
Constraint or catalyst? The regulation of teacher education in South Africa

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Abstract

In this paper we argue that whilst state regulation over teacher education in South Africa appears to be increasing, the current reform climate creates spaces for academics operating within Higher Education Institutions (HEIs) to significantly influence official knowledge for teachers and teaching. We recruit aspects of Basil Bernstein's sociology of pedagogy to analyse the policy and institutional context of teacher education reform, with specific reference to the production of specialist FET mathematics teachers. We contend that with some grasp of the changing spaces in which mathematics teacher educators now work, fragile as these are, there is a possibility to influence the production of criteria for official knowledge for mathematics teachers and teaching.

Introduction

What does it mean to know mathematics, to teach mathematics and to develop mathematical and other forms of knowledge and practice for teaching within the changing South African education context? These questions foreground the 'what and how' of pedagogic discourse for mathematics teachers and teaching, raising questions about access to the knowledge discourses that this could be built on, and, in turn, about the production of curricula for mathematics teachers. In this paper we explore one set of such questions – those related to the institutional and policy context of the production of curricula for mathematics teachers in Higher Education Institutions (HEIs) in post apartheid South Africa.

Over the past decade, a major political project has been underway in South Africa to radically transform the pedagogic identities of existing teachers and to produce new teachers capable of implementing transformation ideals. The new National Curriculum Statements (NCS) for Further Education and Training (FET)¹ visualises "teachers as qualified, competent, dedicated [, . . .] caring [and] able to fulfil the various roles outlined in the Norms and

¹ Grades 10–12

Standards for Educators”, and foresees learners who are “imbued with the values and act in the interests of a society based on respect for democracy, equality, human dignity and social justice as promoted in the Constitution” (DoE, 2003, p.5).

The NCS, together with the Norms and Standards for Educators (NSE) (DoE, 2000a), constitute the particular “bias and focus” of an educational reform intended “to construct in teachers and students a particular moral disposition, motivation and aspiration, embedded in particular performances and practices” (Bernstein, 2000, p.65). They indicate both the nature of official FET school subject knowledge and how it should be acquired and assessed. The NSE provides a vision of a competent, professional FET teacher who is able to integrate a complex set of seven teacher roles² with social, economic and moral responsibility while meeting the specialist demands of the school curriculum. Together, the NCS and the NSE project an official policy image of desired or ‘ideal’ competent specialist teachers and their learners, rather than a constructed reality based in practice.

Much has been written about the gap between such idealised visions and the reality of South African teachers and schools. Two themes within this literature of importance for this paper are the issues this mismatch raises for successful implementation of new policy (e.g. see Mattson and Harley, 2003; Jansen, 2001), and the consequences of ‘empty’ implementation which result in the opposite of what was intended – lack of access by the socially and economically disadvantaged to powerful forms of knowledge (see Harley and Wedekind, 2004). Problems related to the complex demands on teachers made by educational reform initiatives, and the paradoxes they produce for teacher education, are a feature of the global education context (Hargreaves, 2001). In South Africa, reform demands, exacerbated by the pressure to radically change the Apartheid educational order and the punishing time frames for developing and implementing new curricula representing a new democratic order, have produced overwhelming challenges for teacher education and development (Adler and Reed, 2002).

This vision-reality, or policy-practice gap, and the challenges it produces for South African education are a concern of this paper. However, it is not the

² The roles include being: mediators of learning; interpreters and designers of learning programmes and materials; leaders, administrators and managers; scholars, researchers and lifelong learners; community members, citizens and pastors; assessors; and subject specialists.

primary focus. We are concerned with the inter-relationship between institutional and policy contexts in teacher education in South Africa, and the gaps or spaces opening up within and between these contexts. These spaces can be used in ways that either exacerbate these challenges or assist in addressing them. We draw on the work of Basil Bernstein (1996, 2000) to illuminate what we see as productive spaces within the current reform context, and opportunities for inserting disciplined and intellectual activity into the field of teacher education-activity we will argue is critical to the social transformation agenda in South African education.

