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# Teaching Mathematics in Two Independent School Contexts: The Construction of "Good Practice"

by
Dalene Swanson
dalene@interchange.ubc.ca

Department of Curriculum Studies
University of British Columbia

**Abstract**

*This paper compares constructions of mathematics teaching and learning practices in two geographically different school contexts. It looks at the constructions of "good practice" within the schooling communities across these two contexts and describes some similarities and differences between them. It provides an interpretation of these differently constructed practices as being contingent on the socially situated contexts of the two schools and schooling communities. Consequently, it problematizes the rhetoric of the reformist movement in education premised on slogans for "better education" which tend to universalize "good" or "progressive" practices, and which often do not consider the complex and contingent nature of school mathematics discourse and practice, or the socio-cultural and historical differences in contexts of schooling.*

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***Parent 1:*** *"What do you advise we do to help Jonathan with his maths? Do you think that he needs to put more effort into his work, or do you think the problem is with lack of ability? How can we help him?"*

***Parent 2:*** *"If you would give James better scores for his math tests then he would feel better about his math and himself and then he would do better."*

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## 1. Introduction: The construction of "good practice"

Much of the academic discussion on teaching practice in mathematics education is couched within terms of universal understandings of "good practice". Rhetorical phrases such as progressive education, co-operative learning and child-centredness, amongst others, are bandied about in ways which suggest commonly understood ideas on how teachers, "good" teachers, practise their profession. Little cognizance is given to the fact that these practices, spoken of as "good", are open to interpretation in different schooling contexts. Nor is it considered that different settings or

social contexts can produce quite different constructions, and hence, realizations of "good practice".

Teaching mathematics in two geographically and socio-politically different settings allowed me the opportunity to evaluate my own practice in a way which provided a third eye on the situation. It became evident to me that there were significantly different ways in which mathematics teaching and learning *were spoken about* within these school communities in Canada and South Africa[1]. I became aware of two alternative readings of what it means to be an effective teacher of mathematics. I came to realize how dependent "effective teaching" is on the contextual and discursive resources of the teaching environment and of the situatedness of the constructions of "good" teaching within the school and local community. I also became aware of the limitations and possibilities which this presents in terms of how "good practice", constructed in one context, may be differently realized within another.

"Good practice" is not a universally understood set of educational ideals. It is socially constructed and situated. Drawing loosely on Dowling's (1993, 1998) work, one could say that within different contexts, the way in which school mathematics is constituted, and the way in which children learning mathematics are spoken about within a particular community, assists in defining and prescribing teaching practice. What is considered "good", as opposed to "ineffective", teaching practice is dependent on how student learning and achievement is articulated or constituted within a particular educational community, how school mathematics "functions", what practices are produced, and what it means to be a teacher or student of mathematics[2].

## 2. A socio-historical background

To provide an interpretative basis for the assertions I will be making with regard to these differences, I will present briefly a socio-historical background on the contextual differences and similarities of the two settings, (sufficient only to establish my argument). I will discuss briefly the nature of my personal and cultural engagement with these two communities. I acknowledge that these assertions about different contextually-produced constructions of "good practice" are selective and are based on my own personal teaching experiences and social location. Whilst these assertions refer to only two school communities, they provide illustrations of differences in the construction of good practice, sufficient to exemplify how a range of possible differences are produced and reproduced within a variety of socially situated settings.

### 2.1 The Western Cape independent school

In the first independent school context, I taught school mathematics at secondary level (grades 7 through 12) within an historic Anglican all-boys independent school in the Western Cape region of South Africa for ten years. At the time that I joined the academic staff, the school had been multi-racial for more than ten years. I came into this teaching context as a young female mathematics teacher where white patriarchy was hegemonic. My gender, although not my "race", positioned me as "other" (Said, 1994) within a very traditional and hierarchical school ethos. I did benefit, however, from my teaching affiliation with mathematics which held high status within this hierarchized or "stratified" school context (Bernstein, 1976, 1996).

During my tenure at this school, South Africa underwent vast political change, which resulted in a change of government and a new political dispensation for the country. It was a time characterized by shifts in power-relations between educationalists and policy-makers and contestation between students, educators, politicians, industrialists and the electorate. Whilst it introduced new concerns, raised new questions and posed new alternatives, it also heightened the difficulties to be faced in future education, bringing new focus and new emphasis to the socio-economic realities of educational crisis in South Africa. This independent school responded to the new educational dispensation with adaptations to the curriculum (syllabus changes) and a change of examination board, but there was little evidence of any fundamental changes in educational approach in consonance with political changes.

