Educational Research for Social Change (ERSC)
Volume: 5 No. 1, April 2016
pp. 41-53
ersc.nmmu.ac.za
ISSN: 2221-4070

On Bernstein's Sociology of Pedagogy and how It Can Inform the Pedagogic Realisation of Poor and Working-Class Children in South African Primary Maths Education

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Abstract

This article discusses how current South African primary maths curriculum pedagogical changes are characterised by a strengthened frame. This strengthened pedagogical frame results from strong sequencing and pacing and a transformed regulative discourse combining positional and expressive social features denoting mixed pedagogies. Sociological research indicates that the strong sequencing and pacing of pedagogic practices resonate with middle-class children and disadvantages poor and working-class learners. Drawing from both educational sociological studies and Bernstein's central thesis about the social-class basis of pedagogic framing, the paper shows how responsive pacing, sequencing, and mixed pedagogies that reflectively relate with the mathematical concepts to be relayed, ensure learning for children from different social classes. Based on the theoretical framework and related literature review, the paper explores second sites of learning strategies and compensatory pedagogic interventions that can disrupt middle-class social assumptions and support learning access for low-income-background learners in South African primary maths classes. Contextual tensions within the suggested approaches are also considered. Thus, this review offers sociological insights on humanising primary maths interactions that may interrupt social reproduction and ensure low-income children's pedagogic realisation.

Keywords: South Africa, primary maths, Bernstein, framing, pacing and sequencing, social class

Introduction

This article illustrates the social-class assumptions in the South African primary maths education as encapsuled in the Department of Basic Education's restructured Curriculum and Assessment Policy Statements (DBE, 2011a, 2011b). Reflecting on an earlier curriculum analysis study (Pausigere, 2014), it argues that middle-class social ideologies are dominant in the local primary maths pedagogic practices, and explains how such class-based interests can be interrupted to ensure learning for all children. Drawing from Bernstein's (1975, 1986, 1990, 2000) broader sociology of education theory and, specifically, from his central arguments about the social-class nature of pedagogy, and using the concept of framing, the paper explains how middle-class forms of consciousness, experiences, and interests are evident in local primary maths pedagogic practices as revealed in curriculum policy documents. The paper discusses ways of interrupting such middle-class cultural reproduction ideologies and, in the process, of enabling the pedagogical recognition of working-class and disadvantaged learners in South African primary maths classes.

Generally, social-class inequalities in South African primary maths education have been noted (Fleisch, 2008; Graven, 2014; Hoadley; 2007; Taylor, 2007). Official statistics confirm that well over half, that is, 55,7% of local children live in poverty-stricken households (Statistics South Africa, 2014), with South Africa described as having the highest and most extreme levels of social and economic inequalities in the world (Fleisch, 2008; Graven, 2014). Large-scale national research from the DBE's 2001 and 2007 systemic evaluations (DBE, 2008), interpretation of data from the 1999, 2003, and 2013 Trends in International Mathematics and Science Studies (Reddy et al., 2015), and the 2012–2014 Annual National Assessment (ANA) reports (DBE, 2012, 2013, 2014), cite educational inequality as a critical issue. Of the socioeconomic factors suggested as causing differentiation in education (Fleisch, 2008; Graven, 2014), this paper is interested in how the social base of pedagogic relations influences acquisition amongst different learners. Attempts have been made to specify the type of primary maths knowledge that ensures equity (Hoadley, 2007; Pausigere, 2015). Closely related to this article's review is Hoadley's (2008) work, which explains how social-class differences are reproduced, pedagogically, in local literacy classes. Both the Hoadley (2008) study and related work in Australia (Rose, 2004), England (Arnot & Reay, 2004), and Portugal (Morais, Neves, & Pires, 2004) show how particular pedagogic practices can overcome the effect of children's social backgrounds. However, there have been no specific appraisals on how primary maths pedagogies differentiate learners and reproduce inequalities.

The local social-class-disparities background, relevant educational literature reviews, and sociological theoretical perspectives have prompted this paper to investigate how local primary maths pedagogic practices offer unequal chances of acquisition for children from disadvantaged social classes—and to provide strategies for interrupting such propensities. Thus, this article is informed by three key research review questions:

- What are the social-class assumptions underpinning South African primary maths pedagogic practices promoted in the curriculum?
- How might pedagogic practices be changed to enable increased access to learning for all children?
- Which educational strategies might help learners of different social backgrounds cope with the strong sequencing and pacing requirements in the South African primary maths curriculum?