In this paper we analyse the institutional and policy context of teacher education reform in South Africa, and build the argument that despite the apparent increasing pervasiveness of state regulation over teacher education, the current reform context creates space for academics operating within HEIs to define and influence official knowledge for teachers and teaching. We do so with specific reference to the issue of the production of specialist FET mathematics teachers. We chose mathematics as an illuminating case since it is the school subject where the crisis in teacher knowledge is highly visible. We conclude the paper by positing three mutually constitutive discourses and practices that intersect in mathematics teacher education to inform empirical elaboration of whether, where and how academics in HEIs, repositioned as teacher education providers, construct the criteria for official knowledge for (mathematics) teachers and teaching, and through these create conditions for the emergence of new productive (mathematics) teacher identities which in turn can influence the quality and practice of (mathematics) education to be in schools.

Teacher education reform in SA

Changes in the institutional landscape of teacher education

There are indications that internationally the field of teacher education and training is increasingly moving out of the control of the University and under the control of the state, into sites of practice where professional and practical (horizontal) knowledge discourses rather than forms of disciplinary and intellectual (vertical) knowledge discourses are likely to dominate (Bernstein, 2000, and Sayed, 2004). In England this is related to the insertion of 'competency-based' paradigms, new 'generic modes' of learning, and bureaucratic state control over teacher training that work to suppress and exclude academic discourses and their agents, not by explicit censorship, but

by filling the course time available with ‘essential’ (and in England audited) practice-related content (Beck, 2002).

Contrary to the trends indicated above, HEIs in South Africa have been given greater responsibilities for teacher education as a consequence of post-apartheid transformation initiatives. Prior to 1995 there were approximately 150 state funded institutions providing teacher education (Parker, 2003). Operating under 19 different apartheid education authorities and offering a range of qualifications of varying quality, colleges of education had the major responsibility for initial teacher training. Teacher educators within these institutions were state employees. Colleges operated much like high schools, with strong external framing of curricula and in most cases external examinations, full teaching timetables, little space for independent study, and little expectation that staff engage in research or become disciplinary experts. In short, teacher education under apartheid operated largely as a field of reproduction under the control of the apartheid state. Possibilities for systematic intellectual growth and the development of specialist knowledge and identities were severely limited.

By 2001, the new state had restructured the teacher education landscape, the college sector had been incorporated into the higher education system and there remained 23 public (i.e. state funded) institutions offering teacher education. These 23 institutions are also responsible for generating (researching, developing and implementing) purposeful curricula for all teacher education qualifications under the new NSE policy. Teacher educators are repositioned – they are now both curriculum designers and deliverers *and* knowledge producers, under pressure from their institutions to ‘publish or perish’.

Hence an opening or space has emerged. South African teacher educators located as they are in HEIs, are now positioned to redefine knowledge and practices for teacher education and to re-insert disciplined and disciplinary inquiry into teacher preparation programmes. Autonomy to engage this space is, of course, relative (Bernstein, 1996; Apple, 2002). On the one hand, as practising academics in HEIs, teacher educators are under significant pressure to ‘publish’, pushing activity away from the serious investment needed in curriculum development if productive teacher education curricula are to flourish. On the other hand, while a re-emphasis on disciplinary knowledge and research-based practices might be recognised, the dominance of the social logic of competence in education (Bernstein, 1996), reflected in new

qualification systems and curriculum policy for schools and teacher education, creates contradictions for its realisation.

The space to act and exercise this potential power is made possible by the relative autonomy of HEIs with respect to the state and other agents and agencies involved in the education of teachers. In the next sections we illuminate the space by pointing out the nature of state regulation of teacher education that appears to have developed within the current reform climate. That academics have relative autonomy to act is theoretically always a possibility and is well known – what we hope to illuminate are the spaces within which teacher educators could act, spaces that might not be immediately transparent.

