

# MATHEMATICS EDUCATION RESEARCH, DIVERSITY AND INCLUSION

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*This paper comments on Arthur Powell's plenary paper "The Diversity Backlash and the Mathematical Agency of Students of Color". A highlight of some of the main arguments in Arthur's paper is offered, and questions are raised concerning elements of importance in setting a research agenda committed to equity in mathematics education.*

In the international community of research in mathematics education Arthur Powell's work has provided insight into the multiple predicaments of African American students' mathematical learning, from an ethnomathematical perspective where issues of power are connected to school mathematical knowledge and its learning. His work has challenged not only research with an embedded racist assumption about the mathematical learning of these students in the USA, but also even progressive research concerned with issues of equity in the access to participation in mathematics education practices. His paper "The Diversity Backlash and the Mathematical Agency of Students of Color" summarizes the concerns that motivate his and his colleagues research work, as well as the selected approach. A discussion of "inclusion and diversity" in mathematics education –with advances and backlashes– without a consideration of Arthur's work would be incomplete.

Arthur's sentence "*It might be that racism roots itself in our theoretical assumptions, our methodological approaches, our observational lenses, as well as our interpretation of data*" caught my attention. It touches one of the points that I consider to be central in a discussion of inclusion and diversity in mathematics education. Mathematics education researchers have constructed a discourse about the practices of the teaching and learning of mathematics. Such a discourse is not neutral since it provides frames of action for researchers (but also for teachers and policy makers) to address the multiple problems of mathematical instruction (Valero, 2002, 2004b). As Arthur indicates, it is possible to conjecture that mathematics education research and the discourse it produces are implicated in the "diversity backlash".

## **THE THESIS OF THE DIVERSITY BACKLASH**

The thesis of the *diversity backlash* contends that the current diversity discourse, with an emphasis on linguistic and ethnic diversity, omits a direct mention of race, while racial segregation is still a crucial problem. Despite the relatively high public attention to the multi-ethnic, -cultural and -linguistic composition of the population in the USA, little advancement is really being made in the provision of equality of access to a variety of resources to different racial and ethnic groups. The gap between these two is actually a mechanism of the dominant culture to maintain the statu quo.

The thesis invites to discussions of the relationship between structural inequalities and access to participation of different groups in (mathematics) education. It is clear in Arthur's work (see Powell, 2002 in his reference list) that such a connection is indispensable in research concerned with equity issues. For research in mathematics education this means that considerations of the social, political and economic context in which mathematics education practices take place need to be incorporated. This poses many challenges for researchers because, it not only opens the focus of attention of research from the details of learning processes in mathematics to broader social spaces of action where mathematics education practices get constituted, but also because it demands the use of theoretical and methodological tools that have not been widespread in mathematics education research (see Valero & Zevenbergen, 2004; Vithal & Valero, 2003). The challenge becomes finding significant ways of connecting the macro-contexts in which structural inequalities happen with the micro-contexts of mathematical learning.

### **CRISES (OF ACHIEVEMENT) IN MATHEMATICS EDUCATION**

The diversity backlash is associated with *mathematics education instruction and achievement crises*. Arthur argues that USA students' low achievement in international tests can be associated with the dominance of a procedural instruction – while students from countries with a balanced conceptual and procedural instruction achieve higher. This is what he refers to as the instruction crisis. At the same time, the achievement crisis refers to the fact that students from particular racial (ethnic and linguistic) groups continue to have a significantly lower achievement than white students in the USA. The systematic lower achievement of particular groups of students is an alarming sign for politicians about the crises of educational systems, and it is an important justification behind investments in reforms and research in mathematics education. It has directed the attention of researchers towards particular ethnic groups, as well as towards students with learning difficulties, girls and working class students.

But what is behind the focus on issues of achievement? Research has shown that measures of achievement are measures of the ability of students to cope with the social framing of tests rather than a measure of students' mathematical competence (see Wiliam, Bartholomew & Reay, 2004). Mathematics tests fulfill a double function of providing a categorization of students according to criteria of ability determined by the test makers, as well as that of exercising a normalization of students, that is, a classification of each person according to what is considered to be normal (and therefore outstanding and deficient). The average (and related concepts of superior or inferior) is defined in terms of the characteristics of the dominant cultural group, in this case middle-class, white, male population. Measures of mathematical achievement operate as important classification and normalization tools in society in relation to dominant groups. If we adopt this thesis, then underachievement says something about the position of those groups in society, but does not necessarily say something about their actual mathematical ability.

