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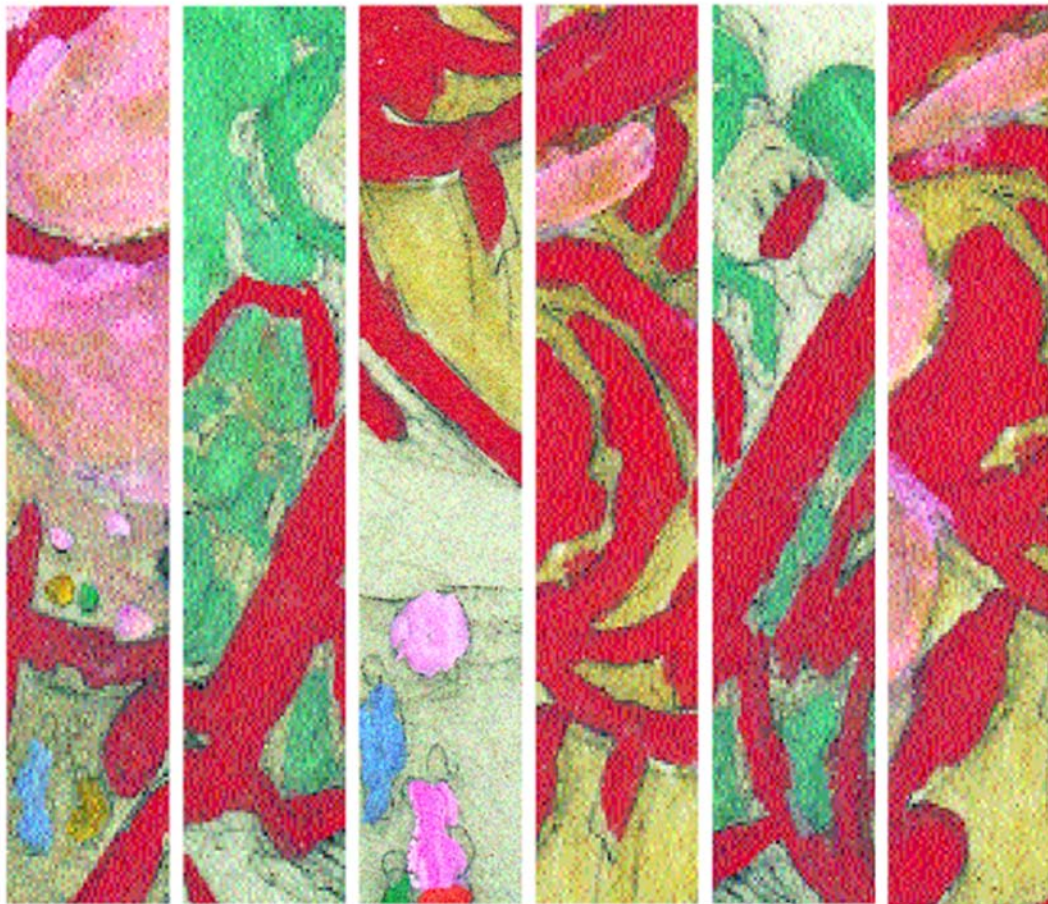
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“Disadvantage” and School Mathematics

The Politics of Context

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Dalene M. Swanson

Introduction

Understanding school mathematics as a discourse of power that (re)produces social inequality, requires, from a critical sociological perspective, invoking a conception of it as a non-neutral discourse that produces contextual realisations according to principles of power. To set the tone, this paper makes a few assertions about school mathematics to support my position and to undergird my discussion on the relationship between discourse and practice in mathematics classroom contexts.

School mathematics is not straightforwardly a subject about mathematical content which pre-existed humanity but which became our gift from the universe. It is culturally, historically, and socially constructed. These constructions are, however, realised differently within diverse classroom locations and communities of practice, most especially within different geographical or socio-political contexts. In other words, the specific context of the mathematics classroom, within the context of the school and the broader social domain, produces its own realisations of mathematical discourse and practice in relation to a range of other mathematics classroom settings located within different communities and social contexts. Most especially, however, constructions of mathematics discourse and practice produce resonances across contexts which refer to broader globalising discourses within the social domain, and it is these *resonances* across contexts, in relation to the *dissonances* produced, which are invested in ideology and power (see Swanson, 2000).