A new system of qualifications: their regulation and quality assurance

The dramatic rationalisation in the provision of teacher education and the shift of responsibility for the provision of all state funded teacher education to Universities, followed extensive post apartheid education policy developments. In particular, the publication of the 1995 South African Qualifications Authority (SAQA) Act, the 1997 Higher Education Act, and a new ‘outcomes-based’ school curriculum referred to as C2005 (DoE, 1997). These reflect a change to a competence based education and training system for the country, the blurring of boundaries between formal education and work-based training, the introduction of a National Qualification Framework (NQF) for all levels in the system, and an elaborate system of governance through setting up of a range of *different* (mostly independent statutory) bodies to register, accredit, fund, and quality assure education qualifications, through different processes.³ All new Higher Education (HE) qualifications, once designed by the various providers, have to be taken through complex bureaucratic processes that involve registration on the NQF through SAQA; accreditation through the Council for Higher Education (CHE), a body constituted under the HE Act; and funding through the DoE (Parker, 2003). The splitting of responsibility for these various functions creates a vacuum in decision making and this, exacerbated by lack of capacity within the system, has produced contradictory and confusing interpretations of HE policy and

³ See Parker (2003) for a detailed description of the policy and governance system for teacher education within Higher Education.

responsibilities creating opportunities for teacher educators to exercise increased autonomy.

The professional body for teacher education, the South African Council for Educators (SACE), unlike councils for other professions such as Engineering, Accounting or Medicine, does not regulate and quality assure the development of higher education qualifications for professional employment. The DoE, as the major employer, has the statutory responsibility to regulate the development of new qualifications for teachers under the Employment of Educators Act of 1998 (DoE, 1998). Through the NSE, the DoE provides the guidelines for a framework of qualifications for teachers. These included a new four-year undergraduate Bachelor of Education (BEd) degree for initial teaching training. In addition to the registration, accreditation and funding requirements, these qualifications also had to be submitted to the DoE for evaluation and recognition for employment in education (DoE, 2000b). Quality assurance measures for teacher education qualifications, would “be put in place by SAQA, the Council for Higher Education and its Higher Education Quality Committee, and/or the relevant Sector Education and Training Authority” (DoE, 2000a, p.30).

In this context, formal teacher development and upgrading programmes mushroomed across the country, offering (particularly black and relatively underqualified) teachers in-service opportunities to upgrade their qualifications, and prepare for delivery of the new curriculum. The quality of programmes varied enormously, particularly in the case of institutions that had formed opportunistic private–public partnerships (Parker, 2003). In 2004 and 2005, the CHE has set in place quality assurance mechanisms for teacher education programmes leading to qualifications. Some critics see these developments as part of wider moves towards increasing state control over higher education (Jansen, 2004). However, rather than being seen as constraining moves by the DoE and the state, these developments could be seen as a proactive move by the ‘relatively independent’ CHE to assure quality in the HE system and to weed out opportunistic programmes of low quality. In the face of the proliferation of qualifications and the absence of clarity over which body is ultimately responsible for quality assurance in higher education, the CHE has proactively entered into memorandums of agreement with various stakeholders in the different fields of learning to set up mechanisms for quality assurance (DoE and DoL, 2003). In teacher education, they have recruited HEI providers to help produce the criteria for quality assurance. i.e. the criteria on which the accreditation of a programme leading to a qualification will be confirmed or denied are being produced, not by agents

working in the direct interest of the state, but by teacher education experts, positioned as they now are within HEIs, who have been involved with the development of the curricula of the programmes.

Together the elaborate policy and governance system and the move to set up quality assurance mechanisms through the CHE, would seem, at first appearance, to reduce possibilities for autonomy and constitute curtailment of academic freedom. Our view, however, is that in the current reform climate, there is an opportunity for teacher educators to provide strong foundations for beginning teachers to develop internal loyalty to specialist (mathematics, mathematics education and mathematics teaching) discourses, and access to alternative education discourses (like philosophy and sociology of education) which might equip them to become critically aware of the forces that structure their professional re-formation (in the new order of things). This could counter the tendency for the study and teaching of education to operate in the realm of what Harley and Wedekind (2003), following Durkheim, call ‘mythological’ rather than ‘scientific’ truth.

