FOREGROUNDS AND POLITICS OF LEARNING OBSTACLES

OLE SKOVSMOSE

In 1954, Hendrik Verwoerd made the following statement in his address to the South African Senate:

> When I have control over Native education I will reform it so that the Natives will be taught from childhood to realise that the equality with Europeans is not for them [...] People who believe in equality are not desirable teachers for Natives [...] What is the use of teaching the Bantu mathematics when he cannot use it in practice? This idea is quite absurd. (Verwoerd, quoted from Khuzwayo, 1997, p. 9)

According to Verwoerd and the apartheid regime, the paramount task was to make sure that blacks were prevented from climbing the social ladder. Being excluded from mathematics also meant being excluded from the possibility of advancement in society.

In other words, learning obstacles for a certain group of students can be established in explicit ways such as being subject to an absurd policy. Here we are a long way away from the epistemic notion of learning obstacles, analysed in terms of students' preconceptions, if not misconceptions, of some mathematical notions and ideas. The epistemic interpretation of 'learning obstacle' is *not* the only one possible. However, processes of exclusion in education can be dressed up in such a way that their political dimension becomes hidden and ignored. It could appear that exclusion is not imposed on students. Instead, exclusion may appear as a consequence of some students' so-called low achievement.

When mathematics education operates as part of social mechanisms, providing or justifying certain forms of inclusion or exclusion, it comes to serve as a gatekeeper. According to Volmink (1994):

> to deny some access to participate in mathematics is […] to determine, *a priori*, who will move ahead and who will stay behind. (pp. 51-52)

This statement can be read as a dramatic description of the role of mathematics education as institutionalising a distinction between those who are included and those who are excluded. Bourdieu (1996) refers to a 'state magic', by means of which the state assigns some authority to a group of people, by referring to that group's good performance in school, and in particular to the performance in mathematics.

To me the notions of inclusion and exclusion are as relevant for the discussion of mathematics education as the notion of achievement. Is it initially high or low achievement that produces social inclusion or exclusion? Or do socio-political processes of inclusion and exclusion manifest themselves in schools and in the mathematics classroom as high or low achievement? Needless to say, the relationship between high/low achievement and inclusion/exclusion is more complicated than that, but I find it essential to consider carefully how social processes of inclusion and exclusion might appear in the mathematics classroom. In this way, it might be possible to discuss the politics of learning obstacles.

I am going to consider such issues from a conceptual perspective. In particular, I am going to draw attention to the notion of *each student's foreground* as a conceptual construct that might facilitate a discussion of the 'politics of learning obstacles'.

The introduction of the notion was inspired by some observations I did years ago of seven-year-old students doing mathematics. At the beginning of each lesson, the teacher carefully explained the new task. Following this, the students had to do some exercises from the textbook. Suddenly several students seemed completely occupied in their own work, and when I tried to engage the boy sitting next to me in a conversation he simply ignored me. I soon realised the reason. After each student had completed the exercises, they went to the teacher's desk, and the teacher commented in an encouraging way about what each student had done.

However, there was another agenda in operation. As the students lined up, a public stratification took place: Who was first, second, third? A competition took place amongst the students, at least among some of them.

I also observed a group of girls who seemed to be ignoring this rush. They did address the exercises, but they worked at their own pace and with a lot of small interruptions. They seemed, somehow, to have renounced speed, realizing, perhaps, that whatever they did they would never become among the first in the line. It was common knowledge that sometimes Peter (who I was sitting next to) was the first, sometimes Anna, sometimes Maria, and a few times a fourth one, but the candidates for winning the game were a minority.

What could one do better than establish one's own priorities? The group of girls had started the first problem, but soon they needed to erase a wrong number, and spent time choosing the proper eraser. Should it be the one with a smell of strawberry? Pencils had to be sharpened; comments and smiles had to be exchanged; and in these ways time would pass. Somehow, they protected their integrity very well. Had they, instead, struggled in vain to get first in line, lesson after lesson, their self-esteem might have been affected.

To understand their approach to mathematics I explored how they interpreted their opportunities. I found that they constructed their 'foregrounds' as expressions of what they experienced as their opportunities, and that these foregrounds set the conditions for their engagement in, as well as their resistance towards, mathematics.

