

COMMENT TO PAOLA'S CONFERENCE: DIALOGISM IN ACTION

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This is a reaction to Valero's conference and paper (Valero, in press). These are the issues that stroke me while preparing the conference (with her) and later on while reading her paper: (1) how we use power and which voices are heard and which are silenced; (2) the role played by the implicit/explicit in meaning construction and in social participation, particularly in mathematics education practices; (3) the relations between theories and practices; (4) the impacts of mathematics education research on the construction of dialogical identities; (5) the contribution of mathematics education to an inclusive and intercultural education.

CHALLENGING POWER IN MATHEMATICS EDUCATION

While discussing with Paola how to organise our participation while preparing the conference, and then reading her paper, the first set of questions that I considered was related to the researchers' decisions, namely those that are usually not explicit when the results are made public:

- Theoretically, what do we emphasize?
- How do we choose the object of research?
- What do we mean by participation?

This first set of questions made me ask her why she had chosen the social practices to be part of her title and not the cultural practices and, at a broader scope, to reflect about why some of us put the focus on the political, while others put it in the social, in the cultural, or in the historical-cultural, just to mention a few possible ones. What I would like to stress is that even the choices we usually do not explain, like the titles, or the focus of our research, are shaped by many of the theoretical, epistemological and methodological choices we made. We are aware of many of them but probably many others need clarification, particularly when we reflect upon the consequences of those choices for those with whom we develop the research and those who participate in it (César 2009, in press). It includes reflecting about the researchers' theoretical choices. For instance, what is the difference between using the construct *didactic contract* (Schubauer-Leoni, 1986; Schubauer-Leoni & Perret-Clermont, 1997) or *norms* (Yackel & Cobb, 1996) to explain part of what is going on in a formal educational scenario such as the mathematics classes? And when we choose to implement and study cooperative work (Rogers, Reynolds, Davidson, & Thomas, 2001) instead of collaborative work (César, 2009; César & Santos, 2006), or dialogical collaborative work (Elbers & de Haan, 2004; Renshaw, 2004)? Why do we decide to emphasize one of them instead of the other(s)? What are the consequences of these decisions for the research, including the participants who are not often aware of those decisions and seldom participate in them?

My point is that while deciding about issues like the theoretical background, the object of the study, the epistemological principles that shape these choices, or the methodological options we assume, we are already using our own lenses in order to illuminate a particular part of the problems we would like to study. Thus we are also shaping, up to a certain point, the answers we will get to the research questions. There is no such thing as neutral and entirely objective research when we are dealing with human beings and complex phenomena such as mathematics education. But, as Denzin (1998) underlines, we must be particularly clear and aware of the knowledge, experiences, values, beliefs that shape our decisions as researchers. This creates huge challenges to the scientific writing - inspired in the so-called exact sciences - but actually referring to quite different objects and contexts. Thus, it must be clear, rigorous, but it must include information about the researchers' paths and choices. Researchers must be particularly attentive to the quality criteria in research. Not being able to be objective because we assume knowledge as situated (Lave & Wenger, 1991) should not be confused with lack of rigour or facilitation regarding the research procedures and choices (Hamido & César, 2009). Assuming the subjective nature of learning – and then, also of research – means being particularly careful while studying the context, the participants' characteristics, the situations in order to produce thick and detailed descriptions, and interpretations that can be validated by the readers and by their peers (Denzin, 1998; Kumpulainen, Hmelo-Silver, & César, 2009). This is important because, as Valero (in press) states, there are "(...) growing amounts of published papers" (p. 1) but this increasing number is not a guarantee of quality.

This leads us to another issue: what is participation. Moreover, who is allowed to participate in research, in scientific events, as a plenary speaker, or in the different roles that research participants assume. Another issue is the degree of participation, i.e., for instance, when we describe the participants in a particular research, what does it really mean to be a participant? Do they participate in the research decisions? What does it mean to be an informed participant? And who decides about the children and youngsters participation: Their legal representatives (e.g. parents) or also themselves? In other words, how do we – researchers, academics, teacher/researchers – conceive mathematics education research? How do we put it into practice? Do we conceive it as a tool for learning (César, Bárrios, & Cristo, 2008; Bárrios, César & Cristo, 2009)? Do we conceive it as a mediator in the promotion of those children, youngsters and researchers' development? (César, 2009, in press)? Or just as one of our many professional tasks that we should perform the best we can?

From this first set of questions emerged a second set, related to the notion of voice (Bakhtin, 1929/1981) and empowerment (Apple, 1995):

- What elements shape the voices that are heard and which are silenced?
- Who are we empowering through the research we produce? And through the educational practices?

- What is the role of language, namely when we consider power issues and participation?

Being a psychologist who studies children and youngsters categorised as presenting special educational needs (SEN), such as Deaf students, I became aware that despite the enormous amount of papers regarding mathematics education, some voices are still quite silenced. The Deaf community is just an example, as there is almost no research – and the one that exists is very hard to publish – about Deaf students learning mathematics, particularly in secondary schools or at the university. There are almost no studies relating the Braille and blind students mathematics learning interactive patterns, or relating the language Deaf people use (sign language) and the solving strategies to which they have easier access to while solving mathematics tasks (Borges, 2009; Santos & César, 2007). Valero (in press) refers to the “issue of *mathematical specificity*” (p. 6, italic in the original), but she uses this designation in a restrict sense. I would enlarge it and connect it with some of the characteristics that shape different needs and ways of mathematics learning, like the sensorial characteristics of Deaf or blind students, or some mathematical thinking that is shaped by participating in a different culture (César & Kumpulainen, 2009). This leads us to the need of equity, also stressed by Cobb and Hodge (2007).