These review questions, and the educational knowledge code category of *pedagogic framing* and how it relates to social class, help structure the ensuing discussion in this paper. Thus, this article argues for the need for responsive pacing and mixed pedagogies that reflectively connect and

profoundly relate with the nature of the mathematical concepts to be taught. Such humanising pedagogic practices can ensure that working-class children reach their potential in mathematics.

Because I relate Bernstein's (1971, 1973, 1975, 1990, 2000) theory to the South African context, it is important that I define the local social-class compositions. At the apex of the South African society is an increasingly multiracial upper class (Seekings, 2003). There is a hypothetical distinction between core and marginal working class. The core working class makes up 20% of the local families and includes semiskilled or unskilled workers such as shop floor workers, factory workers, machine operators, bricklayers, security guards, miners, and so forth. The marginal working class, comprising of farm and domestic workers, comprises 12% and, together with the poor and unemployed category, makes up 41% of households in South Africa. According to Seekings (2003), the core and marginal working classes and the poor are overwhelmingly black in composition. A quarter of the local households are middle class with two thirds of this group being black, whilst 15% are whites. In local educational sociology, the middle class can be divided into old educational professionals and new knowledge professionals (Muller, 2000), which relates to Bernstein's (1975) old and new middle classes in Britain. For both countries the new middle class—mental workers—consists of employees who work in the service provision industry, for example, teachers, police officers, nurses, clerks, public civil servants, and so forth. The old middle class is made of people who work in the production and distribution of goods and services, for example, industrial and business managers, farmers, retail proprietors, artisans, or technicians. Seekings (2003), Muller (2000), and Bernstein's (1990, 2000) work shows similarities between British and South African middle-class occupational groupings.

Theoretical Framework: The Sociology of Pedagogy

This study draws on Bernstein's (1975, 1986, 1990, 2000) theory about the sociological nature of classroom pedagogic communications. Though focusing on pedagogic framing, Bernstein's theory of educational transmissions also incorporates the key principle of knowledge classification. Bernstein (1975, p. 25) acknowledged that the concepts of classification and framing are useful "for the analysis of transmitting agencies." Thus, in a recent paper I have examined how the strongly classified primary maths knowledge in local curriculum documents resonates with middle-class learners (Pausigere, 2015). Bernstein's framing component will be used to understand how social-class relations determine pedagogic transmissions within the South African primary maths curriculum. Bernstein (1975, p. 16) asserted that "educational transmissions embody class ideologies." His structuralist approach, which explains how different social classes relate to and understand education, postulates that the official pedagogic practices privilege middle-class interests, which disadvantages marginalised, working-class, and poor children (Bernstein, 1990, 2000). The argument that school pedagogic practices have a middle-class social origin is also noted in international (Arnot & Reay, 2004; Morais et al., 2004; Rose, 2004) and local (Hoadley, 2008; Muller, 2000) educational sociology literature. Within some of these empirical studies, there are calls for mixed pedagogies, relaxed framing, variable pacing, and sequencing to interrupt social-class stratification and achieve successful acquisitions for working-class learners.

Pedagogical framing rules and the social base

It is important to explain Bernstein's concept of pedagogic framing and its related principles because these help illuminate how middle-class socialisation articulates the processes of pedagogic transmission. In the classroom communication context, framing refers to the nature of the pedagogical relationship between the "teacher and the taught" (Bernstein, 1975, p. 88). A comprehensive definition of framing is found in Bernstein's (1986, p. 234) early work where framing is regarded as referring:

> *to the controls on the selection, sequencing, pacing and criterial rules of the pedagogic communicative relationship between transmitters/acquirer(s) and provides the realization rules for the production of their texts.*

In his later work, Bernstein (2000) elaborated framing as a function of instructional and regulative discourses, with the former being embedded in the dominant latter. Where framing is strong, the transmitter has explicit control over the instructional elements of selection, sequencing, pacing, timing, and criteria, with knowledge transmission being characterised by hierarchical, positional, ritualised, and intrapersonal social-order rules (Bernstein, 1975, 1990, 2000). Where framing is weak, the acquirer has apparent control over the discursive rule, and the social orders are marked by interpersonal, expressive, and cooperative relationships. It is important to note that the instructional framing values of selection, sequencing, pacing, criteria, and also the strengths of the instructional and regulative framing discourses may vary with respect to pedagogic practices (Bernstein, 1990, 2000). Consequently, Bernstein defined framing in relation to its rules and principles as follows:

> *Framing = instructional discourse/discursive order (selection, sequence, pace, criteria) regulative discourse/social order*

It is within the concept of framing that the old and new middle class ideological differences and principles of social control result in conflicting forms of educational transmissions. The strength of the framing carries social-class assumptions that influence and regulate the school's dominant pedagogies, thus, "there is a causal relationship between the structure of social relationships and the principles of communication" (Bernstein, 1975, p. 30). The old middle class was domesticated through strong framing and positional discourses to ensure cultural reproduction and to reduce overhead public education expenditure[1] (Bernstein, 1975). On the other hand, Bernstein (1975, p. 121) explained that the new middle class prefers weak framing and personal forms of socialisation for theirs is an "interrupter system of forms of reproduction." Similarly, in the local educational context, Muller (2000, p. 106) stated that the South African old educational professional prefers "an extended coordinative role for the state," with the new knowledge professional emphasising "sector-specific autonomy." Thus, the conflict between the two different fractions of the middle class on pedagogical ideologies and practices has also been reported in South Africa's curriculum reforms (Muller, 2000). Bernstein (1975, p. 122) described the different pedagogic orientations within the fractions of the middle class as arising from tensions in the forms of transmission of class relationships thus:

> *For the old middle class variety must be severely reduced in order to ensure cultural reproduction; for the new middle class, the variety must be encouraged in order to ensure interruption. Reproduction and interruption are created by variations in the strength of classifications and frames.*

The question therefore arises as to the type of framing that enables the children of marginal classes to *realise*[2] and speak the expected legitimate text. Theoretically, the working class sympathises with the new middle class' pedagogical position because it is regarded as being inclusive of the working-class family culture. Reflecting on Muller's (2000) work, the same can also be said of the educational developments in South Africa. However, the beneficial potential of weak framing might not be

[1] With the old middle class being in control of the field of production (economic), it directly and indirectly pays for the state's educational expenses.

[2] The *realisation rule* regulates how the meanings are to be put together and made public to create the legitimate text (Bernstein, 1990; 2000).

realised by the working-class children because this form of pedagogy originates from a fraction of the middle class. Thus, disadvantaged learners are likely to misrecognise and misread the cultural reality and cognitive significance of expressive pedagogic practices (Bernstein, 1975, 1990, 2000).

Besides the pedagogical promises for equality implied in weak framing, Bernstein (1975) cautiously argued for the need to reflectively decide on forms of transmission that privilege working-class children's interests and which do not embed middle-class instructional orientations. Because both weak and strong framing entrenches middle-class interests, it logically and theoretically follows that a strengthened frame of mixed pedagogies overcomes the effect of children's social backgrounds. Empirical studies carried out in primary science (Morais et al., 2004) and lower secondary mathematics classes (Arnot & Reay, 2004) indicated that mixed pedagogies enable the successful acquisition of scientific and mathematical knowledge by students of different social backgrounds. The latter evidence also concurs with Reynolds and Muijs' (1999) review of research in primary mathematics, which suggests that mixed forms of pedagogies enable the development of high-order mathematical skills. Such research findings are central to the argument and focus of this paper, which reviews how local primary maths transmissions maintain or evoke learners' forms of experiences. Furthermore, mixed pedagogies involve the enactment and praxis of a humanising pedagogy in primary maths classes.

The sociology of the regulative discourse

Throughout his oeuvre, Bernstein maintained that the key and dominant component of the framing principle is the regulative discourse. In fact, the regulative discourse is a precondition for any pedagogic engagement or encounter that creates the moral regulation for transmission and acquisition (Bernstein, 1986). The regulative discourse determines the classroom social order and the beliefs, expectations, and standards about relations, conduct, character, and manner (Bernstein, 1986, 2000). A weak social order encourages expressive, interactive, interpersonal, creative, differentiated, and pupil-generated forms of social control and organisation. Interpersonal pedagogies are educational forms of communication characterised by lateral power relations and these give rise to learner-centred and activity-based pedagogical practices. A strong regulative discourse is marked by hierarchical, interpositional, and stratified pedagogical features. Under intrapersonal or interpositional pedagogical practices, the teacher and learner relationship is one of clear subordination and superordination, such as in teacher-centred instructional practices. As theoretically outlined, weak and strong social orders both carry the intentions of the middle class, which cannot be fully realised by the working-class children because of their modest social and family backgrounds. Thus, a transformed regulative discourse (Pausigere, 2014)—consisting of inter- and intrapersonal mixed pedagogies—becomes a neutral form of pedagogical socialisation or realisation for different types of learners.