Originally I developed the construct of 'foreground' from a philosophic perspective and used it in the interpretation of learning processes taking place in Danish classrooms (Skovsmose, 1994; Alrø and Skovsmose, 2002). However, it has turned out to be useful in other, different, educational contexts:

- for a co-operative project conceptualising and establishing a mathematics education with an explicit concern for democracy (running since 1994) between universities in Denmark and South Africa – discussing educational consequences of the apartheid regime's policy and of the damage to opportunities in life that this regime caused for black students

- for exploring further, also since 1994, the ethomathematical research programme in an extensive co-operation with researchers from Brazil.

Thus, I do not consider the construct 'foreground' to be relevant only when we consider the situations with reference to which the construct emerged. Instead, I consider the construct relevant for any discussion of learning that includes a discussion of learning obstacles.

Privatising or politicising learning obstacles?

Let me illustrate what I mean by *politics of learning obstacles* by summarising one aspect of white research on black education carried out during the apartheid past of South Africa. Interpretations of achievement in school was a big issue, as particular interpretations could help to 'explain away' the brutality of the apartheid regime. Racism was an all-embracing category. Both 'classic' and 'progressive' racism argue that it is not the school that has to be blamed for the weak performance of the black child, but that the child brings the cause for his or her weak performance into school.

In the basic assumption of *classic racism*, performance in school was accounted for by referring to certain 'facts'. That black children did not perform as well as white children had to be understood in terms of biological structures, established thousands and thousands of years back in time. Certainly, such an explanation provided a solid distance between the apartheid regime and the causes for what was observed in classrooms.

In particular, black children's learning obstacles had nothing to do with the school structure, and certainly nothing to do with apartheid politics. These obstacles had to be found in the black children themselves. They bring their own deficiency along with them, right into the school. The children are inevitably linked to their own poor performance, which is just a different expression of their colour of skin. Thus, the political dimension of school performance is efficiently explained away.

In *progressive racism*, the idea that social aspects play a fundamental part in a person's intellectual and emotional development, and not the biological framing, did lead to new priorities within white research on black education. Instead of searching for a biological explanation of the weak performance of black children, social factors, intrinsic to 'black culture', could be identified. In his study of white research carried out during the apartheid era of the Orange Free State University, Khuzwayo (2000) has uncovered what such research included: How to explain observations of black children's weak performance in school? One suggestion was that reasons had to be sought for in their social background.

In one study from the Orange Free State University, an explanation was suggested in terms of family traditions and, in particular, in terms of the dominant role of the father in the black family. According to this study, this aspect of the black family helps to explain that creativity, and also the mathematical creativity of the black child, was eliminated. Thus, family structures became a main factor in the explanation of the black child's performance in school. The problem is thus to be found in the cultural background of the child. In other words, black culture (and therefore not any suppressing white culture) produces the learning obstacles for black children.

Black children's problems in school are established beforehand and are not to be located in the school structure. The black children themselves bring their learning obstacles to school. The best the school can do is to compensate for such cultural deficiencies. According to Bourdieu's (1996) formulation, racism establishes categories of perception and forms of expression,

> which suppress or repress the social dimension of both recorded and expected performances and […] dismiss any questioning of the causes. (pp. 10-11)

Many deficiency theories (theories of the deprived child) follow the approach of racism in explaining away the sociopolitical dimension of school performances, by *privatising* and *personalising* the causes of such performance.

Bopape (2002) has made a study of mathematics education in the most desolate parts of South Africa, and he has showed me what a school might look like; broken windows; doors and all electric installations missing. There was a hole in the roof – maybe the tiles had been removed by somebody who found that his or her house needed the tiles a bit more than the school building did. When it was raining, the children had to get away from this part of the classroom. The classroom would be either too hot, or too cold, or too wet. It looked like a place where teacher and students would meet having a shared intention to leave this ugly place as soon as possible. What seems to be the most obvious learning obstacle to the children in this school: their colour of skin, their dominant father, or the hole in the roof?

What does this mean for mathematics education? It is all too obvious. When we enter the classroom, the first thing that hits us is the evident physical learning obstacles. The learning obstacles are right there in front of our eyes, and on top of our heads. To me, this hole in the ceiling, not referred to in much research in mathematics education, calls any deficiency theory of the child into question (see also Ginsburg, 1997; and Gorgorió and Planas, 2000, 2001).