### 2.2 The Lower Mainland independent school

By contrast, I more recently taught grades 6 and 7 for a year in a co-educational independent school in the lower mainland of British Columbia. The school was relatively new in that it had been in existence for just over a decade. It was situated in an affluent area and there were a fair number of immigrant children attending it. The school size was similar to the South African school (approximately 600 students) but there were a greater proportion of female teachers at the Canadian school. Consequently, I was positioned as "other" in the respect of being "South African" rather than in respect of my gender. The class size was similar at both schools (an approximate ratio of 1:20). Unlike the South African independent school which had streaming (tracking) in all the main subject areas, the Canadian school had mixed-ability classes, although, in the main subjects which included mathematics, there were two other tracks available to students who wanted either an advanced program or who were spoken of as requiring remediation.

A socio-cultural difference between the two schools, and one which from my location, proved to be one of the most significant, was that many of the students in the historic school were third and fourth generation independent school-goers, whereas in the younger school, most of the students were from families who had no previous experience of independent schooling. This reflected itself, from my perspective, in the differences in the way in which, the school mathematics curriculum and other educational criteria were spoken about by the parent communities of the two schools as well as the "expectations" and role of the independent school mathematics teacher.

## 3. Good practice realized differently in two contexts

Given these similarities and differences between the two school contexts, it is not difficult to imagine that there would be differences in school practices and pedagogic discourses. The differences go further than this however, and depend on differences in cultural, historical and political context, which include differences in educational policies and administration. It is not my task in this paper to discuss these socio-historical and cultural differences in any detail but to suggest how they may be constituted and reproduced in pedagogic discourse and practice. Their embeddedness reflects itself in the way in which mathematics teaching and learning is articulated (or discursively established) in the respective schools and the limitations or possibilities for pedagogic practice that are established through school community discourses such as teacher discourse, parent discourse and student discourse as well as the dialogical relationships between them.[3]

The way in which "good" practice is constructed differently across the two school contexts is exemplified in the remarks of two parents quoted at the beginning of this article. Each remark falls within a repertoire of other remarks, but is sufficiently representative to illustrate my concerns. In each case, the parent was addressing me as mathematics teacher of their child. Similar repertorial remarks have been made to teaching colleagues in mathematics respectively in the two schools.[4] Parent 1, from the Western Cape school, speaks in terms of eliciting assistance from the teacher in coming to an understanding of how to solve Jonathan's "problem". The problem is seen as "their" problem, not the teacher's problem and the causes are located within the child. There are only two possibilities causing "the problem": either that the student is not "putting in sufficient effort", or that the student "lacks ability". The teacher, in this case, plays no role in the student's problem and is not blamed. The cause is attributed to student deficiency alone and the student is pathologized in terms of one or other deficiency in relation to mathematics at the school.

In the second remark by parent 2 in the British Columbia school context, the student's achievement level is not spoken of as a "problem". In fact, the way in which achievement is conceptualized is not related to effort or input on the part of the student at all. Here it is understood that the student should be "given" better scores as an unquestioned right of the student in the context of the mathematics classroom. In this remark, no connection is made between effort and achievement and "giving better scores" is suggested as a requirement of "good practice" in teaching mathematics. Further, this practice is related to the way in which the student "feels", and has more to do with the student's emotional well being than with any contribution the student makes to mathematics learning. The issue of whether the better scores are *deserved* or not,

(and here I acknowledge that this is a contested area of discussion referring to the nature and limitations of evaluation in the mathematics classroom and my personal response to this), is not brought into question by the parent in the lower mainland school. The expectation, according to the remark of parent 2, is that "better scores" *precede* "doing better" whereas in the first context, achieving would be viewed as a *consequence* of either effort or ability.

In the second context, "feeling good" in the mathematics classroom is of primary importance to good mathematics learning (or at least to "doing better"), but how "mathematics learning" takes place and how achievement is constructed is different to the way in which it is framed in the Western Cape school context. Generalizing from the remark of the second parent, it is not clear as to whether "learning" is a necessary criteria for educational achievement, and achievement is spoken of in terms of what it *appears* to be: "doing better" by being given "better scores". For the second parent, it seems that the *appearance* of achievement and "feeling good" about mathematics in the classroom are the important criteria for sound classroom practice, whereas for the first parent, achievement is unproblematically viewed as the consequence of an educational *reality*, where mathematics practice is viewed as being neutral and the student is either constructed as "successful" or pathologized as "deficient" in relation to school mathematics discourse.

