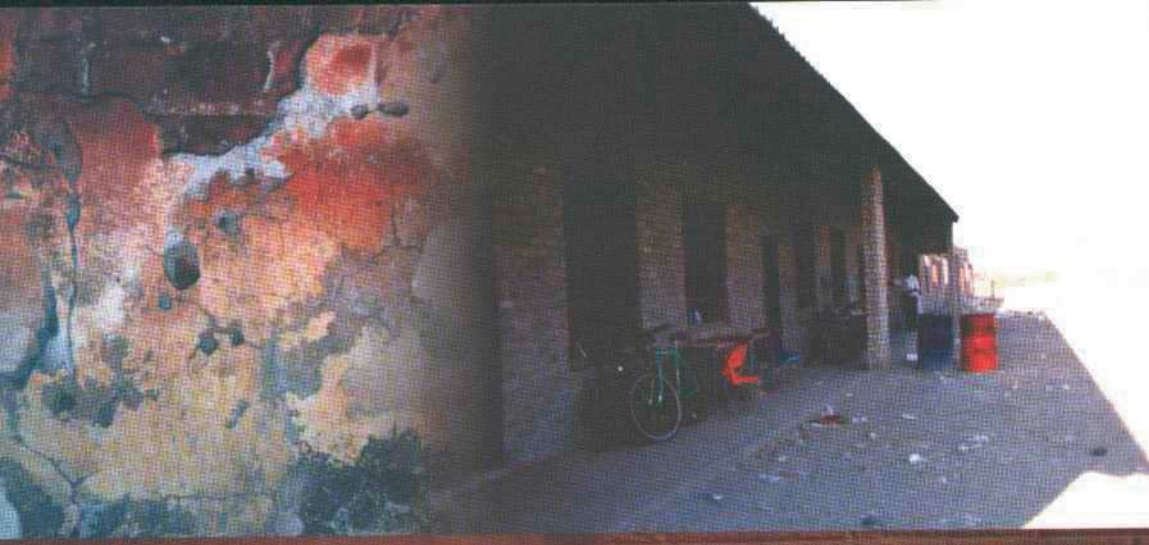
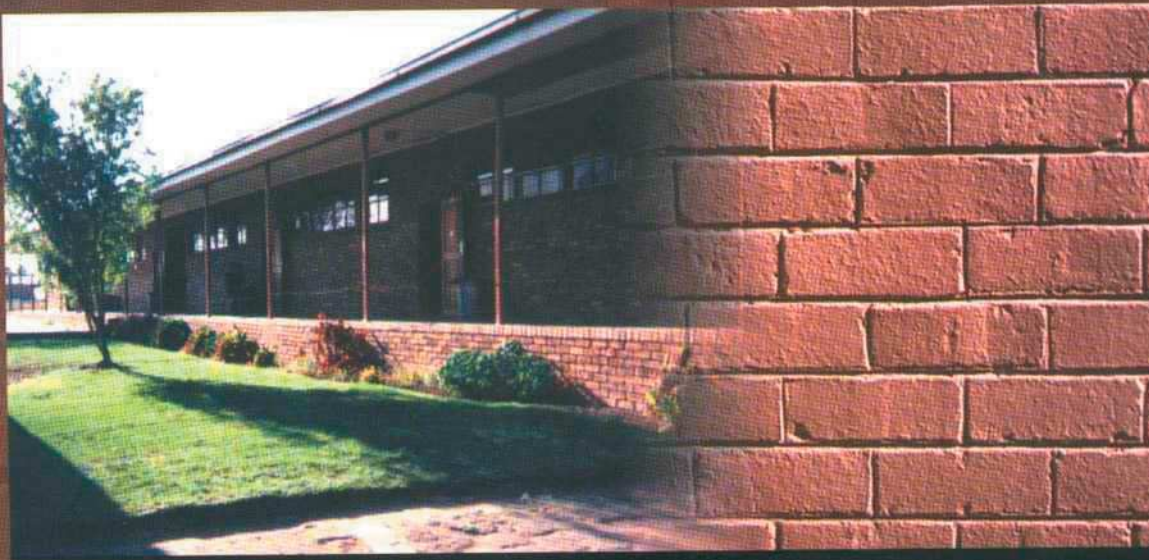


Challenges of Teacher Development

An investigation of take-up in South Africa



EDITORS Jill Adler • Yvonne Reed

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Jill Adler and Yvonne Reed

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Please note that the name of the Northern Province was recently changed to Limpopo.

We dedicate this book to all South African teachers and teacher educators who collectively are working to provide quality education for all our children.

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Jill Adler and **Yvonne Reed**
December 2001

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Chapters 3 and 5 have appeared in educational journals, though in different forms and with different foci.

Parts of Chapter 3 are discussed in Adler, J. & Reed, Y. 2000. Researching teachers' take-up from a formal in-service professional development programme, *Journal of Education* 25*,* 192–226.

Much of Chapter 5 appears in Setati, M., Adler, J., Reed, Y. & Bapoo, A. 2002. Incomplete journeys: code-switching and other language practices in multilingual classrooms in South Africa, *Language and Education*. At the time of going to press, the volume and page numbers were not available.

Other publications arising out of the Wits FDE research project

The list provided here alerts readers to differently focused accounts of various parts of the Wits FDE research project.

Journal publications

Adler, J. 2000a. Conceptualising resources as a theme for teacher education. *Journal of Mathematics Teacher Education,* 3 (2): 205–224.

Adler, J. 2000c. Social practice theory and mathematics teacher education: a conversation between theory and practice. *Nordic Studies in Mathematics Education (NOMAD),* 8 (3): 31–53.

Adler, J. & Reed, Y. 2000. Researching teachers' take-up from a formal in-service professional development programme. *Journal of Education*, 25: 192–226.

Brodie, K. 2000. Constraints in learner-centred teaching: a case-study. *Journal of Education*, 25: 131–160.

Brodie, K., Lelliott, A. & Davis, H. (Forthcoming). Developing learner-centred practices: teachers' take-up from the University of the Witwatersrand Further Diploma in Education. *Teaching and Teacher Education.* At the time of going to press, the volume and page numbers were not yet available.

Setati, M. & Adler, J. 2001. Between languages and discourses: code-switching practices in primary classrooms in South Africa. *Educational Studies in Mathematics,* 43(3): 243–269.

Setati, M., Adler, J., Reed, Y. & Bapoo, A. 2001. Incomplete journeys: code-switching and other language practices in multilingual classrooms in South Africa. *Language and Education*. At the time of going to press the volume and page numbers were not yet available.

Chapters in books

Adler, J. & Lerman, S. (in press). Getting the description right and making it count: ethical practice in mathematics education research. In Bishop, A., Clements, K., Keitel, C., Kilpatrick, J. & Leung, F. (Eds), *The second international handbook of mathematics education,* Dordrecht: Kluwer Academic Publishers.

Technical reports

Adler, J., Bapoo, A., Brodie, K., Davis, H., Dikgomo, P., Lelliott, T., Nyabanyaba, T., Reed, Y., Setati, K. & Slonimsky, L. 1999. *Mixed-mode further diplomas and their effects: summary report on major findings of a three-year research project*. Johannesburg: University of the Witwatersrand.

Adler, J., Lelliott, T., Reed, Y., Bapoo, A., Brodie, K., Dikgomo, T., Nyabanyaba, T., Roman, A., Setati, K., Slonimsky, L., Davis, H. & De Wet, H. 1998. *Mixed-mode FDEs and their effects: an interim report on the teaching and learning practices of primary and secondary mathematics, science and English language teachers enrolled in the Wits Further Diploma in Education (Report).* Johannesburg: University of the Witwatersrand.

Adler, J., Lelliott, T., Slonimsky, L., Bapoo, A., Brodie, K., Reed, Y., Setati, K., Mphunyane, M., Nyabanyaba, T., Van Voore, M. & Davis, H. 1997. *A baseline study: teaching and learning practices of primary and secondary mathematics, science and English language teachers enrolled in the Wits Further Diploma in Education (Report).* Johannesburg: University of the Witwatersrand.

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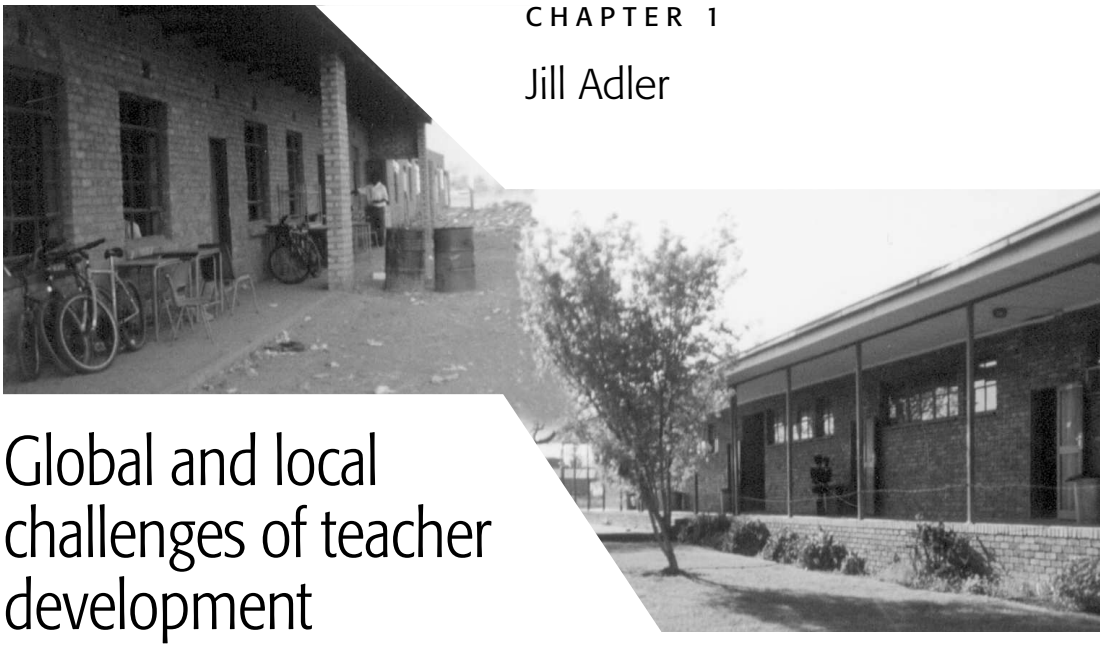
CONTENTS

A NOTE ON TERMINOLOGY

Throughout the book we use the commonly agreed terminology in current policy documentation in South Africa. For example, we no longer refer to levels of schooling as "standards" (e.g. Standard 8), but as "grades" (e.g. Grade 10). We use the term *learners* for school pupils and occasionally use the word *students* to refer to learners in school. In Chapter 2, the term *teacher-learners* is used to refer to teachers engaged in further study.

We use *teacher education* as the generic name for both pre- and in-service teacher education. In other countries, a wide range of terms is used to describe teacher education, and to distinguish its components: for instance in-service and pre-service, professional development, teacher development and support. In the USA, for example, "teacher education" refers to the initial preparation of teachers prior to entering the profession, and "professional development" refers to programmes for teachers already in the profession. In South Africa, terminology continues to shift. Like many others, we distinguish initial and ongoing teacher education through the terms "pre-service" and "in-service" teacher education, and we also use "professional development" to refer to the latter.



CHAPTER 1

Jill Adler

Global and local challenges of teacher development

Introduction

What does it take to teach in post-apartheid South Africa, in a context of ongoing movement away from the inequities of the past and towards a globalised, technological future? What does such movement imply for teacher education? This book tells a story of a group of mathematics, science and English language teachers who work at a range of levels and in a range of classroom contexts. Each of these groups of teachers participated in a formalised in-service teacher development programme and in the associated research project at the University of the Witwatersrand (Wits) between 1996 and 1999. This book offers a description, an analysis and a theorisation of what these teachers learned from these programmes. In uncovering some of the complexities of teachers' learning, it offers both a particular and a general story about teacher education. It tells a story of the Wits Further Diploma in Education (FDE) programme. It also provides some answers to key research questions concerning educational resources, multilingual classroom contexts, learner-centred practices, and teachers' subject knowledge base as these impact on teachers' practices. It goes without saying that the relevance of these questions extends beyond the specificity of the Wits FDE programme into the wider challenges of teacher education globally and the particular challenges of post-apartheid South Africa.

"[T]eachers who *know* more teach better." Cochran-Smith & Lytle open their analysis of the relationship between knowledge and practice in teaching with this "simple" idea that is "more or less assumed" in all teacher education (1999: 249). Although there clearly is no consensus on what *knowing more* and *teaching better* mean, this "simple" idea guides the practice of all teacher development programmes. Be it in the context of edu-

cational reform in the USA, or in the more all-embracing social, political and educational change in post-apartheid South Africa, in-service professional development is seen as critical to repairing, redressing, professionalising and changing current educational practices. Indeed, as this book goes to press (July 2001), the revised National Curriculum Statement (NCS) for Grades R–9 in South Africa has just been released by the National Department of Education for public comment. The overview of this curriculum statement includes guidelines for its implementation, which specifically stress the need for both short-term and long-term teacher development and support. "The NCS sets up expectations of teachers and educators that require a new and prolonged emphasis on education and training at all levels for all educators" (DoE, 2001a: 78).

Since the mid-1980s, in-service professional development (INSET) has been part of the educational landscape in South Africa, but has it fulfilled its promises of educational improvement and educational change? This is a critical question for all involved in INSET, and one particularly relevant in the current educational context in South Africa, where "fiscal constraint" is prominent on the government's agenda. Given the limited resource pool, teacher educators need to be able to justify the resources spent on INSET programmes. We thus need to identify, and then describe and explain, the kinds of programmes that are beneficial, or in the language of finance, add value. In short, we need to be informed by research on INSET activity and so be able to describe and explain what knowing "more" and teaching "better" mean and the relationship between these two constructs as they manifest in different contexts.

In June 1995, a team of teacher educators in mathematics, science, English language and education at Wits began the process of conceptualising, developing, implementing and researching a Further Diploma in Education programme in mathematics teaching, science teaching and English language teaching.[1] This initiative was driven by the need for redress and the demand for curriculum reform, and motivated by the assumption that a quality teacher development programme could make a difference. At the start of our project, we found very little research to guide us, particularly in relation to teacher education in rapidly changing, diverse and multilingual contexts – contexts that were, moreover, constrained by limited resources. Much of the teacher development literature is framed by countries whose historical trajectories in education and teacher education are very different from those of South Africa. The current curriculum goals in these countries: high-level skills, flexible and integrated knowledge and learner-centred practice (cornerstones of Curriculum 2005 and the revised NCS), are informed by very different material, cultural and knowledge resources.

The intention of this book is, in the first instance, to inform teacher education research and development in South Africa. The various chapters collectively point to a critical task that lies ahead: to characterise and articulate "subject knowledge for teaching" and determine to what extent its acquisition lies in the co-ordination of subject, pedagogic and contextual knowledge – or what can be termed *conceptual knowledge-in-practice*. In addition to pointing to this overall challenge, the book inserts a different perspective (both empirically and theoretically) into the wider discourses in teacher education, particularly in relation to issues like learner-centred practice, multilingual classroom

[1] See Adler et al., 1997, 1998 and 1999 for detailed technical reports on the research project. The FDE course materials are all available through the School of Education, University of the Witwatersrand.

practices, reflective teaching practice and teachers' subject knowledge. Each of these critical issues in teacher education is discussed in detail in the chapters that follow.

This first chapter begins with a discussion of the global and local challenges to teacher development that relate directly to the issues previously mentioned, and provides a framework for describing and interpreting teachers' learning from the Wits FDE programme. This is followed by an introduction to the FDE programme. To complete this picture, an explanation is provided for why the team involved in the research and development of the programme has written this book. The chapter concludes with an overview of the chapters that follow.

Multidimensional challenges in teacher education

The challenges of activity, time and place

Teacher development is an extensive and thriving research and development arena throughout the world.[2] It faces multidimensional challenges as regards both pre-service and in-service programmes. That teaching is a complex, tension-filled practice is well known (see, for example, Adler, 2001; Jaworski, 1999). Teaching is about teaching something to someone, somewhere – it is about knowledge and pedagogy, about learning and about context. The driving force behind much of the growth of interest in in-service teacher education has been a world-wide curriculum reform movement. While curriculum reform is not new, it takes a particular form in a technological and globalising world, questioning the kind of knowledge to be produced by schooling, and thus the knowledge required by teachers.

All teacher development programmes are required to manage the tensions inherent in

- the nature of the knowledge selected by the programme – how to balance educational activity between subject and pedagogic knowledge, and between theoretical and practical knowledge
- the location and duration of the programme – where teacher learning is best conducted, and for what length of time.

The tensions around activity: subject-pedagogy and theory-practice

In both pre-service and in-service programmes there are inevitable tensions over the allocation of time and activity to the three necessary components of such programmes: subject knowledge (e.g. science content); pedagogic subject knowledge (the learning and teaching of science); and wider educational knowledge (selections from sociology, philosophy, psychology and history of education). The central issue is how these elements should be integrated in the curriculum. There are two analytically distinct, though interwoven, tensions here.

One key tension is the *subject-pedagogy tension*. There is little contention that teachers need to know the subject matter they are teaching, and moreover, that they need to

[2] See, for example, Wilson & Berne, 1999 for an overview of teacher education research in the USA. See also the international journal *Teaching and Teacher Education* for ongoing reporting of research and development in teacher education.

know how to present this clearly to learners. The issue is how to integrate *further learning of the subject* with *learning about how students in school acquire subject knowledge*. From the time of Dewey's writings in the early twentieth century, it has been widely acknowledged that "knowledge that is organised and held from disciplinary perspectives is not sufficient for thoughtful instruction" (Cohen, 1998: 169). How do teacher educators develop programmes that assist teachers to build conceptual knowledge that is sufficient for, and appropriate to thoughtful instruction? Cohen sums up one key aspect of the challenge:

> Critics and defenders of university-based teacher education accept the validity of learning disciplinary knowledge in traditional form – the "content" – and disagree chiefly about the role of direct experience in learning how to teach content. But a hard-and-fast distinction between disciplinary knowledge and learning to teach probably is unwise … learning to teach prominently includes learning both how to use disciplinary knowledge pedagogically, and learning how disciplinary knowledge is acquired (1998: 169).

For example, a mathematician and a mathematics teacher experience and use their mathematical knowledge in different ways: the former will seek further mathematical truths, while the latter sets out to help others seek such truths.

Cohen's argument here was first brought to light in Shulman's (1986; 1987) seminal work on pedagogical content knowledge (PCK) – that knowledge-base of teaching that is a co-ordination of knowledge of the subject, knowledge of how that disciplinary knowledge is acquired, and contextual knowledge. But being able to name and describe some of the specificity of teachers' knowledge has not led to easy solutions in practice. Can we organise teacher education in science, for example, solely around the notion of PCK, without specific focus on both science per se, and general pedagogical issues? Will such a curriculum provide an appropriate set of activities for teachers to learn the science they need to teach, at the same time as learning how this science can be taught in the context of schooling?

The subject-method tension is as acute in in-service programmes. Driven by curriculum reform, INSET programmes have worked with teachers on new topics and approaches to subject knowledge as well as on new approaches to learning and teaching that knowledge. For example, in mathematics, there are increasing shifts in school curricula towards learners being able to use and apply their mathematical understanding. This entails a pedagogical shift towards more linkages between mathematics and the real world, and an epistemological shift towards including mathematical modelling in the curriculum. Many teachers currently in service have not had the opportunity themselves to engage with mathematical modelling as a topic in mathematics, and are then at the same time required to make a pedagogical shift towards incorporating more of the real world into the mathematics classroom.

In the current South African context the subject-method tension in INSET is exacerbated by the history of teacher education under apartheid. In their report on 38 research projects across a range of schools and with a range of foci, Taylor & Vinjevold (1999) posit that the most critical challenge to teacher education in South Africa is the limited "conceptual knowledge base" of many teachers. What is signalled here is that

INSET needs to attend not only to new topics and new approaches in particular subject areas, but also needs to address the effects of the poor quality of education under apartheid on the majority of South Africa's teachers.

A second interrelated tension in teacher education is the *theory-practice tension*. This tension revolves around how to combine learning about teaching through a distancing process ("theory") with learning through immersion in experience ("practice"). Another way of expressing this tension is to ask whether the focus of teacher education programmes needs to be on *principles* of teaching and learning or on *direct experience* in classrooms. This tension applies both to the subject-focused components and the pedagogy-focused components of teacher education. English language teachers, for example, need to understand the theoretical debates on a developing area like multiliteracy. But knowing that they need to work with multiple literacies does not easily translate into how these become curriculum practice in particular classroom contexts. Similarly, while it is not difficult to agree with the pedagogical notion in the National Curriculum Statement that "teachers should be open to views held by learners" (DoE, 2001a: 79), the correlative classroom practice might not follow. Teacher education would need to include the opportunity to reflect on the arguments behind this notion – how, for example, these relate to theories of learning. But theoretical reflection in itself is not enough. Teacher education activity would need to include experiences in what it means in practice to elicit and work with learners' views.

Exacerbating the theory-practice tension are the increasing difficulties that teachers face that are not directly related to their subject knowledge. Teachers are expected to deal supportively with learners whose lives are constituted by poor socio-economic conditions, who live with poverty, violence, and AIDS, and with social and political alienation. At the same time as having to rise to these challenges of diversity and inequality, teachers are being held accountable for their learners' performance on various kinds of high-stakes testing. Producing good test results often pulls teachers away from being able to care for the range of interests, capabilities and learning trajectories within a diverse classroom (Elliott, 2001).

The problem is that no teacher education programme, wherever it is, can provide experience of all the complexities teachers are likely to face. As a result, some argue that programmes need to provide opportunities for teachers to understand the underlying principles of teaching in general and of specific subjects. These can then be applied and adapted to particular and diverse circumstances, and to new challenges as these arise. Others argue that this kind of knowledge, divorced as it is from real classrooms, is not easily applied or adapted, and thus teacher education is likely to be more effective if it is focused on examples of practice and more direct experience in the classroom and alongside experienced teachers.

The theory-practice tension intersects profoundly with tensions over the location of teacher education and tensions over the duration of programmes, particularly with regard to INSET programmes.

The tensions around place and time

Do teachers learn more about how to teach through courses based in educational institutions like colleges of education or universities? Or do teachers learn more about how

to teach from actually teaching themselves, and from observing experienced teachers and working alongside them as do apprentices and trainee doctors?

In institutions, the distance from the site of practice provides a vantage point from which to look at practice, think about it and critique it while not having to worry about how the actual practice is being carried out. This distancing provides possibilities for developing conceptual tools to think about and work on practice, a distancing that is hard to establish when one is immersed in the day-to-day ongoing challenges of schools and classrooms. Alternatively, learning to teach in schools brings teachers up against the realities of classrooms and the kinds of issues they will face as fully-fledged teachers. The arguments for school-based programmes are particularly powerful in contexts of curriculum reform. Reforming a curriculum means developing new approaches to knowledge, learning and teaching, and constructing new kinds of classroom practices. Teachers need to be able to see directly what this practice looks like, or at least be able to imagine what it looks like. This requires school-based initiatives.

School-based support is, however, labour intensive and thus expensive in terms of time and human resources. In the FDE programme at Wits, for example, coursework was focused on what happens in classrooms, and assignments required teachers to reflect on their actual classroom practice. However, we did not have the financial resources, human resources or time to provide ongoing support to teachers in their classrooms. The lack of classroom support impacted on the programme and the teachers. These are discussed throughout the book, but with a specific focus in Chapter 4. In the recent past, a number of in-service programmes have been established as school-based programmes, where most interaction and activity is focused on what teachers are doing in their classrooms. Though there are some exceptions (as noted in Chapter 2), the intense focus of these programmes results in most of them reaching relatively small numbers of teachers.

Thus tensions related to activity and location are intertwined with tensions over time. Most pre-service teacher education takes place in educational institutions, with time allocated for "school experience", or "teaching practice". In other words, the focus is on principled knowledge supported by field experience. We know that trainee teachers often complain that their courses are not sufficiently practical and that they do not equip them with the skills to cope with their teaching. However, as suggested above, increasing the time given to field experience has resource and hence cost implications.

In INSET programmes, time tensions extend beyond allocation of time within the programme to the duration of the programme itself. There is often a sense of urgency in implementing reform, and a tendency to organise short periods of INSET in support of the reform. It is now well established that short-term programmes do not easily translate into changed or better classroom practice (see, for example, Graven, 1997). Longer, more intensive, school-based programmes appear to be far more effective at the level of classroom practice, though again there are resource and cost implications.

The challenges of activity, time and place are well known, and remain endemic despite years of international research and development. They will not go away. Indeed, as we move into a globalising world and a knowledge-based society, these challenges intensify. It is how they are managed, what is included and excluded, what is integrated and what is kept apart, how much time is given to activities within the programme and to the programme as a whole, and where these activities take place, that ultimately

shape learning possibilities for teachers. It is the management of these constraints that determines what it is teachers can and do learn from such programmes. How these tensions played out in the Wits FDE programme and in teachers' "take-up" from the programme are focused on, in different ways, in Chapters 4 to 8.

At the same time these challenges are further illuminated by others specific to the South African context. Chapter 2 provides a detailed analysis of teacher education, past, present and future, and addresses the specific challenges we faced in the South African context as we launched, developed and researched the FDE project at Wits.

The challenges of teacher education in a changing South Africa

While reform and renewal are on the curriculum agenda across the world, curriculum reform currently under way in South Africa is taking place within a context where there are equally pressing needs for redress and repair. Apartheid produced a grossly unequal society and damaged the essential fabric of society, with consequences which require repair. Redress in education across all institutions is an imperative.

Reform, redress and repair

The Wits FDE programme was launched at a time of intense policy reform in South Africa. A new White Paper for Education was published in 1996 (DoE, 1996), setting broad policy guidelines for educational change. This has been followed by numerous educational policies, further examples of which are given in Chapter 3. A vision was designed for an education that would lift South Africa into the globalised world, and at the same time redress our apartheid past. Curriculum (content, pedagogy and assessment) was to shift from fragmentation to integration, from low-order to high-order knowledge and skills, and from rote learning to active, critical engagement. Teachers were identified as key agents of change, pointing to significant and necessary roles for INSET in the new orientations to knowledge and pedagogy.

The FDE programme was constructed with the vision of a new future firmly in place, but at the same time acknowledging the challenges posed to professional development in the wake of apartheid education. Through our work on the programme we came to understand the profound tension that pervaded all in-service teacher development in the country. We needed to acknowledge and redress the damage of apartheid education and teacher education within it, but in ways that did not inadvertently produce a deficit model of teachers and teaching. Apartheid education had been grossly unequal; black education was inadequately funded and thus of poor quality, and designed to produce acquiescence. Moreover, one of the consequences of the Soweto uprising in June 1976 was to produce schools as sites of political struggle, and in so doing disable their other knowledge functions. Over twenty years, the culture of learning and teaching in many schools broke down.

INSET programmes needed to relate to and work with all qualified teachers as professionals, both experienced in the work they had done and knowledgeable about their current practices in their local contexts, but at the same time acknowledge a history of neglect and dysfunction. How do teacher educators work effectively with contradictory messages? One message to teachers needed to be that they were to be the active inven-

tors of a new educational vision in South Africa, and that what they knew and had learned was valued. However, there needed to be an equally powerful message that what teachers knew and had learned was an inadequate base from which to proceed and grow in post-apartheid South Africa.

Another message to teachers (and this is intensifying across the world) was that they would have to deal with the effects of socio-economic ills, like poverty and violence, in their classrooms – indeed, they would be expected to contribute to alleviating these social ills. In addition to addressing the complex needs of all their learners, they would also be held accountable for learners' performance in high-stakes testing. These two demands, caring for all and producing good results, pull on classroom practices in contradictory ways.

The FDE programme had to rise to the multiple challenges of repair, redress and reform. We needed to conceptualise and develop a programme that enabled teachers not only to participate in the repair and development of subject knowledge, but also to participate in the changing orientations to knowledge and pedagogy in increasingly complex classroom conditions.

Development and democracy in tension

A key constraint on professional development programmes in the context of curriculum reform in South Africa was, and is likely to remain, the issue of scale. As discussed above, research suggests that short courses or workshops do little to assist teachers to learn new subject topics and to take up new pedagogical approaches to their subject. There appear to be significant advantages to focused, labour-intensive professional programmes, where there can be multiple emphases, over time, in sustained ways, and across schools and institutions.

In this scenario, the choice seems to be between development, that is improving the quality of teaching and learning in select schools and so creating a core of excellence which would filter down to other schools, and democracy, that is the spreading of this social good across large numbers of teachers, schools and regions. The challenge for teacher education in South Africa is how to strengthen development and democracy at the same time. As is discussed in more detail in Chapter 2, the development-democracy tension, rife in South Africa, determines what becomes possible in teacher education.

The issue of scale and the related quality of teacher education is currently exacerbated by the entry of market principles and forces into education in South Africa, as is happening elsewhere in the world. Universities are under increasing pressure to offer more to students with less state support. They are thus being driven by the demands of their financial well-being, relegating their role of servicing the wider social good to second place. Motivations behind teacher education diplomas and courses vary enormously, with the goal of generating income sometimes being privileged over the goal of improving schooling.

A different dimension of the development-democracy tension is also described in Chapter 2: when new policy for teacher education is driven by the need for redress. From 2002, all teacher-preparation programmes will be four-year degrees. While this will go a long way to equalising the qualifications of teachers across the country, it flies

in the face of on-the-ground realities. For example, shortages of teachers in some key learning areas suggest that there need to be shorter rather than longer initial teacher education programmes. At the same time, shortages of qualified mathematics and science teachers, coupled with poor matriculation results in these subjects, have recently lead to policy support for specialised science and mathematics schools (DoE, 2001b). Concentrating the human and material resources for quality mathematics and science teaching and learning in a few schools makes developmental sense. It offers the possibility of producing the high-level mathematical and scientific skills required in a technological and competitive world. However, the high status of mathematics and science is well known. Inevitably, not only will such schools stand out, but the effects of drawing mathematics expertise away from surrounding schools may impact negatively on the quality of maths and science offered in those schools.