How could it be that this hole in the roof has not been seriously addressed by mainstream research in mathematics education? Learning obstacles can be looked for in the actual situation of the children and with respect to the opportunities which society makes available for the children. The

actual distribution of wealth and poverty includes a distribution of learning possibilities and learning obstacles. This distribution is a basic political act. Paying attention to this means re-establishing the politics of learning obstacles. Civil and Planas (2004) address the notion of learning obstacle in a similar way:

> [L]earning obstacles are not related to students' preconceptions and misconceptions of some mathematical ideas, but to forms of excluding some groups from mathematics education. (p. 12)

And they emphasise that learning obstacles go "much deeper than classroom dynamics" (p. 12).

During the rest of this article, I shall try to explore in greater detail the nature of learning obstacles by considering the notion of *each student's foreground*. By means of this notion I shall try to illustrate that learning obstacles can take the form of a ruined foreground, and that ruining the foreground of a certain group of children is a socio-political act. That a foreground is spoiled does not mean that there is no foreground, but that the foreground appears to be without attractive and realistic opportunities. Learning can, to a student with a shattered foreground, appear pointless: Why should I try to learn this? Why should I pay attention to mathematics? I cannot see any meaning in this. A ruined foreground does not easily support hopes. However, before getting to these ideas, I want to take a look at the notion of background.

Meaning and background

Bishop (1990) refers to a mathematics textbook that contains the following problem:

> The escalator at the Holborn tube station is 156 yards long and makes the ascent in 65 seconds. Find the speed in miles per hour.

Working with this problem has a very different meaning to children in London than to children in Tanzania who, in fact, have been introduced to this textbook. In the first case, the exercise can be seen as an attempt to provide mathematical exercises with some meaning (although I doubt how successful the textbook author has been in this case). However, when the textbook is used with children in Tanzania, as part of a programme imposed on them by the British colonial officers of the time, the same exercise can be seen as cultural imperialism, and mathematics education can be characterised, as Bishop has done, as a weapon of cultural imperialism.

Meaning has been discussed with reference to the notion of culture. Meaningful mathematics education has been sought for by relating classroom activities and possible contextualisations of exercises to the students' culture and background. The escalator at the Holborn tube station may bring some meaning to some English children. Bringing the students' *cultural background* into the classroom as a resource for contextualisation seems relevant for bringing meaning to the mathematics classroom. To draw on students' background appears to be a simple and obvious idea. Nevertheless, I am not sure that we are dealing with a 'simple truth'.

Culture can refer to many things, and cultural background can operate in different ways in the classroom. Culture can refer to tradition and folklore. But when expressed by the apartheid system, a notion like 'Zulu culture' comes to operate in an oppressive way. It could constitute a trap. An 'appreciation' of Zulu culture might be associated with the assumption that people belonging to this culture stand outside the Western development. The Zulu culture could be picturesque and include, for instance, dances with traditional weapons. The notion of culture could get a negative connotation, referring to people 'out there' and 'down there', supporting the view that people with such a 'different' culture had better stay in their homelands.

It appears problematic if an appreciation of culture results in a constant appreciation of traditions. Culture is changing and developing, it includes new elements, good and problematic ones, in a complex mix. 'Culture' is a contested concept. As a consequence, it is not a straightforward act to search for meaningful mathematics education in the cultural background of the students.

In much ethomathematical literature the intimate connections between culture and mathematics has been emphasised. D'Ambrosio (2001) explains that by *ethno* he refers to the fact that mathematics is acted out in many different ways in different cultures and by different groups. Mathematics is always socially embedded. The ethnomathematics perspective has had implications for the practice of mathematics education: it has been emphasised that it is important to consider the background of the students when we try to constitute meaningful mathematics education.

I certainly agree with the point that making mathematics education meaningful is essential. I also agree that meaningfulness has to do with the cultural background of the students, but I would argue that meaningfulness has much to do with another dimension as well, namely the foreground of each student. To me 'cultural background' should not remain the only key notion when meaningfulness in mathematics education is discussed.

Learning as action

I find it problematic to try to explain the performance of somebody by, first of all, referring to the background of the person. This could be any kind of performance, and also (high/low) achievements of students in a mathematics classroom. 'Referring only to the background' is a strategy by means of which the political nature of learning obstacles can be eliminated. If, instead, we try to explain the performances in terms of the background, the here-and-now situation, and the foreground of each student, then the political nature of the learning obstacles becomes more obvious.