This study sets out to provide a sociological slant to the issues that influence classroom mathematics practices, most especially practices that construct members of school communities, such as teachers and, especially, their students, in terms of “disadvantage” in relation to school mathematics. This sociological approach focuses on the concomitant relationship between the ways in which students (and teachers) are spoken about in terms of social difference, (such as gender, class, race, culture, language, and ability, amongst others), and the kinds of differentiated practices which are afforded them, or in which they engage, in the mathematics classroom. This approach is a break from the more usual cognition-based approach to mathematics education. Although in recent years there has been a greater incorporation of social perspectives in psychological approaches to mathematics education, many of these approaches still tend to view mathematics as objective and neutral, and they often objectify and pathologise students and their ‘ways of thinking’, most especially, in relation to school mathematics. In this way dichotomies are set up between ‘successful’ and ‘unsuccessful’ students, and constructions of ‘unsuccessful’ students are supported by speaking of these students in terms of ‘difficulties’, ‘differences’ and ‘deficits’ and by referencing

their ‘demographics’. In this way, poverty, race, gender, class/socio-economic status, language difference, ability, amongst other constructions, often become ‘factors’ which influence ‘achievement’ in school mathematics. Consequently, ‘truths’ are established about students from ‘disadvantaged communities’ and/or with ‘learning disabilities’, (as examples), which (re)produce themselves within mathematics education discourse, (re)shaping practices within mathematics classrooms in ways which often delimit possibilities of success for these socially constructed students.

Intention

The paper introduces some key aspects of two independent qualitative studies, the research for which I conducted within different schooling communities in South Africa. For the purposes of this paper, I look at two schools, one from each study, in very different socio-economic communities. The paper elaborates more fully on the first study as it addressed many of the main issues and concerns that have strong resonances with the second study as well and speak to the core theme of “the construction of disadvantage” in mathematics classroom contexts. Drawing mainly on the work of Basil Bernstein and Paul Dowling in providing a theoretical framework for the studies, I apply their *sociological languages of description* to an analysis of student and teacher discourse within the two schooling contexts. I will provide some discussion of these analyses so as to exemplify the issues I wish to address in terms of the construction of disadvantage in the mathematics classroom. In conclusion, I will draw together some of the key concerns that have been addressed in this paper, and discuss some comparisons between the two schooling contexts which have pedagogic and political implications for a discourse on mathematics education in different contexts.

First Study

Research Intention

An empirical study was conducted within an independent secondary all-boys school in the Western Cape of South Africa (Swanson, 1998). The study focussed on the exploration of subject positions potentially available to a group of male students in their learning of school mathematics. These male students were drawn from (what was referred to within the school as) the “Black Scholarship Programme”. The study sought to investigate and highlight the manner in which “difference” is created and maintained, produced and reproduced within the schooling context, thereby creating boundaries to epistemological access and limiting possibilities for “success” in school mathematics within this context. Further, and most importantly, the study focused on how this difference is recontextualised¹ into disadvantage in relation to this socially constructed group of students and school mathematics.

¹ “Recontextualising” can be understood as: “the process whereby knowledge is delocated from its context of production and is relocated, transformed and elaborated in another” (Ensor, 1996, p. 2), (following similarly from Bernstein’s and Dowling’s uses of the term). This process of

The study focused on the relationship between discourse, subjectivity and context. In this respect, it focused on the concomitant relationship between the ways in which members of a pedagogic community (in this case, a group of black male scholarship winners in an independent secondary school) are socially constructed, and the kinds of practices that are afforded them, or in which they participate, in the mathematics classroom. Consequently, the study addressed three major analytical and descriptive areas:²

School Context and Disadvantage

A description is provided in the study of the particular “stratified”³ nature of the research school context, and how the institutional rituals and the particular cultural ethos of the school (see Bernstein, 1976) assisted in producing pedagogic boundaries and constructing and establishing “disadvantage” with respect to the students of the “Black Scholarship Programme” at the school.