The sociology of the instructional discourse

The other important aspect of the framing concept is the instructional order. This refers to the rules of selection, sequencing, and pacing of knowledge (Bernstein, 1975, 1986). In his later work, Bernstein (1990, 2000) also included *criteria* as another element of the instructional discourse; however, it is beyond the scope of this paper to consider this assessment component. There is a close relationship between pacing and sequencing for "sequencing rules imply pacing rules" (Bernstein, 1990, p. 65). Sequencing rules are also synonymous with the term *organisation* and the concept of *progression* because they entail the transmission practices of what must come before or after something. Pacing entails the "rate of the expected learning or acquisition" (Bernstein, 1975, p. 103). Or simply put, pacing is the frequency, degree, or extent at which concepts or content material is presented to learners in classroom interactions. Pacing is a critical variable of the instructional discourse, which carries "social class assumptions" (Bernstein, 2000, p. 74); in fact, the "pacing of

educational knowledge is class-based" (Bernstein, 1975, p. 103). Both explicit and implicit instructional rules are generally portrayed as "potentially divisive" (Bernstein, 1975, p. 55) in nature. However, it is strong pacing and sequencing that convey "elitist assumptions and functions" (Bernstein, 1975, p. 64). Explicit sequencing requirements are easily met by middle-class learners yet they militate against working-class children. Bernstein (1975, p. 127) conversely explained that relaxed pacing is "less marked by middle-class assumptions" and is one of the strategies employed for learners who have difficulties in meeting the school sequencing rules. Empirical studies employing Bernstein's pedagogical framing concepts also illustrate how strong pacing selectively constrains disadvantaged learners, with variable or relaxed pacing being remarked for enhancing their acquisition and engagement possibilities (Arnot & Reay, 2004; Hoadley, 2008; Morais et al., 2004; Rose, 2004).

Besides relaxed pacing, school academic repair strategies have been suggested for learners who fail to meet the strong sequencing and pacing requirements of the school's academic curriculum. Where there is an explicit ordering principle, it is also crucial that a child learns to read early to acquire the written code that enables independent solitary learning (Bernstein, 1975, 1990). Strong sequencing rules at primary level require two sites of acquisitions: the school and the home—thus, there is need for silent space and time in learners' homes to allow for official pedagogic discipline in the family context. Bernstein (1990, p. 74) explained that spatial and early reading requirements are easily satisfied in the middle class rather than in poor and working-class children's families, thus, the pacing rule "acts selectively on those who can acquire the school's dominant pedagogic code." Addressed from a second site of learning perspective, strong-paced pedagogic practices resonate with the middle class' weak external framing home assumptions rather than with the working class' strong external framing home codes. The article will discuss tensions in some of the second sites of learning and compensatory pedagogic strategies teachers may employ to support poor working-class learners and enable them to meet local primary maths pacing and sequencing requirements.

Discussion

In this section of the paper, I initially address the first review question, explaining the middle-class assumptions in the recent Curriculum and Assessment Policy Statements (CAPS) curriculum restructuring changes and how it has resulted in a strengthened primary maths frame consisting of strong instructional rules and a transformed regulative discourse of mixed pedagogies. Theoretically informed by the framing principles, the discussion reflects on an earlier analysis of primary maths documents carried out by the author (Pausigere, 2014; Pausigere & Graven, 2013). Responding to the second question, and informed by relevant educational sociology literature, I propose mixed yet appropriate pedagogies whose instructional choices are informed by the nature of the primary maths knowledge to be relayed, and responsive pacing and sequencing that relate to the social background of the learners. Focusing on the last question, the paper explores sociologically-informed second sites of learning and compensatory pedagogic strategies of providing access to disadvantaged learners. The paper also highlights the challenges and tensions under which the envisaged internal official pedagogic framing and external local framing educational changes can flourish and ensure learning for all children.