What I am arguing is that although realising that there is a great amount of papers published about mathematics education, some domains of research are almost not explored and this means silencing many of the children and youngsters that were supposed to learn mathematics and to have access to numeracy and literacy. Thus, through the research we produce – also through the one we do not allow to be produced, for instance because there is no financial support to develop it - we are empowering some people and excluding others, usually those who participate in minority cultures and communities, and whose language is more differentiated from the mainstream language, and then more demanding for researchers. This is done in explicit ways (e.g. verbal language) but also through implicit ways (e.g. non verbal language, ways of acting) that are more difficult to understand when you participate in cultures that are far-away from the mainstream one (César, 2009, in press).

The role played by language in mathematics education and in mathematics research is also emphasised by the role played by English language in academics and researchers’ professional tasks and careers. Once the highly valued scientific journals are only in English – and we should remember that 20 years ago this was not the case -, and the same goes to the top valued scientific events, authors who are not fluent in English experience several forms of exclusion: they do not dare to submit their papers to journals and scientific events; even when they are able to find someone to translate their work then they are not able to communicate in an effective way with their peers during the events; and this leads to frustration and lack of equity. Thus, power and participation are distributed in ways that give a voice to some people and do not allow others to have one (Apple, 1995). This is illuminated by some narratives about schooling like the ones produced in a TV programme (France 3) I watched when I

arrived, quoted in French in honour of our French colleagues who organised CERME 6. This was a programme about people who became famous when they were grown up, but who had experienced so much underachievement that many of them dropped out of school and others had to repeat several grades. When each one of them explained his/her school path, Jean-Marie Rouart stated that: “Le succès est un mystère. L'échec est un mystère. De quel côté on se trouve? J'ai toujours cru que je serai de ceux qui échouent.” (Dumas, 2009). But he was not. He became a famous writer despite of being considered an underachieving student in languages and of the difficulties he experienced before accomplishing the *bac* (last year of secondary school, in France). Moreover, he was elected to the [Académie Française](#) on the 18th [December 1997](#), one of the highest distinctions for a French writer.

But I wonder if the research we produce is able to avoid the many forms of exclusion experienced by so many students in mathematics classes. Thus, when Valero (in press) states that “(...) we need to rethink and enlarge definitions and views of mathematics education as a scientific field of study in order to provide better understandings and alternatives for practice in the teaching and learning of mathematics” (p. 1), I certainly agree. But I would go further: in order to provide a more inclusive and intercultural mathematics education, inside and outside schools, and also to promote students' cognitive, social and emotional development instead of creating barriers. I agree that an “(...) increasing attention was given to reflexivity in mathematics education” (Valero, in press, p. 2), that we moved from de-contextualized studies into contextualized ones, and that we need a broader notion of interactive interplay (César, 2009, in press) – that Valero (in press) designates as a network of social practices - but this can co-exist with giving voice/power to some and silencing others. If this is done in a very subtle way, it can be very dangerous. The example of Deaf students learning mathematics in mainstream schools and the lack of preparation teachers get during pre-service education to teach these students illuminates that. It also illuminates the gap between policy documents and researchers' discourse and practices, illustrating the need to create bridges between theories and practices, between academics and researchers, teachers and teachers/researchers. But also between researchers and participants that should not be seen as merely objects of research but as living human beings who are affected by the research decisions and designs we use.

Thus, I miss some points in Valero's (in press) analysis in order to complete the picture of moving from the didactic triad into more dialectic and dynamic forms of communication: the notion of dialogism (Marková, 2005; Renshaw, 2004); of interactive interplay (César, 2009); and of the regulatory dynamics of participation (César, in press). Assuming, as Sfard (2008) puts it, that learning - and thinking - is communicating, these are essential constructs. In order to study and understand the relations between some of the elements of the network of mathematics education practices we need to be able to illuminate the processes underneath the interactive interplays between them. For instance, if we study the relations between a particular school, families, students, staff, the community and the school leadership, we need to

value the variety of cultures in which each individual participates. To achieve an in-depth understanding of mathematics learning, knowing the cultural background of students is not enough. One needs to conceive identities as dialogical, to understand the different and often conflictive I-positioning that can be assumed in different situations (Hermans, 1996, 2001), scenarios and contexts, and how they shape mathematics learning, mathematical thinking and mathematical performances. These are complex studies that need to be longitudinal and/or to have long follow ups that allow for a broader comprehension of the impacts of mathematical learning. This leads us to a last set of questions:

- How can mathematics education (research) contribute to the construction of dialogical identities?
- How can research and the teaching practices in mathematics education contribute to a quality education and to equity in the access of the cultural mathematical tools?
- How can theories, practices and research in the mathematics education domain contribute to an inclusive and intercultural education, instead of contributing to exclusion?

These are essential issues namely because mathematics is often associated with underachievement, negative social representations, frustration, and seen as a selective subject (César & Kumpulainen, 2009). Some research illuminates that it can be seen differently and that students, families, poor-literate adults, and, more important, all human beings, can experience mathematics education in a different way. But this depends on how those who have more power in this domain will use it.

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