The challenges of researching teacher education in the South African context

Just as there are challenges in mounting any teacher education programme, so there are challenges for researching such programmes. Throughout the research process, the research team faced three central challenges – challenges that are illuminated by the South African context, but which we believe are not peculiar to teacher education research in South Africa.

Challenges of description: from "change" to "take-up" and "learning"

The goal of much teacher education research is the identification and description of activities that make a difference to teachers' classroom practice. Yet these kinds of descriptions get caught in the limits of language, as when, for example, suggesting a need for improvement positions teachers from the outset as somehow "lacking". Moreover, where research reveals constraints on classroom practices, how can these be described without at the same time positioning the teacher as not having changed enough?

The FDE research team grappled with how to describe what it was we were learning from the teachers through their practice. We wanted to move away from the deficit discourses that in our view have prevailed in a great deal of teacher education research and evaluation. In much of the literature, teachers have been described as failing in some way to meet the ideals of reform. We sought a language that enabled us to talk about teachers as having "agency" in their learning, in their teaching and in their professional practice. The underlying conviction was that teachers shape their professional development and are not only shaped by it. At the same time we needed to be able to talk about the constraints on their practice.

Over time we came to talk about teachers' "take-up" from the programme. Our view is that this best captures what occurs through participation in INSET. Teachers take up aspects of the programme, and different teachers do this in different ways.

Awareness of these difficulties of description is bringing about new discourses in teacher education literature. Recent research and programme descriptions are now talking about *teacher learning,* rather than teacher change (Mays, 2001; Graven, 2002). This is

an important discursive shift, particularly when it is framed within a wider educational context of lifelong learning, as is the case in South Africa. All professionals are assumed to be on a journey of lifelong learning. Talking about teacher learning then allows for descriptions of what is learned, and how it is learned, rather than trying to determine whether or not teachers have changed in the intended directions.

Breadth and depth in a complex practice

A second and quite different challenge for teacher education research is the scope of the research. Capturing the complexity of teaching, and indeed the ways in which this is shaped over a period of time, requires in-depth, qualitative research approaches. These enable rich descriptions of "take-up" and learning by a particular teacher in a particular context. At the same time, teacher education research needs to investigate practices that extend across diverse contexts and conditions. Here, research approaches need to enable description and comparison across a range of teachers and classrooms, and with sufficient teachers within the range for patterns of practice to be identified. As soon as the research approach moves to large samples of teachers and schools, it loses capacity for in-depth, rich pictures that capture complexity.

Briefly, the FDE programme offered learning opportunities to primary and secondary science, mathematics and English language teachers. In current South African terminology the programme was offered to intermediate- and senior-phase teachers, as well as those now in FET (Further Education and Training). Our student intake was predominantly from Gauteng and the Northern Province, the most urbanised and multilingual/multicultural province on the one hand, and one of most impoverished provinces on the other. We decided to work across the three subjects; across primary and secondary teachers; and across urban and rural schooling contexts. This decision, together with the multiple research questions detailed in Chapter 3, brought both strengths and weaknesses into the research. By working across difference (in context, subject and level) we gained insights from the outside, so to speak. We could find out more about language issues in the mathematics classroom, for example, by looking at the same time at practices in the English language classroom. We could gain a perspective of the rural or non-urban setting because of its contrast with the urban setting, and we could see more aspects of both primary and secondary practice because of the juxtaposition of each with the other. Yet working across such diversity and in in-depth ways also presented a weakness. For example, we ended up with three secondary English teachers in the study, two in non-urban schools and one in an urban school, too few to distinguish patterns, thus restricting our descriptions to broad brush strokes and "fuzzy generalisations" (Bassey, 1999: 44).

Straddling evaluation and research

As mentioned at the beginning of this chapter, this book tells two stories simultaneously. It tells a partial story of the FDE programme itself – and in this way stands as some kind of partial, though formative, evaluation of the programme. It also offers some answers to key and focused research questions, whose relevance extends beyond the specificity of the Wits FDE into the wider challenges of teacher education in general and in South Africa in particular. Much of the literature on teacher learning, or what has

been referred to elsewhere as "teachers in transition" (Scott Nelson, 1997), includes both focused research questions about teachers' learning and a description of the teacher development programme in which they took part (see, for example, Stein & Brown, 1997; Wilson & Berne, 1999). The issue is that a focus on teacher learning means less of a focus on the details of the teacher development programme itself. Detailed evaluations of course materials, of the residential classes that teachers attended, and detailed analysis of the assignments teachers produced as their school-focused course work were not part of the research design. We knew that shifting the focus onto details of the programme and its evaluation would push other research questions (such as the question of how teachers took up notions of learner-centred practice) into the background. Nevertheless, evaluative feedback on the programme has been one of its constant features. An independent evaluation of the English language FDE (SAIDE, 1998) resulted in its receiving the National Distance Education Organisation of South Africa award for access through distance education. Our continuing interaction with the teachers on their assignments as part of their course work fed into the research process in informal ways.

These global and local challenges of teacher development and its research are woven into each of the chapters that follow. To provide a context for these chapters, we turn now to a brief description of the FDE programme.

The Further Diploma in Education programme

In 1996, the University of the Witwatersrand launched a Further Diploma in Education (FDE) programme in mathematics, science and English language teaching. The goals of this programme were as follows:

- To broaden and deepen teachers' subject knowledge, pedagogic subject knowledge and educational knowledge
- To extend teachers' reflective capabilities
- To facilitate professional growth
- To enable access to further education

Each teacher in the programme took five courses: three in their specific subject and two in education. Of the three subject courses, two were focused on the subject matter itself (e.g. mathematics) and one on the theory and practice of (e.g. mathematics) teaching. Teachers entering the programme had to have an initial three-year post-matriculation teachers' diploma.

There were a number of innovative features to the programme. Firstly, it was a school-focused, formal, in-service programme, leading to recognised certification. While the FDE was run and accredited at a distance from schools and from teachers' classrooms, teachers' assessed tasks and activity – programme content – were focused on school and classroom issues and practice. At the time of its development in the mid-1990s it contrasted with the dominant non-governmental INSET activity of the 1980s and early 1990s that was school-based, non-formal and non-certificated. Secondly, the programme and courses were built on the three interrelated and necessary pillars of teacher knowledge: subject knowledge, pedagogic subject knowledge and educational

knowledge. Thirdly, the programme worked across three subject areas (mathematics, science and English language),[3] as well as across senior primary and secondary teachers, and teachers from rural and urban school settings. The three school subjects, mathematics, science and English language, had all been identified as critical areas for development in a technological era and multilingual society. Typically, research into language, maths or science teaching and learning happens in separate projects. Such projects tend also to focus on either primary or secondary levels, and on urban or rural contexts. Working across subjects, levels and regions was a means of seeing into particular practices from several perspectives. Finally, and this innovation separates the Wits FDE programme from a number of other FDE programmes in South Africa, it was offered through a mixed-mode programme: a combination of carefully produced distance learning materials and quarterly residential workshops. Teacher education through flexible and distance delivery modes offers potential advantages in addition to accessing "remote" students. There are greater possibilities for a programme to link directly into teachers' professional practice, as they engage in the programme's activities on site. This placed the FDE programme somewhere between what were currently viewed as school-based INSET programmes (wholly located on site), and school-focused programmes (located off site, enabling some reflective distance, but with the content of activity being practice based). As a mixed-mode programme, the FDE offered benefits of both on-site and off-site activity. In addition, and contrary to common sense assumptions, distance from the institution offering the programme enabled the responsibility for professional growth to be transferred to the teachers themselves (Ellerton, 1999: 59).

The goals of the research project

In the fluid and contested INSET development, research and evaluation contexts in South Africa, the FDE research team set out to gain an understanding of what it was that teachers do "take-up" from an INSET programme such as the FDE at Wits. The aims of the overall research project were threefold:

- To investigate teachers' "take-up" from the FDE programme in mathematics, science and English language teaching and to determine how this shaped the quality of their classroom practice
- To contribute to knowledge about formal in-service professional development (INSET)
- To feed back into the FDE programme's curriculum development through research

The research team set out to describe and analyse continuities and changes in practices both within and across the classrooms of some participating FDE teachers over a period of time, in relation to conditions in which teachers and learners work. We visited teachers in their schools over three years, each year taking time to observe their teaching and their learners' written work and to discuss our observations and the teachers' experiences and concerns. As we got to know and understand each different teacher's "take-up" over time, we saw the need to provide for anonymity and confidentiality. Hence the

[3] In subsequent years, the Wits FDE has been extended to include two additional diplomas, focused on Learners with Special Educational Needs, and on Deaf Education.

discussion of teaching practice throughout this book does not focus on specific teachers, but draws on extracts and examples from specific classrooms, always keeping in mind the wider context.

Why have we written this book?

The simultaneous undertaking of research and development is not unique to the FDE programme. It is a feature of both distance and INSET programmes in general. There are, however, significant constraints in both the distance and INSET contexts. In his discussion of distance education, Jegede (1994) argues that the demands on those who are developing materials for distance education programmes leave little time for research. The challenge in many INSET programmes is that researchers find themselves researching a phenomenon while they are trying to build it (Wilson & Berne, 1999). And indeed this has been a significant challenge for the FDE research and development team.

Our involvement in research alongside programme development was critical. As practitioners in teacher education we needed to get to grips with the contexts and histories of the teachers who joined the FDE programme, and to discover how the kinds of goals and outcomes we had set for the programme mapped onto such realities. As is discussed in Chapter 2, all sectors of education in South Africa were moving to Outcomes-based Education, where curriculum, qualifications and standard-setting in teacher education needed to be informed by on-the-ground realities. As Welch argues in Chapter 2, there are significant dangers embedded in the current standard-setting processes, in which contexts and histories of the teachers are not sufficiently addressed.

There was clearly a need for a book on practice-based research in the South African context. As a result of the conference we held at Wits in 1999, at which we presented our overall findings, our experiences and what we had learned, we were invited to share our research in a range of forums over the following three years. What became clearer was that little had been recorded on systematic study of what it was that teachers learn and "take-up" from their participation in teacher education programmes, and moreover, how they do this within the constraints of their particular contexts. Despite the many years and relatively large amounts of donor money spent on teacher education, little had been formally and publicly captured.

Perhaps one clear exception here is the 1999 report by Taylor & Vinjevold of the President's Education Initiative (PEI) Research Project, produced as a book entitled *Getting learning right*. Taylor & Vinjevold provide a discussion of teaching and learning in South Africa informed by the 38 PEI research projects. The strengths and weaknesses of this book, and the research that underpins it have been debated elsewhere (see, for instance, Vally, 1999). *Getting learning right* provides a devastating account of teaching and learning practices across a range of schools. But there are problems with parts of this account, problems that we believe are addressed in different ways in this book and our account of research into teacher education. *Getting learning right* makes claims about education in general while at the same time pointing out that each of the research projects was indeed very specific. So, for example, there is no adequate empirical base to the correlation claimed between some of the practices observed in primary classrooms (such as low-level cognitive demands on learners) and teachers' poor subject knowledge. Our goal in producing this book is to take seriously the challenges posed in the discus-

sion in *Getting learning right*, but to take the debates further through a longer-term and more systematic research process than was possible in the PEI projects.

In addition to sharing what we learned about teaching and teacher education in mathematics, science and English language, this book provides a reference point and resource for others who are researching teacher education. As mentioned previously, teacher educators are increasingly called upon to account for the worth of their activity. We thus need to be able to report, from systematic research and thorough evaluation, what it is that teacher development can and does accomplish. Because this book engages theoretically and empirically with current debates in teacher education, it will be a useful resource for postgraduate students in education.

And, significant as all of the above motivations are for this book, the research and its culmination in book form has been a journey for the FDE team into improvement of our own practice. Our experiences through the research project made an immediate impact on our practice. As we spent time in schools, looking at and talking to teachers about their classroom practice, so some of our assumptions about teachers and their contexts were challenged. Despite a wide range of experience in teacher education across the team, we had collectively overestimated, for example, even the limited resources teachers had access to in rural areas. The research activity was the context in which we worked reflexively, in much the same way as we were expecting teachers to do in their practice.

Brief overview of the book

This book has been written as a collection of chapters, each of which stands on its own, that together weave a coherent story. Each is part of a more complex whole. It is our intention that the chapters can be read separately. At the same time there is reference within chapters to other chapters in the book in order to avoid unnecessary repetition.

In Chapter 2 Tessa Welch provides a focused overview of teacher education in South Africa, its history, and its current policies and practices. Here we gain insight into the specific context that informs the way in which we make sense of teachers' "take-up" from professional development programmes.

In Chapter 3, Jill Adler and Yvonne Reed describe the investigation that informs this book. They focus first on the research processes adopted to explore teachers' "take-up". They then turn to the issues that arose as the investigation moved into reporting this "take-up", then into establishing the status of the claims made in this kind of research, and to a consideration of what it means to investigate "take-up" for the purposes of accountability.

Chapters 4–8 get to the heart of the matter. These chapters deal sequentially with the issues of resources, multilingual classrooms, teachers' mediation strategies and skills, their reflective practice and subject knowledge. Each of the chapters draws on literature and research in the wider educational field, and brings to this wider knowledge a particular set of theoretical and empirical insights that were formed through our work across a range of underresourced, multilingual classrooms.

In Chapter 4, Jill Adler, Yvonne Reed, Tony Lelliott and Mamokgethi Setati describe the availability and use of material and cultural resources across the schools teachers worked in, and how these changed over the three years of the project. Here the issues of sufficiency, sustainability and innovation are explored.

In Chapter 5, Mamokgethi Setati, Jill Adler, Yvonne Reed and Abdool Bapoo describe and explain teachers' language practices, particularly code-switching and the production of subject-specific discourses, and how these changed over the duration of the research. The description and explanation revolve around the notion of English language infrastructure, and how this varies across schooling contexts; and around the metaphor of a language journey needing to be travelled between learners' informal talk in their main language and discourse-specific talk in English.

In Chapter 6, Karin Brodie, Tony Lelliott and Harriet Davis explore the central issue of learner-centred practice, what this is, and how it was foregrounded in the Wits FDE and the wider curriculum context. They then describe and explain the varying shape learner-centred practice took as the teachers interpreted central tenets in their practices. In particular, they describe a form-substance tension, with many of the teachers displaying a "take-up" of the forms, but not the substance, of learner-centred practice.

In Chapter 7, Yvonne Reed, Harriet Davis and Thabiso Nyabanyaba reflect on the notion of reflective practice and its relationship to teaching, and then to teacher education programmes – particularly programmes in which teachers study through an additional language. This research supports evidence elsewhere of a correlation between reflection and quality of practice.

In Chapter 8, Jill Adler, Lynne Slonimsky and Yvonne Reed investigate the central issue of subject knowledge in teacher education and describe how the Wits FDE project set out to explore the relationship between change in subject knowledge and changes in teaching. As is made clear in this chapter, the whole issue of teachers' subject knowledge, what we call conceptual knowledge-in-practice, and its relationship to teaching and learning in classrooms, requires further research. It is this chapter that concludes the book – in the sense that all roads lead to specialist subject knowledge for teachers. Understanding the nature of specialist subject knowledge in the complex context of change is the challenge that lies ahead.

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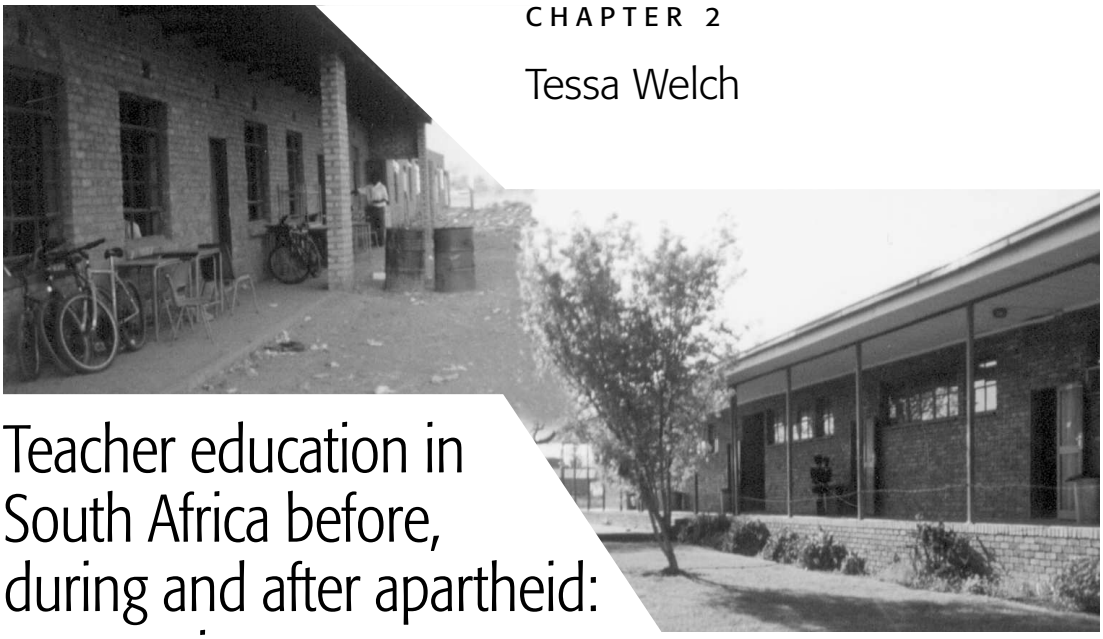

CHAPTER 2

Tessa Welch

Teacher education in South Africa before, during and after apartheid: an overview

Introduction

This chapter presents an account of teacher education policies and practices, past and present, and maps out challenges for the future. In so doing it provides the context for the chapters that follow.

Like all facets of South African life, policy and practice in teacher education is complex, contradictory and faced with dilemmas. On the one hand, a dispassionate look at the big picture suggests that the current situation in teacher education and development is bleak. In 2001 there were 13 000 students enrolled in initial teacher education programmes across the country.[1] While there are an estimated 50 000 inappropriately trained unemployed teachers, located mainly in the Northern Province and in the Eastern Cape (Parker, 2001), the country will soon need to respond to the effects of AIDS: analysts predict that some 30 000 teachers per year will need to be produced. As Luis Crouch succinctly puts it:

> Forecasts of teacher demand and supply suggest a looming imbalance between supply and demand due in part to the AIDS epidemic, but due also in part to a) an overly hasty administrative planning process to control teacher training capacity, and b) an uncontrolled (because uninformed) and relatively short-sighted reaction on the part of young persons potentially interested in becoming teachers.
>
> (Crouch, 2001: 3)

[1] Vinjevold, P., 2001, *Provision of initial teacher education in 2001: institutions, student numbers and types of programmes*. Unpublished paper.
The figure quoted excludes Unisa, Unitra and Fort Hare.

The incorporation of colleges of education into higher education has resulted in the loss of up to two thirds of college teacher educators. Many of the higher education institutions have not considered how their teacher education practices might need to change to respond to the different needs of students who formerly opted for college teacher education. Where institutions have responded more thoughtfully to the incorporation, they are being severely taxed, not only by the complexities of the process, but by the need to respond to far-reaching national demands for the transformation of the higher education system as a whole.

In the 1990s there was a vast increase in the involvement of the private sector in teacher education. This involvement raised concerns about quality assurance, particularly in relation to the large-scale provision of distance teacher education (whether public or private or offered through public/private partnerships). In summary, key challenges in teacher education are the following:

- The supply of qualified teachers is unlikely to meet the demand.
- Young people are not entering the profession in sufficient numbers.
- Complex policy changes, particularly in the governance of teacher education, have drained the energy of the higher institutions responsible for the provision of teacher education.
- There are concerns about the quality of much that is on offer.

On the other hand, since the mid-1990s there has been intense and sometimes visionary policy development in teacher education, particularly with regard to the curriculum. Strong efforts have been made to base policy on sound research. There has been wider participation in constructing new qualifications and curricula than ever before in the history of the country. In addition, a number of providers have taken up the challenge posed in emerging policy to transform their curricula and the quality and reach of their provision. The University of the Witwatersrand (Wits) Further Diploma in Education (FDE) programme, the subject of this book, is one such example.

That the difficulties of the current situation are rooted in the apartheid and colonial past is often overlooked. Although the situation may look discouraging, considerable work has been done through the co-operation of institutions, government and non-governmental agencies across false divisions created in the past by the apartheid government.

Historical roots of education and teacher education in South Africa

Segregation, fragmentation, authoritarian and bureaucratic control of the curriculum, institutions and governance, inefficiency and inequity have been characteristic of South African education for a very long time. This heritage has had a considerable effect on the present.

Before apartheid

The roots of segregated education, according to Cross & Chisholm (1990: 49), predate

apartheid. A recent paper from Econometric Research Southern Africa states that: "… blacks consistently faced poorer educational opportunities than did whites, with the possible exception of black private schooling opportunities in the period 1935 to 1956" (Fedderke et al., 1999: 5). In the latter half of the nineteenth century, British colonial rulers used education as a means to control coloured and African people. In 1855, Sir George Grey, Governor of the Cape, made the following statement in Parliament:

> If we leave the natives beyond our border ignorant barbarians, they will remain a race of troublesome marauders. We should try to make them a part of ourselves, with a common faith and common interests, useful servants, consumers of our goods, contributers to our revenue. Therefore I propose that we make unremitting efforts to raise the natives in Christianity and civilisation, by establishing among them missions connected with industrial schools.
>
> (cited in Christie 1992: 37)

The better mission schools, according to Christie, offered an academic education based on European-type curricula, emphasising Christian values. The curriculum included practical work and technical training. Most of these schools were also teacher training institutes (1992: 74). Although the prevailing state position was oppressive, the better mission schools, such as Lovedale and Zonnebloem, Adam's College and St Peter's, played a significant role in the education of African leaders.

In the first two decades of the twentieth century, education was firmly organised according to four separate schooling systems – white education, Indian education, coloured education and "native" education. Mass schooling for whites served to incorporate the militant white working class into the mainstream, and the purpose of schooling for Africans was to train them for their white-determined subordinate position in the labour market – particularly in the mines. There was free compulsory primary schooling for whites, but schooling for blacks was neither free nor compulsory nor large scale. Even though there was an increase in provision between 1917 and 1927, only 16% of African children were accommodated in 1936 (Cross & Chisholm, 1990: 51). Provision was still mainly through mission schools with gradually diminishing state subsidies, and very few black learners reached Standard 6 (Grade 8).

There were no dedicated teacher education institutions for Africans – secondary schooling *was* teacher education. However, it was during the same period that teacher education for whites was located in post-matriculation colleges or universities (Cross & Chisholm, 1990: 52). Thus there were racially divided streams of teacher training for black learners and white learners at very different educational levels, with only white teacher education conceived of as professional practice. The effects of this are felt even now. Even when colleges were set up for black teacher education, the normal period of study was different for the different groups – three- and then four-year qualifications for white teachers, and two- and then three-year qualifications for black teachers. During the 1990s, two of the challenges faced by institutions like the University of the Witwatersrand were to develop ways of admitting teachers with unequal professional qualifications and to provide them with an opportunity for further professional and academic study in education. The Wits FDE programme, the focus of this book, offered one such way – teachers with a three-year professional diploma could undertake specialised study and, if successful, gain entry to an Honours programme in Education.

The period of "grand" apartheid – 1948 to 1970

The apartheid period saw the rise of mass schooling for blacks but primarily as a means of social control, further entrenching the notion that education should fit Africans for their subservient role in society in terms of the Bantu Education Act of 1953. It also saw the dismantling of the mission school system. The government clamped down particularly harshly on teacher education for Africans. As indicated above, this had largely taken place in mission schools: from 1954, teacher education could only take place in the Department's education centres, and the Department did not recognise for purposes of employment the qualifications of teachers trained elsewhere. In addition, university education became segregated with the Extension of Universities Act in 1959.

The effect of these policy changes was not only an entrenchment of racial segregation, but a more powerful control of the curriculum. In Afrikaans universities and colleges and in the University of South Africa, the dominant educational philosophy was fundamental pedagogics. This philosophy claimed to arrive at a set of immutable truths about education – divorced from the socio-political context of education. In this way it avoided a critique of the ideology which informed its own world view. It positioned both teacher and learner as passive subjects, and the child as a product of original sin, needing to be led into adulthood by the wiser adult teachers, who in turn were led to enlightenment by the wiser pedagogicians. The removal of African teacher education from the control of any other agency than the state meant that the state could enforce its ideology of African subservience by the use of the dominant philosophical tool – fundamental pedagogics.

The long-term effect of this philosophy has been to encourage a sloganeering approach to education (definitions such as "to educate is to lead a child to adulthood" echoed in the hallways of black colleges of education such as Soweto College as late as 1990). It was therefore no surprise that when a new outcomes-based curriculum was introduced in the 1990s, it was proclaimed in enthusiastic but authoritarian and uncritical slogans. The "old" was rejected in favour of the "new", and the "new" was regarded as the only way to educational salvation (see Morrow, 2001).

The government in the 1950–1970 period of "grand apartheid" used Bantu Education to support the Bantustan policy. This reinforced ethnicity and the fragmentation of South African education created an even stronger urban/rural divide. This took place in five main ways:

- The blocking of secondary school expansion in urban areas
- The use of education as a form of influx control, preventing families without urban rights from attending schools in the urban areas
- The strangling of technical training in the urban areas
- Homeland-based teacher and professional training
- Exclusion of the use of funds from private business by schools

(Cross & Chisholm, 1990: 56)

What is significant to note here is that the teachers entering the Wits FDE in 1996 did so with a philosophy steeped in fundamental pedagogics, and with a life experience and knowledge base that had in some cases not been expanded beyond the borders of a par-

ticular homeland. The difficulties these teachers had in embracing the substance of learner-centredness, for example, probably had some of their roots in the inequities and inadequacies described above. A major challenge for teacher development programmes initiated in the late 1990s was to create the space and the time for these deep inequities to be redressed, while not unnecessarily burdening in-service teachers with study demands that took them away from their own classrooms.

Apartheid in the 1970s and 1980s

During this period, there was increased access to schooling for black learners. However, as pointed out by Fedderke et al. (1999: 11), this happened "without providing additional teaching resources at a comparable rate". In addition to this resource crisis, the state's abuse of education for social control purposes (e.g., the enforcement of the 50/50 English-Afrikaans language policy in education), gave rise to a period of fierce resistance, countered by repression, in the late 1970s and the 1980s. The state's response to the crisis was bureaucratic and violently oppressive. The 1983 Constitution Act (Act 110 of 1983) and the National Policy for General Education Affairs Act (Act 76 of 1984) reinforced the educational segregation, making teacher education an "own affair". This meant that by 1986, South Africa had 18 education departments and 15 ministers of education.

In the late 1970s and early 1980s, there was a concerted effort to improve the qualifications of teachers as a whole and to increase the numbers of teachers in black schools. For example, there was the creation of Vista University, an "urban university" with a campus in Pretoria dedicated to the provision of distance upgrading programmes for predominantly black teachers. However, a difficulty with these upgrading programmes was that they very often provided qualifications without quality, and the time teachers spent on them took them away from their classrooms – learners played while teachers completed rote-learning-type assignments at their desks. As Cross & Chisholm (1990: 61) point out, even though the state increased its expenditure on black education after 1976, this did not improve the overall quality provided.

According to Fedderke et al. (1999: 20), the proportion of unqualified or underqualified teachers to qualified ones stood at about 20% during the 1963–83 period for both black and white teachers, but thereafter the proportion of underqualified white teachers dropped sharply to below 10%, whereas it took another decade before the same effect was experienced for black teachers. What is more interesting is the case of teachers who used the state salary incentives to become more qualified than necessary. The proportion of "superqualified" black teachers had increased from below 10% in the 1963–83 period to approximately 50% in 1993. (The comparative increase in white "super-qualified" teachers in the same period was from between 40% and 50% to between 80% and 90%.)

One would expect that the reduction in underqualified teachers and the further qualification of already qualified teachers would result in an increase in the quality of teaching and learning in schools. However, the curricula for upgrading or furthering of qualifications made very little effort to address classroom practice. Fedderke et al. show that

> black matric pass rates (as one indicator of output from the black schooling system) did not respond positively to the higher teacher qualifications – in fact

> they continued declining despite rising teacher qualifications in the black schooling system (1999: 21).

Fedderke et al. (1999: 21) suggest that the pay incentive for increased qualifications resulted in the best teachers being out of the classrooms, thereby negatively impacting on education. This finding is corroborated in the work done for the 1995 National Teacher Education Audit. The audit found that the new provincial budgets for education were spent mainly on teacher salaries (in some cases in excess of 95%). This meant that there was little money left to spend on school infrastructure or teacher development (Hofmeyr & Hall, 1996: 88).

Although the apparent impetus for the revision of the *Norms and Standards of Teacher Education* policy document during the 1990s was a political and technical one – teacher education had to move towards an outcomes-based system in line with the emerging National Qualifications Framework – the underlying urgency was the need to ensure teacher education qualifications and programmes that could transform practice.

The National Audit also revealed that in this period there was intensive activity from mainly overseas-funded non-governmental organisations (NGOs) directed towards alleviating the inequities of apartheid teacher education. The decentralised, localised mode of operating was deliberate – to avoid attention from a state which attempted to crush any opposition to its policies. The focus on the classroom was also deliberate – to counter the effects of the disempowering philosophy of fundamental pedagogics, which made the practice of teaching so obscure that it seemed impossible for a teacher to take any initiative based on his or her own analysis of the teaching and learning context.