Unpacking sociological assumptions within the pedagogical framing of the CAPS

An earlier analysis of the new primary maths policy documents (Pausigere & Graven, 2013) using Bernstein's (1975, 1990, 2000) work, reveals that the new curriculum's framing is strengthened when compared to Curriculum 2005 (Department of Education [DOE], 1997), the first postapartheid curriculum's frame. A strengthened primary maths frame results from explicit instructional discourse

characterised by strong selection, pacing, and sequencing and ritualised positional *social orders* within the transformed regulative discourse. Ritualised positional social orders entail teacher-centred authoritative instructional practices. The transformed regulative discourse consists of differentiated expressive features emanating from the postapartheid's social and political transformation agenda. According to Bernstein (1975, p. 123), an increase in the frame's strength reveals the new middle class' "ambivalent enthusiasm" on modalities of socialisation. Revisiting earlier policy documentary analysis studies, and through a sociological lens, this article explains how each of the framing principles reveals middle-class forms of transmission of class relationships within local primary maths pedagogic practices.

Middle-class principles of social control are evident in CAPS' primary maths strong instructional discourse through the teaching guidelines' specification, timing, and sequencing of content across the four terms of the year, from grade to grade and within phases (DBE, 2011a, 2011b; Pausigere & Graven, 2013). The strong pacing and sequencing serves to indicate the "progression of concepts and skills" over time and also gives "guidance on the spread of content in the (national) examinations or assessments" (DBE, 2011a, p. 15; DBE, 2011b, p. 12; DBE, 2012, 2013, 2014). The first reason for strong pacing and sequencing reported in local primary maths policy documentation implies "reduced options" (Bernstein, 1975, p. 89) regarding pedagogical possibilities, learner engagement activities, and content progression. Syntactically, the local primary maths guidelines state that "teachers may change the suggested time allocated to topics *slightly* [emphasis added]" (DBE, 2011a, p. 39). In fact, the local curriculum subject guidelines maintain that the primary maths "concepts, knowledge and skills" supposed to be transmitted and received in the pedagogical relationship should clearly focus on the recommended and timed content outlined in policy documents (DBE, 2011a, 2011b). Strong sequencing is also illustrated in the primary maths curriculum documents' recommended distribution and allocation of mathematics teaching topic-cum-time schedules, and this resonates with Bernstein's (1990, p. 73) elaboration that "with strong pacing, time is at a premium." The strong sequencing and pacing of primary maths content shows the old middle-class and elitist assumptions in the local instrumental order whose beneficial potential is easily realised by the middle-class learners and misread by disadvantaged social groups (Bernstein, 1975, p. 64). This concurs with empirical studies in literacy (Hoadley, 2008; Rose, 2004), primary science (Morais et al., 2004), and lower high school maths and English classes (Arnot & Reay, 2004), which illustrate how strong pacing selectively constrains working-class learners. Relating educational sociological perspectives and key policy pronouncements, shows that the South African primary maths' strong pacing and sequencing conveys middle class principles of selection (Pausigere and Graven, 2013; Pausigere, 2014). These values of control are noted as perpetuating social and pedagogical inequalities.

I have explained that the South African primary maths regulative discourse has been transformed, and consists of both hierarchical and expressive social orders (Pausigere, 2014) emanating from the old and new middle class. A transformed regulative discourse combining *strong* and *weak* regulative aspects implies mixed pedagogies and results in a strengthened primary maths curriculum frame[3]. Thus, regarding primary mathematics teaching and learning practices, the curriculum policy is noted as allowing for both learner- and teacher-centred activities (Pausigere & Graven, 2013). "Whole class" teaching and "independent learner activities" (DBE, 2011a, p. 9) are outlined in the primary maths subject guidelines as the main pedagogical approaches. Theoretically, this shows hierarchical relations characteristic of strong regulative discourse, which in the case of CAPS points towards a

[3] Graven (2002) noted that it is useful to view strengths of framing along a continuum rather than simply as opposites of strong and weak framing. In my analysis of the framing of CAPS, I have found it more useful to locate the shift as a process of movement between the poles of weak and strong framing, where the starting point, direction, and distance of movement along the continuum are defining (Graven, 2002).

strengthened frame. Sociologically, the strong regulative order arises from the old middle class' preferences for strong framing and positional and individualised modalities of transmission (Bernstein, 1975). Such teaching and learning approaches, according to Muller (2000, p. 105), resonate with South Africa's old middle class "agencies of symbolic control" pedagogical ideologies.