By the *foreground* of a person I understand the opportunities, which the social, political and cultural situation provides for this person. However, not the opportunities as they might exist in any socially well-defined or 'objective' form, but the opportunities as perceived by a person. Nor does the background of a person exist in any 'objective' way. Although the background refers to what a person has done and experienced (such as the situations the person has been involved in, the cultural context, the socio-political context and the family traditions), then background is still

interpreted by the person. Taken together, I refer to the foreground and the background of a person as the person's *dispositions* [1] (and for simplicity I include the meeting point between foreground and background, the present situation, in the foreground).

These dispositions need in no way be homogeneous entities. Dispositions can incorporate conflicts and contradictions. A person can conceptualise different sets of aspirations, *i.e.*, different foregrounds, and his or her background can be structured by conflicts. And, certainly, a person's aspirations need not square with his or her background.

Dispositions should not be taken to be characteristic of only an individual. It makes sense to talk about the dispositions of a group with shared background and foreground. Dispositions provide resources for action – not in the sense that dispositions 'cause' actions, but dispositions embody propensities that become manifest in actions, choices, priorities, perspectives, and practices. Dispositions are continuously reworked and remoulded. They are dynamic. They are relational or interpersonal characteristics. They are sociologically structured. This being said, I continue to talk as well about a person's dispositions as those which are reworked and remoulded in the person's interactions with other people, but which the person can draw upon as his or her resource for action.

According to many philosophic interpretations, and mine also, intentionality or intentions-in-action is a defining element of an action. In order to understand a person's action, we have to consider his or her intentions. Behaviourism proposed that actions could be identified with their physical appearance. In this way a certain conceptual framework was suggested for how to explain actions – in terms of events taking place before the actions are carried out.

Several alternative interpretations have been suggested indicating that an action is more than its behavioural appearance. Following the idea of Brentano (1995) [2] it has been suggested that human consciousness can be characterised in terms of its directedness, its intentionality. I propose an interpretation of action that tries to grasp the specificity of action through its intentionality. This makes intention-in-action a crucial construct.

The intentions of a person are not simply grounded in his or her background, but emerge also from the way the person sees his or her possibilities. In other words, I see intentions as rooted in a person's dispositions. Intentions express expectations, aspirations and hopes. Intentions make up a constitutive part of any action, just as actions without intentions degenerate into simple physical movements. Actions become not simply caused by the past, but represent forms of grasping the future. When we want to try to understand how and why a person is acting, then it is important to get an understanding of the person's disposition.

I see learning as action (not all sorts of learning, but some). This is an important idea in the concept of learning that I am considering (see Skovsmose, 1994; Alrø and Skovsmose, 2002). This notion does not represent a simple description of learning in general, as there are many forms of learning that I cannot describe as action (but instead, in my terminology, a forced activity). Situations where somebody has to learn some routines, like soldiers learning how to go marching in rows, I do not refer to as learning as action. Nor do I consider learning as action, when learning, so to say, takes place beneath the conscious level of the person, like, without noticing it, adjusting oneself to certain habits when put in a new cultural context. Learning as action cannot be forced upon somebody, but students can be invited into situations where they can be involved in processes of learning as action.

Such learning presupposes that students establish intentions-in-learning, as intention-in-action is a defining element in an action. This means that the students see meaning in what they are doing. Maybe it is even better to think of learning as inter-action: learning means doing things together.

However, a particular situation or a particular way of organising teaching-learning processes can prevent students from acting as learners. This was what I observed in the classroom with students reacting to a public stratification. Some engaged in the activities and put extra effort into what they were doing, whilst others, including the group of silent girls, withdrew their intentions from the 'official' activities of the classroom, and redirected them into 'alternative' activities. In order to interpret the activities of the group of 'silent girls' I had to consider not only their backgrounds, but also what they saw as their opportunities. Their foregrounds might prevent them from putting effort into the designated activities.

I see achievement (low or high) as being related to the opportunities that the school structure and the socio-political context in general make open for the students to perceive as their opportunities. This provides a different interpretation of learning obstacles. Such obstacles have not only to be sought in the historical past of the person, but also with reference to the opportunities that the social and political system makes available for the person. In particular, the apartheid system destroyed the future of black children, and this explains some of their behaviour in school. *When a society has ruined the future of some group of children, then it has also obstructed the incitements of learning*. A ruined future can be the most brutal form of learning obstacle. This interpretation of learning obstacle accuses the society in question. A spoiled foreground is a dramatic learning obstacle, and spoiling a foreground is a socio-political act.

Meaning and foreground

In order to establish meaning in education, students should be involved in meaning production, and each student's foreground is an essential resource for this production. I decided to talk about *meaning production*, following a terminology presented by Lins (2001). However, I do not follow the theoretical framework also presented by Lins, as I restrict my use of meaning production to a metaphoric sense, emphasising that meaning is produced and constructed.