Pedagogic Discourse and Disadvantage

The study describes how instructional discourses are embedded within the regulative discourses of the school and social domain (see Bernstein, 1996), producing a hierarchy of pedagogic and social discourses. This hierarchy of discourses, referred to by Bernstein as the “social division of labour of discourses” (see Bernstein, 1993, 1996), assists in establishing a range of voices (from, “successful” to “unsuccessful”, or “disadvantaged” voices). Particularly, the discourse of *mainstream mathematics* and its strength of voice in relation to other instructional discourses, most especially a “bridging” programme, referred to as the *Academic Support Programme*, were also examined.

Disadvantage Realised in Pedagogic Discourse

In the study, the subject positions are marked out by student and teacher utterances, and an analysis is made of the relationship between these positions or voices and the distributions of school mathematics discourse and practice to these voices.

recontextualising produces its own priorities, selectivities and silences, which are socially situated. See also Bernstein (1996) and Dowling (1998) for further perspectives on recontextualisation.

² In establishing a methodology, I drew mainly on Bernstein’s work in the first two areas and on Dowling’s work in the third. As the empirical study began in 1994 and was concluded in early 1998, I drew on their work mainly prior to 1995 in developing a theoretical framework.

³ Briefly, a “stratified” school context is one in which an explicit vertical and horizontal form of social organisation develops and is supported by the schooling structure, whereas its opposite, a “differentiated” context, is one where the vertical features of the social organisation are less pronounced and the structure is less hierarchical (Bernstein, 1976; 1996). Stratified schools are contexts where divisive pedagogic practices are likely to be more visible than in differentiated contexts. Thus, they are also contexts whose cultural ethos rests on domination rather than co-operation, as might be more likely in differentiated schools. These cultural contexts are contingent on the broader social and political, and even physical/geographical, context within which the school is situated.

Data Collection

Some empirical examples of student and teacher utterances with respect to school mathematics were provided. These were documented in field-notes and a set of taped interviews. The interviews were held several months into the entry year of the Programme, which was also the students' first year at the school. The interviews were held separately with the two teachers of the Academic Support Programme and with the group of students from the "Black Scholarship Programme". Other discussions with teachers in the school were documented where these discussions were relevant to the scholarship students and mathematics at the school. Policy documents and related documents were also used as they referred to these students and mathematics.

Discussion

It was through the utterances of teachers and their students, the students of the "Black Scholarship Programme", that positions of alienation were established in relation to these students and mathematics. It was evident that these alienated positions work concomitantly with differentiated distributions of mathematics discourse and practice to these positions. For these students constructed in terms of race, language difference, culture and poverty, the forms of mathematics discourse and practice afforded them was delimiting and disempowering. "Constructed disadvantage" begot "pedagogic disadvantage". I refer to this process as *pedagogising difference* in the mathematics classroom.

The analysis showed how certain students spoken of in terms of "success" were provided with the "regulating principles" of mathematics discourse (Dowling, 1993, 1998) within the school, while the scholarship students were denied such access. The construction of disadvantage does, however, draw on a broader problematic within the social domain and is established within *context*. Of importance, then, is how the cultural ethos of the school, along with ideological discourses from the broader social domain, assist in the (re)production of difference, and how this difference is recontextualised into disadvantage.

The research school is an independent historic church school. There is a preparatory as well as secondary section of the school, each with their own premises. Research took place within the secondary school. The school has a long colonial history and is steeped in tradition. This tradition is supported by a number of differentiating and consensual rituals (see Bernstein, 1976) such as the prefect system, house system and streaming (tracking) system. The school is widely spoken of as a prestigious institution with a reputation for high academic and sporting achievement. Fees for students are well beyond the affordability of the majority of South Africans. A visible hierarchy of regulative discourses referring to codes, such as those of manner, conduct, decorum, were established within the school. These regulative discourses were supported by and, in turn, supported codes of social class and culture. Although the school has been multiracial since 1978, white patriarchy was hegemonic.

Based on the results of an academic entrance examination in the grade 7 year, a small group of "black" students from local township schools were invited to attend the research school. Only four students per year "won scholarships" to attend this school and they entered the school in the grade 8 year. A multi-national corporation sponsored this scholarship programme as part of this organisation's

Social Responsibility or Community Investment Programme. The intentions of the programme were to provide educational advantage to "promising" students from "disadvantaged communities". As the students' academic level was spoken of as being "weak" by comparison with the "academic standard" set by the school, and as a consequence of their spoken-of "language difference" within this English medium school, they were enrolled in an Academic Support Programme. This programme was designed to provide educational support and assist these students bridge "the gap" in their "knowledge" and "educational/life experience" so that the scholarship students could ultimately "fall in line" with the academic standards set by the school.