On the other hand, the primary maths curriculum policy documents still emphasise "small group focused lessons" (DBE, 2011a, p. 13) and also "encourage an active and critical approach to learning, rather than rote uncritical learning of given facts" (DBE, 2011b, p. 4), characteristic of Bernstein's (1975) new middle-class cooperative and interactive forms of communication. The progressive, therapeutic, learner-centred ideologies and weak social order regulative discourse also originally derive from the social transformation and political pedagogical intentions that initially set the groundwork for local curriculum reform in 1997 (DBE, 2011a, 2011b). Muller (2000) also elaborated that these reform-based pedagogies were locally supported by the new knowledge middle-class professionals. The transformed South African primary maths regulative discourse combines both ritualised adult-imposed and expressive youth-generated teaching and learning approaches originating from the old and new middle classes, and serves their respective ideological and social group interests rather than working-class forms of socialisation.

It is also important to view the hierarchical social orders and the explicit instructional discourse as emanating from the CAPS primary maths emphasis on learner operational fluency and the need for deep conceptual understanding. Intrinsically, the strong instructional rules and the transformed regulative discourse combining strong and weak social orders, embed middle-class principles of selection that constrain acquisition opportunities for lower social-class learners. In the next part of the paper, I discuss how the local primary maths' framing rules can provide pedagogical access to disadvantaged learners.

Pedagogic framing features that provide mathematical access to children of low-income status

Having reflected on earlier local primary maths policy documents analysis studies, I described how strong sequencing and pacing ensures middle-class cultural reproduction. Informed by the literature and theoretical insights, I now explain how responsive pacing supports low-income status learners' pedagogical interactions. Responsive pacing considers learners' social position, context, and needs and, most importantly, their levels of understanding. Responsive pacing implies open and learner-sensitive sequencing, which can either relax or maintain optimal pacing depending on the learners' understanding and social-class imperatives. Responsive pedagogical progression takes heed of the theoretical and the empirical need to "relax pacing" (Bernstein, 1975, p. 127; Rose, 2004, p. 105), maintain "weak framing of pacing" (Morais et al., 2004, p. 85), or ensure "variable pacing" (Hoadley, 2008, p. 64) for the realisation of working-class learners in pedagogical encounters. Bernstein's (1986, p. 211) later assertion also confirms the importance of weak framing of ordering in recontextualised school discourses for, according to him, the:

> *rules of selection, sequencing and pacing cannot themselves be derived from some internal logic [of the parent discipline] or practices of those who produce [the research-based subject]. The rules of the reproduction of [these school subjects] are social, not logical facts.*

This paper also dialectically considers the educational sociological perspective that "strong frames" (Arnot & Reay, 2004, p. 148; Bernstein, 1975, p. 121) relay notions of social-class differentiation.

Whilst responsive pacing recognises the social-class implications of pacing and sequencing, it also considers the critical aspect of sequencing framing in relation to the learners' general understanding. However, weak pacing should not be read as reducing content coverage for the working-class learners, which in itself can perpetuate social-class inequalities. In this regard, responsive pacing requires knowledgeable and reflective classroom practitioners whose pedagogical practices are sociologically sensitive, that is, being aware and conscious of social-class differences—and its impacts on learner acquisition. Additionally, such educators also know the mathematical concepts that need to be backgrounded or emphasised, regardless of subject guidelines' stipulations. Thus, responsive pacing is one critical feature of a humanising pedagogy in primary maths education.

The curriculum suggests that the transformed South African primary maths regulative discourse, consisting of expressive and ritualised procedures, entails mixed pedagogies, which I commend as an instructional move in the right direction towards equity. The need for reflective mixed pedagogies is informed by theoretical insights and empirical studies that show how learner- and teacher-oriented pedagogies feature in the local primary curriculum. The importance of mixed pedagogies in supporting working-class learners' acquisition is inferred from Bernstein's (1975, p. 19) disapproval of old and new middle-class transmission strategies when he said:

> *conflicting pedagogies [inter- and intra-personal] have their origins within the fractions of the middle class and so an unreflecting institutionalising of either pedagogy will not be to the advantage of the lower working class.*

Secondly, neither positional nor personal middle-class forms of socialisation carry realisation benefits and potential for working-class children (Bernstein, 1975, 2000). The limitations in both pedagogical practices inform the necessity for mixed pedagogies of strengthened frames, which Bernstein (1975) remarked for being directly related with occupational demands. Evidence from Morais, Neves, and Pires' (2004) and Arnot and Reay's (2004) empirical studies in primary science and lower secondary mathematics classes also indicates that besides teacher knowledge competences, mixed pedagogies also interrupt social-class inequalities. Mixed pedagogies are therefore the preferred and neutral forms of pedagogical socialisation, crucial for engaging working-class and poor children in the learning process.