Let us imagine that we, as mathematics educators, arrive in a village far away 'beyond the mountains', and we find that in this village there are chickens everywhere. We realise immediately that all kinds of mathematical activities can refer to these chickens, such as counting, selling, buying and cooking. What a perfect situation for making sense of mathematical notions! We construct tasks that relate to counting

and selling and buying and cooking chickens. The students will be familiar with it all. This is part of their background. Nevertheless, this need not make sense to students. They may be more interested in, say, pilot's mathematics, although they have only seen an airplane passing by up there high in the sky making a fine white line, signifying that there are many different places to go. When we, as mathematics educators, come to this village we must not only consider the students' background, but we must also consider their hopes and aspirations. We must consider where they want to go. *Meaning not only represents the past. It also represents the present and the future.* Each student's foreground is a principal resource for meaning production.

To me the notion of meaning production emphasises that meaning is not a referential property [3]. Meaning is produced; it becomes an aspect of acts – and not just an aspect of concepts. This is in line with the ideas indicated by Wittgenstein (1953) suggesting an interpretation of meaning in terms of use. Following this direction, I see meaning as an aspect of acts, and meaningful education means that students are invited to engage in meaningful learning acts. Meaning is produced by students, and by co-operation among students and between students and teachers. This production is resourced by the dispositions of the students. Therefore, 'meaning of learning', 'meanings for students', and 'each student's meaning production' must be investigated and interpreted with reference to the dispositions of the students (including their background and foreground).

Meaning production takes place in terms of what the students see as their opportunities, including motives, perspectives, hope and aspirations. It gets its extra fuel from the foreground of each of the students. Meaning production, however, can also be obstructed. If meaning production takes place with reference to the foreground of the each student, then ruining the foreground for certain groups of students creates a real learning obstacle. To a black child in apartheid South Africa, what could be experienced as the point of struggling with mathematics, when jobs which presupposed mathematical skills, like engineering, for instance, were not for blacks? What was the point for many girls in Denmark (or other Western countries) in a not so distant past of concentrating on studying physics and mathematics when jobs, demanding such skills, were apparently for men? Based on her studies, Wedege (1999) claims that the habitus (as interpreted by Bourdieu) of a young woman in Denmark in the 1930-1940s does not automatically encompass a disposition for learning mathematics, nor does it generate a conception of mathematics as a relevant subject. How do children of immigrant parents conceptualise their opportunities in today's Danish (or European) society, and how does that affect their attitudes towards learning? How does an apparent marginalisation of some groups of people affect some groups of students' foreground and therefore their possibilities for being involved in certain learning processes? How does the emerging racism in Western Europe provoke learning obstacles to certain groups of students?

As each student's foreground is one principal resource for meaning production, then ruining a foreground becomes a learning obstacle. This has to be discussed in terms of the socio-political situation of the students. As I see it, by considering the processes of globalisation and ghettoising, we get an idea of the basic condition of learning for many children around the world. Here we find fundamental forms of establishing or ruining foregrounds.

Globalisation includes exclusion

Globalisation refers to inclusion, but also to processes of exclusion. Castells (1998) discusses the rise of what he calls the Fourth World as an aspect of globalisation:

> This widespread, multiform process of social exclusion leads to the constitution of what I call, taking the liberty of a cosmic metaphor, the black holes in information capitalism. These are the regions of society from which, statistically speaking, there is no escape […]. (p. 162)

Furthermore:

> The Fourth World comprises large areas of the globe, such as much of Sub-Saharan Africa and impoverished rural areas of Latin America and Asia. But it is also present in literally every country, and every city, in this new geography of social exclusion. (*ibid*, p. 164)

One essential question concerns the possible foreground of each student living within or close by the Fourth World. What aspirations could they have? How do they see their opportunities? What opportunities could be created for them in their process of schooling (if they have the opportunity to go to school)? What can be created within mathematics education? Schools have got a tricky position in the "new geography of social exclusion". This geography determines the foregrounds of the majority of students around the globe. It determines the disposition of groups of people, and as a consequence it structures motives for learning and for meaning production. Many schools are positioned on the borderline between the Fourth World and the informational society. I see much of mathematics education positioned right there in "borderline schools" (Penteado and Skovsmose, 2002; Penteado, 2001).