By 1994, the size of NGO provision was considerable. The Audit (Joint Education Trust, 1996: 17–32) came up with a figure of 99 NGOs spread across the nine provinces – offering short courses, school-based courses, classroom support, materials and information, and reaching 111 862 teachers (a third of all those employed). Another feature of NGO provision was the high calibre of many of the staff and volunteers involved. Gifted educationists, intolerant of formal provision in restricted public institutions, found an ideological home in the many education NGOs. Even though uneven in quality, and often poorly managed, these NGOs produced innovative work which has contributed markedly to policy and programme development work since the demise of apartheid. What was also important was that donors insisted increasingly that the work of *their* NGOs should be evaluated. This led to a level of accountability that was not present in the public system, as well as to a culture of reflective practice. Programmes such as the Wits FDE, discussed in detail in the following chapters, were thus able to draw on piloted materials and innovative approaches from a range of NGO providers. Indeed, many of the teachers in the FDE research sample had participated in NGO initiatives in their schools or districts prior to entering the FDE programme (see Table 4.3).

Into the present: teacher education for post-apartheid South Africa

When the new government took over in 1994, it was faced with the task of dealing with a segregated, fragmented, authoritarian, and dangerously unequal and inefficient educa-

tion system. One of the first actions it took in respect of teacher education was to commission a National Teacher Education Audit, which aimed to:

- develop an analysis of teacher demand, supply and utilisation as a basis for the development of models for projecting future needs
- evaluate teacher education institutions and programmes, formal and non-formal, in terms of their capacity to provide preservice and/or in-service teacher training, the quality of the programmes offered and the staffing and governance structures (Hofmeyr & Hall, 1996: 1).

The picture that emerged was that in 1994 teacher education involved about 150 public institutions with about 200 000 students, 80 000 of whom were in 104 colleges of education. Part of the reason for the size of provision was that in the 40 years of the apartheid era, the only access to tertiary education for many black students had been through colleges of education, as the state provided teaching bursaries to students who did not have a matriculation exemption. There had been a tremendous growth in the number of colleges of education as the apartheid system advanced. Since homelands were not allowed to establish universities, homeland leaders built colleges of education to show visible commitment to education. Often this was with money that should have been spent on upgrading primary education. For example, in Lebowa four colleges of education were built in 1990: Bochum near Dendron, Naphuno near Tzaneen, Sekhosese near Soekmekaar and Thamoopo near Pietersburg, even though there were already eight colleges in Lebowa with enough room for expansion (Jaff et al., 1996: 9).

The Audit revealed that 129 614 teachers, approximately one third of the teaching force, were engaged in distance teacher education – mostly in-service. Of these only 63 015 were involved in upgrading to qualified teacher status (matriculation plus three years), while 32 878 were qualified teachers furthering their qualifications (SAIDE, 1995). Aside from public provision, however, a feature of the 1990s was a rapid growth in the provision of teacher education at a distance through public-private partnerships (RAU in collaboration with Lyceum College; Pretoria University with Success College; University of Port Elizabeth with Azaliah College). Estimates are that by the year 2000 up to 40 000 teachers were involved in the distance education programmes delivered through these partnerships (Parker, 2001). These are not full-time equivalent numbers as in-service teachers might be studying only two modules per year.

Essentially, the Teacher Audit (SAIDE, 1995: vii), stated that, with reference to distance education provision, lack of quality and uncontrolled expansion increased the costs of education, and had serious implications for its transformation. At the same time, the realisation of the educational aims expressed in the White Paper on Education and Training was prejudiced by a lack of appropriate curriculum reform in a sector which is, each year, influencing more teachers than previously. Consequently, teachers faced with the task of building a new system of education were being prepared for it in a system still firmly located – in terms of curriculum content and pedagogic style – in the undemocratic, teacher-centred, apartheid-serving system of the past.

It must be mentioned that while the Teacher Audit took stock (with admirable thoroughness) of teacher education in the sense of pre-service and in-service education, and different modes of delivery, it was only in the NGO section of the Audit that the broader and more amorphous field of teacher development was tackled. And even in that sec-

tion, the relationship between the occupational, professional and academic demands on teachers, and the relationships between teachers in schools and other educators (e.g., adult educators, early childhood practitioners, practitioners in industrial and training contexts) were not dealt with.

The present government is also faced with the challenge of entering the global market. As John Gultig (1999a) remarks:

> The White Paper sets up what has become an enduring educational policy tension: balancing the political imperative to transform the philosophy and ideology which underpins South African education while at the same time fulfilling an economic imperative, namely developing and managing a system that will educate/train more competent workers.

The present South African government has to consider how education can serve the economy. In this respect it follows Sir George Grey in realising the economic potential of the masses in the latter half of the nineteenth century, the Union of South Africa in serving the interests of the mines, and the apartheid government in manipulating further the already existing policy of segregated education in the interest of economic imperatives. But two things are different. Firstly, the nature of the economy is entirely different. It is global, created and sustained by information and communications technology, and demands education that equips learners for flexibility and change. The global economy has no need for an unskilled, nationally based labour force which does not have access to world capital or information technology. Secondly, the present government has a powerful mandate from its voters to increase access for the poor, for redress, and for equity. The characteristic response is espousal of one of these imperatives, and vigorous opposition to the other. The structures that have been set up to balance the demands of these imperatives – such as the South African Qualifications Authority with its emphases on international comparability and intellectual rigour, as well as on redress, access and equity – are struggling. There is a great need for an influential, properly resourced, and properly managed "third way".

What follows is an overview of current policies and practices in the governance and curriculum of teacher education, and the challenges they pose for the future.

Challenges for governance of teacher education

Meeting the imperative of democratic governance

Current policy developments in teacher education need to be understood within the framework of "a model of co-operative governance of the higher education system" (Parker, 2001). This model is an attempt to balance the imperative of integrating a disastrously fragmented and racially segregated system with the imperative of democratic governance.

Under apartheid there were 18 departments of education and 15 ministers of education. Even though there were different curricula and funding processes for different groups, with enormous equity implications, the national government controlled the funding and curricula for teacher education as well as the employment of teachers. It did this in different ways, through the provinces and the homeland governments, the

Department of Education and Training, the House of Delegates and the House of Representatives, and through the semi-autonomous higher education institutions.

The situation in 2001 is that there is now a single system of governance, with a strong drive for equity and redress. However, it is a dispersed system, and a great deal of energy is absorbed in trying to work out the relationships and areas of authority for each part of the system. For example, authority for the development of qualifications for teacher education is the responsibility of the South African Qualifications Authority (SAQA). However, the Council on Higher Education is responsible for academic policy for all of higher education – part of which involves a qualifications framework. Similarly, the Department of Education is responsible for conditions governing employment in education – part of which involves determining appropriate qualifications. The more bodies involved, the greater the amount of time taken to negotiate reasonable solutions. There is also a tendency towards increased bureaucratisation of the system, rather than the desired decrease in bureaucracy. As Parker comments in his paper:

> Part of the lacuna between policy and implementation lies in the proliferation of "regulatory" bodies and the multiplicity of role players and stakeholders represented on these bodies. This has created confusion over roles and responsibilities and undermined the kind of executive decision-making that is necessary for efficient management.
>
> (Parker, 2001: 2)

On the other hand, however, the creation of stakeholder structures for the forging of new curricula has resulted in real conversations between people and institutions who formerly would not have had any common ground. These stakeholder structures, properly managed, have made it possible for parts of a still divided system to develop shared and new understandings of quality. There is now more of a chance that the kind of work done in developing programmes such as the Wits FDE can be shared with other providers, and become influential in the shaping of national policy.

The challenge for the future is to simplify these structures and lines of accountability, but not destroy the potential for sharing across apartheid-created divides.

Meeting the imperative of efficiency – the incorporation of colleges of education into higher education

In the late 1990s, governance of teacher education underwent even more dramatic change. Without doubt, the most profound change in teacher education has been the incorporation of teacher education into higher education and the resultant closure of colleges of education.

This incorporation of teacher education into higher education was a result of a constitutional agreement in 1994. The 1996 Constitution made tertiary education a national competence and the Higher Education Act of 1997 (section 21) made all teacher education part of the higher education system. The rationalisation of teacher education was necessitated by the expensive fragmentation of teacher education created by apartheid. This rationalisation was seen as a critical step in creating a more efficient system. However, there are already indications of problematic consequences.

On 15 December 2000, the Minister of Education published a declaration of colleges

of education as subdivisions of universities and technikons in the Government Gazette. This effectively signalled the demise of colleges of education and their incorporation into higher education. In 2001, the number of public institutions offering teacher education was reduced to 23 (not all of the 36 public higher education institutions have teacher education programmes). The rationalisation of teacher education through incorporation of colleges into higher education has now been achieved; a drastic reduction from 150 institutions to 23 institutions in seven years.

The impact of the decline in student teacher enrolments, loss of teacher educator staff and the lowering of morale in institutions offering teacher education is a matter of considerable concern. The integration of teacher education into higher education and the control of the disproportionately high per capita costs have been achieved, but the cost in terms of loss of teacher education expertise and student enrolments was underestimated.

The challenge for the future is to find a way to increase enrolments in teacher education programmes, and to develop the capacity of existing teacher educators within higher education to meet the demands of quality provision. Of particular importance in this respect are the barriers to access for prospective teachers created by the location of teacher education within rather intimidating and expensive higher education and training institutions. The intention in creating the mixed-mode Wits FDE programmes was to create a possibility for teachers far from the centre in Johannesburg to gain access to programmes which could help them improve their teaching as well as further their own studies. An attempt has also been made to increase access by collaborating with an NGO in the delivery of the FDE programmes from established NGO learning centres outside Johannesburg. Furthermore, the emphasis in the programmes on individualised feedback on assignments and responsive learner support have gone some way to lessening the intimidating effect of association with a university.

Challenges for curriculum: qualifications and standards setting

One of the many tensions in current qualifications debates arises from a confusion of standards with quality. Quality in education depends on a thorough analysis of both where learners currently are and where they need to be, and the development of systematic ways to encourage the necessary learning. Quality assurance should measure not only how successful the learning has been, but also the ways in which learning has been encouraged. Proponents of improvement in "standards" tend to concentrate on where the learners need to be, and often do not take cognisance of the reality of where they are. Indeed, as noted in Chapter 1, given the diverse nature of the South African context, it is not hard to miss appropriate entry points in teacher education programmes. Simply setting the standards does not ensure that the standards will be reached – though standards, of course, are an important starting point.

However, the proclamation of standards is often done in the name of equity, and arguments which are apparently against equity are difficult to win in the new South Africa. For example, an obvious goal of a new qualifications framework and new requirements with respect to qualified teacher status should be to rectify the past inequities of the fact that there was a two- or three-year pre-service teacher education programme for black teachers and a four-year programme for white teachers. Hence the recommen-

dation of a 480-credit (four-year) Bachelor of Education as the main initial qualification for all teachers. What this recommendation does not consider, however, is whether a long initial degree is the best route for reaching the goal of quality professional education for teachers in a country which for some time will be faced with a severe rural/urban divide, and severe teacher shortages. It may well be that prospective teachers will be put off by the length of the education programme; or if they attempt a degree, they will fail, but will nevertheless be in the schools teaching; or if they achieve a degree, will use it for mobility out of the rural contexts which need them. The option of an exit point from the B.Ed. with a professional diploma after 360 credits (three years) goes some way towards meeting the need for professionally capable teachers who might not have the financial or academic resources for full degree study.

The conclusion that could be reached in this regard is that standards need to be set in ways that will facilitate quality learning for the majority of the target learners and contribute to the long-term, though incremental, building of the profession. International comparability may be a goal which is not instantly attainable.

Challenges for curriculum: programme design and delivery

The clearest policy direction for the design and delivery of teacher education programmes is contained in Section 5 of the *Norms and Standards for Educators* as gazetted on 4 February 2000 – *The Transformation of Existing Practice: Standards for the Design and Delivery of Educator Development Programmes*.

Essential to the new qualifications, from the Educators in Schooling Standards Generating Body (SGB), the *Norms and Standards for Educators*, and SAQA policy, is the requirement that qualifications should develop applied competence. This has been defined by the Educators in Schooling SGB (2001) as "the ability to put into practice in the relevant contexts the learning outcomes achieved in obtaining a qualification". The *Norms and Standards* (DoE,1998) define quality learning as applied competence – three "inter-connected kinds of competence":

> Practical competence is the demonstrated ability, in an authentic context, to consider a range of possibilities for action, make considered decisions about which possibility to follow, and to perform the chosen action. It is grounded in foundational competence where the learner demonstrates an understanding of the knowledge and thinking that underpins the action taken; and integrated through reflexive competence in which the learner demonstrates ability to integrate or connect performances and decision-making with understanding and with an ability to adapt to change and unforeseen circumstances and to explain the reasons behind these adaptations (1998: 10).

It involves not only *knowing and reflecting*, which is not dependent on place or time, but also *doing*, which has to have a site of practice. In the case of teachers, the site of practice is the classroom and the school. Therefore, in order for teacher education programmes to develop applied competence, they need to be classroom- and school- focused.

The challenge that this presents to a system that has been dominated historically by fundamental pedagogics is enormous. It was relatively easy to react against fundamental pedagogics by concentration on practice to the exclusion of theory. The initial work in

Curriculum 2005 did this by emphasising "learner-centredness and experience-based learning", "an outcomes-based curriculum", and "redefining disciplinary-based subjects with performance-based learning areas" (Gultig, 1999b). This has resulted in a narrow and instrumentalist notion of teaching and learning. It is not theory or practice, but theory *and* practice, or theory *as* practice that is required. This will not only meet the requirement to improve classroom practice, and restore the necessary focus on schools in teacher education programmes; it will also equip teachers to meet global demands with intellectual attributes such as

- a deep understanding of "higher order" concepts and perspectives … rather than the acquisition of low-level facts and information
- reflexivity … an ability to rigorously evaluate and, if necessary, reconstitute our own thoughts and actions
- the ability to think metacognitively … to recognise that our claims to knowledge are always susceptible to further and ever-higher forms of evaluation

(Barnett, in Gultig 1999b)

That the Wits FDE programme developers were aware of the theory-practice tension was evident in the naming of one of the required courses "Theory and Practice of English Language/Mathematics/Science Teaching". As the discussion in Chapters 6, 7 and 8 will show, integrating theory and practice in teacher education is demanding. Current research, particularly into teacher-learners in rural areas, reveals much about the literacy levels of teacher-learners and their capacity for reflective practice (Harley & Timm, 1999). A difficult balance of challenge and support will be required to help teacher-learners move from where they currently are to positions in which they can operate with greater ease at a meta-cognitive level. The temptation will be either, as John Gultig writes (1999b), to give in to the apparent reluctance of teacher-learners to learn from written course materials and to read widely, or to overwhelm teacher-learners with intellectual demands they cannot meet, and cause them to neglect their practice, and resort to rote learning.

The improvement of teachers' subject knowledge is a priority that has also been underlined in recent teacher education research (see particularly Taylor & Vinjevold, 1999). Teachers need to be confident in their knowledge of the subject they are teaching, and teacher education programmes should be structured in ways that help teachers develop both subject content and pedagogic knowledge or, as the *Norms and Standards for Educators* puts it, "the disciplinary bases of content knowledge, methodology and relevant pedagogic theory". However, current practice shows that the implications of this are not universally understood. Pedagogic knowledge is often misunderstood as simply "teaching method", which in turn is often reduced to "classroom tips for teachers". Pedagogic knowledge should include the theoretical basis for various approaches to teaching – for example, behaviourist as opposed to cognitive theories of learning lead to different approaches to the teaching of reading, which in turn play themselves out in various methods and techniques that are adopted. If student teachers are taught merely the methods and techniques, the opportunity for proper reflective practice is severely limited. Theory helps teachers understand learner difficulties and how to change their practice to improve learning. Methods are simply tools that can be used in this process.

Similarly, there are difficulties with regard to content knowledge. Although it is understood that teachers need to grasp the "disciplinary bases of content knowledge", it is sometimes not understood that there are varieties of ways in which subject content can be selected, some more appropriate for teachers than others. For example, it would be appropriate in a language course for teachers to include literary analysis of children's literature rather than only literary mainline study of English and American literature, intended for the students' own enrichment and induction into literary theory and discourse. Finally, there also needs to be consideration of how content knowledge and pedagogic knowledge are related. To continue the example from literature, it would also be appropriate to consider approaches to evaluation and selection of children's literature for use in the classroom, as well as methods of teaching. Particularly in the foundation phase, it is important to integrate understanding of the subject and understanding of how the subject is learned.

In the brief description of the FDE programme in the introduction to this book, all of the points emphasised above are incorporated in the goals of the programme. In the chapters that follow the challenges of realising such goals are discussed (Chapter 8, for example, deals with the issues of teachers' subject knowledge).

Challenges for modes of delivery

Since the 1990s, there has been increasing pressure on traditionally face-to-face providers of teacher education to reconsider their mode of delivery. The policy directions in this regard are twofold – the need to cater for in-service and initial teacher education students in the same programme, and the need for a school focus in teacher education programmes.

Catering for in-service and pre-service students in the same programme

Because of the looming shortage of teachers, it is possible that the system will be forced to provide relatively brief initial teacher education and follow this up with sustained professional development while teachers are in schools. It is also possible that students will be recruited straight from matric (or the new further education and training certificate) into schools as interns and provided with opportunities for professional and academic study while they render assistant teacher services.

This means that the same provider will have to cater for initial teacher education and in-service professional development of teachers within the same programme. There will no longer be the assumption that certain providers (mainly distance education providers) will cater for in-service and upgrading, and that certain providers (contact-mode providers) will cater for initial teacher education. Further implications [extensively drawn out in Section Eight of the *Norms and Standards for Educators* (1998)] are:

- *The need for materials-based courses*. Course content will need to be communicated not simply through the lecturer, because in-service teachers will not be in a position to attend many classes. It is logical to use the same materials for initial and in-service students, and hence the ways in which contact sessions are conceptualised, even in predominantly contact courses, are likely to change.

- *A new conception of the academic year*. Teaching education institutions will no longer be able to take the "school holidays" as they are likely to be teaching in-service teachers at that time.
- *The need for self-contained courses based on unit standards*. These will consist of clearly assessable units for teachers whose period of study is interrupted, or who work towards achieving the qualification over a longer period of time because of their school teaching responsibilities.

A school focus which entails integrated assessment of applied competence in authentic contexts

In all the new qualifications, and in the *Norms and Standards* requirements for integrated assessment of applied competence, there are stipulations agreed: that whatever "mode of delivery" is selected, the programmes should be school-focused and should assess applied competence in authentic contexts.

Even though "mode of delivery" is not specified, research into current large-scale distance teacher education programmes indicates that it is difficult for such programmes to meet these stipulations. In programmes with thousands of enrolments across the country in which lecturers meet the teachers for a mere one or two days a year and never visit their teachers' schools, a school focus is unlikely. In programmes with only summative assessment, and no provision for ongoing developmental assessment, it is unlikely that teachers will develop applied competence. The development of applied competence is a process in which teachers learn to apply their foundational knowledge in practice in authentic contexts, and reflect on their practice in the light of experience as well as theory. This is a cyclical process in which competence can be achieved only over time and with frequent practice – opportunities should be *ongoing*. Furthermore, the comment of tutors (as well as mentors and peers) on the teachers' efforts at planning, practice and reflection is an essential part of the process. The opportunities should be *developmental* or *formative*.

In the Wits FDE programmes there is an emphasis on ongoing developmental assessment with a school and classroom focus. As an evaluation of the English language teaching FDE noted:

> The notion that teachers need to be researchers in their own classroom is a theme through all the assignments

And

> What is interesting about the assessment design for this course is that whereas the detailed content of the assignments and examination questions differs from unit to unit, the basic processes through which students are required to work are broadly similar. These processes of design (or adaptation of lessons or approaches provided), implementation and reflection are shown diagrammatically below.
>
> (SAIDE, 1998: 64–5)

It is clear that this programme has an assessment approach that both develops and measures applied competence.

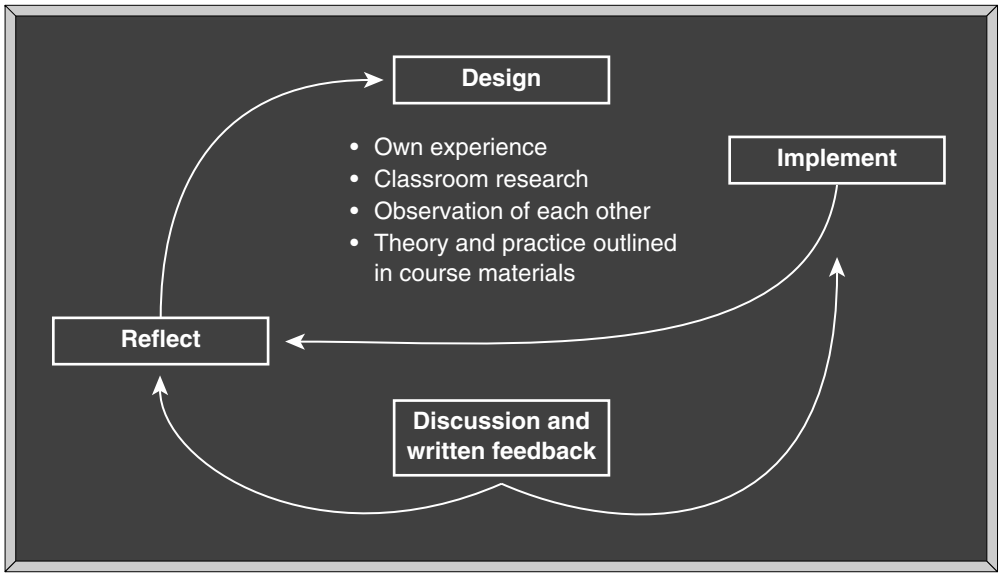

Figure 2.1 Assessment design in the Wits FDE in English language teaching

This is by no means the norm, however. Examples of programmes with limited opportunities for developing applied competence exist in public dedicated distance education institutions, as well as in partnerships between public, primarily contact institutions and private providers. The argument put forward by large-scale distance education programmes with enrolments of over 3 000 students per annum throughout the country is that frequent contact, assessment of classroom performance, and even ongoing developmental assessment are not feasible from a financial point of view. In other words, they claim that requirements of the *Norms and Standards* are not implementable in large-scale distance education programmes. One "mode of delivery" appears to be ruled out.

This is a short-sighted response. Large-scale distance education providers do reach students in remote places, which contact institutions do not. However, in order to meet the requirements of the *Norms and Standards*, they will probably need to form collaborative relationships with agencies that can carry out classroom support and undertake developmental and observational assessment. This has, in fact, been done in the large-scale B.Prim.Ed. programme for in-service teachers delivered by the Fort Hare Distance Education Project. Staff are seconded from the Eastern Cape Department of Education as tutors on the programme. They run fortnightly Saturday contact sessions for the 1 300 teachers in numerous learning centres throughout the province, and they manage the formative assessment process.

Conventional wisdom would suggest that in providing teacher education programmes for teachers in remote areas, one is faced with a choice between two equally important imperatives: to offer high-quality programmes – but only to small numbers of teachers; or to open access to large numbers of teachers – but without adequate learner support or assessment. The challenge for a teacher education programme is to find a way to

meet the imperatives of access as well as quality – retaining quality support and assessment whilst still reaching significant numbers of learners.

Challenges for Educator Development and Support (EDS)

The *Implementation plan for Tirisano*: January 2000–December 2004 (Ministry of Education, 2000) has as a priority the goal to "develop the professional quality of our teaching force", with a strategic objective "to develop a framework for educator development that promotes and enhances the competence of all educators". One of the performance indicators for this plan is that "all educators are participating in educator development programmes". It is interesting that Tirisano does not refer to teacher "education", but uses the word "development" – an emphasis on less formal in-service provision.

As was pointed out previously, during the 1970s and 1980s most of the less formal teacher development activity was in the NGO sector. However, this is now changing. With the gradual withdrawal of direct overseas funding for NGOs, an increasing number of them are being forced to close. Secondly, many leading staff in the NGO sector have moved into government positions in order to support the transformation of state education. Thirdly, the drive towards the creation of a National Qualifications Framework is creating a consumer demand for accreditation and certification – a demand which NGOs offering non-formal short courses find difficulty in meeting. Fourthly, while some public institutions are willing to incorporate the ideas and experience of NGOs, collaborative relationships between public and NGO providers are difficult. What this points to is the reality that NGOs can no longer be looked to as the main providers of non-formal school-based teacher development. Although there is a need to maintain the NGO sector because of its capacity for innovation and its independent perspectives, mechanisms need to be found to increasingly mainstream NGO approaches to teacher development.

Formal teacher education institutions need to broaden the scope of their activity to embrace less formal teacher development. Secondly, formal teacher education institutions need to recognise that the divide between initial teacher education and in-service professional development is not as rigid as previously conceived. It has been suggested earlier in this chapter that the emerging qualifications framework implies that teacher education will have to be offered in increasingly flexible ways. Former contact institutions will have to deliver part of their teacher education courses in contact-mode, and part through the use of distance methods for teachers in schools. Also, because of the existence of the National Qualifications Framework, there is likely to be a consumer demand for credit accumulation from EDS courses in which educators have participated. This in turn will create pressure for short courses that are based on unit standards, fit into qualifications, and enable educators to use these courses to advance on a learning and/or career pathway (Welch, 2001b).

It is not only formal educational institutions that need to move into the role previously played by the NGO sector, but also the provincial departments of education. During the later years of apartheid, departments of education were regarded with suspicion, and could not play a role in the development and support of teachers. However, current policy directions are encouraging them to combine the roles of monitoring with support and development.

All of this points to the need to develop a coherent framework for continuing professional development that integrates all forms of provision, and allows short EDS courses providing qualifications, to meet national teacher education and development needs. It is to be hoped that the envisaged national teacher education strategy being developed will draw together the various strands of teacher education and development work and create a mechanism for the principled development and management of such a framework.

Conclusion

When the new government took office in 1994, it was faced with a number of tasks in dealing with the legacy of a fragmented, segregated, bureaucratic, authoritarian, and inefficient system of teacher education:

- The segregated and fragmented governance of teacher education had to be resolved.
- The inefficiency and lack of quality of teacher education provision had to be addressed.
- The responsibility for curriculum had to be broadened and democratic participation in curriculum processes had to be increased.
- Provision had to be made more equitable, but at the same time new understandings of quality teacher education and development had to be built.

It is clear from the above discussion that considerable progress has been made with these tasks. The basis has been laid for an integrated and democratic system, and our curriculum policy reflects best practice internationally as well as being tailored to meet the needs of this country. Across the country, providers are developing programmes attuned to the new policy directions. However, there is still much work to be done to improve efficiency, system-wide quality assurance, educational planning, and management of the dispersed governance system. The imperative for future planning is to harness and deploy, in an imaginative and efficient way, the capacity and insight that is there.

The stories of the Wits FDE, told in the chapters that follow, illuminate aspects of the complex dynamic of a society and education system in transition: moving from a painful and complex past to a more hopeful, though equally complex, present and future.

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CHAPTER 3

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Researching teachers' take-up from a formal in-service professional development programme

Introduction

The challenges outlined in Chapter 1 of this book include the challenges of researching teachers' take-up from the Further Diploma in Education (FDE) programme at the University of the Witwatersrand (Wits). In this chapter we describe and discuss the methodology of the three-year research project. We focus on two broad methodological issues:

- What kind of knowledge claims can we make and what might be their status, given the methodology that was employed?
- If learner performance is an important indicator of teacher take-up and thus a component of accountability, how can this be established?

On the basis of our empirical experience, we argue that it is feasible to generalise about take-up and the effects of a teacher education programme from cross-case analysis through what Bassey (1999) calls "fuzzy generalisations". We raise concerns about one-off testing of learners and about what can be inferred from the results of such tests, and argue that there are more effective ways of relating learner performance to teacher education. Indeed, in the current South African educational context, it is highly problematic to infer a teacher's knowledge on the one hand, and the effects of a specific teacher education programme on the other, from learner test performance only.

We hope that through its practical detail our description of the development and implementation of the methodology employed in the FDE research project will serve as

a stimulus to further debate on teacher education research in South Africa. We begin with a description and discussion of the research methodology that evolved over the three years of the project. We then describe the kinds of challenges we faced as the research team conceptualised and implemented the research, and reflect on both its strengths and limitations.

Research methodology: development and implementation

As mentioned in Chapter 1, the aims of the overall research project were threefold:

- To investigate teachers' take-up from the FDE programme in mathematics, science and English language teaching and to investigate how this shaped the quality of their classroom practices
- To contribute to knowledge about formal in-service professional development (INSET)
- To inform the FDE programme's curriculum development through research

The research team set out to describe and analyse continuities and changes in practices both within and across the classrooms of some of the teachers over the three-year FDE programme. These continuities and changes were described and analysed in relation to the conditions in which they taught and still teach.

While the research has project evaluation elements to it, the methodology is more appropriately described as a practice-based (Lampert & Ball, 1998) case study of cases (Bassey, 1999). There are two elements to each of these methodological dimensions. The FDE programme itself is the overall case being studied. It is a case of formal, in-service professional development that we are using not only to improve our own practice as the practitioners in the programme, but also to contribute to policy and practice in the wider field of teacher professional development. The teachers we worked with constitute a collection of particular cases. They constitute a small sample of purposively selected mathematics, science and English language teachers in the FDE programme. The sample consisted of 11 mathematics teachers (six primary and five secondary); seven science teachers (three primary and four secondary) and six English teachers (three primary and three secondary) from four schools in Gauteng Province and six schools in the Northern Province. The selection of the 25 teachers is discussed in detail elsewhere (Adler, Lelliott & Slonimsky et al., 1997). It was made using the base-line data of all the FDE teachers enrolled for their first year of study and was based on the following:

- Areas in which large clusters of students resided (Gauteng and Northern Province)
- Schools in which there were two or more teachers enrolled in the programme, thus reflecting the situation recommended in the programme that students have learning partners
- Schools in which teachers in the programme have additional INSET support
- Proportional numbers of students studying in a particular subject area within the programme (e,g,, in 1996 mathematics had the highest number of students in the programme and this is reflected in the sample)

Our unit of study is the "contextualised teacher", or the "teacher-in-school". If take-up from the programme and the quality of classroom practices are to be understood, these need to be contextualised and personalised, and entail a description of what happens over time with *this* teacher in *these* kinds of circumstances, that is, a set of case studies.