In the following section we analyse teacher education policy in general and with respect to specialist mathematics teaching in particular. We show that what appears to be strong regulation, is better understood as an open space that provides possibilities for productively claiming control of the pedagogic space created.

Teacher education policy in South Africa

The norms and standards for educators

The NSE policy

describes the roles, their associated set of *applied* competence (norms) and qualifications (standards). It also establishes key strategic objectives for the development of learning programmes, qualifications and standards for educators. These norms and standards provide a basis for providers to develop programmes and qualifications that will be recognised by the Department of Education for purposes of employment. This policy on Norms and Standards for Educators needs to be informed by continued research, and provides a focus for that research (DoE, 2000a, p.9, italics in original).

The NSE provides, through its description, a general direction for the development of teacher education curricula. There is a commitment to the general regulative discourse of the state, most visible in the description of the ‘Community, citizenship and pastoral role’, where the

educator will practice and promote a critical, committed and ethical attitude towards developing a sense of respect and responsibility towards others [and] uphold the constitution and promote democratic values and practices in schools and society (*Ibid.*, p.14).

While “providers have the freedom and responsibility to design their learning programmes in any way that leads learners to the successful achievement of the outcomes as represented in their associated criteria” (*Ibid.*, p.12), it is clearly stated that the lists provided for each role are “meant to serve as a *description* of what it means to be a competent educator [and] not meant to serve as a checklist against which one assesses whether a person is competent or not” (*Ibid.*, p.13, italics in original). Indeed these descriptions are general enough to cover all specialisations, even though all qualifications “must be designed around the specialist role as this encapsulates the ‘purpose’” (*Ibid.*, p.12).

For the specialist role the FET teacher:

will be *well grounded* in the knowledge, skills, values, principles, methods and procedures *relevant* to the discipline, subject, learning area, phase of study or professional or occupational practice [and] will know about different approaches to teaching and learning [. . .] and how these may be used in ways which are *appropriate* to the learner’s context. The educator will have a well developed understanding of the knowledge *appropriate* to the specialism (*Ibid.*, p.14, italics added for emphasis).

A list of 17 competences is given for this role. For example, under practical competences, teachers must be skilled at “Selecting, sequencing and pacing content *in a manner appropriate* to the phase/ subject/ learning area” (DoE, 2000a, p.1 italics added for emphasis).

This indicates in fairly clear terms that the lists do not specify criteria: they are ‘place holders’ for criteria yet to be designed, necessarily empty because they cover all specialisations, broad enough to give direction for the intended pedagogic discourse without giving any substantive details. Competences are mostly described in generic language, focussing on specialisations that are not specified, relying on words such as ‘appropriate’, ‘relevant’ and ‘effective’. As such they are *rubber sheet* descriptions that can take on *any* meaning. They have “at their heart an emptiness” which makes the notion of ‘competent teacher’ self-referential (Bernstein, 2000, p.57).

In an analysis of the technical report that formed the basis for the NSE, Shalem and Slonismky (1999) critically examine the idea that ‘criteria’ for

‘good teaching’ can be prescribed. They challenge some taken-for-granted assumptions or misconceptions about the way criteria can provide epistemological access to good teaching. They use this conception to show that the provision of lists of criteria by the state cannot create consensus on what counts as good practice and is unlikely to position all South African educators as members of a common culture of teacher education.