## 4. Positioning of the teacher

What role then does the mathematics teacher play? Again, this question needs to be examined in terms of the differences in context and what the discursive and cultural resources of the two contexts will permit in terms of teaching practice. In the first school, the teacher's voice (Dowling, 1992, 1993, 1998) is much stronger than in the second school. This is supported by the cultural and historical ethos of the first school whose stratified or hierarchical nature permits this dominance of voice (Swanson, 1998).[5] In the second school, the voice of the teacher is far weaker, superseded by the voice of the parent. The relationship between voices in the second school follows a market-related (consumerist) pattern where the paying client's voice (the parent) has dominance over the producer's voice (the teacher). The product becomes, in fact, the "feeling good" of the student and the "better scores", so that, from my culturally situated experience and personal point of view, the product appears to be all packaging and little content or form. Discourse on student development in mathematics education, learning strategies and methodological implications for classroom practice are in a distal relationship to this parent voice, whilst the production of high scores is proximal. Interestingly, it is a *non-professional (as in non-educator)* voice which is dominant here and, from my perspective as a teacher concerned with providing students with full intellectual access to the "regulating principles" (Dowling, 1993, 1998) of school mathematics discourse, it is one which *narrows* the possibilities for classroom practice, *de-emphasizes* the importance of learning in terms of the access to mathematical knowledge, and assists, instead, in the production of consumerist education. This is not to say that the parent does not have an intellectual or educational contribution to make to the school community, nor that the parent does not have an important role to play in the development of educational values and cultural norms associated with the schooling community, but that the voice of the parent is most often one which speaks from a location which does not reflect inside-classroom experience. Often the agenda of the parent in educational discourse is very different to that of the teacher.[6] I am arguing that when this is the case and when the voice of the parent dominates that of the teacher, less "classroom-based" constructions of good practice are produced. These may be ones which tend to construct achievement in terms of "scores" rather than as "understanding", "critical thinking" or access to "knowledge"[7]. This has been the case in my experience.

## 5. Implications for reform policies

### 5.1 "Better education" in context

This refers to my initial concern regarding the rhetoric associated with progressive/ reformist education. The call for greater parental involvement in the school to enhance and improve the educational experiences of children does not *always* traverse well across all school contexts. I have little doubt that this might well apply to some schools in particular contexts where the social and cultural dynamics of the schooling environment and its discursive resources may increase

possibilities for improved classroom practice and student learning. I believe, however, that this should not be utilized as a universal policy or slogan for "better education". This is acknowledging that "improved classroom practice" is, in itself, a construction of "good practice" in context. It refers, however, to how this construction relates to the discourse on progressive education. What I am pointing at here is, that while the tenets of progressive education and the constructions of "good practice" embedded in this rhetorical discourse might apply to some contexts, they cannot be applied generally to all educational contexts unproblematically.

### 5.2 Mathematical misconceptions

To return to the implications for classroom practice, this tendency towards a more consumerist model in the case of the second school also reflected itself in the way in which students and parents spoke about and dealt with mathematical misconceptions or "mistakes". In both schools I exercised the practice of marking students' mathematics papers with comments and pointers designed to facilitate students' learning of school mathematics. I wrote comments and pointers on scripts where mathematical misconceptions had occurred in an attempt to encourage a collaborative dialogue between students, their peers and myself in mathematical language, provide a forum for individual attention and support student learning. In the first school, this was viewed as *good* practice and as the mark of an effective teacher who provides sufficient support for her students. In the second case, this was viewed more as *poor* teaching practice as it purportedly drew attention to the students' "mistakes" and, as it was put by a parent, "would make them feel that they weren't good at mathematics". Exhibiting concern and providing assistance for student learning and understanding, as I viewed it, appeared to be much less of a priority in the second school than the appearance of "achievement" and feelings of "well being" of the student. In the first school, by contrast, the priority was spoken of in terms of "student understanding" and where the student gained "satisfaction" from their "achievement of mathematical understanding and insight". Good scores, therefore, were spoken of as a *reflection* of this achievement, and not *the achievement* itself.