However, given the goals of the FDE programme, the study also needed to enable the identification of patterns or trends across teachers and contexts, or a cross-case analysis (Yin, 1994). As Black & Atkin's report on innovation and change in mathematics, science and technology education in 23 OECD countries reveals, change in teaching is indeed very particular, but general and linked trends can and do nevertheless emerge (1996: 121). The overall research project therefore focused on a relatively small number of teachers in the programme – small enough to enable us to look in depth at each teacher, and large enough for us to be able to identify some patterns and trends across teachers.

There are also two dimensions to the practice base of the study. At one level, the study was embedded in the practices of the FDE as a mixed-mode delivery, professional development programme. It was carried out by a team of researchers, most of who were practitioners in the programme. The research was also carried out in classrooms, with classroom practitioners. The goals here were to learn from teachers' classroom practice about their practice, but with the focus on the relationship between their practice and our professional development practice. The significance of practice-based research for the project and the team was that it was our intention from the outset to learn about our practices and the teachers' practices by investigating and theorising practice (Lampert & Ball, 1998). Moreover, given the specificity of the teacher education context in South Africa, it was our intention to understand teachers' practices, and therefore in-service professional development, through investigating and theorising practice in the local school settings in all their complexity and diversity.

In relation to classroom practice, the key question that framed the overall study was as follows:

> How are teaching and learning affected by resources (material, time and socio-cultural resources), by teachers' subject knowledge, by teachers' pedagogic knowledge and by teachers' reflective capabilities?

Data were gathered from the following sources: school inventories, classroom observation schedules supplemented by field notes; learner productions such as class work and homework tasks and projects; tests administered to learners; videotapes of some lessons; audio-taped interviews with teachers and school principals; questionnaires and narratives completed by the teachers. (See Addenda 1, 2 and 3 for examples of a school inventory questionnaire, classroom observation schedules, learners' work observation schedule and interview questions.) This collection of data constituted our attempt to capture teaching and learning in their dynamic complexity, and in relation to the contextualised teacher.

The researchers worked in subject teams in selected schools in the Northern Province and Gauteng for one week in each of the three years (1996–1998) of the project, with the data collected in 1996 serving as the base-line. Adler (1998) discusses two metho-

dological issues; timing and range in "quality" among the teachers, in relation to establishing this base-line.

Establishing a base-line

Because students in the programme received introductory booklets on enrolment and were thus positioned in relation to programme goals before data gathering began, they could be regarded as "already influenced". There is no solution to this dilemma if the base-line study is to include students from within a programme. It is only possible to know who the students are once they have enrolled. Even if all the students in a programme were to be part of its base-line study, they could still only be identified after enrolment. Thus it was necessary to acknowledge the fact that the sample of teachers in our study had had some exposure to the programme before data were collected.

This opens for critical review the notion that a base-line study for a teacher development programme needs somehow to be neutral, that is devoid of any influence related to it. Following on from this notion, one possibility for a base-line for the Wits FDE might have been similar teachers not involved in the programme. This possibility was not explored. Working with a social theory of mind where learning is both personal (i.e. intentionality plays a part) and contextual, and with an understanding of the complexity of teaching and of curriculum as contextualised social process, a group of teachers who had not actively sought out further study or INSET would not necessarily have been a neutral comparison group. In fact, such a comparison group might well have served to exaggerate the impact of the INSET programme. Instead we deemed it necessary to work with and follow up particular FDE teachers in their particular contexts over the course. This meant that we had to allow for the fact that the teachers, at the start of their studies, were already positioned, and positively so, in relation to the programme.

In addition to the sample having been selected after enrolment, the school timetable and mid-year examinations prevented us from visiting the teachers in their schools until the teachers had been in the programme for four months. This situation resulted in the further shifting of our base-line data from an early starting point to a point when first courses in the programme were well under way.

With reference to teacher "quality", the purposive selection of the sample did not attempt to include a range of "good" or "poor" teachers either with respect to their reported professional experience or their academic background. The reason for this was that the base-line study was not an end in itself, but a crucial first phase in any evaluation or analysis of an FDE programme. Moreover, at the time of the selection of the sample, the researchers had limited personal knowledge of the teachers and could have relied only on the self-reports on their enrolment forms. One effect of this blind selection was that the sample did not necessarily include a full range of those teachers in the programme who later came to be identified as the most capable, top academic performers and those who struggled to meet its requirements.

An alternative to selective sampling could have been to include *all* the teachers in the programme in the base-line study, with a later selection of a smaller sample for detailed follow-up. With 140 teachers in the programme, possibilities for qualitative data gathering and analysis of classroom practices would then have been significantly reduced. It is thus difficult to conceive how we could have secured a range in the quality of teachers.

Developing descriptions of practice over time

The main aim of both the data collection and the analysis in the base-line study and in the first year of follow-up in 1997 was "thick description". The team attempted to develop adequate portraits of each teacher, capturing as fully as possible the texture of the teacher's practice. Each portrait was similarly structured, to facilitate cross-case analysis and the identification of patterns of take-up, in the first instance within and across the three subject areas, and then across the whole set of cases. In any reporting on the research project, in this book and elsewhere, we have avoided naming either schools or teachers in order to preserve their anonymity. Each of the teachers in the sample was assigned a number by the researchers who analysed data on particular aspects of the project (see, for example, Chapters 6 and 7).

Analysis of the base-line data collected in 1996 led to minor changes to the classroom observation schedules, the pupils' written work observation schedule, and the interview guidelines for 1997–98. (See Addenda 1–3.) For example, learners' language production changed from being a specific focus of interest in the English class only to being of interest across all the subjects. This was possibly a result of greater understanding of similarities and differences in classroom practices across the three subject areas as each research team member became more informed about practices in the other subject areas.

An ongoing tension for data collection was the difficulty of securing adequate and continuous time with each teacher in his or her classroom. For secondary teachers, the tension extended to obtaining adequate continuous time across the grades in which the teacher was teaching. In 1996–97 the researchers observed selected lessons during their visits to a teacher's classroom, following at least one class over three consecutive lessons. In 1998, where possible[1], we remained with each teacher throughout the school day for two or three consecutive days in order to be able to observe and interact with the teacher in the continuity of his or her practice.

Thematic analysis of the data

Analysis of the data collected in 1998 also began with the development of teacher portraits, now extended to provide a portrait of the teacher over the three years of the study. However, through discussion and through following the research process over the three years, we had begun to identify key issues that pertained to all three subject areas. These were issues that we believed to be central to the FDE programme, to teacher development and curriculum change in South Africa and to in-service professional development more widely. We thus moved away from subject-focused teams and subject-based cross-case analyses, and proceeded to analyse the data obtained over the three years and captured in the 1998 portraits, according to the following key themes:

- The nature, availability and use of material and cultural resources as a function of programme take-up and the context of teachers' work (see Chapter 4)

[1] In two of the Northern Province schools, mathematics and science teachers were away at NGO-organised and Departmental approved workshops for two days – including school time – during the research week in that area.

- The challenge of language-in-education policy and practice, particularly code-switching as a teaching and learning resource across contexts where the English language infrastructure varies (see Chapter 5)
- Teachers' take-up of the forms and substance of learner-centred practice (see Chapter 6)
- How in-service professional development plays a role in teachers becoming reflective practitioners (see Chapter 7)
- The relationship between teachers' take-up of subject knowledge and changes in their classroom practice (see Chapter 8)

In the remainder of this chapter we reflect on the development and implementation of the research methodology behind these emergent themes.

Strengths and limitations in the methodology

Some of the challenges faced by the research team have already been mentioned. Each of these and the additional challenges described briefly below had an impact on the conceptualisation of the research project and on the processes of data collection and analysis. We include this description to bring some of the tensions and contradictions that are inevitably part of the social practice of research to the surface. In our view, such tensions and contradictions too often remain a matter of private trauma instead of becoming a matter of public debate from which other researchers may both learn and take comfort.

Much of the literature on research in teacher education has been developed in first-world contexts (Elliott, 1999). In 1996, we found little previous research to guide the design of a project that was situated somewhere between formal research and project evaluation, and that was to take place in conditions of educational and economic "underdevelopment" and instability in South Africa. Local conditions impacted on the data collection process. Contact with schools and teachers in rural areas was difficult – some had no telephone or fax, and mail was not always reliable. Visits to such schools had to be arranged months in advance, and were difficult to rearrange when we were faced with unexpected occurrences, for example the nation-wide strike we encountered during our 1997 data-gathering phase.

In addition, the research was undertaken at a time of social and educational transformation in South Africa. Over the three years of the project the following were published: the National Teacher Education Audit (1996); Green and White papers on Education and Training; on Further Education; on Higher Education (1996; 1997; 1998); the South African Schools Act (1996); the Education Labour Relations Act; Norms and Standards for Teacher Education (1997/98); policy and implementation documents in regard to language-in-education (1997/98), to the establishment of school governing bodies (1997) and to Curriculum 2005 (launched in March 1997). It was also a time of much change in the staff complement at many schools, with some teachers taking voluntary severance packages, some being redeployed and some being retrenched. This changing educational landscape impacted on different schools in different ways. For example, in two of the four Gauteng schools, the voluntary severance package (VSP) and redeployment activity

in 1997 impacted very negatively on the functioning of the schools, and hence the involvement of the teachers in both the programme and their teaching. With the unit of study being the "teacher-in-context", we collected data about the school and conditions and changes in the wider context. Nevertheless, our major focus was observation of teaching and learning processes. We had to work out how local conditions and the changing landscape affected classroom practice and take-up from the programme.

The project was ambitious in scope, given that the research was undertaken with primary and secondary teachers of three subjects; English language, mathematics and science; and in urban and rural contexts. This spread reflected the range of teachers who had joined the FDE programme in its first year. We hoped to be able to capture trends in take-up across contexts, and thus set out to work with the possibilities of both differences and similarities across the teachers. We thus needed in-depth accounts of each teacher as well as a common framework for observation and interviews. It was sometimes difficult for team members across the subjects to accommodate one another's interests and concerns (e.g., the learning of English and the learning of a more content-focused subject do not always suggest common categories of practice). It was also difficult to work with the diverse contexts of the teachers in the study.

At the same time, working across three subjects and across urban and rural contexts was a considerable strength of the project. In relation to subject expertise, we were all provided with opportunities for interrogating our subject-specific knowledge and practice from the outside. We engaged, for instance, with the meaning of the concept of "pedagogical content knowledge" from the perspective of mathematics and science as content subjects, and how such conceptualisation was similar to or different from the perspective of English as a language. What counts as "content" in the context of a language as a subject? We made an effort to enter one another's discourses, and construct a common language without detracting from the integrity of each subject. In terms of diverse contexts, working in both urban and rural contexts has been particularly important, as these are so different not only in socio-economic terms, but also, crucially, in English language infrastructural terms. We understood socio-economic diversity as one of the diverse contexts in which teachers coming into the programme would work, and hence explored the issue of resources. We also understood the multilingual nature of South African classrooms. However, we had not fully grasped the significance of the language context in rural schools for a programme that emphasised, as one of its major goals, the importance of talking to learn, and of learning through interpersonal communication. Being able to work with teachers over time in diverse contexts has enabled us to see just how complex and different the teaching-learning task is when English as a target language has such power, and the English language infrastructure in many rural primary and secondary schools is not supportive of the kind of language-in-education policy currently being advocated. The language practices issues are discussed in detail in Chapter 5.

We were further ambitious in scope in that we attempted to observe teaching and learning in numerous complex dimensions, including what resources were available and how these were used, what language practices were dominant and how knowledge was approached and mediated. The spread has enabled us to capture some of the complexity of classroom practice, and to understand the diversity of take-up from the programme and some of the reasons for it. At the same time, it has been difficult to "hold" the

teacher-in-context (rural/urban; primary/secondary; supportive/unsupportive school leadership, etc.) and do justice to all the interrelated dimensions of classroom practice.

Both in conceptualising the research and then analysing the data, we could, with hindsight, identify two competing interests in our research approach. One was to approach the research process from the perspective of practice, to learn about the practice of teaching in a grounded way and interpret take-up from the perspective of the teacher-in-context. The other was to explore key aspects of the FDE programme. We thus worked with both structured data, such as structured classroom observation schedules developed from the perspective of the FDE programme, and with unstructured observational data, like classroom videotapes and narratives of observed lessons. In the final year, interviews with the teachers, in contrast to their semi-structured form in 1996 and 1997, were in the form of ongoing conversations and were far less structured.

As a result of these competing interests, we did not set out with a clearly articulated theoretical framework beyond a broad agreement on the notion of teaching as a complex social practice, and a function of personal history and social context. In addition to our ambivalence about a directed study, it was not easy to establish an agreed and clearly defined framework of conceptual categories of exploration and analysis across a large and diverse team. The loose frame from the outset was, nevertheless, enabling as well as constraining. Establishing analytic categories from qualitative data is, within any study, a time-consuming task. And time was never on the side of the research process. At the same time, the loose frame, and the resultant scope to "listen" to the ground enabled us to embrace and engage, if only partially, with unanticipated issues that emerged through the study. One such issue was time.

In addition to the diversity, instability and complexity of the context, time emerged through the study as a significant factor in both the research process and in interpreting school life across very diverse conditions (Adler et al., 1999). Firstly, formal schooling is premised on specific time-space relations, notions of continuity in time and the structuring of time through timetables. Such relations took particular forms in rural contexts where, for example, transport to school was erratic, and where family needs (like assisting with cattle dipping on Friday mornings) conflicted with school attendance. The issue of time in school life is seriously underexamined, particularly in our local diverse contexts. As we had not anticipated time as an issue, we did not collect sufficient data to take the issue further in this study.

A second dimension of time for the research project was the current pressure from within the university and from research-funding organisations (like the National Research Foundation) for research "capacity building". While all members of the research team brought expertise as teachers and teacher educators to the project, the majority had limited research experience. This resulted in more time being needed for the planning and implementation of the project than would probably have been the case with a more experienced research team. It also resulted in an increased workload for the team leader.

Thirdly, as intimated above, most members of the research team were also participants in the development of the FDE programme. There were clear benefits to this dual role to both programme development and research development. But there were also serious time constraints. The attendant demands of curriculum development and implementation in a new programme placed the FDE staff under enormous time pressure

throughout 1996 and 1997, thereby reducing the possibilities for focused research work and for spending frequent and extended periods of time in the schools, and limiting our data collection to extracts from the teaching year. In addition, constraints like strike action during planned visits created further time pressures on researchers in gathering the data.

In addition to the time factor, the dual roles of researcher and programme developer of the team members positioned as "insiders" raised questions about the research process and the nature of the data collected. For example, when researchers who were also course lecturers interviewed the teachers, would the teachers be inclined to use the discourse of the programme in order to display their engagement with it? We were able to deal with this, at least in part, by conducting interviews after we had observed the teachers in their classrooms. We were able to probe what teachers said in relation to our observations. In addition, we found that as the teachers and researchers grew to know and understand each other over the course of the programme, most of the interviews in the final year became ongoing conversations rather than formal interviews.

In sum, we faced considerable challenges as the research unfolded. Practical constraints continually raised concerns about the potential for mismatch between our epistemological and methodological assumptions, our research intentions and goals, and on-the-ground realities. It is beyond the scope of this chapter to deal with all the methodological issues that we faced. We return now to the challenges of accountability raised in the introduction to this chapter, and to interrogate firstly the notion of learner testing as an indicator of the impact of a teacher education programme, and secondly the relationship between the methodology of our practice-based case study of cases and the status of the knowledge claims which it is feasible for us to make.

Learner "performance" as an indicator of inset success

We would like to start the discussion here with the questions: what does learner performance on "carefully designed tasks" (Taylor & Vinjevold, 1999: 66) tell us? About the learner? About the teacher? About the curriculum? About national standards? Learner performance on carefully designed tasks can tell us about any or all of these … though we would add the proviso, "depending". It depends on the nature of the tasks set, when the assessment occurs, where the assessment occurs and how often. These assertions are not new. As Säljö & Wyndhamn's (1993) study reveals, task "performance" is a function of the task and the learner in a particular setting at a particular time. There are thus significant issues in reading learner competence from single tests or tasks without significant attention to context, let alone moving from learner performance to the teacher's competence.

Our issue is even more particular. We take issue with the implications in the "accountability" context of in-service professional development described earlier, that learner performance is easily measured, and that it can serve as a clear indicator of teacher quality (and particularly the teacher's knowledge base) in the first instance, and then in-service programme quality in the second. We will describe our experiences with learner assessment and performance as part of our research project, to point out just how problematic these inferences are in the current South African context.

Learner performance is typically accessed through some form of testing. While it was the original intention of the study to test learners, the complexities of doing this were completely underestimated. We were open to looking at learner performance through testing as one possible indicator of programme/INSET impact. But we kept coming back to whether a particular test or set of tests would be an appropriate or adequate means of assessing learners – and which learners – over three years, and moreover, in such a way that the impact of the FDE programme on the quality of a particular teacher's practice could be inferred. For example, tests with the same learners at two different times in the year should show learning gains, but we could not see how to legitimately establish any kind of causality between learner gains and their teacher's participation in an in-service programme. More appropriate would be either comparative testing of programme teachers' classes with other similar classes in their schools, or with similar classes in different schools where teachers were not involved in the programme. But we did not believe that we could control for intervening variables, nor that such an endeavour was conceivable. In addition, any of these tests meant the construction of new items in order to assess knowledge and skills valued in the programme. But the reliability and validity of any new test could not be accomplished within the time frame of the project.

In the face of these methodological concerns and practical obstacles, we considered the use of existing standardised tests such as tests that had been constructed by the Human Sciences Research Council (HSRC). The tests we received from the HSRC had been constructed prior to 1994. While these might have been illuminating, they would not have been able to capture some of the innovations in relation to Science, Mathematics and English Language teaching built into the project, for example the strengthening of communication in English teaching, practical experimental work in science and elaboration of mathematical processes beyond set procedures. Moreover, these tests, particularly the English and some of the Science tests, were culturally inappropriate, given their construction in the apartheid era and hence their reference to the norms of "white" South Africa.

Our difficulties in designing an effective means for studying learner performance over a period of time as an indicator of learning gains does not mean this is not an important problem to overcome. As Jansen (1996) argues, learning gains must be a primary goal of in-service professional development activity. Black & Atkin (1996) also discuss the limitations in evaluations of educational innovations when information on student learning is lacking. In contrast to the advocacy for testing as the indicator of student learning, they acknowledge the difficulties involved. In discussing the evaluation reports they received from the 23 countries in their study, they point out:

> The fact remains that some types of evidence are lacking. More data about appropriate student assessments would have added to the authority of the reports; but we can see that producing such data would have required the researchers to construct and test instruments to assess new aims. That would have been a formidable task indeed.
>
> (Black & Atkin, 1996: 197)

While the FDE research team was understandably unable to construct new tests for the base-line study, or use existing standardised tests, we did not abandon assessment of learner performance as an additional indicator of teaching and learning. Each teacher

observed had a set of his or her classwork books examined to ascertain the kind of written work that was being covered by learners in their lessons – a coverage that could not be discerned from two or three lesson observations. Learner books are not direct indicators of learner performance. They nevertheless may reflect the kind of mathematics, science and English language valued by the teachers, through inscription and attempts at practice and mastery. These were added to observations of mediated content during lessons, and in 1996, the instrument used and the processes adopted were varyingly successful in illuminating learner performance.

In the school visits in the second and third phases of the research (during 1997 and 1998), a more detailed and more successful "pupils' written work" schedule was constructed and used to illuminate learner performance in the subject in all their written work accumulated between February and August. Classwork books, homework books, test books, exam papers, test papers and scripts of nine learners (three good, three average and three weak) were examined and recorded in the schedule. The class selected for this was the one with which two consecutive lessons were observed and with which the videotaping was done. In particular, the observations here focused on content coverage throughout the year, and the nature and form of written work, assessments and feedback given to learners.

In addition, some testing was conducted in Grade 7, 8 and 9 classes in each of the three subjects. In 1997 the tests used were constructed and conducted by members of the research team, and were understood as investigational, both in terms of how they were used and what they revealed. Time constraints prevented the piloting of these tests in order to develop greater confidence in their validity. However, as is reflected below, the tests served to support and add to the study as a whole, and to the observational data collected and analysed.

In 1998, we were able to access Grade 7 mathematics and English language tests developed as part of a project geared specifically towards the development of more appropriately normed tests than those available to us through the HSRC. We then built on our science and Grade 9 tests from 1997, and conducted learner tests in classrooms where teachers in the study were teaching any of the three subjects at either Grade 7 or 9 level. Grade 7 was chosen because this was the one level where a number of the teachers had remained teaching throughout the three years of the project. The choice of Grade 9 was arbitrary.

We learned several lessons from this testing activity – lessons that we describe as "good, bad and ugly". Testing some learners revealed to us how this additional data could provide for the triangulation of data within case studies (Hitchcock & Hughes, 1995: 323). The test performance of learners in different teachers' classrooms by and large confirmed, and thus strengthened, the accounts of teaching and learning practices analysed and built into the teacher portraits. In instances where there was a mismatch between our independent test assessments and what we observed in learners' written texts, including their in-school testing, we were able to explore these with the teacher and develop insights to enrich the overall portrait of teaching and learning. Testing learners as part of researching teacher development and INSET effects was illuminating. This is the "good" side of such testing.

The "bad" side of the testing for us was that in general our independent test results confirmed South African results from the Third International Mathematics and Science

Study (TIMSS) with regard to levels of performance in mathematics and science across our schools. Our results were not at odds with test results obtained by most of the teachers themselves in their own testing. The "bad news" is that this situation persists. Our broader data for each teacher assisted us in seeing that learner performance was not in any simplistic way a reflection on the teacher's knowledge. Some of the teachers in the study were, for example, mathematically and pedagogically competent. One example here will suffice. One of the mathematics teachers working at the junior secondary level, a teacher who demonstrated extraordinary take-up from the FDE programme, worked in an overcrowded, impoverished context. Her learners arrived at her Grade 8, 9 and 10 classes considerably underprepared for the levels at which she was expected to teach and assess them. No wonder then that on her own tests, let alone the independent tests we administered, performance was extremely poor. This learner performance tells us something about the state of the nation – but to infer teacher quality and INSET programme quality from such "results" is extremely problematic. And we have not yet got to the "ugly"!

The standardised tests we used were problematic. Some of the mathematics items were ambiguous, and some of the English language items were culturally inappropriate. This raised serious questions about interpreting learner competence from performance on tests that included such items. For some of the learners, where a reform curriculum was in place, the form of the test items was unfamiliar (as was the case with the multiple-choice items in TIMSS for South African learner participants). The FDE researchers were present when learners undertook the tests, and noted occasions when a learner's inability to respond to an item was due to its unfamiliarity alone. A simple prompt by the researcher enabled a correct response by the learner. Crude analysis of test performance, in situations where the form is unfamiliar, may misrepresent learner knowledge.

Testing is not simply a matter of "carefully designed tasks" but crucially a function of the testing context, including learners' familiarity with the tasks. Test validity is a serious research endeavour. Our concern, as a result of our experience, is not that testing should not be done, but that in the first instance the appropriate research and development be undertaken in the development of instruments appropriate to various processes of research. In their recent review of such research in the USA, Wilson & Berne discuss the difficulties of linking professional development to student achievement:

> Of course, the capacity of researchers to tie measures of teacher learning to measures of student learning is also challenged by the lack of robust and standardised measures of student learning in many fields (1999: 197).

We would like to add, however, that testing is by no means the only indicator of learning gains. Our experience suggests that close analysis of school learner written material is possibly more illuminating than one-off tests in the context of teacher education research. Close examination of school learners' classwork and test books, alongside the tests and examinations that teachers set and their marksheets, particularly illuminated the depth and breadth of coverage by the teacher and the kinds of knowledge forms that were inscribed by learners, hence indicating what was valued as knowledge within the school setting. We did not need independent tests, over and above such analysis, to reveal to us key challenges for teachers and hence the FDE programme. Their written

texts revealed learners' limited exposure to knowledge, and how teachers, for a range of reasons, were not covering required areas of learning, nor enabling learners to engage with knowledge beyond superficial levels of recall and repetition. We noted difficulties with selection, sequencing and grading of tasks on the part of most of the teachers, and this was also evidenced in learner written texts. This observation not only told us about teaching practices but, more significantly for the programme, pointed to one of its omissions: the FDE programme did not pay explicit attention to selection, sequencing and grading of tasks, that is development. The key issue of development is noted in Adler et al. (1999).

In contrast to the analysis of learners' written work over the years, which revealed a rich description, learner test performance on our independent tests revealed, overall, poor performance but little else. We would not have been able to discern the substance of what appeared to be poor learning gains. More bluntly, test performance on its own is far too limiting to infer anything substantive about teaching or INSET. Learner productions, in the form of classwork and test books, verbal and written productions in class and displays on the walls of the classroom, are far more revealing of learner performance for the purpose of making appropriate inferences about the teacher and teaching quality on the one hand, and INSET programme quality on the other.

Teacher education research methodologies and the status of resulting knowledge claims

We have described the Wits FDE research methodology as a practice-based case study of cases. Bassey defines a case study as a "study of singularity conducted in natural settings" (1999: 22). The Wits FDE programme is the overall case, and the selected teachers in the research project are cases within the study. We discussed how and why it was necessary to work in depth with a few teachers – qualitative, multifaceted observation was required if we were to do any justice to the complexity of teaching as a social practice. How then, on the basis of diverse case studies, even with cross-case analysis, do we make claims about teacher take-up from the Wits FDE programme that extend beyond the specific research teachers, and hence to overall programme effects? And how do we infer from a particular case of formal in-service professional development conclusions relevant to the wider field of in-service in general? How do we meet demands for accountability through case study?

In an earlier book on educational research, Bassey (1995) distinguishes two kinds of empirical study in educational research: the search for generalisations (requiring investigation of large populations through carefully selected samples), and the study of singularities (case studies). The implication here is that case studies cannot lead to generalisations, and thus that they are limited in their use in educational policy and planning. Bassey has taken his investigation into small-scale qualitative research, and particularly case studies, further, and in his more recent work (1999) argues that it is possible to develop what he describes as "fuzzy generalisations" from carefully conducted case studies. He uses the term "fuzzy generalisation" for a statement that makes no absolute claim to knowledge but hedges its claim with uncertainties. It arises when an empirical finding from a case study, such as *In this case it has been found that,* is turned into a qualified general statement, such as *In some cases it may be found that* or *If we do x rather than y*

then teachers may learn more. Bassey suggests that if educational researchers disseminate their findings in the form of fuzzy generalisations they are inviting teachers and education policy makers to enter into a discourse with these generalisations. Entry into such discourse is likely to be facilitated by access to an "audit trail" – the evidence in support of the fuzzy generalisations which the case study has produced.

Bassey's argument for "fuzzy generalisations", and even weaker claims in the form of "fuzzy propositions", arises out of his extensive educational research experience, where he has seen numerous studies of quality not impacting on teachers and policy makers precisely because findings are deemed too specific. Our findings in the FDE research project, and the status of the related claims we believe we can and should make, about the FDE programme as a whole and INSET practice in South Africa, resonate with Bassey's notion of "fuzzy generalisations". Indeed, "fuzzy generalisations" appear to be constitutive and reflective of other teacher education research.

In their review of "highly regarded" published research on "teacher acquisition of professional knowledge" in the USA, Wilson & Berne (1999: 194) identify a number of common themes. Two are particularly pertinent here. Firstly, common to the projects studied was the goal of engaging teachers as learners in their subject (e.g. mathematics) at a level suitable to their own learning. Wilson & Berne summarise:

> While it is clear that the knowledge teachers acquire in these projects could and should be helpful to them, it is not clear what the relationship is between that more general knowledge and the specific curricula or students that the participants encounter in their practice. However, it is important to note that Kennedy (1998), in an analysis of in-service programs, found that programs that focused on subject matter and knowledge of students *were likely to* "have a greater impact on student learning than are programs that focus on teaching behaviours". This *suggests that* current professional development, is, indeed, on the right track.
>
> (1999: 194–5, emphasis added)

Secondly, Wilson & Berne identify methodological themes, including a concern with the labour intensity entailed in the qualitative nature of the research (hence expensive in human and related financial terms from our point of view), and the substantial commitment it demands in terms of examining teacher talk, and classroom practices. They continue to point out that "[E]ach research project struggles with ways *to document* teacher knowledge" (1999: 195, emphasis added).

Because of the complexity of classroom practice and the qualitative case study nature of much of the research, documenting and hence evidencing teacher professional development is difficult. Claims made ("… programs … were likely to …") are tentative, or in Bassey's (1999) terms, "fuzzy generalisations".

To return to our specific research, we will draw on our analysis of teachers' take-up of language practices (see Chapter 5) to illustrate how we documented, evidenced, and then drew out recommendations at the level of the FDE programme, and generalisations in relation to INSET policy in South Africa, and INSET research and development more widely.