While Shalem and Slonismky wrongly assume that the criteria listed in the NSE are written for, and would be used by teachers to help realise good practice, their examples are useful since they rightly point out that there are a complex set of meanings that constitute the notions ‘education’ and ‘teaching’. What counts as ‘good’ or ‘appropriate’ education and teaching practice has given rise to long and heated debates based in different schools of thought, so it is very doubtful whether it is possible to get all educators to agree about the content of teaching, and ethical and politically acceptable ways of teaching it. For example, even if agreement is reached in favour of ‘democratic teaching’ there could still be heated debate over the relationship between authority and participation, between personal knowledge and public knowledge, between what is empowering and what is not, about the nature of the learner etc. They point out that while “all our knowledge, everything we assert or question (or doubt or wonder about. . .) is governed [. . .] by criteria” (*Ibid.*, p.19), we cannot grasp the object by being told about it. Their central argument is that the ‘internal goods’ of a practice cannot be described by giving lists of criteria, no matter how detailed. For Shalem and Slonismky, inscribing and legislating of criteria as a way of defining what good teaching is, “carries the danger of promoting facile forms of ventriloquism, more so for the not yet competent educator” (*Ibid.*, p.27). Thus they suggest enabling access to criteria of good practice is a pedagogical problem not a regulatory one.

Shalem and Slonismky seem to miss a key purpose of the NSE, as a document for knowledgeable teacher educators to use in their design of teacher education programmes. It seems clear that the lists of ‘empty’ criteria in the NSE give no guarantee of the outcomes. The point, however, is that this is the challenge for teacher educators. The criteria are open to interpretation and, indeed, the way the NSE is formulated, suggests that teacher education providers are explicitly expected to use the lists to give direction for the production of meaningful criteria for their teacher education programmes and that these should be purposeful, specialised and researched (DoE, 2000a; Asmal, 2001). It is this openness that has enabled the HEQC to use teacher education experts to develop specific criteria and standards for quality assurance within the framework provided by the NSE.

Thus, while it may seem that teacher education is heavily regulated by the state through the NSE, and that a competence-based, integrated curriculum focussed on generic skills for teacher education is being imposed this is not necessarily the case. The curriculum for specialised teacher education is not prescribed: it is open to interpretation and generation by relatively autonomous agents, i.e. teacher educators in HEIs.

The specialist role and subject knowledge

With reference to initial qualifications for FET mathematics teachers, the policy does not prescribe what ought to be taught, how it ought to be taught, or what “the disciplinary basis of content knowledge, methodology and relevant pedagogic theory” (DoE, 2000a, p.28) is in substantive terms. While the specialist role is marked out as “the overarching role into which the other roles are integrated, and in which competence is ultimately assessed” (*Ibid.*, p.12), there is no indication of how this integration should take place or how competence should be assessed. It is left up to the teacher education professionals to produce the criteria for the development of this specialisation of consciousness and to provide paths for student teachers to acquire them. Thus teacher educators are expected to be “in the criteria” (Shalem and Slonimsky, 1999): experts in their fields, able to design the kind of curricula that will lead to the production of teachers who are able to recognise and realise a notion of “best practice” (Ensor, 2000), competent to teach new kinds of mathematics in new ways, and able to creatively select and produce the type of materials that provide learner-centred activity to meaningfully mediate productive knowledge acquisition and moral development (Adler and Reed, 2002).

Further, teacher educators are expected to draw on expertise within their broader institutions to deliver high quality education. The former Minister of Education, Professor Kader Asmal (2001, p.3-4), emphasised this when he said:

Our greatest collective challenge is [. . .to. . .] start delivering high quality teacher education [. . .and institute a. . .] disciplinary approach [. . .that. . .] should have a beneficial impact on teachers. We know that one crucial weakness of our teachers is their lack of subject content knowledge. A solid foundation in the disciplines that underlie the school curriculum will address this weakness especially in the Further Education Band.