### 5.3 Evaluation in context

Consequently, the difference in focus in mathematics practice was most poignantly seen in evaluation practices. The tendency in the second school context was to compartmentalize the mathematics curriculum into small discrete "units". Evaluation of these units involved focusing on discrete "skills" or competencies and then, once students achieved a score for each unit, the unit was disregarded. The interconnectedness between mathematical conventions, topics, concepts and ideas was lost (see Dowling, 1990, 1993, 1998). Any "relevance" that these "skills" might possess to another unit was not addressed in any conceptual manner and little holistic discussion of mathematics took place. Further, I observed the practice by mathematics teachers in the second school context of re-testing students with low scores on a particular unit of the curriculum until their scores "improved" to within an "acceptable" range. In each case of re-testing, the fundamental format of the original test remained the same, with a few adjustments, usually numerical changes. From my observation, the students appeared to learn the *schema* of the test in the process of re-testing and, by anticipating what was required, were able to improve their results in this way. Whether there was an improvement in "mathematical understanding" or greater access to the 'regulating principles' of mathematics discourse (Dowling, 1998) through this process, however, needs questioning. This practice of re-testing to improve scores, considered "good practice" in the second school, was not evident in the first school, and whilst the mathematics curriculum was also compartmentalized to some degree, testing usually involved a broader range of topics across the curriculum. In this school, evaluation scores were weighted in such a way that "examinations", mostly involving problem-solving questions reflecting an integration of mathematical topics, were emphasized over "tests" which were designed to test smaller areas of the curriculum. Any re-testing would be utilized for "confidence-building" and "practice" and would not be assigned scores for evaluation purposes. This form of evaluation was considered "good practice" in this context.

The role of mathematics in determining vocational choice is critical to the discussion on evaluation and here is where the strength of voice of teachers in relation to parents is most pronounced.

Significantly, the second school context where the voice of parents appeared to be dominant over the voice of teachers (the students' voice, in my opinion, being relatively weak in both school contexts), was one in which scores were emphasized over learning and the "teach-to-the-test" phenomenon was observed. Scores were spoken about as being paramount in determining students' entry into academic institutions of further learning, and were the "value" for which the high price of independent schooling was paid.

Davis (1996) perhaps best encapsulates these issues in the following comment[8]. His comment refers to a preliminary discussion paper on the development of provincial mathematics curricula for British Columbia. It draws attention to and exhibits concern for these aforementioned practices in mathematics teaching in schools:

School mathematics has come to fulfill a gate-keeping role, serving as a primary (and often sole) determiner of educational/vocational choice after high school. While the factors contributing to this situation are diverse, a clear contributor is the seeming ease with which narrow mathematical competencies can be tested.

Setting aside a consideration of the moral implications of this matter, we can clearly see that the testing regime surrounding school mathematics has contributed to a series of educationally questionable practices - not the least problematic of which are the gate-keeping status of school mathematics and the "teach-to-the-test" phenomenon. A further problem is the tendency to regard errors as something to be avoided, rather than as necessary and potentially fruitful events within learning settings. (Davis, 1996, p.19)

## 6. Conclusion: "good practice" and the importance of context

Despite different constructions of "good practice" in relation to evaluation in mathematics, both schools engendered a high degree of competition amongst students. Davis (1996) speaks of this phenomenon in terms of the way in which "modern curricula" in mathematics are constituted, in both form and content. He points out that: "Modern mathematics curricula have tended to be founded on the assumptions that thought and understanding are strictly individual, subjective, and mental phenomena. Such assumptions have supported a pedagogy that has held learners apart (and) judged them against one another" (p.18). In advocating the development of new curricula, teaching practice and learning strategies, we nevertheless need to consider our positions in terms of the different possibilities and limitations which these hold for different educational contexts and how these are realized in different constructions and elaborations of "good practice".

Using but one comparison, based on personal experience, I have tried to show how "good practice" may be constructed differently across a variety of social, cultural, political and spatial settings. Yet, it is currently premised on notions of universalism and on assumptions of the "common good", and as such needs to be problematized within mathematics education research. In developing new curricula and educational policies underpinned by slogans for "better education", we need to ask ourselves, for whom, for where and under what social conditions? Consideration needs to be given to the complex and contingent nature of school mathematics practice and discourse, and that "good practice" in mathematics teaching and learning is a political act,[9] which is socially and historically situated.

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**EndNotes**

1. It must be noted that I am *not* attempting to present an argument about which constructions of "good" practice are better than the next. This is not my concern in this paper, and is an oblique argument to the 'sociological description' model I am putting forward. In fact, to advocate that one construction is better than another would produce a contradiction in terms. This would be to impose a notion of "good" practice upon "good practice" as if there was some all-pervasive and universal 'truth' to be found in it, and would therefore contradict my argument that "good practice" is a socially-situated construction. Put differently, I am premising my discussion on the understanding that "good practice" is discursively established and contingent on the context of this production.