We documented teachers' and learners' code-switching practices and the production and reception of expressive and discourse-specific language over the three years of

study. We used structured classroom observation schedules, unstructured videotapes of lessons, structured observation of learners' written texts and teacher interviews. Our most significant observations were the following:

- We found increased use of code-switching by teachers and learners in most classrooms, in particular increased drawing on learners' main language(s) as a resource.
- We learned from the teachers that their code-switching practices are intentional but dilemma-filled, particularly in the face of the dominance of English in the South African context.
- We also found widespread take-up by most teachers of forms such as group work, and hence increased possibilities of learning from talk (i.e. of learners' using language as a social thinking tool).
- However, most of the teachers did not complement or support this shift to learning from talk with strategies for learning to talk, such as learning subject-specific formal or educated discourses.
- We also found that while the above were general patterns across all the teachers, they concealed important differences between teachers in different contexts, levels and subjects.
- For example, because their primary goals differ, there was more code-switching by mathematics and science teachers than English language teachers. There was less code-switching and more focus on using and modelling English in primary than secondary mathematics and science classes, as primary teachers carry out dual functions of teaching the subject, and developing learners' proficiency in English. This dual role and emphasis on English was complicated further in rural schools, that is in schools with limited English language infrastructure.

These "findings" from our case study of cases led us to the following recommendation for the FDE programme, and fuzzy generalisations for INSET policy and practice. The intent here is to inform ongoing curriculum review in the FDE programme on the one hand, and to invite teachers and policy makers to "enter into a discourse" (Bassey, 1999: 52) with these generalisations on the other.

FDE programme

At the level of the programme it was critical that we pay more explicit attention to possible journeys from exploratory and informal talk in the main language towards discourse-specific talk in English and formal writing in English.

Educational policy in South Africa

At the level of policy, findings from our research suggest that some of the dominant "messages" in current curriculum documents may need to be reviewed. For example, one of these messages in Curriculum 2005 is that group work is "good" as it encourages exploratory talk and co-operative learning. The issue of how teachers and learners are to navigate the journey from informal spoken language (in the learners' main and/or additional languages) to formal, written subject discourse in English is not addressed.

INSET research and development

> What we have shown from our study of FDE teachers in multilingual contexts is that firstly, take up of these practices was evident across contexts, but also differed across contexts … This suggests the need for more serious engagement in teacher education with the possibilities of and constraints on what are typically presented as panaceas for "good practice" … The different English language infrastructures, levels and subjects in which teachers work appear to be significant for shaping INSET possibilities and constraints. We suggest that we need to disaggregate schools and classrooms along these three different axes and tailor programmes according[ly] …
>
> (See Setati et al., Chapter 5)

Conclusion

The members of the FDE research team have indeed learned a great deal about research and practice in this field. In this chapter, we have attempted to describe and discuss our research practice in ways that we believe will contribute to the development of theory, practice and research, in their interrelationship, in teacher education in South Africa. To do so we investigated two key issues in teacher education research:

- The inferences about effects of teacher education programmes from learning gains evidenced through learner tests
- The status of knowledge claims made through INSET research

In addition, we offer our insights into these particular research challenges and problems in the conditions that distinguish South African teacher education from other teacher education, as a way of expanding the field more broadly.

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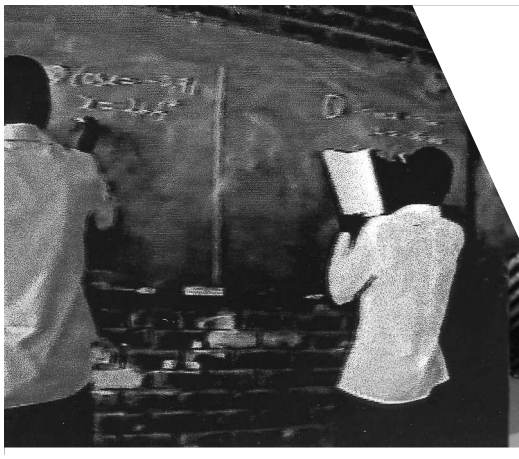

CHAPTER 4

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Availability and use of resources: a dual challenge for teacher education

Introduction

This chapter focuses on the issue of resource availability and use in school classrooms and possible consequences for equity. As discussed in Chapter 1, in the juxtaposition of resources and equity lies an acknowledgement that there is always a tension between *development* – moving ahead with new ideas and practices in school subjects such as English language, mathematics and science (these subjects being the focus of the research project), and *democracy* – access to education, and participation and success for all learners.

For example, across quite diverse "movements" in current mathematics education practice it is possible to discern a shared goal: to move the learning and teaching of Mathematics in school beyond "mathematics as procedures" and "pedagogy as teacher dominated". Motivations behind the shared goal, however, differ in significant ways: from, on the one hand, the learning of deep mathematical ideas and the development of flexible problem-solvers, on the other, to social justice goals realised by all citizens who are able to engage critically and collectively with the mathematical formatting of our world and its social and political consequences, and to the emancipation of colonised minds through ethnomathematical activity. Related programmes likewise emphasise different kinds of mathematical activity, ranging from an emphasis on mathematical

processes and apprenticeship into the activity of the mathematician, to a focus on mathematical problem solving as a tool for critical action in the world.

In any mathematics, science or language programme, dominant functional resources in teaching and learning, like the chalkboard, learners' classwork books, prescribed textbooks and six or seven half-hour lessons per week, come into question. In themselves, they no longer suffice. Teachers, as reflective or critical practitioners, draw on a range of additional resources (material and sociocultural) to create a rich mathematical, scientific, linguistic and social environment for their learners. Shifting practices, as advocated for example by general curriculum reform in the USA and UK, by critical mathematics education (e.g. Skovsmose, 1994), ethnomathematics (e.g. Gerdes, 1996), and realistic mathematics education (e.g. De Lange, 1996), by constructivism in science education (Fosnot, 1996) and by new approaches to literacy in language education (New London Group, 1996; Stein, 2000; Janks, 2000) inevitably entail resources for, and a re-sourcing of, practices. The re-sourcing of practices and the resources for practice involve the teachers themselves, and those materials and ideas from which they construct problems, tasks and activity. This re-sourcing also occurs at the level of their learners, and includes the learners' access to a range of resources for engaging with such tasks. It is our contention that, ironically, even those movements with an explicit social justice agenda have not paid sufficient *explicit* attention to the assumptions they make about resource availability and the re-sourcing possibilities across contexts.

The subtext of these provocative and somewhat sweeping introductory statements is to throw into sharp relief how, in South Africa, as surely in other countries where poverty circumscribes the lives of the majority, the availability and use of educational resources can never be taken for granted; educational resources are not only seriously limited, but also unequally distributed. Differential distribution of material and human resources in school education is highly visible across South African schools. Apartheid's legacy of gross disparities across class, race and region is discussed in Chapter 2. The relative wealth of schools in historically white middle-class suburbs compared with impoverished schools in black townships, in rural areas and in the increasing spread of informal settlements is well known. The Schools Register of Needs (Bot, 1997) revealed that a staggering 17% of all schools in South Africa lacked basic physical infrastructure. There was serious overcrowding in some of these schools, with classes of up to 100 learners, and in 23% of all schools there was neither running water nor any toilet facilities in the school. A survey of the physical and material infrastructure and of human resources in ten schools was undertaken in each of the three years of the FDE research project (see Chapters 1 and 3 for details of this project). Tables 4.1 and 4.2 summarise the data gathered at the ten schools in 1997. Schools 1 to 4 are in Gauteng and School 8 is in an urban area in the Northern Province. The remaining schools are in rural contexts in the Northern Province. While all are underresourced in various ways, those in rural contexts have significantly fewer physical, material and human resources than those in urban contexts.

In schools with limited infrastructure there is not only little to draw on for learning and teaching, but conditions actively detract from the possibilities for focused attention on learning and teaching. A central educational challenge in South Africa, alongside the implementation of a new curriculum, is thus the provisioning and (re)distribution of human and material resources for learning and teaching in schools.

Table 4.1 Physical and material infrastructure

	Gauteng				Northern Province					
SCHOOLS	**School 1**	**School 2**	**School 3**	**School 4**	**School 5**	**School 6**	**School 7**	**School 8**	**School 9**	**School 10**
Electricity	Y	Y	Y	Y	O – some	Y – disrepair	N	Y	N	Y
Ablution Staff	O – male toilet not working	Y	Y	Y	Y	Y	O – 4 toilets at new school for all learners and staff to share	Y	O – portable unit	O – pit
Students	Y	Y	Y	Y	Y	Y – if no water go to bush		Y	N	N
Phone	Y	Y	N	Y	N	Y	N	Y	N	O – doesn't always work
Security fence	Y	Y	Y	O – in disrepair	Y	O – in disrepair	N	N	N	Y – new
Copier	Y – new	Y	Y	O – broken	N	N	N	N	N	N
Windows	Y	Y	O – broken	O – some broken	O – few broken	O – some broken	O – at new N – at old	O	Y	O – broken
Furniture	O – not enough	Y	Y	O – not enough	Y	Y	O – not enough	O – not enough	O – shortages	Y
Libraries	Y – classroom used as library – old books	Y	O – not equipped	Y	Y	Y – limited stock	N	N	N	N
Laboratory	N	Y	Y	O – in disrepair	N	Y	N	N	N	N
Staff room	O – principal's office used as staff room	Y	Y	Y	N	Y	O – classroom	N	O – class converted, not enough room	N
Textbooks	O – old	Y – shortages	O – outdated syllabus	Y	Y	Y – arrived July	O – not enough	Y	Y	Y
Charts/Posters	Y	N	N	N	Y	N – not noticed	N	O – not enough	Y	O – not enough

Table 4.1 Continued

	Gauteng				Northern Province					
SCHOOLS	**School 1**	**School 2**	**School 3**	**School 4**	**School 5**	**School 6**	**School 7**	**School 8**	**School 9**	**School 10**
OHPs	Y – one for whole school	Y – one	Y – one	O – not enough	N	Y – one	N	Y – one	N	N
Hall/ Auditorium	Y – partitioned classes	Y – double class	N	Y	N	N	N	N	Y	N
Specialist rooms	Y – workshop without equipment	N	Y – 2 Home economics rooms	N	N	N	N	Y – Woodwork, technical drawing	N	N
Sports fields	N	N	N	Y	N	O – shared with other schools	N	N	N	N
Secretary	N	Y	Y – one	Y	N	Y – one	N	N	N	N
Computers										
Administration	N	N	Y	N	N	+ 3 admin computers	N	N	N – typewriter	N – typewriter
Learners	N	Y	N	Y	N	N	N	N	N	
Community aid	Y – feeding scheme	N	Y – school fees	N	N	N	N	Y – assisted with brick paving	Y – parents assist with feeding scheme	Y – school fees R31 a year
Water	Y	Y	O – inter-mittent	Y	O – inter-mittent	Y – sometimes dry	O – one tap at new school	O – sometimes dry	Y	O – taps dry most of the time

Table 4.2 Human resources

	Gauteng				Northern Province					
SCHOOLS	**School 1**	**School 2**	**School 3**	**School 4**	**School 5**	**School 6**	**School 7**	**School 8**	**School 9**	**School 10**
Teacher/ learner ratio	1:38	1:26	1:28	1:26	1:35	1:29	1:47	1:35	1:37	1:31
Learner/ teacher	574:15	823:32	1 380:49	1 000:38	489:14	1 079:37	751:16	480:16	767:21	826:27
Class size	33–62	26–42	22–40+	23–49		21–86	32–103	36–40	33–68	38–84
Staff turnover	Stable	Medium (a few each year) 3 teachers left in the last week or so	Medium	Medium (a few took severance packages this year)	Stable	Stable	Stable	Stable	Stable	Stable
Staff quality	3 unqualified	All qualified	2 under-qualified	All qualified	All qualified	2 unqualified	All qualified	12 prof qualified 4 unqualified	All qualified	All qualified
HOD	2 female	4 (1 male) (3 female)	5 (2 male) (3 female)	5	1 female	5 male	4 (sort of acting)	2 female	2 male	3 male
M/F staff	1 male 14 female	17 male 15 female	25 male 24 female	16 male 22 female	2 male 12 female	23 male 14 female	4 male 12 female	9 male 7 female	8 male 13 female	21 male 6 female
Student attendance	Good, always in class	Good, always?	Good, always in class on time	Medium, not always in class, arrive late	Good, always in class	Poor, not always in class, arrive late	Medium, some arrive late and some not in class	Good, always in class	Good, always in class. In winter – late arrivals	Good, arrive late and sometimes do not go to class
In-service support	SELP Macmillan	Subject Advisory Services (Govt)	SMT (GDE) SRC Governing Bodies	None	Phalaborwa Foundation	Phalaborwa Foundation MASTEP Dept Prog	Phalaborwa Foundation MASTEP	Ramano College Workshops conducted by college lecturers	None	Govt PPASA (Planned Parenthood Ass of SA)
Curriculum 2005 material received	Booklets Day-by-Day (GDE)	Booklets Workshops (Govt)	Booklets	Booklets (Govt)	None Inset Courses on OBE by Phalaborwa	Booklets (Govt)	Booklets (Govt)	Booklets Dept Handouts (Govt)	None	Booklets

4 AVAILABILITY AND USE OF RESOURCES

Any attempts to change practices, be they in the wider mathematics, science and language education fields internationally, or in the more politically charged South African context, will bring with them new and different resources or new uses for existing resources – and, perhaps more substantively, a re-sourcing of the practice. This explains why, even in educational contexts that are relatively well-resourced, difficulties with change in educational practices are attributed to "lack of resources". A large-scale research project on the implementation of the National Mathematics Curriculum in the United Kingdom, for example, reported that lack of resources was given by teachers as a reason for their difficulties; that at "all key stages teachers felt that they lacked suitable activities in probability, and that they had inadequate teaching materials in handling data" (Johnson & Millett, 1996: 62). The challenge of re-sourcing new practices is not exclusive to contexts of limited resources.

As indicated above, the FDE research project included a focus on resource availability and on resource use by teachers. These teachers were participating in a teacher development programme that advocated both learner-centred pedagogy and practices that moved beyond mathematics as procedures; beyond science as a series of facts to be memorised; and beyond literacy as decoding and encoding print. The programme needs to be understood as located within a highly charged context of social and political change in South Africa, one aspect of which was a new curriculum for Grades 1–9. Curriculum 2005 had transformation intentions: school education throughout this new curriculum was to play a significant role in the development of a vibrant and thriving post-apartheid democracy. Within a wider outcomes-based approach to learning, learner-centred practice was advocated across the curriculum (see Chapter 6 in this volume for a discussion of the challenges for teachers of a shift to learner-centred practice). Over the duration of the research project the FDE research team realised that as teachers brought in additional resources, or as they used existing resources to meet new and different educational goals, their emergent practices were simultaneously shaped by their histories and by the contexts in which they worked. In some cases we observed teachers harnessing additional resources to provide their learners with greater opportunities to engage and grow in subject knowledge and skills. In others, and particularly in the more impoverished schools, we saw teachers unintentionally shutting down opportunities for learning as they attempted to integrate new goals and resources into their practice.

In this chapter we draw on episodes and examples from the research project and relate them to re-sourcing issues that are of global significance. In so doing we build a general argument that while new practices entail "more" resources (new resources or different uses for existing resources), more resources do not lead to better practice in an unproblematic and linear way. There is a tension between an uncritical (re)distribution of resources to meet equity goals, and how such resources can be used to support learning purposes across different contexts. We develop two interrelated strands to this argument. Firstly, it is essential that any programme which advocates the shifting of classroom practices interrogates its assumptions about resource availability and use. Secondly, resource use is always a recontextualisation and appropriation – a dialectical relation between the personal and the contextual. Teachers' changing resourcefulness is partial and uneven. As we strive for greater equity in access to education and for education in schools to play its role in building democratic practice, we need to embrace the dual challenge of resource (re)distribution and equity across different contexts.

Some conceptual and theoretical background and elaboration

Firstly, what do we mean by "equity" and "resources"? Like others (e.g. Secada, 1995; Apple, 1995) we use the term "equity" to engage diversity and difference, not through sameness but through fairness. At a quantitative level, one obvious and necessary application of fairness in the current South African context is that poor schools should be receiving more resources. The disparity of resources across schools is untenable and this needs to be addressed. However, our concern goes beyond provisioning to an interrogation of diverse conditions and contexts and what these mean for appropriate resourcing.

A dictionary definition of "resource" is a noun: "stock that can be drawn on; a country's collective means for support and defence; an expedient device or practical ingenuity, quick wit". It is also possible to think about resource as the verb "re + source", to source again or differently, where "source" implies origin, that place from which a thing comes or is acquired. In this paper "resource" is both noun and verb – "resources" refers to *those objects and actions that we draw on in our various practices.*

Secondly, as Adler has argued elsewhere (1998; 2000), reconceptualising *resource* as a verb, as a doing word, shifts attention off resources *per se* and onto resources in use in a particular context. Access to any social practice, which includes school mathematics, science and language practice, entails access to the resources of that practice. Such access hinges on the concept of *transparency* with its dual functions of visibility and invisibility (Lave & Wenger, 1991). Access to a resource in a practice requires that the resource be both visible (seen so that it can be used) and invisible (seen through so that the practice is illuminated). For example, effective use of a geoboard in a mathematics class means seeing the nails, and seeing through the nails to the spatial relationships between them.

We also need to understand classroom practice as a hybrid of selection of content on the one hand and of pedagogical strategies on the other. It is a practice that draws from outside of itself – resources in the practice are delocated from everyday practice and relocated in the mathematics, science or language classroom. Their mathematical, scientific or linguistic meanings do not shine through them, but need to be mediated. Moreover, in more learner-centred strategies, resources are handed over to the learner and mathematical, scientific or linguistic meanings are then meant to be extracted from the activity. In a framework of resource transparency, and contrary to common-sense notions, more classroom resources are likely to make more, rather than fewer, demands on teachers.

A *re*conceptualisation of resources needs to go further. Adler (1998; 2000) has argued that we need to extend our understanding of the notion of resources in use beyond those "basic" human and physical resources that are typically quantified in educational studies, such as buildings, water and electricity, teacher qualifications and class size. We call these "basic" in that they are necessary to the enterprise of schooling, premised as it is on learning within very specific boundaries of time and space. We argue instead for a broader notion of *resources in use* that includes

- additional human resources like teachers' knowledge bases (as opposed to their mere formal qualifications)

- additional material resources such as geoboards that have been specifically made for school mathematics; sustainable science kits, the materials for which can be improvised in local contexts; a range of readers for the language classroom; and also "everyday resources" like money or magazines
- social and cultural resources like language, collegiality and time.

Table 4.3 provides a way of categorising the range of resources in use in school mathematics, science and language classrooms and points to the numerous issues they raise.

Resources in mathematics, science and English language classroom practice: need, availability and use

In this chapter we extend the conceptual frame developed so far to include two notions – recontextualisation and appropriation – as explanatory tools for understanding and interrogating teachers' use of resources in context and over the period of the research project. We focus on the use of two key material resources for schooling; chalkboards and textbooks (usually available across wide-ranging contexts), and also on the perceived need for and availability and use of additional material resources.

Chalkboards

The chalkboard is a central resource in teaching. In the TIMSS video study for example, teachers made extensive and ranging use of the chalkboard (US DoE, 1997; Kawanaka et al., 1999). This was across the six classroom lessons captured as typical of Japanese, German and American mathematics teaching in Grade 8. There were other physical resources that teachers could and did draw on for displaying knowledge in those classrooms (e.g. overhead projectors and a computer for a dynamic display of a range of different triangles with the same base and the same height). Despite its widespread use as a teaching and learning resource in classrooms, the chalkboard is often taken for granted. It does not seem to come into focus as a valued resource in in-service professional development programmes. Instead, it is inserted negatively into a professional discourse that connects "chalk" and "talk" to problematise "transmission" teaching. In the rhetoric of Curriculum 2005 and the transformation of educational practice in South Africa, "chalk and talk" has come to signify "old" practice that needs to be replaced with learner-centred, resource-based activity.

In most South African classrooms, however, the chalkboard is the only resource available for ongoing and changing displays of knowledge. Over the three years of the research project, all the secondary teachers and most of the primary teachers in the study made continuous use of their chalkboards, sometimes to excellent effect, as in the case of a secondary English teacher who drew sketches on his chalkboard to illustrate stages of a journey undertaken by the central character in a literature text. What is interesting for the discussion in this chapter is the way in which chalkboard use shifted over the duration of the study, and the possible consequences of such shifts. In the first year of the observations, the chalkboard and textbooks (discussed in the following section) were the dominant available resources and the most used, at least by the teacher. All teachers had chalkboards (though of varying sizes), and most teachers used them for

Table 4.3 Categorisation of resources recruited in school mathematics, science and English

BASIC RESOURCES – MAINTENANCE OF SCHOOLING			
Resources		**Exemplars**	**Issues**
Material		School buildings, water, electricity, fence, desks, chairs, paper, pens	Absence makes demand for more resources obvious and necessary
Human		Teacher-learner ratios, class size, teacher qualifications	Agreed as basic, but scope and content of qualification, and what constitutes optimal class size, are contested
OTHER RESOURCES AND THEIR TRANSPARENCY			
Human resources		Teacher's knowledge-base • Mathematics; science; English language • Pedagogical content knowledge • Knowledge of world	Scope, content, weightings, orientations all contested
		Collegiality	For maintenance of the practice as well as change
Additional material resources	Technologies	Chalkboard, calculators, computers, photocopier	Need for invisibility to see through technology to the subjects
	School maths, science and English materials	Textbooks, readers, other texts, cuisenaire rods, geoboards, computer software, chemicals, scientific apparatus	Meaning for the subject not obvious; subject meaning and pedagogical possibility is built into them; when inserted in "learner-centred" pedagogy, can become too visible
	Everyday objects	Money, newspapers, stories, pamphlets, calculators, rulers, seeds, plants, soil, household chemicals	Have uses outside of subject, so need to be visible and invisible
Cultural resources	Maths and science artifacts	Math text (e.g. a proof), number lines, magic squares; science formula	Specifically mathematical and scientific
	Language	L1, L2, code-switching (CS), verbalisation, communication	Assumptions: CS, talk are enabling; need to be visible and invisible
	Time	Timetable; length of periods; homework	Structuring of time needs to be visible and invisible; with new pedagogies or when schooling breaks down, can become too visible

reviewing homework or classwork, writing up solutions, elaborating concepts or summarising lesson content with the whole class.

In the second and third years of the study, there were three interesting and interrelated shifts in the use of this physical resource. Firstly, some of the teachers harnessed the chalkboard as a shared public resource. Learners came up to the board to record a solution to a homework or classwork task. In other words, the chalkboard was no longer *teacher owned*, but was *shared with learners*. Secondly, in most classrooms, the chalkboard was also used to publicly display diverse learner responses to tasks or problems. The responses were mostly from learners presenting either an individual response, or a report from group work. In some cases, the teacher wrote on the board what learners offered. The shift in use of the board was from the *demonstration of a single set of procedures or singular examples of correct answers* to the *display of diverse solutions or responses to tasks*. And finally, instead of the *learners copying examples and procedures written by the teacher*, they were invited to *scrutinise procedures, solutions and task responses written by other learners*.

Black & Atkin (1996) illuminate the fact that new practices are often incorporated into existing routinised practices, explaining that routine practices are important in teaching. Effective teaching appears to depend on routines. Stress levels would be enormous if teachers could not draw on routinised skills in each interaction with learners. What can thus be deduced from this extension of the use of the chalkboard is that values and aspects of learner-centred practice in the teacher development programme, such as increasing learner activity and encouraging diversity, were *appropriated* by some of the teachers. The form this appropriation took was to incorporate these practices into existing dominant and routine uses of the chalkboard.

It is important to add here that extension of chalkboard use was not evident across all teachers, and individual teachers did not use their boards in this way all of the time. In addition, the extended use was not necessarily optimal. In one primary class, for example, the teacher was restricted to a portion of the chalkboard – the board was shared with other teachers – and erased learner responses immediately after they had been written. She thus simultaneously produced, and then diminished the potential effectiveness of learner-generated public displays. Significantly, this occurred in the poorest school in the study. Some teachers who purposefully elicited a range of learner responses did not use the opportunity for exploration provided by the public display of these different responses. Instead of probing learners' thinking, they closed down these learning opportunities by focusing only on identifying correct answers. One primary school teacher did not even focus on correct answers: she offered no comment on learner displays that were inaccurate or inappropriate.

Finally, what also emerged in the second and third year of the study was that chalkboard use disappeared in those few primary lessons where the teacher attempted more open mathematics and science tasks (though this was not always the case in English classes). Public display shifted from the chalkboard as a central focal point to displays from groups of learners. In this setting, there is less public pointing to, or explicit marking of, those displays that are valued in terms of mathematical and scientific outcomes.

This illumination of chalkboard availability and its shifting use over the course of the programme reflects teachers' changing resourcefulness, and the fact that this is uneven, partial and contextual. It also poses an interesting question for teacher development

programmes, and specifically in-service programmes that draw in teachers from schools with limited resources. Should in-service programmes for teachers explicitly address optimising the use of functional and often taken-for-granted resources like the chalkboard? What do teachers themselves come to value as the means for re-sourcing their practice? Both these questions take on a particular pertinence in the context of curriculum reform where professional discourse includes a general derision of "chalk and talk".

Textbooks

Two problems are frequently raised about the form and function of textbooks in school mathematics, science and language teaching. The first problem is that dominant textbooks in use present a narrow approach to these subjects. For example, most mathematics textbooks follow a well-oiled and familiar script. A concept or procedure is introduced, with some related worked examples; this is then followed by an exercise for pupils to practise, consolidate and possibly extend their understanding of the concept or procedure. This steady diet is well known for its rather deadening effects on learner motivation and interest in mathematics on the one hand, and on possibilities for learners' mathematical development on the other. A recent study of science textbooks found that many of them cover too many topics and fail to develop any of them well. The texts examined "include many classroom activities that either are irrelevant to learning key science ideas or don't help students relate what they are doing to the underlying ideas" (Project 2061: www.project2061.org).

A second problem relates less to content and design and more to the ways in which textbooks that structure all teaching are likely to produce in teachers a reliance on single prescribed texts, and to result in the disempowerment and de-professionalisation of teachers. Both these problems are well documented,[1] and both have been identified as problems to be addressed in a new educational dispensation in South Africa.

Between the first and second years of the FDE research project, Curriculum 2005 was launched for Grades 1–9, with its explicit advocacy of a shift from a content-driven curriculum to an outcomes-based curriculum, and to new questions about the form and function of resources like prescribed textbooks in schools. In fact, one of the goals of the new curriculum for Grades 1–9 is actually for teachers to be able to design (select and generate) learning resources to support a range of contextualised teaching purposes. Throughout the three years of the research project, textbooks remained a structuring resource for mathematics and science teachers, particularly at the senior secondary level, though less so for English teachers. For mathematics and science teachers, content remains the organiser and decider of curriculum, and key texts are indispensable for teachers' planning on the one hand, and for providing a range of tasks for learners on the other. This situation might well change when a new curriculum takes root in senior secondary education in South Africa. However, in the present context, and particularly at secondary level, the fact that the prescribed textbooks remain crucial for mathematics and science teachers is not surprising. Black & Atkin argue the point quite clearly: in

[1] Love & Pimm (1996) provide an extensive interrogation of textual materials in mathematics education. Textbooks are but one part of their wide analysis. They point to the problems we have raised and refer to earlier research (or lack of it) in aspects of this important field.

maths and science, because content is easily defined, prescribed textbooks serve to legitimate and sequence school curricula in a number of countries, particularly at a secondary level. Teachers' reliance on such textbooks is then more appropriately interpreted as responsibly meeting the needs of their learners to succeed in secondary school mathematics and science.

In contrast to the secondary mathematics and science teachers in the research project, the primary teachers of these subjects and the primary and secondary teachers of English used textbooks for some lesson preparation. Despite consistent use for this purpose, these teachers did not use their textbooks to assist with sequential learning. There appeared instead to be a rather fragmented selection from textbooks for individual lessons.

As with the use of the chalkboard, this discussion on textbook use by teachers raises the question as to whether in-service teacher development programmes should engage teachers in critical analysis of the forms and functions of a textbook. Because any textbook is a selection and a particular reading of "subject knowledge" for school, it is imbued with an approach to knowledge on the one hand and a set of values attached to learning the subject on the other. A critical and reflexive use of the text entails being able to "see" this reading. However, a reflective stance also entails "seeing" the text's attention to selection and grading of tasks, to progression and sequence and how these support (or undermine) possibilities for particular learnings. Again, as with the chalkboard, optimal use of a textbook as a teaching and learning resource is often taken for granted in in-service programmes. Emphasis, particularly in reform programmes, is placed instead on new and additional resources. Optimising the use of existing textbooks is perhaps most important in impoverished areas in South Africa, where possibilities for state-provided additional resources beyond the chalkboard and textbook are unlikely in the short term, despite the government's new differential funding formula to assist the poorest schools. As Love & Pimm argue: "Text materials – even textbooks – are resources, not the curriculum. The curriculum is also how a teacher interprets or uses such texts" (1996: 398).

One of the rural secondary teachers in the research project, for example, explained how her experience in the programme had enabled her to understand the thinking behind certain aspects of her textbook that she had not appreciated or even noticed before. There is a danger that in aspiring too rapidly to the ideal situation where teachers have and can select from a range of texts to plan their curricula, the benefits and functionality of a good text that models appropriate tasks and their sequencing might well be undermined. (Reed, 2001, outlines some benefits of effective textbook use.)

So far we have discussed two widely available resources, chalkboards and textbooks, in the teaching and learning of mathematics, science and English and the questions that arise for in-service professional development when these dominant and key functional resources are taken for granted. The underlying argument is that the development-democracy tension might be better served through optimising the use of such resources across contexts. Our challenge then as teacher educators is to open up possibilities for critical reflection on the forms and functions of chalkboards and textbooks in school practice, without undermining their use.

The issue of resource distribution and use is raised when we look at what happens when teachers bring in and use additional materials in the classroom.