Furthermore, if tests are analyzed from this socio-political perspective, high achievement of different groups may be interpreted as a success in an assimilation of different groups to the dominant cultural discourse. I doubt that the aim of diversity (with or without consideration of race) is that we all become “White, Middle-class Americans”. That would also represent a disaster for diversity (and may not necessarily secure equality of access to participation in social, economic, cultural and political resources). A challenge for mathematics education research with a concern for equity and diversity is unpacking the discourse of (under)achievement and finding other tools to talk about what different groups of students actually can mathematically (instead of starting from a deficit perspective).

### **THE THESIS OF THE INTRINSIC RESONANCE**

It is of paramount importance that African Americans and Latinos do well in mathematics since “mathematical achievement is simultaneously shaped by and shapes the economic and social well being of communities as well as of nations” (see Powell, this volume). Arthur argues that the recent crisis of unemployment in male African American population will result in more poverty in that group and, consequently, in lower school participation, lower mathematical achievement, lower participation in the work market and so on. This cycle compromises the “biological viability of certain racial and ethnic groups”.

Mathematics has been associated (in the Western culture) with economic wealth. The more mathematical (technological and scientific) production a society has, the wealthier the society becomes. Since the time of the “Sputnik shock” this argument has been at the roots of justifications for expanding mathematical research and improving mathematical instruction. Part of the concern for achieving equity in access to the participation in mathematics education is precisely that of giving access to excluded people to wealth. In other words, good mathematics education in itself empowers people.

Behind these formulations there seems to be a belief in the intrinsic goodness of mathematics (education). Mathematics and mathematics education are given positive characteristics such as being “empowering” or “wealth-provider”. Such assumption of goodness diverts attention from the operation of mathematics (education) in larger social and political spaces where both mathematics and school mathematics are power-knowledge used as resources for the creation of “wonders and horrors” (Skovsmose & Valero, 2001). Therefore, it is necessary that researchers examine critically the ways in which mathematics (education) forms part of larger systems of reason and is used in the construction of unjust as well as just social, economic and political structures.

### **INDIVIDUAL, INTELLECTUAL AGENCY AND POLITICAL AGENCY**

A key notion in the study of African American and Latino students’ participation in mathematical instruction is *individual intellectual agency*. Such agency is defined as

the learner's individual initiative and ownership of ideas to define, redefine, build, take risks and go beyond the specificities of a mathematical problem. The concept of agency is bounded to the particularities of the context defined by the mathematical problems through which the research will invite students to display and build their intellectual activity. This notion of agency is focusing on the characteristics of those students as learning, cognitive subjects engaged in mathematical activity.

Much of mathematics education research has concentrated on describing and analyzing the individual, intellectual agency of students in diverse mathematical contexts. I have argued (Valero, 2004a) that such research has constructed a view of the learner as a "schizomathematicslearner". Such a discursive object portrays students as mathematical cognitive agents, decontextualized from the social, historical, political and cultural arenas where they exist. The focus and interest in understanding one aspect of students' thinking has almost eliminated the other components of students as fully real, living, and acting human beings. The notion of cognitive, intellectual agency has to be encompassed with a notion of political agency understood as the students' action in complex social situations where mathematical initiative is one of the multiple possible ways of influencing their life conditions. An interesting challenge for research is finding ways to enlarge the notion of agency in order to connect the micro-context of the mathematics classroom with larger context of action in which students participate (and where exclusion/inclusion is also in operation). In other words, the challenge is link the individual learner (and his/her intellectual agency in mathematics) with his/her larger social setting, within which disadvantage on the grounds of race and ethnicity has been historically constituted.

## **ELEMENTS OF A RESEARCH AGENDA FOR DIVERSITY AND INCLUSION**

That research in mathematics education is implicated in the maintenance of exclusion is a contention that has been examined in different ways (see Skovmose and Valero, 2002; Popkewitz, 2002). Theoretical frames, problems and methodologies contribute to the creation of a discourse (and of a practice) that leaves unattended fundamental issues of access of different groups of students to various resources of power. When thinking of a research agenda committed with diversity and inclusion there are some necessary issues to consider: (1) The connection between macro- and micro-spaces of action in search of explanations for and interpretations of exclusion of certain groups of students. (2) The deconstruction of the discourse of achievement as a measurement of mathematical capacity, and analysis of the social processes operating through the measurement of achievement. (3) The critical examination of the discourse around mathematics (education), power and equity. (4) The expansion of notions of agency to encompass both intellectual and political dimensions of students' actions.

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