   Nevertheless, I will later discuss how the different constructions of "good practice", established in each school context, provide limitations or possibilities for learning and teaching within each educational environment. This necessarily locates a point of view which reflects my personal experience and engagement with these school communities. I have acknowledged this personal perspective, at various points throughout the text, as being informed by my social location, teaching experience, and cultural and cross-cultural engagement with these respective communities.

2. Again, it is not my brief in this paper to present measures or definitions of teaching, achievement, parenting or learning. Its purpose is well beyond that, in that I am not attempting to measure or present a particular 'truth' about teaching, learning, parenting or achievement. Instead, I am attempting to show reciprocity between how learning, teaching, achieving are *spoken about* or socially constructed in different schooling contexts, and how this works concomitantly with different realizations of practice.
3. I am of necessity being brief and I incorporate little detailed explanation of context. Nor do I explore in any depth the literature in the areas that come under scrutiny. This is purposeful! Given the constraints of space, I am attempting to provide discussion sufficient to support the thrust of my argument. This argument does not address possibilities or implications for teaching practice in terms of providing a 'better' notion of 'good practice' (which would require an elaboration of researcher assumptions on teaching, learning and achievement). Rather, its aim is to raise the consciousness of the

reader to a largely hidden problem in researchers and teachers assumptions of generalizability. This discussion, intended to be looked upon as a small "case study" or "window" on this problematic of generalizability, serves to alert the educational research community to the need for more consideration and investigation of context and cultural situatedness before introducing "new" universalized approaches to the curriculum.

4. I am aware that these comments could be made in other teaching contexts and that they could be said of other curriculum subjects other than mathematics. I have chosen these two comments, however, as exemplars of a repertoire of similar comments said, either to me as teacher in these respective schools, or to colleagues of mine which have shared these comments with me. They therefore refer more to the frequency and consistency with which similar repertorial comments were made in relation to context, than to the specifics of each comment.
5. The research to which I refer here, took place within the Western Cape independent school in which I taught previously. In this study, I examined the discourse of a group of racially-referenced students, constructed in terms of social difference and 'disadvantage', as well as their teachers, in their learning and teaching of mathematics. The purpose of the study was to examine how disadvantage was socially constructed and maintained within the research school, how this was contextually established and how these constructions worked concomitantly with the uneven and differentiated distributions of mathematics discourse and practice afforded these students. In this way, I showed how disadvantage was "recontextualised" (Dowling, 1993) into school mathematics discourse and practice. In other words, I showed how "constructed disadvantage" begot "educational disadvantage" in the research school, a process which I referred to as the "pedagogizing of difference". The methodology was developed from theories of *subjectivity* and *discourse*. I made use of a sociological language of description, drawn from the work of Bernstein (1976, 1990, 1993) and Dowling (1992, 1993) in the main. This was used to describe the context of the school and analyze the discourse of students and teachers in relation to the discourse and practice of mathematics within the school. This sociological approach served as a break from the more usual cognition-based approaches and constructivist theories in mathematics education research.
6. In more sociological terms, the teacher's position with respect to her/his professional knowledge and classroom location, is different to the parent's position and location. These positions/locations produce different emphases and criteria for evaluation of educational practices.
7. Here, I have made use of some of the more commonly used terms from "teacher talk" - terms that I have heard in my teaching experience amongst teachers to describe the learning practices of their students.
8. Although the sociological framework of my research is very different to Brent Davis's approach, I am, nevertheless, recruiting his point of view here to further my argument, as I believe this point of view to be valid and consistent with the stance I am taking.
9. There has been much discussion in mathematics education and elsewhere about teaching and learning as a socio-historical and political act. Nevertheless, in support of this assertion, I will recruit the work of Foucault (1981) here:

   Although education may well be, by right, the instrument thanks to which any individual in a society like ours can have access to any kind of discourse whatever, this does not prevent it from following, as is well known, in its distribution, in what it allows and what it prevents, the lines marked out by social distances, oppositions and struggles. Any system of education is a political way of maintaining or modifying the appropriation of discourses, along with the knowledges and powers which they carry. (Foucault, 1981, p. 64)

   Also, Dowling (1998) in his *Sociology of Mathematics Education* comments:

   > ...if power is reinstated as necessarily characteristic of the social, then the generation of any particular knowledge structure as a 'point of view', a specialism within the division of labour, is, both socially and individually, a political act. (p. 106)

**About the Author**

**Dalene Swanson** is in a doctoral program specializing in Mathematics Education in the Curriculum Studies Department at the University of British Columbia. Dalene's research interests are sociological perspectives in mathematics education. She is particularly interested in how disadvantage might be differently realized and established across a range of pedagogic contexts. 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.