'Schooling' can be seen not only as a support for entering the network society, but it can also become a gatekeeper, and an 'excluder' from the network society. If students perceive their foreground as ruined, this could easily turn into low achievement, which, in turn, could confirm their exclusion. In this way, schooling can mean a preparation for the dumping of people into the Fourth World. The remarkable statement of Verwoerd thus represents a clear indication of what it means to put people into a ghetto, in this case represented by homelands. The grand idea of apartheid was built upon the notion that people should be separated, and that black people had no role to play in white society beyond the level of unskilled labour. The existence of ghettos of the network society seems to indicate that the informational economy does not need everybody. Only a part of the global population fits into the networking – the rest had better be left in their 'homelands'.

In the days of apartheid, learning obstacles had their obscure significance, but recent processes of globalisation also cause dramatic learning obstacles to many students. What does it mean for each student's aspirations and hopes to be located close to the black holes of the informational

society? Castells (1998) refers to the millions of homeless, incarcerated, prostituted, criminalized, brutalized, stigmatized, sick and illiterate persons, who are literally expelled from the informational economy with no functional role to play. From a certain economic perspective, they appear disposable. They are worth nothing as consumers; they have no value as possible human resources for production. Other and sufficient human resources are available. This is one brutal aspect of the informational economy and of the 'new geography of the social order'. Children experience this new order, and many as something highly problematic. This influences their foreground, and therefore their dispositions and motives for learning. To me, a ruined foreground is a learning obstacle. As a consequence, I find it important to discuss learning obstacles with references to globalisation and ghettoising as represented by the Fourth World.

Searching for the foreground

If we want to understand the learning activities of students and the way they engage in learning processes, it is important to understand what they consider to be their foreground and their possibilities in life.

I do not see any contradictions in assuming, for example, that working with computers and playing with dynamic geometry can be meaningful when we deal with marginalised students living close to the Fourth World. Working with computers may be miles away from their cultural background. But this background does not represent the only essential parameter in their meaning production. Their foreground is important as well. So, an essential question is how activities, say, including playing with dynamic geometry, may capture their hopes and aspirations. It is important that mathematics education provides opportunities, and when these appear to be real opportunities, seen from the students' perspectives, they can become active in their processes of learning.

There is no point in mathematics education celebrating a certain kind of technological culture, or celebrating the network society. There is no point in mathematics education presupposing an appreciation of any 'high-tech' culture. The point is simply that mathematics education should not organise resources for meaning production in such a way that students are parked in a Fourth World.

Valero (2002) suggests a change in interpretations of learners' activities in the classroom. Instead of emphasising the cognitive interpretation, Valero suggests a socio-political interpretation. She refers to a turning point for her reflections taking place during her observations in a school in Bogotá. On one occasion the teachers were missing, and Valero took over the mathematics lesson:

> I was supposed to give them the exercise worksheet that they had started to solve the previous session. While many in the class worked, two male students engaged me in a chat. These two boys were supposed to be doing the mathematics. Instead, they looked at the worksheet and laughed. They called me for help, but in reality they were curious to know about my intentions and motivations to be in their school. (2002, p. 490)

The students could not understand why Valero had gone to their poor school and chosen to talk with poor students. The conversation made Valero emphasise that there were reasons to study, and also to study mathematics. Then one of the students answered:

> The only class I would like to pay attention to is English, because I want to get out of this fucking country and to go to the US.

It is difficult to find a clearer expression of the idea that reasons for learning are to be found in the foreground of the students, and that a ruined foreground is a learning obstacle of enormous dimensions. Students may be well aware of this. Learning obstacles are interpreted by students, and the socio-political and economic dimension of the learning obstacles might turn into a student's or a group of students' resistance towards learning. Thus, Planas and Civil (2002) observe:

> If students cannot see any perspective in what they are doing, then we cannot expect any meaningful participation of students. (p. 15)

Alrø and Skovsmose (2002) discuss in detail a group of students who cannot find any motivation with which to engage with the proposed task in the classroom. They are not able to put their intentions in the activities – they find no motives. A learning obstacle becomes acted out as a learning resistance.

It is not possible to claim that mathematics education can fundamentally affect the socio-political processes of inclusion and exclusion. Processes of globalisation are stronger than educational processes. They influence the dispositions of many students, *i.e.*, their motives for learning as well as the learning obstacles they come to face. Nevertheless, I see the task of mathematics education as being to provide opportunities for students. Mathematics education has to realise the foreground of the students as a resource for any meaning production. To look for each student's foreground, and to try to relate learning activities to this, becomes an ongoing challenge to any mathematics education.