Additional materials

As summarised in Table 4.3, material resources that are used across contexts to support learning range from technologies, such as chalkboards and calculators, to materials such as textbooks, apparatus and everyday objects. In the second and third year of the research project, a range of additional material resources was brought into class by all the primary and some of the secondary teachers that we observed. In mathematics classes these ranged from materials like hand-written or copied worksheets, tangrams, unifix cubes and cuisenaire rods, to everyday materials like round sweets for "seeing" non-tessellations, rulers for measuring and paper for paper folding and fractions. In science classes teachers brought in worksheets, and a range of objects to use in observations and experiments, for example household chemicals, such as bleach, seeds, flowers and soil. English teachers made worksheets and brought in a rage of print materials including newspapers, magazines and advertising leaflets. In the mathematics, science and English courses in the teacher development programme there are examples and activities that draw on such material. In this section of the chapter, we use three illustrations from the research project to illuminate a relationship between the observed widespread use of additional material resources in primary classrooms and the kinds of tasks that accompanied the recruitment of these resources.

We will start with an example from one of the primary teachers in the research project who works in a semi-urban, well-functioning and supportive school. Over the three years of the study, she provided her learners with the most task-based mathematics lessons. In one set of observed lessons on tessellations, she brought in spherical sweets, home-made tangrams and a worksheet with the intention of having a creative lesson in which learners could "see" some of the mathematics they were doing. Within the hour lesson, she organised the class into groups and presented learners in their groups with three different kinds of tasks, each at an appropriate level of demand. Her learners were provided with a creative, hands-on learning experience across three different tasks. They were encouraged to think about whether round objects could cover a surface, about manipulating puzzle pieces to fit a square and about how to draw tessellating shapes so that they did cover a surface. The learners' enjoyment was evident in their not rushing out of the class as soon as the lesson ended.

In this class there were over 40 learners arranged in groups of at least six. The teacher had made the tangrams herself – enough for one per group. She used her own time and material resources to do so. But with only one tangram per group and six learners in a group, there were a number of learners who at no stage in the activity touched or moved any of the pieces. At best they watched others. Of greater importance were the number of potentially confusing interpretations of her tasks, which diminished the possibilities for optimal use of the resources she had brought in. Three-dimensional sweets were used to illustrate "gaps" in covering a surface. The tangram activity was used to convey a meaning of "tessellation" as shapes that "fit together" and have "straight edges". Moreover, the tangram was home-made, and had numerous pieces that most learners did not manage to put together into a square. Finally, the tessellation worksheet only included shapes that did tessellate. While there was a structure to the lesson, and the designed tasks were sequenced, the independent and relational mathematical foci of the tasks and their mathematical purposes were not clear. In discussion,

the teacher shared her concern that some learners were not participating and her recognition that this was probably because they did not understand what was required of them.

This teacher took a double risk – teaching a new mathematical topic (tessellations) and doing this in a new way (through a resource-based, hands-on approach in which she had no direct pedagogical experience). The difficulties in this are widely recognised: Black & Atkin's study of teachers and change across countries points out that:

> … changes generate more complex tasks which require new classroom routines. It is often left to the teachers to invent those routines. To do this they are, effectively, being asked to accept the responsibility for re-defining both their roles and relationships with their students and to reformulate both the aims and image of their subject (1996: 134).

This particular teacher's teaching and use of resources need to be seen in the context of the above insight. She had indeed taken on a task that stretched her existing resourcefulness to the full.

To bring home the notion of resource use in context, we now turn to two examples from teachers who worked in more impoverished rural school settings. One of the teachers was in a Grade 3 mathematics class, and teaching measurement. She brought in some rulers for a measurement task and had groups of learners come up to "measure the desk" (her desk) one at a time. These learners were to be provided with the practical experience of measuring. However, she only managed to have two groups accomplish the task at her desk during this lesson, and so most of the class was left with nothing to do for most of the lesson. Moreover, by "measure the desk" she meant measuring the perimeter, and assumed that learners could read their rulers, distinguish centimetres and millimetres, and that they could "see" that they only needed to measure two adjacent sides to measure the whole table. Later in the week, with the same class, the lesson purpose was the consolidation of the four operations. Again, with the desire for interaction and participation, the class was organised into groups, and each group given a small piece of paper with some calculations written on for the group to complete. Each group focused on a different operation. These small "worksheets" were taken in at the end of the lesson, leaving group members with no record of their tasks. While responses were shared with the class, the teacher was restricted to a small section of the chalkboard (as other teachers shared the classroom space) and kept erasing each group's work for the next group to write up their answers. As a result, each group had limited opportunities to consolidate all four operations.

The second teacher, working in a Grade 6 English class, attempted to use dictionaries and crossword puzzles for vocabulary-building activities. In preparation for the dictionary-based lesson she borrowed six dictionaries from colleagues and from friends outside the school, as there were no dictionaries at the school. In her class of 34 learners this meant that there was only one dictionary available for each group of five or six learners. An additional problem was that the dictionaries were from a range of publishers and at differing levels of complexity. It seemed to the researcher that while the teacher assumed that learners would know how to use a dictionary, the majority had never worked with one before. Once the teacher realised this, she shifted the focus of her

lesson from a particular vocabulary building activity to "how to use a dictionary" but, with the limited resources available, some learners had no opportunity to put a dictionary to use. In another lesson this teacher brought in a set of textbooks in which there was a crossword puzzle for use in vocabulary development. In this instance, the resource was available to each learner, but the teacher's assumption that learners would be familiar with such puzzles proved incorrect. As in the dictionary lesson, she needed to teach learners how to use the resource rather than to implement her original lesson plan.

The other primary teachers and some of the secondary teachers in the research project also recruited additional material resources into their teaching and faced similar new challenges. Collectively these teachers showed interesting *improvisation*. Some of them used resources readily available in the environment. However, particularly in areas where paper was a scarcity, teachers struggled with *sufficiency*. For example, in a number of classes there were not enough worksheets for all the learners. Most learners left the lesson without a record of the day's activity. Moreover, in a number of cases (e.g. the home-made tangram, wall charts with information on science or language topics), the teachers had generated these additional materials at their own expense, raising the issue of *sustainability*. It was unlikely that such additions could and would be sustained over time.

In addition to questions of sufficiency and sustainability, some teachers struggled to use the recruited resources to support learning. Either the tasks set were at an inappropriate level, or they were poorly graded, structured and sequenced. Alternatively, and more seriously, the possibilities for pulling through the subject knowledge embedded in these materials were not fully exploited, and in some cases created confusion (as in the crossword puzzle lesson). In short, lesson purposes were often unclear.

Teachers of English in junior secondary classes used a range of additional materials in an attempt to arouse the interest of learners in using English for communication. The tasks based on these materials varied in quality from the well structured and appropriate to those that left learners confused at the end of a lesson.

Additional materials were less visible in secondary school mathematics and science classrooms in the study. As a consequence, tasks were largely textbook exercises, and were largely appropriate (in terms of level and structure). In the words of one of the secondary teachers, "I still have the same textbook", and no other materials, and so she still relies on it for her teaching at Grade 12 level. Again, this limited use of additional resources at a secondary level is understandable, given the content pressures on secondary teachers, and the legitimacy of the current prescribed textbooks in relation to the high-stakes matriculation examination.

The primary maths and science teachers and the primary and secondary English teachers undoubtedly took risks in their observed lessons, with some problematic consequences. They recruited additional materials into their classroom practices, though in uneven ways and with a range of possible effects. The difficulties that emerged as teachers used these additional resources were a function of their own biography, the specificity of the subject matter they were attempting to teach, the relative transparency of the resource for learning, and the context of their use. Here, the resource (e.g. a sheet of paper to fold into fractional parts, or a crossword puzzle) has to be visible (so that it can be seen to be used) and invisible (so that it can be seen through to the subject

knowledge). For example, learners need to see the crossword puzzle and the instructions for how to complete it, but at the same time see through the puzzle and instructions to the vocabulary that is the learning focus of the activity. The ability to render a resource both visible and invisible in class, and to draw connections between mathematics, science and language and real-world objects and situations in interactions with learners, demands a flexible and in-depth understanding of the subject by the teacher.

Our intention in this discussion about recruitment and use of additional resources is to foreground the dynamic relationship between new resources and their use in context. Firstly, there is the issue of *sufficiency and sustainability over time*. Implied here is the need for financial support from the state. The demands to enact new curriculum practices have resource implications that, in the current South African context, are being left to individual teachers, schools and in-service programmes. As teachers take up these responsibilities, so they become open to carrying the blame for the difficulties they encounter, and these difficulties extend beyond provision.

Secondly, the impact of additional resources lies in their *use in context*. As additional material resources are recruited by teachers, they make more rather than fewer demands on teaching preparation and activity. It is not a new idea that the presence of a learning aid does not automatically translate into effective use and into benefits for all learners. We are suggesting rather that in-service teacher education needs to work with teachers on the use of all kinds of resources to support a range of "subject knowledge" and pedagogical purposes. This is in addition to in-service programmes supporting optimal use of key functional resources like chalkboards and textbooks. The emphasis needs to produce a shift in focus from the resources *per se* to their use for supporting learning in context and hence for the support and development of the resourceful teacher.

Hence our dual challenge in teacher education: advocacy of the distribution and provision of resources to support curriculum practice in the classroom on the one hand, and clearly focused attention on resource use *in context*, including the use of the chalkboard and textbook, on the other. This requires careful and reflexive work with teachers on what counts in their specific contexts.

Developing a theoretical discussion

In this discussion of resource availability and use, we have described, explored and hinted at an explanation of some teachers' use of what we have termed "key functional" and "additional material" resources. Adding to the categorisation of resources in Table 4.3, we have begun a categorisation of uses (mainly of the chalkboard) and a categorisation of issues in the use of additional resources. To shift to explanation we have drawn on the notion of transparency (which was briefly elaborated), and the notions of recontexualisation and appropriation (which have not been elaborated), and used these to interrogate classroom practice and teacher education practice.

Transparency and recontextualisation are explanatory tools that illuminate the use of resources in the classroom. They reveal how the meaning of a resource does not lie in the resource itself, but in its use for learning. As we draw on a resource from outside the classroom (e.g., a sheet of paper) it needs to be rendered transparent, that is, made simultaneously visible and invisible. The difficulty with a resource like a sheet of paper is

that as it is drawn into the classroom, it is recontextualised. It is no longer a sheet of paper: within a mathematics lesson on fractions it could stand for a "whole"; in a science lesson it could represent the end product of a paper-making process that began with wood pulp. Resources that are brought into the classroom do not necessarily have educational meanings built into them. Nor do educational meanings shine through them. The meanings of the resources emerge through their use in the context of classroom practices and the subject knowledge being learned. There is a dialectical interaction between the bringing in of a new resource (like a sheet of paper, or greater pupil-pupil discussion), or the use of an existing resource in a new way (like the new uses of the chalkboard discussed above) and the shaping of classroom practices. Using the chalkboard in a new way changes classroom practices (like participation) and at the same time, existing classroom practices (well-established routines like focusing on correct answers in mathematics, science or English) shape possibilities for new uses of the resource. Simply, resources shape and are shaped by their contexts of use. At the same time as the context produces a new meaning for the resource, so too the resource acts on classroom processes. This dialectical recontextualisation emerges interactively from an empirical field and from growing interrogation and understanding of pedagogical practice in the theoretical field of education. Transparency and recontextualisation thus provide a theoretical language with which to think and talk about resources and their use in school mathematics, science and English teaching.

Neither, however, helps to explain the heterogeneity and the uneven ways in which individual teachers in the research project took up and used additional resources or used existing resources in new ways, or why some teachers displayed more innovative or more successful use of resources. One explanation lies in viewing the teachers in this study as learners – they are learning more about their teaching. Interrogations of learning, particularly from a sociocultural perspective, have helped explain unevenness and heterogeneity by shifting away from cognitive science notions of internalisation (a simple taking in of the external), to appropriation – where tools in the learners' environment are understood as being used adaptively (Kirshner & Whitson, 1997: 5). There is an ongoing interrelation between the learners' biographies, their learning in the programme, and the context in which they work. In relation specifically to changing chalkboard uses, we discussed teachers' appropriation of aspects of the teacher education programme (greater learner activity and participation) through new uses of the chalkboard. In relation to recruitment of additional resources, we illuminated ways in which appropriations of resource-based tasks were a function of biography and context, a simultaneous product of the teachers' past engagement with mathematics, science or English, their experiences in the programme and the availability and levels of resource sufficiency in their contexts.

Conclusion

As we reflected on what we, as teacher educators and researchers, were learning through our involvement in teacher development research, we were reminded of Clark's ethnographic study of the trialling of a package of innovative science materials in an urban black township school in South Africa. In an article "Challenges to practice, constraints to change" Clark (1998) talks of his "sobering experience", one that "reinforces

Fuller and Snyder's (1992) comment that the more we learn about what teachers should be doing, the more we realise just how constrained their social roles actually are within schools…"

We were also aware that this interrogation of resources in use in the learning of mathematics, science and English is in our voices – the voices of researchers and teacher educators. It inevitably provides a partial reading, a reading framed by the particular shape and context of the research project. The focus of the research was to understand teachers' take-up from a teacher development programme, and the major goal was to feed back into the programme and its ongoing curriculum development. There remains a great deal of work to be done with teachers across a range of contexts on how they understand specific resource needs and use. We need to develop our understanding of resources and equity. A different project, perhaps with a more collaborative methodology, could provide for interaction and dialogue with teachers around resource availability and use. Through such activity we could confront and work on the unsettling understanding that emerged through the research project: that *in contexts of greatest need* the teachers' appropriation from their in-service experiences and the recontextualisation of new or existing resources exacerbated inequality. There were teachers whose context and/or personal disposition appeared to work against pedagogic innovations, and in these cases an unintended consequence of innovation appeared to be both an undermining of the teacher's resourcefulness, and consequently reduced learning opportunities for his or her learners.

In all contexts, and particularly contexts of inequality, the availability and use of resources in the teaching and learning of mathematics, science and English are substantive issues. Research methodological issues aside, the reflection on teacher education practice through an interrogation of resource availability and use in this chapter provokes two questions. As teacher educators, is it not our political and educational responsibility to build on existing functional resources, while advocating and contributing to the provision and distribution of additional resources? How else are we to support the curriculum renewal envisaged for enhancing development and democracy in post-apartheid South African education? At the same time is it not also our political and educational responsibility to recognise and build critical awareness of the fact that more decontextualised resources are not a panacea for improvement in education?

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CHAPTER 5

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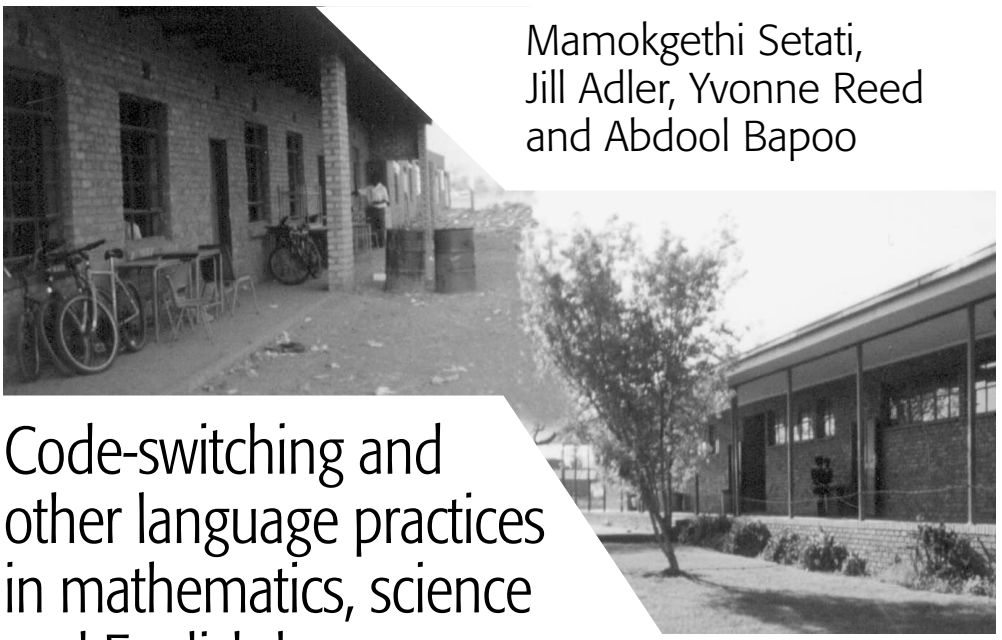

Code-switching and other language practices in mathematics, science and English language classrooms in South Africa

Introduction

In this chapter we describe and discuss what the team researching teachers' take-up from the Further Diploma in Education (FDE) programme at the University of the Witwatersrand (Wits) learned about the language practices of teachers and learners as we worked with teachers from ten different schools, primary and secondary, urban and rural. We focus particularly on the reception and production of language through "code-switching", "exploratory talk" and "discourse-specific talk". We use the metaphor of a journey to describe how teachers and learners move from informal, exploratory talk in the learners' main language(s) to discourse-specific talk and writing in English. As is described in the chapter, few teachers and learners completed this complex journey, and the constraints on their practices differed across classroom context, level and subject being taught. We begin with a brief description of the language teaching and learning contexts in South African schools – what we have decided to call their *language infrastructure*.

Language infrastructure across South African schools

With the exception of texts used for the teaching of language as subject (e.g. isiZulu, Setswana, French, Portuguese), most teaching and learning materials used in South

African schools are printed in either Afrikaans or English. However, Afrikaans and English are the main or primary languages of only a minority of the country's teachers and learners. The majority of South Africa's teachers work in classrooms and schools where English is officially the language of learning, but is not the main language of either the teachers or the learners.

The teachers in the FDE research sample worked in a variety of multilingual or bilingual contexts. In each of these contexts English was not the main language of teachers and learners. English language teachers had the responsibility of teaching English as an additional language. Mathematics and science teachers faced the double challenge of teaching their subject in English while learners were still learning this language.

One of the most significant contextual differences was in what we have termed *the English language infrastructure* of urban and rural schools and communities. We agree with Ringbom (1987) that it is important to consider the contextual differences between "second" (in South Africa now commonly referred to as "additional") language acquisition/learning and "foreign" language learning.

> In a second language acquisition context the language is spoken in the immediate environment of the learner, who has good opportunities to use the language for participation in natural communication situations. Second language acquisition may or may not be supplemented by classroom teaching.
>
> In a foreign language learning situation, on the other hand, the language is not spoken in the immediate environment of the learner, although mass media may provide opportunities for practising receptive skills. There is little or no opportunity for the learner to use the language in natural communication situations (1987: 27).

In *rural schools*, most teachers and learners shared the same main language, though there were exceptions to this. Learners in these schools typically only spoke, read or wrote in English in the formal school context. Reading material (in any language) was limited to textbooks, and in some schools learners had few opportunities to use these books, either because one class set had to be shared among several classes or because teachers wished to preserve such a scarce resource. In general, together with an impoverished socio-economic context, these schools had an extremely limited English language infrastructure. In such schools, though English is the official language of learning and teaching (LOLT) in all but the first three grades, we argue that it is more accurately described as a *foreign language* than as an additional language, because exposure to the language is almost entirely limited to the school context. In this chapter we refer to such a teaching and learning context as a Foreign Language Learning Environment (FLLE).

In *urban schools*, the teachers in our sample worked with learners with a range of main languages. While this multilingual setting complicates teaching practices, the English language infrastructure of urban schools is more supportive of English as LOLT. In urban areas there is far more environmental print (e.g., advertising billboards) in English (and in other languages) and teachers and learners have greater access to newspapers, magazines, television and to speakers of English. We argue that in urban contexts it is appropriate to describe English as an *additional language* because of the opportunities that many learners have to acquire the language informally outside the classroom. We

use the term additional language learning environment (ALLE) for schools in urban contexts.

As we will show, these different language infrastructures had an impact on language practices like code-switching – and so too on take-up from the FDE programme.

Language and learning as a focus of study in the FDE courses

All of the courses in the Wits FDE programme emphasise the importance of talk as a social thinking tool (Mercer, 1995), and thus for learning: for asking questions, for exploring ideas, for giving opinions, for summarising and reporting findings, and so on. Although it is appropriate for much of this learning talk to be in the learners' main language(s), they also need opportunities to speak, read and write in English in the English class. In the mathematics and science classes they need to understand and use formal mathematical and scientific language – usually in English. In other words, teachers need to consider two different dimensions of "learning talk":

- The *exploratory talk* which is such a necessary part of talking to learn and which is likely to be most effective in the learners' main language(s) because learners need to feel at ease when they are exploring ideas (Barnes, 1992: 126)
- The *discourse-specific talk* which is part of learners' apprenticeship into the discourse genres of subjects in the school curriculum (Wells, 1992: 291). For reasons that will be indicated in the next section of this chapter, the majority of learners need to develop competence in using English for this discourse-specific talk.

Analysis of the base-line data gathered in 1996 led to a decision, in the next two years of the study, to focus on two key language practices: *learning talk* in all three subjects and *code-switching* by teachers and learners. As is explained below, the language emphasis across courses, and the key practices identified through and for the research, intersect in critical ways with language-in-education policy in South Africa, and the goals of the new national curriculum, popularly referred to as Curriculum 2005.

Politics and practice: language in education; language and education

Four areas of politics and practice have informed the language foci in the Wits FDE courses, and so too the research foci:

- Language-in-education policy in South Africa, including LOLT
- Changing pedagogic practices advocated in the new Curriculum 2005
- Debates on strategies (such as code-switching) for teaching and learning in multilingual classrooms
- Debates on the acquisition of discipline-specific discourse (e.g., "the language" of Mathematics)

Language-in-education policy and LOLT

The South African nation is multilingual. The Constitution adopted for post-apartheid

South Africa in 1996 provides for certain human rights, amongst which are language rights. For the first time nine African languages (Sepedi, Sesotho, Setswana, siSwati, Tshivenda, Xitsonga, isiNdebele, isiXhosa and isiZulu) have been added to English and Afrikaans, the only two languages that enjoyed official status in the apartheid era. Multilingualism is now encouraged through the new Constitution and given educational substance in the South African Schools' Act. The new language-in-education policy states the following:

> Subject to any law dealing with language-in-education and the constitutional rights of learners, in determining the language policy of the school, the governing body must stipulate how the school will promote multilingualism through using more than one language of learning and teaching, and/or by offering additional languages as fully-fledged subjects, and/or applying special immersion of language maintenance programmes …
>
> (DoE, 1997: 8)

Not only can South African schools and learners now choose their language(s) of learning and teaching, but there is a policy environment supportive of multilingual language practices like code-switching. Learners are to *add* new language(s) to their repertoires, and not subtract their main language. It can, however, be predicted that most parents and schools will not opt for main language as LOLT, since among speakers of African languages main-language LOLT policy has a bad image. The association of African languages with an inferior education was noted in the NEPI (National Education Policy Initiative) Report:

> Parents' memories of Bantu Education, combined with their perception of English as a gateway to better education, are making the majority of black parents favour English as a [language of learning and teaching] from the beginning of school, even if their children do not know the language before they go to school.
>
> (NEPI, 1992: 13)

In fact, English is becoming more and more dominant because the majority of parents want their children to learn in English. This point is forcefully made in the overall report of the range of classroom-based research projects undertaken across a number of schools during 1998 (Taylor & Vinjevold, 1999).

New language policy in South Africa is intended to address the overvaluing of English and Afrikaans and the undervaluing of African languages. In practice, however, English continues to dominate. Although it is the main language of a minority, English has become both the language of power and the language of educational and socio-economic advancement, that is, a dominant symbolic resource in the linguistic market (Bourdieu, 1991) in South Africa. The issue of the dominance of English in South Africa is not easy to resolve, and it ramifies in complex ways into classroom practice. In particular, we need to understand that the language practices of mathematics, science and English teachers, and whether and how they embrace talking to learn and code-switching as pedagogical strategies, will not only depend on what policy stipulates, but also on teachers' skills, their context of practice and what they perceive to be in the interests of their learners. As Baker has argued;

> Decisions about how to teach [second language learners] … do not just reflect curriculum decisions … they are surrounded and underpinned by basic beliefs about … [the learners' main languages] and equality of opportunity (1993: 247).

The challenges, therefore, for educational practice in South African classrooms are: firstly, dealing with the material and political power of English and widespread common beliefs that access to English needs to be enabled as early as possible with no serious regard for main language maintenance; secondly, working beyond the stipulated language of learning to include other languages in learning and teaching; and thirdly, supporting multilingual teaching with appropriate materials and INSET.

In a policy document on the implementation of the new language-in-education policy, released in 1999, we find the beginnings of an INSET strategy:

> As the language situation in many SA schools develops away from monolingual teaching, teachers should … also be trained to use more than one language of learning and teaching. All teachers teaching in public schools in South Africa are bi- or multilingual, but very few of them can teach in more than one language. If the language support for learners is to be provided, teachers will have to be trained to do so. It is furthermore necessary to target all teachers in order to enable them to facilitate language learning in their classrooms – irrespective of the subject or learning programme they teach.
>
> (DoE, 1999: 17)

There is a clear resonance between language-in-education policy and implementation strategies that are being developed at a national level in South Africa, and the orientation to language and learning both implicit and explicit in the various FDE programme courses.

Curriculum 2005 and pedagogical orientations

In addition to language-in-education policy, educational transformation in post-apartheid South Africa includes the conceptualisation and development of a new school curriculum. Curriculum 2005 is a slogan system (Apple, 1988) for a better education for all, one that is driven by principles of success, equity, flexibility and integration. This approach to education is distinct from apartheid education, driven as it was by knowledge fragmentation, racial segregation and inequality. Pedagogical orientations and processes now aim to promote collaborative and co-operative learning, problem solving, and meaningful communication between learners and teachers and among learners themselves. All these require learners to interact with both the teacher and other learners.

These interactions are, however, not easy to initiate, sustain and develop in multilingual classroom settings, be they additional or foreign language learning environments. As discussed earlier, most learners in South Africa are not fluent in English, yet this remains the preferred LOLT in many schools. It is indeed ironic that the demand for English as target language has, if anything, increased in the post-apartheid era. With English as target language, and in support of the principles of learning and teaching embedded

in the new curriculum, code-switching practices are not only inevitable but necessary in schools where English is being learned at the same time as it is being used as the LOLT. Code-switching is a language practice that could support classroom communication in general and the exploratory talk that is such a necessary part of learning.

Exploratory talk in the multilingual classroom

Debate on the effects of bilingualism on the learner goes back decades. We will not rehearse the arguments here as they have been described in detail elsewhere (e.g. Saunders, 1988). Some maintain that bilingualism has negative effects on language development, educational attainment, cognitive growth and intelligence (Reynold, 1928; Saer, 1963; both in Saunders, 1988). Others argue that under certain conditions bilingual skills can have positive effects on the learning process (Pearl & Lambert, 1962; Ianco-Worrall, 1973; Ben-Zeef, 1977; Doyle, 1978; Bialystok, 1987; all in Saunders, 1988; Auerbach, 1993).

In an article entitled "The bilingual as a competent specific speaker-hearer" Grosjean (1985: 471) argues for a bilingual (or holistic) view of bilingualism. This is different from the monolingual view, which always compares the linguistic ability of bilinguals with that of monolinguals of the languages concerned. Bilinguals have a unique and specific language configuration and therefore they should not be considered as the sum of two or more complete or incomplete monolinguals.

> The coexistence and constant interaction of the two languages in the bilingual has produced a different but complete language system. An analogy comes from the domain of athletics. The high hurdler blends two types of competencies: that of high jumping and that of sprinting. When compared individually with the sprinter or the high jumper, the hurdler meets neither level of competence, and yet when taken as a whole, the hurdler is an athlete in his or her own right. No expert in track and field would ever compare a high hurdler to a sprinter or to a high jumper, even though the former blends certain characteristics of the latter two. In many ways the bilingual is like the high hurdler.
>
> (Grosjean, 1985: 471)

It can therefore be assumed that language practices in bilingual and multilingual classrooms will not necessarily be the same as in any other classroom. A particularly important aspect, one which makes the bilingual or multilingual person an integrated whole, is code-switching. Code-switching, or switching from one language to another, can therefore be expected to occur in multilingual classroom communication.

In their study of Science classrooms in Swaziland, Rollnick & Rutherford (1996) found the use of learners' main languages to be a powerful means for learners to explore their ideas. They went on to argue that without the use of code-switching, some learners' alternative conceptions would remain unexposed. A key finding was that learners' written work might conceal misconceptions and that these were more likely to be revealed in peer discussion in the learners' main language.

Code-switching as a learning and teaching resource has been the focus of study in Mathematics education in the recent past in Southern Africa (Arthur, 1994; Adler, 1996;

Setati, 1996) and in the United States (Khisty, 1995; Moschkovich, 1996; 1999). These studies have shown that use of the learners' first language in the teaching and learning of mathematics provides the support needed while the learners continue to develop proficiency in the language of learning and teaching.

An interesting study regarding the use of code-switching in English language classrooms was undertaken by Stein (1994) in a Grade 7 class at a Gauteng primary school. Together with a research student and the learners, Stein produced a book of multilingual stories, jokes and drawings. She describes how working with all the main languages of the learners facilitated the storytelling and story-writing process:

> At the beginning of this project, when I asked the class if they had any stories to tell, or if they could remember any stories from their families or communities, many said that they did not have any stories. Then Patrick Baloyi, a research student from the Department of Applied English Language Studies at Wits, came along and started off the process by telling some of the stories his father used to tell him when he was young. Stories about World War 2, stories about the family history, stories about animals. We said to the children, "Tell your stories in the language in which it was told to you." And then suddenly all the stories started coming out! Stories in Zulu, Tswana, English, Afrikaans, Tsotsitaal! So we set up oral storytelling sessions with the whole class and recorded them on video camera. If someone told a story in Xhosa, someone else would translate it into English. In this way we tried to develop the children's skills in translation. Zulu into English. English into Sotho and so on. This is how we built up a collection of more than 30 stories.
>
> (Stein, 1994, no page reference)

The code-switching foci of the various studies mentioned above range from misconceptions in Science, to sustaining mathematical discussions, to storytelling in English. There is, nevertheless, an underlying common thread in both the motivations for, and the findings of, this growing research field. Exploratory talk is important for enabling learners to explore ideas and concepts in a comfortable environment. It is also important for enabling teachers to listen to learners' ideas and conceptions so that these can be worked with and built on. Code-switching, and through this the harnessing of learners' main languages as resource, becomes a means for exploratory talk in the multilingual classroom.