The implication here is that teachers should not only be taught by teacher educators who are researching education, mathematics education and teacher education, but that they could also be taught by other academics within disciplinary departments.⁴

Asmal's reference to 'quality' and 'subject content knowledge' has to be seen in relation to the National Teacher Education Audit (Hofmeyr and Hall, 1995), which highlighted the poor quality of education in the colleges, and research into the implementation of the original version of C2005 reported in the influential PEI report (Taylor and Vinjevold, 1999). The PEI research suggested that teachers lack subject content knowledge and that there has been too much focus on general teaching methods (such as group work) and too little on the underpinning conceptual knowledge that needs to be taught. It was suggested that teachers with *more* subject knowledge will be able to teach better, no matter what kind of teaching practice is in place, or how teachers come to know this knowledge. However, this has been contested within the mathematics education community (see Adler, Slonimsky and Reed, 2002; Brodie, 2004). These debates have brought into focus questions about teacher knowledge, the relationship between mathematical knowledge and practice in mathematics teaching, and the *kind* of knowledge that teachers need for practice.

In a "socio-cultural and political context deeply scarred by apartheid education" (Adler, 2004, p.6), the unequal distribution of knowledge and 'ability' is starker in the field of mathematics than in most other areas of the school curriculum. The National Strategy for Mathematics and Science (DoE,

⁴ Most of the HEIs involved in teacher education and which incorporated a college campus assigned the responsibility for teaching teachers mathematics *and* mathematics education to their education schools or faculties, thus excluding mathematicians from the process. That this opportunity has not been exploited can be partially explained by particular notions of what is relevant for mathematics teaching. There is a pervasive belief amongst some mathematics teacher educators (often ex-college staff) that what teachers *really need* is school curriculum knowledge, rather than extended access to mathematics at higher levels. Associated with this is the opinion that mathematicians do not understand what it means to teach school mathematics and that modalities of practice implemented in the university mathematics lecture room are not productive for their future careers as teachers. This belief (mythological truth?) bars the way for developing new and productive relationships, in both economic and educational terms, between mathematicians and mathematics teacher educators, and between the discipline of mathematics as practiced at higher levels and mathematics education.

2001) highlights the dismal performance of African⁵ candidates and points to a context in which prospective teachers who would not normally ‘make the grade’ for entry into university mathematics courses become the major source of new teachers. This is a major challenge: it is not only necessary for student teachers to develop an identity as ‘mathematics teacher’, it is also important to develop an identity as ‘able mathematics learner’ of a kind of mathematics that is qualitatively different to what they may have experienced at school, or what may be traditionally offered by university mathematics departments. It also points to a key problem of epistemic access to the discipline of mathematics, particularly for economically and socially disadvantaged students.

Changing spaces and challenges for mathematics teacher education

We have argued that a productive space for teacher educators and academics to control pedagogic discourse for mathematics teachers and teaching has opened up and that there is a need for establishing the criteria (or evaluative rules) for its recognition and realisation (Bernstein 1996). It is important that teacher educators do take up this challenge, because if they do not, the possible consequence could be the institutionalisation of problematic, even dangerous practices in the name of reform. The establishment of such criteria, however, will take place in a highly contested terrain. It is useful to exemplify the kinds of problematic practices that can be, and indeed have been, produced within the vision-reality gap of post apartheid education.

Lacking criteria for new practices being advocated by the state (such as ‘learner centred classrooms’, or ‘activity based learning’), teachers may opt for strategic mimicry (Mattson and Harley, 2003), or facile ventriloquism (Shalem and Slonismky, 1999). Here teachers, aware that they are expected to carry out various new roles and practices, but lacking evaluative rules which enable the recognition and substantive realisation of these new roles and practices, flounder and imitate what they believe is required. Thus, ‘group work’ becomes a place-holder for ‘learner centred teaching’, and often results in vacuous activity where the teacher ‘facilitates’ access to what learners already know. This adoption of *form* over *substance* was in evidence in the

⁵ African is the term used in the document to indicate black South Africans whose mother tongue is an African language. In 2000, only 4.1% of African candidates wrote mathematics on higher grade, and of these only 15.5% passed, compared with the national average where 50.1% of the candidates who wrote Higher Grade passed.

empirical research on teachers' take-up from a professional development programme (Brodie, Lelliott and Davis, 2002) and is highlighted as a major problem in the report on the review of C2005 (DoE, 2000c).