These scholarship students were placed in lower academic streams (tracks) in mathematics, within the *mainstream programme*, as it was affirmed by the schooling administration that: "They would be unable to cope with the language demands of mathematics at a higher level with such a poor standard of English" (excerpt from interview). The study showed how the low mathematics streams were associated with "inability" and educational "lack" within this stratified school, most especially in school mathematics, which carried a strong voice. Whilst the students were placed in a lower stream as a result of "lack of language skills" and an "educationally disadvantaged background", the low streaming differentially positioned them as "low ability" students. In this way, "cultural difference" translated or recontextualised into "educational deficit" in relation to the school context, which in turn resulted in the scholarship students being associated with *inherent* "inability" in mathematics and hence assigned a position of "low academic status". Consequently, a construction of these scholarship students in terms of "educational failure" was facilitated. These constructions were established within the stratified school context through codes of social class and culture. Although the positions of alienation were marked out, within language, in relation to other demarcated subject positions as they related to mathematics discourse at the school, it was the broader school context and cultural ethos which provided the means by which these positions were established. Further, constructions of race, educational disadvantage, experiential deficit, cultural and language difference, and poverty were supported and reproduced by the socio-political discourses within the broader social domain that contribute to the legacies of Apartheid in South Africa.

The analysis showed that the Academic Support Programme proved to be *weakly classified* (and framed) (Bernstein 1993, 1996) against the *strong voice* of the mainstream mathematics discourse at the school. Consequently, the bridging programme did not provide access to mathematics discourse, as intended, since it did not possess the *recognition* and *realisation rules* (Bernstein, 1993) of mainstream mathematics to enable 'success' in this instructional discourse. Said differently, it could not provide the necessary access to the regulating principles of mainstream mathematics at this school.

The rules of evaluation in mathematics were vigilantly policed within the mathematics department. Consequently, the upper streams within the mainstream programme were provided with greater access to the rules of evaluation than were the lower streams. As a result, the scholarship students' association with the Academic Support Programme served more to reinforce difference on cultural, linguistic and racial grounds than enable access to the generalising principles and

hence, “rules of success” in mathematics. Consequently, it proved to be relatively ineffectual in providing the expected achievement in mathematics at the school.

In the interviews, the teachers of the Academic Support Programme often spoke of the students in association with “the educational woes in South Africa” and (at that time) “a deficient language policy in education”. The students were educationally located within terms of the historical baggage of Apartheid, the history of racialism and poverty. Their mathematics was spoken about in terms of a language problem, an experiential deficit and perceptual problems. The discourse of mathematics was spoken about by the Academic Support teachers in particular ways which separated it according to dichotomous categories such as reason vs. experiential, taught mathematics vs. innate mathematical ability. One construction of mathematics was privileged over its counterpart when speaking of that ‘form’ of mathematics in association with the scholarship students, changing its form and emphasis when speaking about other more ‘successful’ mathematics students in the school. Each of these ways served to position the students in terms of deficiency and disadvantage with respect to mathematics at the school. These constructions located codes of race, class, culture, language, experience, culture, poverty and environment. Further, it is necessary to note that within the hierarchy of the school, the voices of the Academic Support teachers were *also* subordinated by mainstream mathematics teachers’ voices. (This is elaborated on in the study where it is shown that the weakly classified and framed Academic Support Programme against the strong classification and framing of mainstream mathematics, positions the voices of teachers accordingly.) Critically, the *weak voices* of the Academic Support Programme teachers, even as they attempted to be inclusive, by separating out mathematical knowledge in accordance with the scholarship students’ spoken-of experiential ‘lack’, served, in fact, to *reinforce* cultural and social difference within this schooling context and *establish* disadvantage rather than *contest* it.⁴

