

Mathematics education's solidarity assimilation methodology

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This paper discusses the solidarity assimilation methodology (SAM) under the critical scrutiny of the community, as a strategy of intervention in an inherently exclusionary school system. This intervention has been operating for almost 40 years in direct contact with the classroom and in the context of institutional obstacles faced by the authors. The core principles of SAM is to distinguish promotion from evaluation and to conflate rewarding effort with content progress as promotional criterion leading to credit. SAM adopts the motto “we teach when we listen, we learn when we talk”. We argue that this common belief in progressive pedagogies acquires a deeper meaning under a Lacanian perspective. Rewarding effort is less easy to digest because it forces us to politicise our work. The problem of universal failure will not be solved by SAM, but SAM provides an understanding-in-action of the role of failure in the resilience of school practices.

Keywords: Solidarity Assimilation, Hegel, Marx, Lacan

Introduction

Solidarity assimilation methodology (SAM) is an intervention into capitalist schooling that started in Brazil through the work of Roberto Baldino and Tânia Cabral. Contrary to other approaches in mathematics education, SAM is not a bird's-eye view on the teaching and learning of mathematics, developed by a researcher who is not teaching mathematics. Instead, it born out of the necessity to deal with the daily difficulties that Baldino experienced when trying to teach mathematics to his university students at the Federal University of Rio de Janeiro in the early seventies. Since then, other people, including Alexandre Pais, have joined in the development that is now well documented in the research literature (e.g. Baldino, 1997, 1998a, 1998b; Baldino & Cabral, 1989, 1998, 1999, 2006, 2008, 2010, 2013; Baldino & Carrera, 1999; Cabral, 1993, 1998, 2015; Gluz, Cabral, Baggio, Livi, & Mallmann, 2008; Pais, 2011; Persad, 2014; Silva, 1997). In the present article, we briefly describe the main aspects of SAM and point to a research project to be developed in the years to come. The following personal testimony of Alexandre Pais completes our introduction.

The reality of the classroom forces teachers to believe that we are all struggling for “mathematics for all”, at the same time making it difficult to sustain the illusion that a complete pedagogy can be achieved. This led Alexandre – at the time a mathematics teacher in a Portuguese school – to find in the work of Baldino and Tânia elements to understand his everyday reality. For the first time Alexandre saw a lucid account of the sociopolitical problems he was experiencing as a teacher. While mathematics education research was roughly divided between a ‘didactical’ approach, with no social or political concerns whatsoever, and a ‘postmodern’ approach, with its emphasis on discourse and

power relations, Baldino and Cabral were using old Marxist categories to analyze their work as mathematics teachers at the university (e.g., Baldino, 1998a, 1998b; Baldino & Cabral, 2006).

Their research spoke to Alexandre because he felt in their work an attempt to show the “shit” (Pais, 2015) involved in schooling, instead of trying to disguise it through the report of successful experiences which teachers find difficult to associate with their practice. Indeed, the reader will have to search hard to find in Baldino and Tânia’s research one example of a successful experience. This is because they are not talking from above to an arranged classroom (where someone else is doing the work of teaching). They are researching their own teaching and, as such, cannot afford to play the narcissistic game that so often populates mathematics education research (see, for instance, Pais, 2017).

One can say that Baldino and Tânia anticipated what is now known as the “social turn” in mathematics education. Studies within this vein emphasize the importance of considering how what is happening in a classroom depends on the entire social, cultural and political frame. These studies highlight the importance of “social interactions” and the role of “culture” when learning mathematics; they also raise broader issues of equity and social justice in accessing mathematics education (Gutiérrez, 2013; Sriramann & English, 2010). A problem with these studies however, is their disavowal of the *economy* when addressing the question of failure in school mathematics (Pais, 2014).

Despite the diversity of studies animating the social turn, what binds them is the rejection of a central organizing principle, which takes into account how schools manifest the totality that capitalism is today. In a postmodern research-world, it is not easy for researchers to posit capital as the “concrete universal” of our times (Baldino & Cabral, 2018). To do so, will imply a questioning of not only the structures and actors that exercise damaging influence on school mathematics (governmental policies, discourses, etc.) but also a questioning of our own role worsening what we intend to improve (Pais, 2015). In what follows we briefly present what can be considered the main principles of SAM.

SAM’s birth scenario

Here, we briefly describe the political context where SAM was born so that the reader can understand why we say that this methodology is an intervention in an elitist undergraduate teaching context and how it is an understanding-in-action of a system which is inherently thwarted.

In 1972, under the military dictatorship, the Brazilian economy was growing steeply, an illusion that did not last long. In that scenario, students’ meetings were strictly forbidden, many professors had been expelled from universities, some students were killed in demonstrations, others disappeared, the press was under control and observers disguised as students watched every classroom. In 1969, a university reform had opened access to underprivileged students to higher education. A radical elite expected that failure, especially in calculus courses, would push these newcomers out. Most teachers developed personal strategies to accommodate the situation. People engaged in SAM¹ called the prevailing exclusionary pedagogy, *current traditional teaching* (CTT).