A similar problematic practice emerges from an ideology of increased access to mathematics through the idea of 'relevance' – that access to school mathematics can necessarily be achieved through links to learners' everyday knowledge. While such connections can productively create access to powerful mathematics learning, this does not necessarily occur: where the principle of integration overwhelms the mathematical purpose, everyday knowledge becomes the focus of learning to the detriment of conceptual knowledge (Adler, Pournara and Graven, 2000).

In Bernstein's terms, the latter example reflects the tendency for school mathematical knowledge to be treated as a horizontal discourse (Bernstein, 2000), motivated by the belief that this will provide access to mathematics for the socially and economically disadvantaged. However, everyday and academic knowledge are produced in different social contexts and are therefore fundamentally different knowledge forms (Muller, 2000) and thus attempts to integrate across these forms potentially produce serious consequences. These include the assumption that "the everyday experiences of all learners are the same and thus is blind to the differential distribution of different forms of experiences across different social groups" (Ensor and Galant, 2005, p.287). It can therefore compromise vertical progression within the school curriculum for learners who do not already have access to the right type of experiences to enable the recontextualisation across the academic and the everyday to be mathematically meaningful. As we have already mentioned, and as is the focus of intense political debate in education in South Africa, the push for social justice education may even lead to the opposite of what is intended, to even less access to powerful knowledge (Harley and Wedekind, 2004).

In each of these examples, the practices that have been implemented appear not to be based on access to principled knowledge forms or on research of what are recognised as best practices in the field. Thus teachers do not have access to the 'inside' of the practices that would produce productive learning and enable the transformation agenda to be realised.

Lack of access to powerful forms of knowledge is a key issue underlying the poverty of mathematics education in South Africa, amongst teachers as well as pupils. That this is a product of the uneven distribution of knowledge under

Apartheid is well known. The problem is that it may continue to be so in the post apartheid order unless the space we have identified is exploited to alter these patterns of access. Access to “high knowledge, high skills” is a principle of the NCS (DoE, 2003, p.1), and in FET mathematics this includes the study of “Mathematics as a discipline in its own right” (*Ibid.*, p.9), as well as “the establishment of *proper* connections between Mathematics as a discipline and the application of Mathematics in real-world contexts” through mathematical modelling (*Ibid.*, p.10, italics added for emphasis). The NCS produces a post apartheid image of official school mathematical knowledge that is qualitatively different from ‘traditional’ apartheid practices. But stating these new outcomes in a curriculum document cannot lead to access – access to the criteria for the realisation of these outcomes requires the production of pedagogic discourses for teachers and teaching that enable the recognition of the meaning of, and realisation of, these new legitimate mathematics texts.

In the present reform context, relations between the HEIs and the state within the field of symbolic control create conditions for academics to be positioned to have an effect on pedagogic discourse independently of the state. They therefore have an opportunity to design the criteria for what could become recognised as ‘good practice’ for mathematics teaching, and through their teacher education programmes provide access to these criteria. The space opened up within this reform context creates the possibility of producing teachers who can operate productively (and not cynically) within the education system – teachers who have access to the mathematical and educational foundations that will enable them to work within the system, supporting the general regulative discourse of the state, and yet at the same time accessing knowledge bases that become tools for critical awareness of the potentially problematic practices instituted in schools in the name of reform and social justice.

Currently, the new space that is potentially the most productive is one opened up by the introduction of the new four-year Bachelor of Education (BEd) degree, a qualification that integrates the academic and professional aspects of teaching. This programme potentially will become the major vehicle for producing new teachers and it is here that the possibility of breaking the cycle in the poverty of (mathematics) education and teacher education lies. It is within this programme that teacher educators have the greatest opportunity to construct official pedagogic discourses for teachers to internalise new criteria for school mathematics teaching as well as criteria for the foundations of that knowledge. For FET teaching this would include access to the discipline of mathematics in and for itself, at levels that would normally be associated with

a degree programme, with a focus on conceptual understanding, mathematical thinking, proof and application through modelling (all explicit aspects of the new curriculum), as well as the ability to work quickly and flexibly with powerful mathematical objects. It would also include making available access to the research produced within the field of mathematics education so that disciplinary knowledge can be ‘unpacked’ (Ball, Bass and Hill, 2004; Adler and Davis, forthcoming) and become useful for the mathematical work of teaching.