Acknowledgements

I want to thank Helle Alrø, Bill Barton, Núria Gorgorió, Arne Astrup Juul, Miriam Godoy Penteado, Núria Planas and Paola Valero for critical comments and suggestions for the improvement of this article. A previous version was presented at the Second International Congress on Ethomathematics, 5-7 August, 2002, in Ouro Preto, Minas Gerais, Brazil, and a Portuguese translation is published in: Ribeiro, J., Domite, M. and Ferreira, R. (eds), *Etnomatemática: papel, valor e significado*, São Paulo, Brazil, Zouk Editoria.

Notes

[1] My use of disposition can be compared to Bourdieu's concept of habitus:

> The habitus is the set of dispositions which incline agents to act and react in certain ways. The dispositions generate practices, perceptions and attitudes which are 'regular' without being consciously co-ordinated or governed by any 'rule'. (Thompson, in the *Introduction* to Bourdieu, 1991, p. 12)

However, the notion of foreground does not play a vital role in Bourdieu's notion of habitus, which appears to be more related to 'background' in my interpretation. While background (and habitus) concerns experiences, foreground has to do with expectations, although certainly mediated by experiences. Nevertheless, I find Bourdieu's concept of habitus extremely

interesting as part of the clarification of both the notions of foreground and background.

[2] Brentano's main work *Psychologie vom empirischen Standpunkte* is from 1874. An English translation is found in Brentano (1995). Searle (1983) analyses conceptual connections between action and intentionality.

[3] With reference to classic philosophic interpretations, meaning is assumed to be a referential property. The meaning of a concept is the set of objects or entities to which the concept refers. According to this interpretation, when we in mathematics education are able to expand the references of notions such as function, exponential function and metric space we provide extra meaning of such concepts.

References

Alrø, H. and Skovsmose, O. (2002) *Dialogue and learning in mathematics education: intention, reflection, critique*, Dordrecht, The Netherlands, Kluwer Academic Publishers.

D'Ambrosio, U. (2001) *Etnomatemática: elo entro as tradicões e a modernidade*, Belo Horizonte, Brazil, Autêntica.

Bishop, A. (1990) 'Western mathematics: the secret weapon of cultural imperialism', *Race and class* **32**(2), 51-65.

Bopape, M. (2002) *Mathematics school based in-service training (SBINSET): a study of factors contributing towards success or failure of SBINSET in the South African school context*, unpublished doctoral dissertation (contact e-address: Bopapem@nu.ac.za), Aalborg, Denmark, Department of Education and Learning, Aalborg University.

Bourdieu, P. (1991) *Language and symbolic power* (edited and introduced by Thompson, J.), Cambridge, UK, Polity Press.

Bourdieu, P. (1996) *The state nobility: elite schools in the field of power*, Cambridge, UK, Polity Press.

Brentano, F. (1995, second edition) *Psychology from an empirical standpoint*, London, UK, Routledge.

Castells, M. (1998) *The information age: economy, society and culture. Volume III, End of millennium*, Oxford, UK, Blackwell.

Civil, M. and Planas, N. (2004) 'Participation in the mathematics classroom: does every student have a voice?', *For the Learning of Mathematics* **24**(1), 7-12.

Ginsburg, H. (1997) 'The myth of the deprived child: new thoughts on poor children', in Powell, A. and Frankenstein, M. (eds), *Ethnomathematics: challenging eurocentrism in mathematics education*, Albany, NY, State University of New York Press, pp 129-154.

Gorgorió, N. and Planas, N. (2000) 'Researching multicultural classes: a collaborative approach', in Matos, J. and Santos, M. (eds), *Proceedings of the 2nd International Mathematics Education and Society Conference, Lisbon, Portugal, Centro de Investigacao em Educacao da Faculdade de Ciências,* Universicade de Lisboa, pp. 265-274.

Gorgorió, N. and Planas, N. (2001) 'Teaching mathematics in multilingual classrooms', *Educational Studies in Mathematics* **47**(1), 7-33.

Khuzwayo, H. (1997) *[A report on] Mathematics Education in South Africa: a historical perspective from 1948-1994*, (contact e-address: hbkhuzw@pan.uzulu.ac.za), Copenhagen, Denmark, Department of Mathematics, Physics, Chemistry and Informatics, Royal Danish School of Educational Studies.