¹ Mainly, Charles Guimarães and his group.

According to the military, teachers were supposed to speak for the entirety of the class, and the students should listen quietly. Teachers of CTT dedicated their attention to stimulating stronger students while passing the weaker ones who had not learned enough, based on criteria tinted with social and ethnical prejudice; for instance, manners and speech associated with those of the upper class counted as hidden subsidiary criteria. As a consequence, CTT stimulated rote learning and enabled students' to gain credit without learning.

Implementing an alternative pedagogy became an urgent political issue to those who opposed the regime. Baldino tried to approach the students who were repeatedly failing in the two mid-terms and one final exam each semester. However, the prompt answers of the academically successful elite presented an obstacle when he tried to address the difficulties of these students, e.g. by offering simpler questions during class. Extra class activities were monopolized by questions from the mathematically stronger students. His attempts to reduce the number of students per class had little support from the administration and faced considerable opposition from the leading students.

SAM's pedagogy

There is much literature on pedagogy and didactics but the meaning of these terms is not always clear. In order to develop SAM as a pedagogy of intervention, we must say that, by pedagogy we refer to the institutional conditions designed to engage the students with the learning task, mostly through what Vinner (1997) called the *credit system*. We acted on these conditions introducing rules to get credit in group work. These so-called norms of SAM were developed over a decade. Each semester began with a description of the rules adopted in the previous one, followed by a report of defective results. Then, a modification of the rules was suggested and a question was made: does anyone have a better idea? We finally arrived at a stable set of norms to include assessment of classroom work as a promotional criterion leading to credit, thereby distinguishing SAM from other pedagogies based on assessment. These norms provided us with the necessary empowerment to face the disruptive elite. They allowed contact with weaker students during classes, without harm to stronger students, and with all students separated into ability groups. In this way, SAM became an efficient instrument to rebuff disruption or the monopolization of classes by the radical elite. SAM intervened in CTT by, on the one hand, culturally rewarding underprivileged students according to what they could give, namely work and, on the other hand, constraining the white-male elite to submit to the classroom organization.

Basically SAM conflates effort-based with content-based promotional criteria. The class is organized into groups of four; the students are expected to engage in the task of solving *and understanding* the solution of assigned exercises. SAM norms, under the form of a work contract, are presented in the first class; after a two or three weak clearance trial they are put to a vote, against CTT. Generally the supporters of SAM prevail. Before asking for help, the group must decide what they are going to ask. In case of divergence in the group, each student must report the point of view of the other. The group must work together on each exercise and never pass to the next without showing understanding of the solution of the former. If everything goes well, the group receives credit points proportional to the duration of the work. *Only effort, not content progress counts at this moment.* These points count as a bonus to be added to the grades obtained in the classical CTT summative assessment represented

by individual exams. Individual disruption of the norms, count negatively *to the whole group*; group disruption of general classwork, such as failure to be silent at collective moments, count negatively *to the whole class*. Cases of disruption are reported in the fifteen-minute final plenary session occurring after each one-hundred minute class.

Difficulties with implementing this strategy in the classroom can be addressed, provided that we recognize the differential progress of different ability groups and adjust our help accordingly, formulating different questions to different groups. The organization of the SAM classroom is further discussed in Baldino (1998a), and Baldino and Cabral (1999, 2010). The content progress made in each class, is what we call *understanding* and how operational and preferential this understanding will be in the next class, is what we call *learning*. SAM was developed under the supposition that understanding implies learning. However, along the way we have found out that this is not necessarily so (Baldino & Cabral, 2005). We tell the students that we can assure understanding, but learning is a result of their attitude with respect to the discipline, the university and, in general, to life.

It soon became clear that opposition to SAM was not only an “educational” questioning, but a truly *political* one. We are not advancing *effort-based promotion* as the solution to the segregation problem, but these questions force us to examine the promotional criteria used in CTT— how do we, as teachers, arrive at a “grade” that is supposed to condense everything that the student did during a certain period of time? Once we take up such political questions, new ones emerge. What criteria do we have to impart credit to some students and deny it to others? What are the consequences of our denial to the life of a particular student? Should we base our promotional criterion exclusively on assessment of content progress? Are we allowed to take our own classrooms as objects of research, introducing unexpected changes? SAM has been considering such question since the 1980s (e.g., Baldino & Cabral, 1989).

SAM’s psychoanalytical slant

From first pioneering report (Baldino, 1997) to the recent presentation in MES 10 (Cabral & Baldino, 2019a), our work (see below) reports the results of our classroom practice based on SAM, and is mainly concerned with economy and psychoanalysis. Here, we only have space for a brief discussion.

“You teach when you listen, and you learn when you talk.” This motto calls up the vast literature that posits the student as constructor of her own learning and holds that the teacher’s role is to formulate questions, not to give answers. Relying on Lacanian psychoanalysis, SAM reformulates some meanings of progressive pedagogy. Within SAM, ‘making questions’ in a situation of individual tutoring, means driving the student into *contradiction*. ‘Listening’ means to let oneself be hypnotized by what the student says, in an “upside-down hypnosis” (Lacan, 1973, p. 245). ‘Not giving answers’ means to follow up the student's saying with new questions, to keep the focus of the initial contradiction until she perceives what irreducible signifier she was attached to. Finally, ‘talking’ refers to the student's expression of her new understanding.

