue that it should be a process through which people adapt to the new situation without having to give up their cultural background, but can reinterpret it in the light of their present needs.

Mathematics educators, teachers and researchers, through their attitudes perpetuate the myth that the subject is just for elites, consciously confirming the failure of some students through poor learning conditions, or unwittingly through prejudice, values and expectations (Apple, 1998; Dowling, 1998). Researchers and teachers

should be aware that teaching may induce, consciously or not, intentionally or not, failure among the immigrant students through their transitions. In their individual action as agents for change they have a big responsibility that cannot be avoided or excused by the constraints of the structure that limits it.

2. THE RESEARCH CONTEXT: ITS COMPLEXITIES

In recent years, there has been an increasing immigration into Catalonia, an autonomous region in northern Spain (whose capital is Barcelona), which has led to significant changes in the school population. The immigrant population in Catalonia is about 1.4% of the whole population and, in 1997, it reached 2.3% in Barcelona. This percentage is not homogeneously distributed in the city; in particular, in the area where we have focussed our research the percentage of immigrant students rises to 90%. This new situation has focused attention on the inadequacy of the educational provision in multicultural schools and classes and raises many questions related to issues of equity and justice.

In 1997, the first of the authors received a grant from a Catalan private foundation devoted to education, *Fundació Propedagògica*, to carry out a project concerned with mathematics teaching in schools that have large numbers of immigrant students². The project was also supported by the Catalan Ministry of Education. In this section we introduce the research context and we discuss its complexities, both from the global point of view, as to how the political and social structures are in tension with the researchers' assumptions, and from a more local point of view, the complexities of the classroom reality in everyday life.

Even if the project was initially linked to a request from the administration, the team's understanding of the multicultural situation in schools goes far beyond that of the educational administration. The team negotiated strongly to change what initially was expected to be a policy-driven 'research' project into a research project with no inverted commas. Probably, the most difficult argumentation with bureaucrats and politicians, has been about mathematics being a cultural product and that learning and teaching mathematics is linked to values, beliefs and expectations and that this emotional aspects can explain many of the difficulties immigrant students have when learning mathematics.

To acknowledge mathematics as a cultural product is a first step to taking advantage of the cultural diversity among the students as a source of richness for mathematics learning (Wilson & Mosquera, 1991). On the other hand, since any mathematics classroom can be considered to be a multicultural class, understanding culture in a broad sense (Borba 1990), an approach that considers mathematics as a cultural product will benefit all students, whether they are immigrant or not. The search for curricular models and methodological approaches that take culture into

² The context of the research has already been presented as a contribution to MEAS1, 1st International Conference on Mathematics Education and Society, held at Nottingham on September 98: Gorgorió (1998)

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