However, the study goes further and explains how mixed pedagogical choices must reflect on the nature of mathematical concepts to be transmitted. Such varied instructional practices are being implicitly encouraged in the South African primary maths curriculum (Pausigere & Graven, 2013). Both Reynolds and Muijs (1999) and local primary maths policies (DBE, 2011a; DOE, 2008) concur that whole class interactive instruction is effective in teaching basic numeracy skills such as number bonds, multiplication and division facts, or the four basic operations. On the other hand, direct instructional teachings that emphasise memorisation, drill, and practice for learners have been associated with good mental mathematics understanding (DOE, 2008; Reynolds & Muijs, 1999). Reynolds and Muijs' (1999) work and the Foundations for Learning campaign (DOE, 2008) both agree that small-group work exchanges are valuable for developing problem-solving skills. Investigative learner-centred approaches resonate with elementary statistics (data handling) and measurement tasks. Independent learner activities are noted as essential for reinforcing and consolidating mathematical concepts already taught (DBE, 2011a). Whilst local primary maths subject guidelines explain the importance of mixed pedagogies they do not explicitly highlight, justify, or reflect on the connection between pedagogical choices and the mathematical knowledge, concepts, and skills to be taught. Thus, this paper claims that a transformed regulative discourse of mixed pedagogies that profoundly connect to the mathematical skills to be relayed, relates to the wider social-class structures. In fact, mixed pedagogies are culturally responsive and strategic humanising teaching

approaches appropriate for imparting primary maths concepts and skills to learners of different social backgrounds.

To ensure learning for children of different social classes, the local primary maths pedagogic practices must consider responsive pacing and sequencing and reflective mixed pedagogies that take cognisance of the nature of mathematical concepts to be transmitted. Such instructional and regulative framing features interrupt social-class differentiation and promote pedagogical equality within primary maths classes. The last part of this review discusses educational strategies and contextual tensions within some of the suggested remedial approaches that can help children of poor and low-income black workers cope with explicit instructional principles noted in South African primary maths education.

Suggested strategies for supporting learners to cope with the strong sequencing and pacing requirements in the CAPS

In this section, I foreground strategies suggested within the theoretical framework and the literature reviewed. Throughout his work, Bernstein explained how crucial early reading is in visible pedagogies marked by strong sequencing and pacing rules. Early reading is the basis for doing homework, allows for independent privatised solitary learning making the child less dependent upon the teacher, and gives the student access to alternative perspectives (Bernstein, 1975, 1990). Local annual national assessments (ANA) reports (DBE, 2013, 2014) and Rose's (2004) empirical study also explained the need to equally support all learners to read independently in junior primary. However, large-scale regional testing evidence indicates that local children face challenges in reading (Taylor, 2007). The child's ability to read enables self-study, which facilitates transfer and uniquely provides two sites of acquisitions for the learner: the school and home. The importance of homework in primary maths education is outlined in the Foundations for Learning campaign, though it is barely mentioned in the foundation and intermediate phase maths subject guidelines. Locally, both Graven (2014) and Hoadley (2008) remarked that family home support for education is a key resource and site within low socioeconomic status communities. It therefore follows theoretically, empirically, and relationally, that the space to read (both in physical and in opportunity terms) in the home is integral for learners to cope with the strong pacing and sequencing requirements in the local primary maths curriculum. However, the home's spatial, temporal, and silence requirements are more easily met in the middle-class, than in poor working-class families' setups. There is thus a tension between the selection ordering requirements in policy documents, and poor and working-class children's ability to read and their family home and community contexts. In the light of these challenges, it is imperative that lower-class families and communities encourage a reading culture and learning environment within their homes and neighbourhoods.