Findings

There are many extracts in the study that elaborate on various aspects of the construction of disadvantage and how it is realised through the pedagogizing of difference in this research context (Swanson, 1998; Swanson (in press)). The study also provides many contextual descriptions of the relations of power and control between discourses within the school. Some general conclusions follow:

A gap or disconnect occurred between teacher and student meanings with respect to what is possible for the students of the Black Scholarship Programme in their learning of mathematics. This became evident through an analysis of teacher and student discourse. Teacher constructions of social difference such as cultural, ethnic and language differences, experiential and cognitive spatial deprivation, and

⁴ It is very important to note that I am not criticizing this Academic Support teachers’ intentions or motivations here. I am convinced they were intended to serve the best interests of the scholarship students as they saw it and within the prevailing and delimiting context. My intention, in support of my theoretical framework, is to describe the ways in which mathematics knowledge/discourse is spoken about in different and often contradictory ways; ways which separate it out in accordance with differentiated subject positions, and the implications this differentiated discourse has on establishing and pedagogizing difference.

social class, became pedagogically delimiting criteria in the students' access to mathematical knowledge. It was noted that the scholarship students' voice resonated with the teacher's in these constructions on occasions throughout the interviews, while at other times they did not and the students assumed a position of partial resistance. Ironically, under both circumstances, the scholarship students' voice strongly reflected their position of subordination-either through constructing themselves as unable mathematically, or, on the other hand, as lacking access to the regulating principles of mathematical discourse. The dissonance or disconnect between the voices of teachers and students is most accentuated with respect to the *responsibility* for the culturally-premised pedagogic "mismatch". While the teachers, for the most part, placed the onus on the scholarship students-the school bearing little responsibility for the students' lack of mathematical success, on occasion the dissonant voice of the scholarship students placed the blame on the school and prevailing pedagogic context, thereby attempting to distance themselves from the school's interpretation of their lack of success. For the teachers, the problem is interpreted as deficit, and the scholarship students' culture, experiences and language difference are spoken of in terms of this deficit; while for the students, the fault, in part, lies with the differentiated nature of the streaming system, their lack of access to the regulating principles of upper stream mathematical discourse, and their consequent disempowerment. The scholarship students speak of alienation: linguistic, cultural and experiential as well as pedagogic, and thereby position themselves as subordinate in resonance with their teachers' construction of them. Consequently, the concomitant relationship between discourse and practice as it informs the construction of disadvantage in the mathematics classroom is complete: the scholarship students carry a construction of disadvantage, which becomes the means by which they are disadvantaged mathematically within the school, thereby reproducing and reinforcing the conditions by which the construction of disadvantage is established. This assists the interpretation of the construction of disadvantage as working empirically with the "pedagogising" of difference in the research school.

Constructions of disadvantage are recontextualised into the discourse of mathematics, reinforced by "poor academic achievement" in mathematics, and realised in the pedagogising of difference. This was exemplified in the following words of a scholarship student. It confirmed his alienated position and highlighted the dissonance between teacher meanings of successful students and what was possible for these students at the school:

Like in my last school (referring to a township school), you try to compete with the person and you know he's here and like, you could do better than him. But now you don't know if you'll get to cope there (referring to the upper streams) and you never know what to expect ever, but last year you were the same with everyone and you first compete with each other and, like, that's what I preferred to the sets and stuff here.

The Second Study

Research Intention

The second study took place within an "impoverished" community in the Western Cape region of South Africa and research was undertaken in mid-2001 over a three

month period. The study was premised on the same methodological principles as the first study and served to extend the discussion on school mathematics and constructed “disadvantage”, from a critical sociological perspective, with a further emphasis on context (both schooling and the broader political context). The intention of the study, like the first, was to examine the relationship between the ways in which students (and teachers) were socially constructed and the kinds of practices afforded those students in context. It also examined, through student and teacher discourse, some of the interconnections between prevalent social domain discourses and how these discourses are recontextualized and reconfigured in ways that inform practices in situated contexts. The emphasis on the second study was to examine the concomitant relationship between constructed “disadvantage” and the *pedagogizing of difference*, but most especially how this is differentially or similarly realized *in and across* contexts.