SAM adapts the directives of the clinic to the classroom through the concept of *pedagogical transference* (Cabral, 1998), where the teacher controls the level of anxiety by opening and closing the lack of understanding that the student perceives with respect to mathematics. The teacher assumes a special position, called the *Other’s position*, in such a way as to suggest that she may also have a

mathematical lack. When the teacher listens, the student cannot figure out whether he is just trying to understand what she says or whether he is trying to take time to think. SAM seeks to assure the student that she will not find in this Other, the fulfillment of the lack that would allow her to pass (gain credit) using rote learning. The teacher endeavors to keep the student's fault open, leading her to ask herself: *Did I understand? What do I really want?*

In fact, anxiety emerges when the student presupposes that this lack may lack, that is, when she evaluates that she has actually understood; in this case she becomes vulnerable: what if in her next answer the lack is filled with a negative teacher's verdict? The teachers' listening is selective, but sufficient to detect signs of anxiety in the student's gestures and speech. Negative individual verdicts should be avoided and replaced by further questions, otherwise they may cause unbearable anguish. The organization of the classroom into ability groups is fundamental in SAM: a negative verdict which addresses a common mistake made by the whole group, produces coalition and positive excitement instead of anxiety.

If, on the contrary, the teacher hides his own lack behind a position of *subject supposed to know* and provides ready-made explanations, he obliterates both lacks, his and the student's. From this position, he produces the illusion that the student understood and he denies the student the opportunity to face her ghosts and develop her own *savoir* about her learning process. She has no chance to come to "love maths anxiety" (Baldino & Cabral, 2008).

SAM is a way of sustaining the student's lack and accepting her initial position of not wanting to know about a *savoir* that she actually detains. She asks *may I do this?* We answer *if it is right you may, if it is wrong you may not; let us check it.* This is how SAM allows the student to learn by speaking and the teacher to teach by listening. The word has a high value for the speaker; it is important to the student to be sure that she will be listened carefully. SAM has allowed us to approach the student's ignorance regarding his preferential ways of justifying mathematics that expose her cognitive difficulties.

The economic issue: school opposition and resilience

A discussion of the valorization of effort instead of content is virtually absent from mathematics education research. Typing <"reward effort" "mathematics education" calculus> into Google shows 70 entries, none of which thoroughly discusses, much less advocates rewarding effort. Summative assessment is highly underrepresented in the literature (Cabral & Baldino, 2019b), not even in the Routledge yearbook 2017: Assessment inequalities. As an exception, the possibility of rewarding effort appears *en passant* in Jablonka (2017) as though in a devaluated rise. The system demands that measuring achievement be the only promotional criterion. SAM provides a way to teach inside the system, but not "according" to the system. It is bound to face opposition.

We assign the reason for the absence of effort rewarding studies in mathematics education to the need to *cover up that school is an economic enterprise where the production of qualified-labor-power threatens to become evident* (Baldino & Cabral, 2013). In this sense, the usual requirement of reviewing literature in this eight-page article would cut the space for presenting the new and would corroborate the cover up.

Although a student can spend an entire year in school, going to classes, participating in all the regular activities, if after everything she does not get a certificate, she will not receive anything for all the work she did. On the contrary, those who get the diploma may vaunt their merit of having superseded those who failed. As a commodity, qualified-labor-power has to be sold in the market for higher salaries, otherwise the investment would not be worthwhile. From this perspective, failure is necessary for school functioning, as argued by Baldino and Cabral (1998, 2013). It is because some of us fail that others can achieve higher positions in social hierarchies. The value produced by the ones who flunk is appropriated by the ones who pass. This is the scandal that SAM-in-action threatens to reveal.

The years to come

The dialectical movement that has generated SAM and CTT as opposite poles goes on today in a wide scenario. The hippy movement of the sixties was the first sample. Not only does capitalism penetrate all pores of private life, but it also offers advance role scripts for its eventual opponents (Baldino & Cabral, 2018). What this sort of late capitalism cannot admit to is the demonstration of the dialectical movement from which it emerges as one of the poles. It has to present itself as the only natural truth. In particular, it cannot admit that school is an economic enterprise producing qualified-labor-power. It must hide its truth under a thick layer of priestly teaching and ‘helpful’ mathematics education research that we call CTT.

Therefore, research in SAM for the years to come should aim at eliciting such dialectical movement. SAM is an intervention into capitalist schooling that defines itself in opposition to CTT. Nevertheless, it is not a cosmology or a formula on how school should be. We are not implying that literature on assessment must move beyond content progress evaluations. SAM is not intended to replace CTT; insofar as this could happen, SAM would lose its *raison d’être*. Contrarily to globalized liberal capitalism, SAM recognizes itself as one of the poles generated by the same dialectical socio-historical movement.

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