Khuzwayo, H. (2000) *Selected views and critical perspectives: an account of mathematics education in South Africa from 1948 to1994*, unpublished doctoral dissertation (contact e-address: hbkhuzw@pan.uzulu.ac.za), Aalborg, Denmark, Aalborg University.

Lins, R. (2001) 'The production of meaning for algebra: a perspective based on a theoretical model of semantic fields', in Sutherland, R., Rojano, T., Bell, A. and Lins, R. (eds), *Perspectives on school algebra*, Dordrecht, The Netherlands, Kluwer Academic Publishers, pp. 37-60.

Penteado. M. (2001) 'Computer-based learning environments: risks and uncertainties for teachers', *Ways of Knowing*, **1**(2), 23-35.

Penteado, M. and Skovsmose, O. (2002) *Risks include possibilities*, a report, Copenhagen, Roskilde and Aalborg, Denmark, Centre for Research in Learning Mathematics, Danish University of Education, Roskilde University and Aalborg University.

Planas, N. and Civil, M. (2002) 'Understanding interruptions in the mathematics classroom: implications for equity', *Mathematics Education Research Journal* **14**(3), 169-189.

Searle, J. (1983) *Intentionality: an essay in the philosophy of mind*, Cambridge, UK, Cambridge University Press.

Skovsmose, O. (1994) *Towards a philosophy of critical mathematics education*, Dordrecht, The Netherlands, Kluwer Academic Publishers.

Valero, P. (2002) *Reform, democracy, and mathematics education: towards a socio-political frame for understanding change in the organization of secondary school mathematics*, unpublished doctoral dissertation (contact e-address: paola@learning.aau.dk), Copenhagen, Denmark, Department of Curriculum Research, The Danish University of Education.

Volmink, J. (1994) 'Mathematics by all', in Lerman, S. (ed.), *Cultural perspectives on the mathematics classroom*, Dordrecht, The Netherlands, Kluwer Academic Publishers, pp. 51-68.

Wedege, T. (1999) 'To know – or not to know – mathematics, that is a question of context', *Educational Studies in Mathematics* **39**(1-3), 205-227.

Wittgenstein, L. (1953) *Philosophical investigations*, Oxford, UK, Blackwell.

These notes and references follow on from page 15 of the article "Issues of perceiving equality in a co-learning partnership in Pakistani schools" that starts on the opposite page (ed.)

Notes

[1] The textbook suggests "percentages are special fractions".

[2] Zakat is one of the fundamentals of Islam according to which Muslims are obliged to share 2.5% of annual savings with the poor.

References

Frost, D. and Durrant, J. (2002) 'Teachers as leaders: exploring the impact of teacher-led development', *School leadership and management* **22**(2), 143–161.

Fullan, M. (1999) *Change forces: the sequel*, London, UK, The Falmer Press.

Hargreaves, A. (1992) 'Cultures of teaching: a focus for change', in Hargreaves, A. and Fullan, M. (eds), *Understanding teacher development*, Columbia, OH, Teacher College Press.

Jaworski, B. (2002) 'The student-teacher-educator-researcher in the mathematics classroom: co-learning partnerships in mathematics teaching and teaching development', in Bergsten, C., Daland, G. and Grevholm, B. (eds), *Research and action in the mathematics classroom, Proceedings of MADIF2, the second Swedish Mathematics Education Research Seminar, 2000* Linkøping, Swedish Society for Research in Mathematics Education, pp. 37-54.

Ma, L. (1999) *Knowing and teaching elementary mathematics*, London, UK, Lawrence Erlbaum Associates.

Macmurray, J. (1961) *Persons in relation*, London, UK, Faber and Faber Ltd.

Mohammad, F. R. (2002) *From theory to practice: an understanding of the implementation of in-service mathematics teachers' learning from university into classroom practice*, unpublished doctoral dissertation, Oxford, UK, University of Oxford.

Mohammad, F. R. (forthcoming) 'Problems of teachers' re-entry in schools after in-service education', in Farah, I. and Jaworski, B. (eds), *Partnerships in educational development*, Karachi, Pakistan, Oxford University Press.

Rogoff, B. (2001) *Learning together: children and adults in a school community*, Oxford, UK, Oxford University Press.

Wagner, J. (1997) 'The unavoidable intervention of educational research: a framework for reconsidering researcher-practitioner cooperation', *Educational Researcher* **26**(7), 13-22.