A crucial struggle for control of the curriculum in teacher education is therefore around the selection of knowledge discourses made accessible to student teachers through the BEd programmes. We posit that reclaiming the knowledge careers of teachers will require the development of new specialised identities. In particular we suggest that, within the current reform context, there are three different mathematically-related specialised pedagogic identities that a novice FET teacher needs to construct: an identity as a student of mathematics (becoming an able mathematical thinker and actor); an identity as a student of mathematics education (becoming someone interested in learning from research in the field); and an identity as a mathematics teacher (becoming someone who can utilise their knowledge to help learners develop productive mathematical identities). In each case, recognition and realisation rules (Bernstein, 1996) for ‘legitimate’ knowledge and practice need to be developed, and knowledge resources and practices need to be selected for this purpose. Each of these projected identities is a product of access to a different knowledge discourse – each with its own ways of thinking and doing (practices), organisational structure (vertical and horizontal) and grammar (strong or weak) (Bernstein, 2000). It is not only important what is selected but also how it is made available, who makes it available, and what relations are set up within and between the discourses. Whether and how these discourses are being produced in HEIs is a question for later empirical elaboration.

Conclusion

We have shown that there is a visible increase in state regulation over qualifications for teachers. However, the standards and competencies described, including those of the specialist role (e.g. mathematics) are open-ended. They are not prescribed. Coupled with the relocation of teacher education in HEIs, a space opens up for a productive selection and transmission of (mathematical and other) knowledge and practices for teachers

and the work of teaching. HEIs, as providers, have the opportunity to design specialised meaningful criteria for teachers to acquire new knowledge discourses and teaching practices. Thus HEI based teacher educators and academics are powerfully positioned to influence the selection, distribution, recontextualisation and evaluation of knowledge for mathematics teachers and teaching, and thus to insert their 'bias and focus' into the official knowledge and pedagogic discourses for mathematics teacher education and school mathematics practices. The space for exercising this power is, however, fragile. Whether new teacher education programmes emphasise generic competences or the development of intrinsic subject loyalty will vary in terms of institutional providers' available intellectual and economic resources and participation in wider struggles for control over pedagogy.

In presenting this paper, we hope we have illuminated possibilities for academics located within the HEIs to take advantage of the current situation, and so influence the knowledge careers and pedagogic identities of new (mathematics) teachers. Our motivation is that unless they exercise this power to project their particular 'bias and focus' of research-based criteria which enable the recognition and realisation of mathematically orientated practices, 'default' positions are likely to take hold. The proliferation of new generic forms of practice within a mythological notion of 'relevant' school mathematics knowledge and social justice, or, the reinforcement of old forms of consciousness created during student teachers' prior (Apartheid-based) mathematical training, could be the result. This could, in the long run, severely limit extended access to powerful mathematics by South African FET mathematics teachers and learners.

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Acknowledgements

This paper is a development of a paper delivered by Diane Parker at the Third International Basil Bernstein Symposium held at Clare College, Cambridge in July 2004.

The work reported in this paper is supported by a grant awarded by the National Research Foundation (South Africa) under the Thuthuka (Researchers in Training) programme: GUN 2052952 – Mathematics Teacher Education. Any opinion, findings and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Research Foundation.

We thank Roger Deacon, Ken Harley and Ben Parker for their valuable comments on earlier drafts of this paper. Their suggestions contributed significantly to the final version of the paper. However, in the end, all responsibility for the content is ours. The comments by the anonymous reviewers of this paper were also valuable and have been helpful in focussing the paper more effectively.

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