Discourse-specific talk in the multilingual classroom

It is well known that language is important for thinking and learning. This means that language is not only an issue in multilingual Mathematics, Science and English language classrooms but in all classrooms. Language, however, takes on a specific significance in multilingual classrooms. Learning and teaching mathematics, science and English language in a classroom in which the LOLT is not the learners' main language is, undoubtedly, a complicated matter. Learning mathematics and science has elements that are similar to learning a language, since these subjects, with their conceptual and abstracted forms, have very specific registers and sets of discourses. This places

additional demands on Mathematics and Science teachers and learners.

As became evident in the first phase of the FDE research project in 1996 (this point is taken further later in this chapter), mathematics and science teachers face different kinds of challenges in their multilingual classrooms from those encountered by English language teachers. The latter have as their goal, fluency and accuracy in the new language – English. Mathematics and science teachers, in contrast, have a dual task. They face the major challenge of continuously needing to teach both the discipline and English at the same time. Learners have to cope with the new language of the discipline as well as the new language in which it is taught: English (Adler et al., 1997).

What is similar about these three subject areas, mathematics, science and English, is the fact that learners have to be initiated into specific ways of talking. Most learners come into the school with informal ways of talking and the challenge that teachers face is to encourage movement in their learners from predominantly informal spoken language to formal language, both spoken and written. Formalisation takes on different forms in mathematics, science and English. In mathematics and science, informal language can be referred to as the kind that learners use in their everyday lives to express their mathematical or scientific understanding. Formal mathematical or scientific language refers to the standard use of terminology which is usually developed within formal settings like schools. In most mathematics and science classrooms both formal and informal language are used either in written or spoken form. Pimm (1991), whose work originates in mathematics education, but can be used across mathematics, science and English, suggests that there are two possible routes to facilitate movement from informal spoken language to the formal written language that is frequently more valued in the school learning situation. The first route is to encourage learners to write down their informal utterances and then work on making the written language more self-sufficient; the second is to work on the formality and self-sufficiency of the spoken language prior to its being written down.

In multilingual classrooms the movement from informal spoken language (exploratory talk) to formal written language (discourse-specific writing) is complicated by the fact that the learners' exploratory talk may be in a language that is not the learners' LOLT. Figure 5.1 shows there are different possible routes that can be followed to facilitate the learners' movement from informal exploratory talk in the main language to formal discourse-specific written language in English.

The discussion so far enables us to see complex and competing demands on teachers in multilingual classroom contexts in South Africa. They are required to embrace an additive model of multilingual learning, and at the same time deal with the popular demand for access to English. Teachers also need to enable exploratory talk, which invariably needs to take place in learners' main language(s), or in a combination of those languages and the LOLT, constituted by code-switching. At the same time they are required to provide learners with access to subject-specific discourses. In particular, they need to assist learners to develop formal spoken and written mathematics, science and language competence in English. The pedagogical and the political are inextricably intertwined in each of these. And in moments of classroom practice, they can pull in competing and contradictory ways.

The outcomes of the Wits FDE research project provide insights into this complex arena of educational practice.

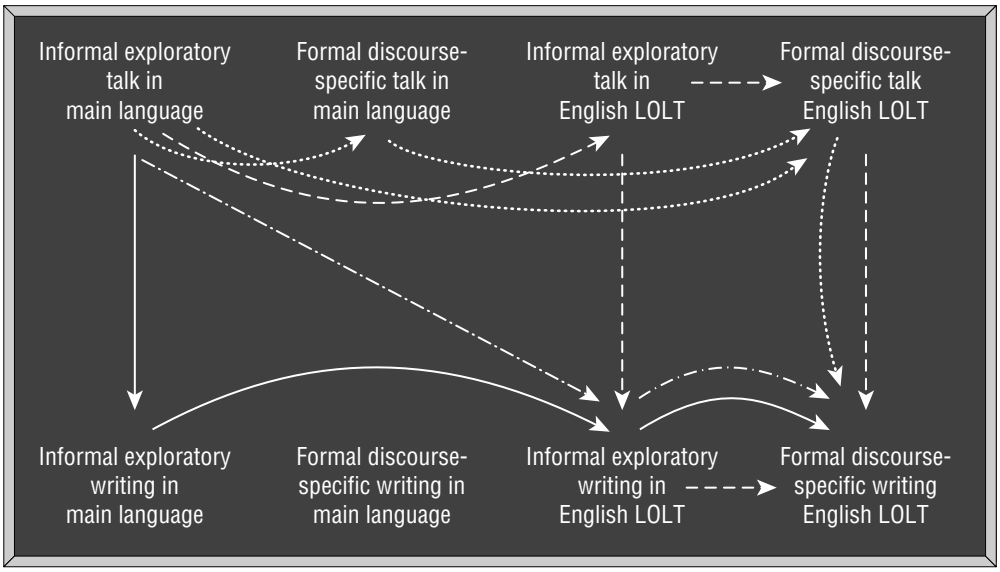

Figure 5.1 Possible journeys from informal exploratory talk in the main language to discourse-specific talk in English

Code-switching practices across classrooms and contexts

In all three years of the study (1996, 1997 and 1998), researchers recorded the occurrences of code-switching by the teacher and the learners in each class against particular items in a classroom observation schedule. Observation records were backed up by written narratives of every lesson as well as videotapes of selected lessons. Teachers also spoke about their code-switching practices in their in-depth interview each year. Table 5.1 on page 81 presents an analysis of this data in summary form.

Our main findings are described and discussed in terms of:

- changes in code-switching practices of teachers and learners over the three years of the study
- teachers' views on code-switching[1]
- differences across teaching and learning contexts
- differences across subjects

Changes to code-switching practices, 1996–1998

Code-switching by both teachers and learners was observed during the base-line study in 1996, particularly in mathematics and science classes, showing that it was already an established practice of the teachers in the study before they entered the FDE programme. The table shows that, in general, the extent of switching increased over 1997 and 1998. The form code-switching took in most classrooms was as follows: In the public domain, teachers used English predominantly and they switched to learners' main

[1] Due to our focus on teachers' practices, we did not interview learners to ascertain their views on code-switching.

Table 5.1 Record of codings from observation schedules 1996, 1997, 1998

	Teacher – according to subject, level and language infrastructure	CST: Code-switching by teacher			CSL: Code-switching by learner		
		1996	1997	1998	1996	1997	1998
MATHS	**MP1 FLLE**	1	2	1	1	2	1
	MP2 FLLE	1 to 3	XX	2	1	1	1
	MP3 FLLE	XX	2–	2–	0	2	2
	MP4 FLLE	0	0	1	1	2	1
	MP5 ALLE	1	1	1	2	2+	2+
	MS1 FLLE	2	2+	2+	1	2	2
	MS2 FLLE	2+	2	2+	3	2	2
	MS3 ALLE	2	2+	2+	2	2+	2+
	MS4 ALLE	2	2+	2+	1	3	3
SCIENCE	**SP1 ALLE**	1	2	2	2	2+	2+
	SP2 ALLE	2	2+	2+	2	2+	2+
	SS1 FLLE	0	0	2	1	2	2
	SS2 FLLE	2	2	2	1	2	2
ENGLISH	**EP1 ALLE**	0	1	0	2	2	4
	EP2 FLLE	0–1	1	2	1	1	0–1
	ES1 FLLE	0	0	0	4	4	4
	ES2 FLLE	1	2	3	0	3	3
	ES3 ALLE	0	2	1	0	3	1

MP1 FLLE = Mathematics primary teacher #1, in foreign language learning environment

ES3 ALLE = English secondary teacher #3, in additional language learning environment

XX = not teaching mathematics in that observation period

Code-switching by teacher – CST

0 = teacher uses only English in all verbal interactions

1 = teacher occasionally switches from English to main language(s) for reformulation in public and in limited individual/group interactions

2 = teacher switches from English to main language(s) for reformulation in public whole-class teaching, and uses main language(s) as major language of interaction with individuals and small groups

3 = teacher switches between English and main language(s) as necessary for the flow, order and content of teaching in public whole-class teaching and uses main language(s) as major language of interaction with individuals and small groups

Code-switching by learners – CSL

0 = learners only use English in all verbal interactions

1 = learners use limited English in public domain (responding to teacher questions, typically short phrases or single words, procedures require); occasionally have opportunity in individual/ group interactions to use main language(s) for questions/ exploratory talk

2 = use English in public domain (still limited to short responses), with good opportunity for exploratory talk in main language(s)

3 = switch as needed in whole-class interactions; use main language for exploratory talk

4 = switch as needed in whole-class interactions; use main language for exploratory talk and English for reporting on work done in public domain

language(s) for reformulation in public whole-class teaching, and for interaction with individual learners or small groups. Learners also mainly used English in the public domain. In many classrooms this spoken English was limited to short phrases, single words or recall of procedures. In 1997 and 1998, however, learners engaged in more exploratory talk in their main language(s) than had been observed in 1996. This increased "learning talk" in many of the lessons was related to the incorporation of more group work by many teachers into their practice.

In fact, the most visible change that we saw over the three years was the increase in group work across most classes (Adler et al., 1999). Learners had more discussions with each other in their groups or in pairs in their main language, or in their main language and English, creating more possibilities of learning from talk in many classrooms. However, group work as it occurred across many of the classrooms, and the accompanying harnessing of learners' main language(s) as a learning resource and thinking tool, resulted in some unintended consequences.

In some English classrooms there was a significant increase in oral work, and in the ability of learners to use English for extended speaking turns when addressing the whole class. However, a structured analysis of learners' classwork books indicated that increased oral work was accompanied by more limited writing of extended texts in English. Exploratory talk seemed to feed a practice that undermined writing.[2]

In most of the maths and science classes, there were few opportunities for learners to report on their group work, and written work was restricted to exercises, typically in symbolic form. There were also few opportunities for learners to use and develop spoken and written English. In the science classes in particular such language was used mainly by the teacher. SP1 and SP2 and MP5 all organised learners into groups to work on science experiments and more open mathematical tasks respectively. In each of these classrooms, learners engaged with one another in their main languages while working on a mathematical task (e.g. exploring tessellating shapes) or on an experiment in science (e.g. exploring magnetic substances). However, the movement from this exploratory talk was directly to exposition by the teacher, typically in English, or to written worksheets in English. The data we have does not enable us to make firm claims about the consequence for learners of this abbreviated journey. However, it is likely that the *meanings* of the formal concepts and/or symbols they came to write down were not sufficiently elaborated, either through more explicit moves from informal talk to discourse-specific talk, or from spoken to written mathematics or science language.

In summary, across English, mathematics and science classes the journey that needed to be navigated from learners' informal, exploratory talk in their main language to formal, discourse-specific talk and formal written work in English appeared, for the most part, to be incomplete.

[2] One of the difficulties in reporting longitudinal qualitative research is providing evidence of observations of classroom talk and writing over time. We did not keep copies of learners' classwork books in the first two years. Even if we had, we would need to reproduce substantial extracts from these to illustrate change over time. Similarly, evidence of increased exploratory talk requires substantial excerpts from classroom transcript. Moreover, as we designed the study with its focus on teachers' practices, we did not set out to record in any detailed way learners' language production. This emerged as important over time, and we attempted to capture this through careful analysis of learners' classwork books, particularly in the final year. In research reporting terms, this limits, then, the nature of the claims we are able to make. Hence the "fuzziness" (Bassey, 1999) in some of our claims.

Teachers' views on code-switching

On the one hand, many of the teachers talked about how their FDE studies gave them more confidence in using code-switching. An established practice was legitimated through their engagement with language practices in the programme. In her first interview in 1996, MS1 told us that "before I joined the FDE I thought it's a mistake to talk in Tsonga in the maths class …" Similarly, MS2 said that when she uses Tsonga "learners understand better. I used switching even before, but I got confidence to use code-switching from the FDE" (MS2, Interview, 1998). In the words of two of the English language teachers, the FDE "liberated" them with regard to code-switching. This is significant in the light of the politics around English as target language and how this is best acquired, suggesting that the approach in the FDE programme works as a support for the language-in-education policy in a hotly contested political terrain.

On the other hand, many teachers also articulated a number of dilemmas in relation to access to meaning and access to English. As they talked about code-switching in their interviews, they justified their own and their learners' use of their main language in ways that indicated that they believed that code-switching really should not happen, but that they had no alternative to making use of it. Switching was needed for understanding concepts or ideas, and for communicating this understanding:

> Ever since [teaching] Standard 10 [Grade 12] I have done that [code-switched] because sometimes when I talk to them [learners], I look at their face and I could see they don't hear any word. So I try to switch to Northern Sotho. This is something that I have even told my Standard Sixes [Grade 8], that there is maybe something you want to say, if you find you can't find the words in English, just say it in Northern Sotho.
>
> (SS2, Interview, 1998)

MS1, a secondary mathematics teacher in an FLLE school in the Northern Province, demonstrated increased use of code-switching in 1997 and 1998 for reformulation in the public domain and during interaction with individuals and small groups. In her 1997 interview, she offered the well-rehearsed argument for teaching in English: "Teachers should use English because the exams are in English." By 1998 she was able to articulate some comfort with her code-switching by referring to how it is used:

> Code-switching is good only when it is used properly … I mean if you just allow your students to use just Tsonga they just talk, talk, talk Tsonga too much … but maybe if you ask a question and you see that a child is struggling to say something properly in English, but maybe he has got some ideas, if you allow your students to talk in Tsonga it helps. You find that he has got brilliant ideas or the answer you wanted or something like that or the misconception … after you have code-switched to Tsonga, you can repeat that thing in English. Or maybe if one child answers in Tsonga, you can repeat in English for the others … to show them that it's important that they try and use this language because they read question papers in English.
>
> (MS1, Interview, 1998)

Signalled here is the "dilemma of code-switching" described by Adler (1998) in her study of secondary Mathematics teachers' knowledge of their practices in multilingual classrooms. Teachers who are themselves multilingual, whose learners know that they can reformulate and converse with them in their main language, are continually judging when to switch from English so as to enable learners to make sense of the concept or topic under discussion. At the same time they are continually judging when to push learners' reception and production of mathematics in English, since this, ultimately, is the language in which learners will be assessed. English as target language has to be acquired through and during the learning of mathematics. The dilemma between access to meaning and access to English is ever-present, having to be managed ("used properly") in the day-to-day practices in multilingual mathematics classrooms in South Africa.

A discussion of code-switching and the formation of identity is beyond the scope of this chapter and particularly beyond what was present in the data. The significance of code-switching for engagement with issues of self in varying ways was, nevertheless, signalled by one of the English teachers. ES3 is clear that as an English language teacher, she needs to work in English. However, there are times when it is necessary for her to work in the learners' main language(s).

> At times there is something that when you explain in English, they seem to understand. But if you tell it in vernacular they seem to understand it better. Maybe if you instil some morals, if you say it in English it becomes at times light, they take it and just joke. But if you express it in mother tongue, they get the feel of it.
>
> (ES3, Interview, 1997)

The shifts to more code-switching by teachers and learners observed and summarised in Table 5.1 are intentional, if dilemma-filled, though there is a relative silence around issues of identity in teachers' motivations and justifications for code-switching. Moreover, the teachers do not express an awareness of the demands made on them to steer their learners towards increasingly discourse-specific talk in English in the classroom. In the struggle with and for English as LOLT, and the legitimating of code-switching practices, what is signalled in this study is that strategies that enable exploratory talk in the main language are fairly easily appropriated by teachers. But this appropriation is not easily coupled with equal attention to discourse-specific talk in English on the one hand, and extended formal writing in English on the other.

Differences across teaching and learning contexts

One of the difficulties encountered in doing research across teachers, however small the sample, is that patterns across conceal divergences and important differences within and between. What the teachers' views begin to reveal is how the "average", or overall pattern, of increased use of code-switching conceals important differences across subjects, across levels, and across regions. Here is where the detail available to us through case studies enabled us to identify some of the complexities that constitute these differences.

Differences between the code-switching practices of primary and secondary mathematics teachers are evident in Table 5.1. They can be seen in a different display in Tables

5.2, 5.3 and 5.4. that position each teacher in a grid relating teacher and learner switching in each of the years 1996, 1997 and 1998. In Table 5.2, there is a dispersion of the teachers across the grid, a dispersion that begins to converge in 1997 and continues to do so in 1998. In relation to level and context, there is an interesting phenomenon across the nine mathematics teachers. Teachers and learners in the secondary mathematics classrooms observed made greater use of code-switching than those in primary mathematics classrooms. This observation surprised us during the first year of the study, and its persistence required further examination. We had in fact anticipated the reverse. In the primary school, where levels of competency in English as additional language

Table 5.2 1996

		TEACHER			
		0	**1**	**2**	**3**
LEARNER	0	EP2 ES3	ES2		MP3
	1	MP4 SS1	MP1 MP2	MS1 MS4 SS2	
	2	EP1	MP5 SP1	SP2 MS3	
	3			MS2	
	4	ES1			

Table 5.3 1997

		TEACHER			
		0	**1**	**2**	**3**
LEARNER	0				
	1		EP2		MP2
	2	MP4 SS1	MP5 EP1	MP1 MS1 MP3 MS2 SP1 MS3 SP2	SS2
	3			MS4 ES2 ES3	
	4	ES1			

Table 5.4 1998

		TEACHER			
		0	1	2	3
LEARNER	0				
	1		MP1 MP2 MP4 ES3	EP2	
	2		MP5	MP1 MS2 MP3 SP1 SS1 SP2 SS2	MS3
	3			MS4	ES2
	4	EP1 ES1			

could be expected to be poorer than at secondary level, we expected teachers to use learners' main language more frequently themselves and have their learners do so.

This "level" observation nevertheless intersects with context in an important way. Four of the five primary mathematics teachers were in rural FLLE contexts, with minimal English language infrastructure. That English was more prevalent in these primary FLLE mathematics classrooms can be understood as teachers seeing it as their task to model and encourage English and mathematical English. The classroom is the only context in which learners have this exposure. And the teacher himself or herself is possibly the only source of this, hence the pressure to use English as much as possible. The double irony here is that in the very context where learners' main language is their only route to exploratory talk, there are the greatest pressures on the teacher to use English as much as possible, and at the same time to maximise learners' use of English in the classroom.

That there are different demands on teachers at different levels and in different language infrastructural contexts was reflected in the ways teachers talked about their code-switching.

While the dilemma of code-switching was expressed in some form by all teachers, it was far more acute for primary than secondary school teachers, particularly in mathematics and science. Primary mathematics and science teachers carry the responsibility, together with the English language teachers, for *establishing* fluency in English while they are teaching their subject. The dilemma was also more acute for teachers in rural FLLE schools than it was for teachers in urban ALLE schools. MP1, a primary school mathematics teacher in an FLLE context, whose practice shifted from no switching in 1996 to limited switching in the public domain in 1998, expressed contradictory views about her own switching as a teacher which illustrate her dilemma. In 1997 she said: "I use code-switching because learners do not understand English." In 1998, she was equally adamant that, "Code-switching does not benefit learners." MP1's ambivalence explains why teachers like her are seen to switch minimally, and are also not seen encouraging learners' use of their main language in formal class time.

In FLLEs, the school is likely to be the only place where most learners can hear English being spoken. Teachers are faced with the challenge that even if learners do not understand English, they need to provide maximum opportunity for these learners to hear and use English.

Differences across subjects

The mathematics and science teachers in the study, particularly those working in secondary schools, switched to the learners' main language to reformulate concepts, ideas and instructions.

SS2 explained his code-switching practice as follows:

> Sometimes I ask them a question, and they keep quiet, all of them. I have to rephrase the question and still … and I try to lead them to an answer.
>
> (Interview, 1997)

MS3 explained how important it was that learners draw on their main language in their mathematical learning:

> It is easier for them to ask questions if they use their mother tongue. They become more free. It is easier for them to explain exactly what they want.
>
> (Interview, 1998)

While present, switching was a *minor part* of English language lessons. EP1 and ES1 switched least; in fact ES1 did not switch at all. By 1998, their learners switched as needed, used their main language for exploratory talk and were encouraged and able to report on work in the public domain in English. These English teachers enabled learners' use of their main language as a resource for learning talk – for both exploratory and discourse-specific talk. They themselves "scaffolded" English rather than switched. (The notion of scaffolding is discussed in Chapter 6.)

EP1 explained in her interview that she switched into Tshivenda only "as a last resort". This would be to clarify an instruction or explanation or to respond to learners' queries during individual or group work.

> If learners do not understand a word in a comprehension passage I say look at the dictionaries. You find that even if they look in the dictionary, they do not understand. I tell them in Venda, it means this.
>
> (Interview, 1997)

Interestingly, this view about code-switching only holds for her in her English language class. She commented that when she taught other subjects she switched more – as indeed was observed in her teaching of Health lessons.

ES1 used only English in the public domain in his class. As noted by one of his observers: "He reworks the meaning of the word through the generation of multiple sentences in which the word is used, all the while linking the meaning of words to students' experiences" (Lesson observation commentary, 1996). In his interview in 1998, he explained that his "students have limited chances of getting their vocabulary (in English)

enriched" and so it is very important for teachers to speak English and to provide a model for learners.

Both EP1 and ES1 were, nevertheless, effective in harnessing learners' use of their main language. In most of the English classrooms, learners were encouraged to switch for exploratory talk. ES1 said:

> It's much easier for them to talk so long as I don't go to them and listen to the type of language they are using. Because if you are still constructing a picture and then I want you to paint it in English, then it's much more difficult. But when they are using their mother tongue it's quite easy. They come up with ideas and then the battle will obviously be the presentation. But as long as they are making sense I am okay with that.
>
> (Interview, 1998)

and EP1 said:

> If there's someone, maybe he is not able to speak the sentence in English, she can make some code-switching. But not always. You must speak … maybe the sentence in English and then you put the Venda words. The group will help you. Or you can say the whole sentence and the group must tell you the sentence in English. I ask them to code-switch.
>
> (Interview, 1998)

That Mathematics and Science teachers switched more in the public domain than English language teachers thus emerges as a clear function of their differing primary goals. The primary goal in the English language class is the acquisition and learning of English. We have been persuaded by these two English teachers, in particular, how important it is in the first instance to distinguish between teachers' and learners' use of main languages in the classroom. Moreover, in contexts with limited English language infrastructure, the teacher's role in modelling and scaffolding the use of English is critical.

Much of the literature on models of bilingual and multilingual teaching includes generalised claims for the harnessing of learners' main language as a resource in the teaching-learning process, and for switching to be part of both teacher and learner talk. The practices and views across the mathematics, science and English language teachers in this study enable us to see that more research is needed that distinguishes teachers' and learners' switching needs in relation to the subject learning at hand. As mentioned earlier, as we focused on teachers in this study, we did not interview learners on their views of code-switching, and our attention to learners' language practices was in relation to our focus on the teachers. Clearly, for full accounts of teaching and learning needs across subjects, further research needs to include focused attention on both teachers and learners.

Implications of the research findings

One of the most significant things we have learned through this research project is just how complex language issues are in rural schools where there is very limited English infrastructure in the surrounding community on which teachers can build. Exposure to English is via the teacher. This puts pressure on teachers to use English as much as pos-

sible. Teachers in rural schools in this study, particularly across Grades 7 to 9, argued quite strongly against frequent code-switching in class. We also found that primary maths and science teachers in urban and rural schools feel far more pressure than their secondary colleagues to teach in English because their learners are still in the early stages of learning English.

Across all the teachers, the dilemma of code-switching persists, and with it issues of meaning, of self and of access to English, the dominant and most powerful language in the country. So what does this mean for the FDE programme at the University of the Witwatersrand, for educational policy in South Africa and for INSET more generally?

Implications for the FDE programme

At the level of the programme it is critical that we pay more explicit attention to possible journeys from exploratory and informal talk in the main language towards discourse-specific talk in English and formal writing in English. Moreover, attention needs to be given to the ways and means by which these journeys are likely to differ across contexts. In concluding her study, Adler (1998) argues that cases built around key dilemmas in multilingual classrooms (like code-switching) could be a means for enabling teachers to engage critically and substantively with the complex demands in South African multilingual classrooms. In the English language classroom, teachers need to grapple with cases or instances where the dilemma of switching is apparent. An example here would be reading, speaking and writing about an emotive text. Teacher ES3 suggests that emotive meanings, meanings tied to self, are unlikely to be revealed or accessed in English. A case could be built that explores how to move from informal discussion in main language(s) to speaking and then writing about the text in English. As Figure 5.1 shows, there are many routes for this pedagogical journey – but it needs to be navigated.

While on the surface reading, speaking and writing mathematics and science might be less emotive (we suggest that emotions are always present in the classroom, but they might not be the explicit focus of attention as in an English text), a similar journey from informal talk in the main language to formal written productions is necessary. For mathematics teachers, a concept that has no immediate translation into the learners' main language requires teachers to either scaffold within English or draw on metaphors and other meanings in the main language and then navigate the journey between these and the formalisation of the concept in spoken and written forms. The case could highlight the kinds of difficulties learners and teachers might confront on such a journey; and it could also highlight the kinds of routes that teachers and learners navigate.

In short, the FDE courses and programme as a whole need to attend more explicitly to instances of practice (practice-based learning in Lampert & Ball's (1998) terms) which both act as images of what the journeys could be, and consider why and how these journeys might create tensions for teachers and learners.

Implications for educational policy in South Africa

The findings from our research suggest that some of the dominant "messages" in current curriculum documents may need to be reviewed. For example, one of these messages in Curriculum 2005 is that group work is "good" as it encourages exploratory talk

and co-operative learning. The issue of how teachers and learners are to navigate the journey from informal exploratory talk (in the learners' main and/or additional languages) to formal, discourse-specific spoken and written English is not addressed. As a second example, language-in-education policy that supports additive multilingualism in classrooms aggregates all schools and does not sufficiently consider the differing language infrastructures of schools and communities.

Implications for INSET

The different language infrastructures, levels and subjects with which teachers work appear to be significant for shaping INSET possibilities and constraints. It would not be overstating the case to say that across national contexts increasing emphasis on learner-centred practice is widespread (e.g. Black & Atkin, 1996), as is advocacy for additive models of bilingual education, within which code-switching is a key strategic practice (JET, 1997). Advocacy of learner-centred practice, of additive multilingualism and of strategic code-switching are features of the courses in the Wits FDE programme. What we have shown from our study of teachers in multilingual contexts is that, firstly, take-up of these practices was evident across contexts, but also differed across contexts. Code-switching practices facilitate the harnessing of learners' main languages and so exploratory talk in the classroom. At the same time, however, there are unintended consequences of the increasing exploratory talk in class, with teachers either short-cutting or not completing the journey from informal exploratory talk in the main language to formal discourse-specific writing in English. This suggests the need for more serious engagement in teacher education with the possibilities of, and constraints on, what are typically presented as panaceas for "good practice".

That all the teachers in the Wits FDE study experienced some form of dilemma in relation to code-switching, and that these dilemmas were most acute in FLLE and primary school contexts, supports research literature recently emerging from what are called ESL (English Second Language) contexts elsewhere. In two independent articles reporting on research in science and mathematics reform classrooms in the USA, Fradd & Lee (1999) and Moschkovich (1999) each question whether and how group work and a more facilitative and less instructive role for the teacher actually promote equity goals. In their shared concern for developing discourse-specific talk and competence in learners of mathematics and science, they ask whether so-called universal "good practices" actually deny rather than enable learning in ESL contexts.

In their report on a study of science classrooms, Fradd & Lee (1999) pose the question: does the total move from whole class to small group work benefit ESL learners? They argue that learning science is dependent on the learners' ability to comprehend and communicate concepts and understandings. Learners need to develop the language to question, inquire and explore: they need to acquire the discourse of school Science. They go on to argue that the indirect nature of exploratory talk (in groups) makes it difficult for learners to acquire these specific participation rules on their own, and as a result, a fully exploratory Science classroom learning environment may limit, rather than enhance, learners' opportunities to learn. Fradd & Lee argue that learners could benefit from both explicit teacher-led activities and from exploratory teacher-facilitated activities. They advocate a research agenda to effectively implement science inquiry in ways

that would enable all learners to succeed, where teachers need to link the nature of science with learners' experiences and interactional styles.

Moschkovich (1999) addresses this very issue, but specifically in relation to teaching and learning mathematics in ESL contexts. Starting from the assumption that teachers need to support the participation of ESL learners in mathematical discussions, she argues for the kinds of strategies observed in the classrooms of the two English language teachers discussed earlier in the chapter (ES1 and EP1). She shows, through a case study of a teacher, how mathematical discussion is facilitated by the teacher using several expressions (in English) for the same concepts, using gestures and objects to clarify meaning, accepting and building on learners' responses in English, "revoicing" learners' statements using more formal maths language (again in English), and focusing not only on vocabulary but also on maths content and argumentation practices. She too poses the question: Does the total move from whole class to small group work benefit ESL learners? Her research suggests that the answer here is "no".

Conclusion

We learned from the teachers in this study that their code-switching practices are intentional but dilemma-filled, particularly in the face of the dominance of English in the South African context. Attention to code-switching in INSET could be an important part of a process of legitimising what teachers actually do (i.e. harness learners' main language as a resource for learning) in a context where pressure to access and acquire English is enormous.

The widespread take-up by most teachers in the study of forms, such as group work, that increase the possibilities of learning from talk (i.e. of learners' using language as a social thinking tool) indicates that this practice is easily integrated, at least in form, into existing teaching and learning repertoires. However, learning from talk is significantly limited if it is not supported or complemented by strategies for learning to talk, that is, learning subject-specific formal or educated discourses. There appears to be a danger that the advocacy of talking to learn and use of main languages is being incorporated or taken up at the expense of learning to talk mathematics or science. In the English language class it may also be at the expense of writing extended texts.