The purpose of using this particular secondary school in the study was to highlight the potential differences and similarities in discourse and practice between schools within vastly different socio-economic contexts. While the differences may be self-evident, the reasons for these differences as informed by prevailing or ‘universal’ discourses and their recontextualization in the situated contexts of each school demanded examination. Consequently, unlike the privileged context of the school in the first study, the school in the second study was situated in a socio-economically impoverished community, some of whose students were drawn from a nearby informal settlement. The students and teachers were mostly mixed-race or black, and the school is considered “historically-black” drawing on the current educational terminology in the South African context to describe schools as they developed and were organized within the Apartheid era and the ideological premises these categories informed.

Data-Collection

As in the first study, the data collection took the form of a set of interviews with different groups of students. The groups were determined by availability and ‘who felt comfortable to be interviewed with whom’. Some of the interviews were with individual students where this was the preferred method. The mathematics teachers of the students were separately interviewed. These interviews were taped and became the basis of the research. These were complimented with a set of observations of secondary mathematics classes across a range of grades and copious field notes were taken. The principal of the school was also interviewed.

Discussion

In the case of the research in the second school, the “failure” in school mathematics was more *visibly* established and less of a hierarchy was produced between “successful” and “unsuccessful” students in this context. This school displayed less of a stratified school context than in the first study, where there was less of a pronounced hierarchy of instructional discourses in the school. In this sense, the school was more differentiated (Bernstein, 1976; 1996). Procedural teaching practices were all-pervasive within the school and little, if any, opportunity was provided for generalising practices in mathematics. Mathematics discourse and practice was more evenly distributed to student voices within

classrooms. However, the students tended to be homogenized in terms of “poverty”, and, consequently, race, social class, “social problems”, “learning difficulties”, and other experiential deficits. While the first study showed that hierarchies produced *within* the stratified research school strongly *reflected* hierarchies within the broader social and political domain, the second study showed how schooling within this less stratified, more differentiated school context, and “disadvantaged” community, reflected discourse and practice which situated the school and schooling context *more directly* in terms of the broader social and political context. In other words, the schooling community, being less empowered, was deeply embedded and oppressed by the existing social relations and political conditions of its place and time. Again, constructed disadvantage begot pedagogic disadvantage. Consequently, there appeared to be little possibility for contested terrain *within* the community that would enable its students to be provided with access to the regulating principles of mathematics in a way that may possibly facilitate their socio-economic and political empowerment.

Educational Significance of the Two Studies

The two studies, therefore, propose an alternative reading of educational and social difference to research which approaches student non-achievement in terms of deficit or disability. The studies provide an understanding of the role of context in the production of subjectivity and the manner in which discourses within the broader social domain, as well as the schooling context, differentiate groups of students in accordance with social difference. To these students are distributed differentiated distributions of discourse and practice that are most often disempowering and situate them in terms of difference, disability, poverty and disadvantage.

The studies serve to alert the education community to the contextual complexities of mathematics education in different South African schools and to the specific socio-economic and political realities that remain a challenge for the future. Further, the studies have important implications for other socio-political and geographic contexts where students from diverse communities, constructed in terms of social difference, are not well served in their mathematics learning at schools. Most importantly, this research has implications for a more critical examination of, and emphasis on, contexts of learning, which are often delimiting and disempowering. Consequently, it is also important in considering the way in which, for example, “progressivist” ideals and universal or global trends in mathematics education are interpreted and recontextualized in different classroom contexts. Often, policy initiatives and rhetoric on “better education” do not properly consider the complex and contingent nature of school mathematics discourse and practice, or the socio-cultural, economic, political and historical differences in contexts of schooling.

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Dalene Swanson is completing a Ph.D. in Mathematics Education in the Curriculum Studies Department at the University of British Columbia. Dalene’s research interests are in sociological perspectives in mathematics education. She is concerned with the “pedagogizing of difference” in the mathematics classroom, and focuses on how forms of social difference are recontextualized into disadvantage through the discourse and practice of school mathematics. Dalene is particularly interested in how disadvantage might be differently realized and established across a range of pedagogic contexts. Dalene also teaches mathematics methods courses with a social justice focus to pre-service teachers in the teacher Education Program at UBC. She was born in South Africa and has pursued dance and drama as well as poetry and narrative writing. Dalene has taught secondary school mathematics in South Africa and Canada for more than 15 years. She is a graduate of the University of Cape Town.