Other feasible second sites of learning for working-class and disadvantaged children are community and school libraries. Access to libraries has been suggested as one of the key national interventions for supporting the teaching and learning of maths and literacy (DBE, 2013, 2014). Whilst community and public libraries are found in most urban areas and townships, they hardly exist in rural and remote areas. The limited number of school libraries is mentioned in the *South African School Library Survey 1999* (DOE, 1999), which states that only 7% of local schools have libraries. In the light of these challenges, classroom corner libraries can enhance access and provide reading resources (DBE, 2014). Furthermore, after-school maths clubs with relaxed instructional rules, and targeting township schools, can also help working-class learners meet the primary maths policy sequencing requirements. Besides these second sites of learning strategies, there is also a need for remedial and compensatory pedagogic programmes for socioeconomically low-status learners. Repair systems such as extra, remedial, and holiday lessons can be introduced by the class teachers to help learners cope with the curriculum sequencing requirements. Whilst primary teachers can easily offer extra

and remedial lessons, holiday lessons are problematic to initiate in primary schools and are mostly suited for core subjects in exam-writing secondary school classes. The additional repair strategies discussed herein can help disadvantaged social group learners meet the primary maths strong sequencing requirements.

Responsive pacing and sequencing, reflective mixed pedagogies, second sites of learning, and compensatory pedagogic strategies are sociologically intended to weaken the strong external framing between local lower-income homes and official school practices that make it difficult for children from disadvantaged backgrounds to be realised in pedagogic interactions. Weak external framing exists between middle-class learners' primary contextualising family and the official pedagogic discourse. The internal and external framing strategies discussed in this part of the study pedagogically support local working-class and poor children. Such approaches generally interrupt middle-class reproduction and provide different social-class learners with a gaze to "recognise and realise the phenomena of concern" (Bernstein, 2000, p. 171) which, in this case, are primary maths practices. These approaches can be regarded both as critical features of a humanising pedagogy and education strategies for social change.

Conclusion

Through Bernstein's sociology of pedagogical framing and an appraisal of related literature, this review paper explained how strong pacing and sequencing in the instructional discourse and a combination of weak and strong social orders reveal middle-class principles of social control and forms of transmission within local primary maths pedagogic practices. Sociologically and epistemologically, a transformed regulative discourse of mixed pedagogies, critically combining expressive and positional features in relation to the mathematical concepts and skills to be relayed, has the potential to interrupt middle-class pedagogical privileging to address social and economic class inequalities in terms of access to learning. Thus, relative to the equity and humanising cause and the effective teaching of numeracy, local primary maths policy guidelines must explicitly encourage mixed pedagogies that reflectively connect with the mathematical knowledge and concepts to be taught. This article has also indicated how responsive pacing and sequencing in primary maths can ensure acquisition and the realisation of working-class and disadvantaged learners in pedagogical interactions. Mixed pedagogies that deeply relate to the nature of mathematical concepts to be transmitted, and responsive sequencing and pacing, require knowledgeable and reflective classroom practitioners. Such educators inherently know the primary mathematical concepts that need to be back- or foregrounded, irrespective of subject guidelines specifications, and are sensitive to social-class differences and its effects on learner acquisition.

Besides changes in the internal framing features and official primary maths pedagogic discourses, the paper also explored broader educational strategies that can help poor working-class learners cope with the strong sequencing and pacing requirements in the South African primary maths curriculum. The ability to read the text, second sites of learning approaches, and compensatory pedagogic interventions are critical for enabling all learners to manage the pacing and sequencing in the local primary maths curriculum policy documents. However, further studies must empirically explore the practicality and contextual tensions within the suggested strategies, as well as the feasibility of responsive pacing and sequencing and reflective mixed pedagogies in overcoming social-class and pedagogical differentiation in primary maths classes. The arguments in this paper instigate and provoke sociological insights and interrogations on the forms of primary maths classroom interactions that interrupt middle-class reproduction tendencies and ensure acquisition and the realisation of low-income learners in pedagogical encounters. Such insights illustrate the critical features of a humanising pedagogy, instigate social change within primary maths education, and increase access to mathematical learning for all children.

Acknowledgement

This work is supported by the FirstRand Foundation (with the RMB), Anglo American Chairman's Fund, the Department of Science and Technology, and the National Research Foundation. The author is also thankful to the two anonymous reviewers for their comments on the earlier versions of this paper. The input and feedback of Mellony Graven is sincerely acknowledged. However, the ideas and opinions expressed in this article are my own.

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Please reference as:

Pausigere, P. (2016). On Bernstein's Sociology of Pedagogy and how It Can Inform the Pedagogic Realisation of Poor and Working-Class Children in South African Primary Maths Education. *Educational Research for Social Change*, 5(1), 41-53. http://dx.doi.org/10.17159/2221-4070/2016/v5i1a3