As previously stated, the different English language infrastructures, levels and subjects in and with which teachers work appear to be significant for shaping INSET possibilities and constraints. We need to dis-aggregate schools and classrooms along these three different axes and tailor programmes according to whether they are within English Foreign Language or English Additional (Second) Language infrastructures; whether they are primary or secondary; whether they are about language as a subject or language for a subject. Our concern is that without such specific contextual attention we will only exacerbate educational inequalities and leave some teachers and learners stranded at some point on their educational journey.

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CHAPTER 6

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Developing learner-centred practices through the FDE programme

Introduction

Learner-centred teaching is seen as an important element of the South African Curriculum Framework and Curriculum 2005 (Chisholm et al., 2000; National Department of Education, 1996). However, research on teachers' practices in relation to Curriculum 2005 suggests that while teachers are generally enthusiastic about the new curriculum, and often believe they are working with its principles in their classrooms, much teaching practice remains teacher-centred (Chisholm et al., 2000; Taylor & Vinjevold, 1999; Jansen, 1999). This research is consistent with much international research which suggests that teacher-centred practices are remarkably resistant to change (Sugrue, 1997; Cuban, 1993; Edwards & Mercer, 1987). Chisholm et al. (2000: 78) argue:

> … teachers described what they believed determines the essential features of C2005. Generally, the responses point to changes in classroom arrangements such as group-work and learner-centred activities where the teacher plays the role of the facilitator. However, it is often the case that when these concepts are implemented in the classroom, *teachers showed evidence that they had embraced the form rather than the spirit and content of the ideas*. Teachers may be aware of the need to make learners participants in the learning process. However, this was understood more in procedural terms, rather than as something which promotes learning. Many learners in the classes observed still do not participate fully in the learning process since teachers are still providing a great deal of direct instruction and are still preoccupied with content coverage.
>
> (Chisholm et al., 2000: 78, our emphasis)

The Further Diploma in Education (FDE) programme at the University of the Witwatersrand (Wits) deals substantially with learner-centred teaching in a number of its courses. In this chapter, we investigate the extent to which teachers on the programme did manage to take up learner-centred practices, and their successes and difficulties in doing so. We explore in depth the idea that teachers take up "the form rather than the spirit and content" of learner-centred practices. To do this, we create a framework for understanding learner-centred teaching, we develop the notions of "forms" and "substance" of learner-centred teaching in relation to this framework, and we present an account of how teachers in our sample worked with the forms and substance of learner-centred teaching in their classrooms. We show that take-up is more complex than a simple distinction between forms and substance. In this way, we hope to deepen understandings of some of the difficulties for teachers in taking up learner-centred practices. We also draw out implications of our research for the Wits FDE programme and for in-service programmes in South Africa more generally.

A framework for learner-centred teaching

Notions of learner-centred teaching have a long history, reaching back as far as Plato's Socratic dialogue where, through strategic questioning, the teacher drew out the ideas of the student. Rousseau's *Emile,* published in the eighteenth century, was the first comprehensive presentation of learner-centred ideas (Darling, 1994). Rousseau argued that children are naturally active, both physically and mentally, and that education should build on this activity, taking account of individual differences and the levels of development of the child. The first person to explicitly use the term, in 1889, was the German, Friedrich Froebel, who argued that schooling should fit children's stages of development (Chung & Walsh, 2000).

At the turn of the twentieth century, Dewey ran an experimental school in the USA where the "curriculum was centred around children's interests in adult work, family and community ties, group co-operation, and democratic practices geared towards larger social goals" (Cuban, 1993: 40). In this school, even the youngest learners were encouraged to make decisions regarding what they would learn, take responsibility for these decisions, work practically and co-operatively, and make links between what they were learning and their lives outside of the classroom. This kind of project- or activity-oriented curriculum was based on notions of democracy and community development, which brought a more social orientation to the notion of learner-centred schools (Chung & Walsh, 2000).

Ideas about learner-centred teaching gained psychological support from Piaget's theory of development which argues that young children actively construct their own concepts, that these differ from adults' conceptions of the world, and that children's ideas make sense in terms of their current thinking (Ginsburg & Opper, 1979). These ideas ushered in an era of learner-centred ideas and teaching, particularly in primary schools in Britain (Edwards & Mercer, 1987) and also in the USA and Australia. Currently, many curriculum reforms, including Curriculum 2005 in South Africa, promote or are informed by notions of learner-centred teaching.

Learner-centred teaching is thus a robust concept. However, it can hold remarkably different meanings for different people. Cuban (1993: 39) argues that what most concep-

tions of learner-centred teaching hold in common is "the conviction that schools can transform children's lives, and ultimately the larger society". As discussed in Chapter 1, in South Africa, transformation towards democracy and access to knowledge for all learners is clearly a key need, and curriculum policy sets this up as an explicit goal of education (National Department of Education, 1996). "Learner-centredness" is seen as a key means for providing for personal and social development through the new curriculum:

> Curriculum development, especially the development of learning programmes and materials, should put learners first, recognising and building on their knowledge and experience, and responding to their needs. Curriculum development processes and delivery of learning content (knowledge, skills, attitudes and values) should take account of the general characteristics, developmental and otherwise, of different groups of learners. Different learning styles and rates of learning need to be acknowledged and accommodated both in the learning situation and in the attainment of qualifications. The ways in which different cultural values and lifestyles affect the construction of knowledge should also be acknowledged and incorporated in the development and implementation of learning programmes.
>
> (National Department of Education, 1996: 11)

The above description of learner-centred curriculum development incorporates many of the historical notions of learner-centred teaching, and has included recognition of and respect for diversity among learners as a key aspect of learner-centred practice. It contextualises international understandings for local circumstances. However, what the policy does not explicitly take into account are the local difficulties that teachers experience in putting the above ideals into practice. A common thread running through all the chapters in this book is that in South Africa we are working in an education system with generally underresourced schools and many demoralised teachers, in a conflictual and violent society. As a result, the goals of learner-centred teaching play out and are transformed in our classrooms in complex ways.

In order to help us understand how teachers in our sample have taken up learner-centred practices, we identify three analytically distinct characterisations of learner-centred teaching:

- Interpersonal relations between learners and teachers
- The curriculum: what is taught and how it is decided upon
- Instructional practices, or pedagogy: the interrelations between learning and teaching

Together these provide an integrated framework for analysing how the Wits FDE presented learner-centred teaching to teachers in the programme, and for analysing how the teachers were able to work with learner-centred ideas in their classrooms.

Interpersonal relations

Learner-centred classrooms and schools are often considered to be those where there are relationships of respect and trust between teachers and learners. Teachers acknowledge learners and their achievements, and in this way motivate them to learn and

achieve. Learners should not fear teachers, as this could inhibit their learning. The abolition of corporal punishment in the South African Schools Act reflects this position (Vally, 1995). In diverse societies like South Africa, learner-centred interpersonal relations are articulated in policy and require the development of tolerance for differences, so that the voices of all children and the communities they come from can be heard in the classroom (*Government Gazette*, 1996: 13).

In a study of learner-centred teaching in Irish primary schools, Sugrue (1997) argues that the most significant aspect of learner-centred practice he observed was in the area of interpersonal relationships. Teachers were able to create comfortable working environments and maintain friendly, caring relationships with learners, but found it more difficult to develop learner-centred curricula and pedagogy. For the teachers he interviewed, the shift in interpersonal relationships is the most significant long-term change in schooling; it is what is most different between their teaching and how they were taught as learners in school. This is probably the case in many reasonably resourced, developed contexts. It is to be expected that in these contexts, shifts in interpersonal relations, which relate to control over behaviour, might be easier to achieve than shifts in curriculum and pedagogy, which relate to control over knowledge. It might also be argued that shifts in interpersonal relationships are a necessary although not sufficient condition for shifts in curriculum and pedagogy.

An important question is to what extent, and in what ways, it is possible for teachers to significantly shift interpersonal relationships with class sizes of between 60 and 100 learners. A second key question is: What is the nature of the power relations in South African classrooms? In very violent situations, teachers might be afraid of learners, and learners of each other. How do the realities of the South African education system impinge on teacher-learner relationships in the classroom? Our study did not set out to answer these questions. However, they form an important background to our data, which does point to some of the relationships between shifts in interpersonal relations, and shifts in curriculum, and pedagogy.

Curriculum

Three interrelated aspects are usually associated with a learner-centred curriculum: a curriculum that is responsive to learners' needs (e.g. Darling, 1994); a negotiated curriculum (e.g. Ingram & Worrall, 1993) and an integrated curriculum (e.g. National Department of Education, 1996).

A curriculum that is responsive to learners' needs can be conceived of in terms of, firstly, learners' backgrounds and their everyday practices; and secondly, their possible futures. The first suggests that teachers should structure the curriculum to include aspects of learners' everyday knowledge. However, Taylor (1999) argues that there is a substantial gap between everyday knowledge and the concepts and processes of formal knowledge, specific to a subject and organised in a disciplined way. Therefore, a curriculum which focuses substantially on the everyday, at the expense of formal knowledge, is in danger of denying access to disciplined knowledge to the very people who have been denied it most in the past. This point is similar to the argument in Chapter 5 for completing the journey between everyday talk in learners' main languages and discourse-specific talk and writing in English. Relating the curriculum to learners' futures is reflect-

ed in the emphasis on skills and application of knowledge, in order to prepare learners for the job market and competent citizenship.[1] Thus being responsive to learners' needs raises the question as to which needs, present or future.

With reference to a negotiated curriculum, a question that arises is who decides what learners' needs are (Darling, 1994). Are learners themselves in the best position to make such a decision? Are teachers, or parents, in a better position? A negotiated curriculum was a feature of the early experimental schools in the USA (Cuban, 1993) and other progressive movements in education (e.g. Skovsmose, 1994; Ingram & Worrall, 1993; Mellin-Olsen, 1987). Learners decide together with the teacher on key projects that they will undertake, and as these unfold, skills and knowledge are developed together. The teacher may take a key role in structuring projects and ideas. However, much of the activity is learner-directed. Such practices raise two questions. First, can all or most key concepts in an area of knowledge be covered in this way? Second, should some form of consolidation and automisation of knowledge gained also be considered?

An integrated curriculum is one in which fixed boundaries between disciplines are broken down, and which enables learners to make connections between knowledge domains. Integration is one of the principles underlying C2005. As with relevance, integration is a separate principle from learner-centredness in the curriculum framework, but is part of the discourse of learner-centred teaching, because it emphasises what the learner needs to know, rather than disciplinary demands. However, integration may lead to a situation where key ideas and competences within disciplines are not dealt with properly (Taylor, 1999). In addition, integration across subjects makes additional demands on teachers. In implementing any curriculum, teachers have to make key decisions on the sequencing, pacing and grading of tasks. Findings from both our study and the President's Education Initiative research projects (Taylor & Vinjevold, 1999) indicate that sequencing, pacing and grading of tasks are difficult for teachers even within conventional subject boundaries, which bring with them the disciplinary organisation of knowledge. When such boundaries are stretched or broken, demands on teachers' subject knowledge and mediational skills increase.

In relevant, negotiated and integrated curricula, teachers need to keep both learner and subject in focus at the same time, drawing on the resources that each provides to make links with the other. Thus a truly learner-centred curriculum is both learner- and subject-centred, and through the increased demands made on teachers, learner-centred curricula place them too in the centre of the educational enterprise. The key to making links between learner and subject is teachers' pedagogical practices.

Pedagogy

Learner-centred pedagogy involves teachers acting to make links between learners' current meanings and new knowledge, and is informed by theories of learning and development, particularly Piagetian and Vygotskian ideas. Many ideas about learner-centred teaching come from Piaget's theory of the active construction of knowledge by the

[1] It is interesting that the South African curriculum framework records this aspect of curriculum under "relevance" (National Department of Education, 1996: 12), and not learner-centredness. However, much of the literature (e.g. Cuban, 1993; Taylor, 1999), and certainly the common discourse among teachers, sees relevant curricula as part of learner-centred teaching.

learner (Darling, 1994; Edwards & Mercer, 1987). Two conditions are necessary for such construction to occur. Firstly, the learner must be at a point in her development where she is ready to construct the new knowledge on the basis of the old. In this view, teaching that is too early can be counter-productive and result in rote learning. Secondly, active engagement with new situations is necessary. For Piaget, such activity is both mental and physical (Ginsburg & Opper, 1979).

For Piagetians, new knowledge is constructed in relation to current understandings, and this may be either positive or problematic for the learners' development. Learners can construct misconceptions on the basis of previous knowledge (Hatano, 1996), or the learners' previous knowledge may itself be problematic and hence lead to the construction of further misconceptions (Solomon, 1995). However, for a Piagetian, this is not necessarily problematic because it is assumed that the correct experiences (tasks) will enable learners to reconstruct "correct" knowledge. What is important for Piaget is that there is an integrity to the learner's thinking. A learner's misconceptions make sense to her, in terms of what she knows. From this perspective, a teacher's role is to set up situations conducive for learning and for challenging misconceptions, possibly by creating cognitive conflict for the learner (Jaworksi, 1994). In order to do this, a teacher needs to make sense of how learners might be thinking through probing their responses, and to intervene in ways that do not impose the teacher's ideas on learners before they are ready. Piaget's ideas suggest that if the right conditions are created, a learner will learn.

Piagetian perspectives have been criticised for not taking account of learning at school, where there is a specific set of concepts, processes, skills, attitudes and values to be mastered in a fixed period of time. How does a teacher hold the tension of working with learners' current knowledge and at the same time covering the knowledge required by the curriculum and assessments (Edwards & Mercer, 1987), particularly in a more negotiated or integrated curriculum? Edwards & Mercer argue that Vygotsky's notion of the zone of proximal development (ZPD), where the teacher mediates between the knowledge of the learner and the knowledge of society, is more helpful in understanding teaching and learning in schools. For Vygotsky, teaching creates a space where learners can engage with new knowledge on the basis of the old. This does not happen automatically, even given suitable tasks and conditions. The teacher plays an active role, mediating between the knowledge to be learned and the learners' current thinking, while still respecting the integrity of the learners' thinking. The processes of mediation can be described by the notion of scaffolding (Wood, 1991; Wood et al., 1976), which describes ways of teaching in which the teacher provides support for learners, contingent on the learners' current knowledge and previous levels of support. The teacher may direct or focus the learners' attention on important aspects of the task; may reduce the complexity of the task for learners while holding the overall purpose in mind; may prompt the learner to remember previous activity and knowledge; and may provide the emotional support necessary in a challenging situation (Wood, 1991). As the metaphor from the construction industry implies, scaffolding is seen as a temporary, adjustable support, to be removed when the learner no longer needs it. A crucial part of teaching is to determine when it is appropriate to remove the support (Edwards & Mercer, 1987). The limitation of the notions of the ZPD and mediation is that they assume a "manageable space" between what the learner knows and what is to be learned. In our research it became evident that this is not necessarily the case in South African schools. Most

teachers in our sample worked with learners whose knowledge was extremely limited, given the grade they were in (Brodie, 2000), and teachers struggled to create appropriate ZPDs between the learner and the subject.

Thus learner-centred teaching involves interpersonal relations, curriculum, and pedagogy which play out in particular ways in particular contexts. The contexts in which the teachers in our study work include primary and secondary schools, urban and rural schools, schools that are collegial and supportive of teachers' work and those that are not, and schools that are either relatively or extremely underresourced (see Chapters 3 and 4). The initial analysis of our data suggested differential take-up of learner-centred practices in relation to the *forms* and the *substance* of learner-centred teaching. In what follows, we describe what we mean by these, and use these descriptions to take our analysis further.

Forms and substance in learner-centred teaching

In the previous section we explained that a *substantive* notion of learner-centred practice includes: interpersonal relations in the classroom; negotiated, relevant and integrated curricula; and pedagogical interactions in the classroom. All three are seen as key aspects of learner-centred teaching in the literature and current education policy. However, these can be formulated in problematic ways that ignore the importance of subject knowledge and the teacher in relation to the learner.

For us, the *substance* of learner-centred teaching involves the selection and sequencing of tasks in relation to learners' current knowledge and providing for the required conceptual development in a subject area, or across subject areas. Teachers anticipate learners' strengths and difficulties when planning tasks and learning programmes. Once tasks have been set up, appropriate interactions between learners and teachers in class would involve identifying learners' meanings and scaffolding their current knowledge to develop new knowledge. Such scaffolding requires learner expression and participation, which the teacher may shape in particular ways to serve particular purposes or outcomes of learning. It is important that potentially destructive power relations between teacher and learners and among learners are acknowledged and worked against, so that all voices can be heard. However, it is also important to acknowledge the particular authority of the teacher. All of the above are difficult to achieve in overcrowded and potentially conflictual classrooms.

In order to achieve the substance of learner-centred teaching, certain *forms* of classroom organisation and activity are often suggested and used. For example, it is argued that group work may allow learners' meanings to be expressed in the classroom, may provide for better engagement for more learners, and may enable opportunities for more responsive scaffolding on the part of the teacher. In this way, group work may lead to a more meaningful, relevant and negotiated curriculum in the classroom. Thus group work is often suggested as a form of practice which might help to achieve learner-centred goals. However, it is possible for learners to construct meaning in a lecture situation if the learner is actively engaged and if the teacher frames and scaffolds the knowledge appropriately in the lecture. It is also possible for teachers to make lectures relevant and to present integrated knowledge in lecture situations. Group work can also be used in ways which do not achieve the substance of learner-centred teaching. There

might be little interaction among learners in the group, and such interaction might be dominated by a few learners, particularly in heterogeneous classrooms. Also teachers might not set appropriate tasks to enable development and might not scaffold such tasks appropriately. There might be little negotiation of meaning or of the curriculum. Thus some lectures might be more learner-centred than some forms of group work. Group work as a *form* of learner-centred practice may or may not enable the *substance*.

A second example that brings out the *form-substance* distinction relates to teacher questioning. On the one hand, teachers can and do use questions appropriately as a kind of scaffolding through which the teacher tries to elicit learners' meanings, listen to them and work with them (Corden, 1992; Wood, 1991). On the other hand, teachers often use questions to try to get learners to give the answers that they want to hear. They do not hear the learners' meanings: they rather concentrate on making their own meanings public (Wood, 1991; Edwards & Mercer, 1987). Thus they use the *form* of questioning in a non-learner-centred way. A lecture with very few questions, which makes contact with learners' meanings and encourages learners to ask rather than answer questions, may be more *substantively* learner-centred than predominantly "question-and-answer" sessions in which teachers intend to engage learner activity, but in fact actively engage learners in trying to work out what the teacher wants to hear. As with group work, questions as a *form* of learner-centred practice may or may not enable the *substance.*

Other examples of *forms* of learner-centred teaching are tasks, projects and assignments which relate to learners' lives, learner talk and discussion, learner involvement in assessment (e.g. self- and peer-assessment), and portfolios and oral presentations. As with group work and teacher questioning, the extent to which these enable the *substance* of learner-centred practice needs to be examined in classroom analyses. So *form and substance* constitute two independent axes of teacher variation in the take-up of learner-centred practice. These are illustrated in Table 6.1 below. It is possible to employ the generally recognised forms of learner-centred practice in ways that are substantively learner-centred (Block 1: form and substance) and the generally recognised forms in ways that are not substantively learner-centred (Block 2: form, no substance). It is also possible to teach substantively in learner-centred ways without necessarily employing the recognised forms; for example, a lecture can be learner-centred (Block 3: substance, no form), and it is possible to employ neither form nor substance of learner-centred teaching (Block 4: no substance, no form).

When we analyse our data in a following section, we will develop the above matrix further. Before we do this, we analyse the Wits FDE programme using the same framework with which we will analyse teachers' practices, that is: forms and substance of

Table 6.1 Form and substance in learner-centred teaching

		Form	
		yes	no
Substance	yes	Block 1: form and substance	Block 3: substance, no form
	no	Block 2: form, no substance	Block 4: no substance, no form

learner-centred teaching in relation to interpersonal relations, curriculum and pedagogy. This is important, since if we are to understand teachers' take-up from the programme, we need to understand how the programme transmitted the notion of learner-centred practice to teachers.[2]

Learner-centred teaching in the Wits FDE programme

An overview of the Wits FDE programme and its research and development has been provided in Chapters 1 and 3. For the purposes of this chapter it is important to remember that each student takes five courses, three in her or his subject and two in education. Some of these courses focus on subject content, and we will not deal with these here. We focus on the courses that deal with curriculum and pedagogy, namely: "The Contexts of Teaching in South Africa" (Brodie, 1996); "Curriculum and Classrooms" (Brodie & Purdon, 1997); "Approaches to Evaluation and Assessment in Teaching" (Pahad, 1996); "Theory and Practice of Mathematics Teaching" (Dikgomo et al., 1996); "Theory and Practice of Science Teaching" (Bapoo, 1996); and "Theory and Practice of English Language Teaching" (Reed, 1996). We will include some discussion from the other courses where appropriate.

These courses were written by 12 people and taught by about 20. Some courses were written entirely by individuals, others by teams of up to seven people. It is to be expected that among such a large group of writers there would be a range of understandings about the meaning of learner-centred teaching. There are also similarities and resonances between the various courses because the core staff of the programme[3] spent a lot of time meeting and developing a shared vision for the programme. In what follows we discuss how the different courses in the programme approach the idea of learner-centred teaching.[4]

Interpersonal relations

The course "Theory and Practice of Mathematics Teaching" discusses interpersonal relations as an aspect of classroom management and the importance of developing a classroom atmosphere free from fear and yet suitable to an exploration of mathematics. It is the only course with such explicit discussion. Words such as "care", "trust", "respect", "concern" and "security" are used. The course promotes teacher as listener and affirmer of learners, as well as self-discipline through motivation to do the mathematics. There are some attempts to show that this is an area of complexity, with no total solutions,

[2] We should point out here that the first author of this paper was a course developer for the Education courses in the programme so it is inevitable that our position and the programme's positions will intersect to some extent. However, our framework was developed after the programme and research were conducted, through the process of data-analysis, so it is fruitful to look at the ways in which the programme represented learner-centred teaching in these terms.

[3] These were the four co-ordinators and main writers in each of English, maths, science and education, the director, deputy director and a curriculum consultant. Two of the authors of this paper are included in this group.

[4] This analysis was done by the three authors. The author who was also a writer did not analyse her own courses. The analysis is supplemented by an independent evaluation of some courses, which included classroom observations (SAIDE, 1998).

and the merits of control and authority as against democracy and negotiation are debated. However, the course does not deal with how violence in society, and a breakdown of general management and discipline in some schools, impinge on attempts to create secure classroom environments.

"Theory and Practice of English Language Teaching" and "Curriculum and Classrooms" promote the idea of the teacher as listener and affirmer of learners' ideas, and make suggestions for the kinds of classroom environments that would enable this to happen. "The Contexts of Teaching in South Africa" deals with the change in policy on corporal punishment, and how this might or might not reflect changing interpersonal relations in South African schools. It also examines issues of commonality and diversity in the classroom, as does "Approaches to Evaluation and Assessment", dealing with issues of race, culture, class, language and gender in teaching and assessment practices. While the attention to interpersonal relations as a topic of discussion is limited in most courses, all of the courses are written in a style which shows respect for the students. Teaching during residential sessions also displays this kind of respect. Staff consciously attempt to create environments of mutual trust and respect among all participants. However, it is not clear whether these practices are made explicit enough to enable teachers to think about them in relation to their own teaching.

Curriculum

Explicit discussion of relevant, negotiated and integrated curricula are found, to a limited extent, in the courses. "Curriculum and classrooms" focuses on negotiated and integrated curricula, through a case study at a school in Johannesburg. The course presents the (then) developing frameworks of the NQF, OBE and Curriculum 2005 as examples of negotiated curriculum development, which encourage curriculum integration. The science content courses explicitly link scientific principles with everyday phenomena, thus building in a component of relevance. The mathematics and science content courses also contextualise mathematics and science as subjects. Mathematics is seen as a historical creation, as well as being found all around us, for example in newspapers. In relation to integration, "Theory and Practice of English Language Teaching" emphasises the need for teachers to integrate different components of learning English, namely speaking, listening, reading and writing. In "Theory and Practice of Mathematics Teaching", the only explicit reference to integration is a small section on integrated textbooks. However, the section on problem solving can be seen as an attempt to integrate across mathematical concepts while focusing on the processes of solving problems in mathematics. The science courses integrate chemistry, physics and biology. There is no focus on integration across the three subjects in relation to teaching and learning at school.

All of the courses embody the notion of relevant curricula in that they attempt to relate what is being taught and learned to the students' experiences as teachers in the classroom. Educational theory is consistently related to practice, and the courses draw on the teachers' backgrounds and daily experiences in their schools and integrate these with readings and experiences of other teachers, both in South Africa and elsewhere. Many of the activities and assignments require the students to choose examples from their own experience in their schools and classrooms and to relate these to examples in the courses.

Pedagogy

Different courses focus on different theories of learning and teaching in different ways. However, across the programme, there is an emphasis on learning as making meaning and as making sense of the world, and a general perspective on learning as a social construction. In other words, there is a strong focus on learner-centredness throughout the programme. "Theory and Practice of English Language Teaching" focuses on a communicative approach to language teaching, which emphasises the creation of opportunities for learners to engage in constructing language while interacting with other speakers, namely the teacher and fellow learners. Learners should engage in exploratory investigative activities, using spoken language to discuss, question, clarify, describe, evaluate and justify ideas. The course suggests that teacher mediation should be less directive and more facilitative, although a range of roles for teachers is acknowledged. "Theory and Practice of Mathematics Teaching" argues that learner-centred teaching encourages learner reasoning, explanation and problem solving. Teachers are encouraged to use questions, tasks and assessments to gain insight into their learners' thinking. As in the English course, less-directive teacher mediation is encouraged; it is suggested that the teacher's role is to probe learners' ideas. "Theory and Practice of Science Teaching" introduces teachers to a number of "instructional modes" available to them in the classroom. These modes are described, illustrated with associated activities, and discussed in terms of implications for learning. No particular mode is suggested as the preferred one. "Curriculum and Classrooms" deals explicitly with learner-centred teaching, and deals with Vygotskian notions of pedagogy, such as the ZPD and scaffolding. The course emphasises the idea that learners have minds and that teachers should listen to learners' ideas and work with them, even (and especially) when they reveal errors. Although these aspects of learner-centred pedagogy are clearly advocated, difficulties in trying to find out what learners are thinking are acknowledged. Suggestions are given as to how to avoid some of these difficulties.

Forms and substance of learner-centred teaching

What is modelled and taught in the courses can be said to be the programme's understanding of the substance of learner-centred teaching. We have mentioned above, and will elaborate in this section, that the programme both models and explicitly discusses a range of strategies to enable learner-centred practice – what we have earlier called the forms of learner-centred teaching.

The most obvious form of learner-centred practice is group work. The various courses take different approaches to group work. "Theory and Practice of Mathematics Teaching" devotes a whole unit to this topic, and presents an extremely favourable orientation to group work. Only positive research findings regarding group work are presented and there is a lot of detail on how to do group work, particularly in relation to interactive and interpersonal processes. There is little discussion as to why particular mathematical tasks that are given in the unit may or may not be appropriate for group work. Mathematics is brought in to provide examples of general principles that could apply to any other subjects; there is no unpacking of group work and mathematics in relation to each other. There are a few disclaimers to the effect that group work might not always be the best strategy, but no extended discussion of the conditions under which it might be

appropriate or not to use group work, nor how to distinguish whether different mathematical topics or tasks may be amenable to different kinds of group work. Group work is positively mentioned in many other units throughout the course.

"Theory and Practice of English Language Teaching" deals with "classroom interaction" and suggests that learner-centred classroom interaction involves working in pairs or small groups. Throughout the course there are suggestions that group work is a valuable strategy for communicative language teaching, and the prescribed textbook that is part of the course makes frequent references to group work. "Theory and Practice of Science Teaching" makes almost no mention of group work, except as one of a number of instructional modes. The benefits for learning and the limitations of group work are not explicitly discussed in the course. "Curriculum and Classrooms" deals explicitly with learner-centred classrooms, but not with group work. The unit on teaching deals with scaffolding in detail and teacher questioning as a means of scaffolding. Scaffolding is seen as a means to support and encourage learning. "The Contexts of Teaching in South Africa" begins with a paper on diversity and group work. Although the paper focuses more on diversity than group work, it is the first paper in the first Education course that students take, and this may initiate the idea that group work is seen by lecturers as an important strategy.

"Theory and Practice of Mathematics Teaching" and "Curriculum and Classrooms" explicitly deal with teacher questioning: open and closed questions in the former, and how questions might scaffold learning in the latter. They both try to show how questions can be both limiting and enabling, and "Theory and Practice of Mathematics Teaching" discusses a number of examples of open, enabling, questions, and closed, limiting questions. "Theory and Practice of English Language Teaching" spends a lot of time discussing tasks and resources for enabling the different modes of speaking, listening, reading and writing. All of the three subject "Theory and Practice" courses give ideas and examples of tasks and activities that might be useful in teachers' classrooms. These are the forms which might enable the substance of learner-centred practice, depending on how they are used by teachers.

Aspects of learner-centred pedagogy are modelled in the face-to-face teaching of the courses. During residential sessions, all of the courses use a range of tasks and pedagogical strategies to enable lecturers to elicit and engage with students' ideas. Students often work together in groups, with tasks structured to enable them to develop key concepts. Their lecturers scaffold and mediate in ways consonant with the discussion in forms and substance in a previous section. Thus the teachers experience, for the most part, the kinds of teaching that are encouraged by the programme.[5] We note here that in all the courses group work is a pervasive element of residential sessions. Students often work in groups with tasks specially structured for them to do so. So the practice of group work, while not explicitly discussed in some courses, is modelled in all. This is especially important for this chapter because, across the sample, group work was the first and main form of learner-centred practice that was taken up by teachers, in some cases as early as the first three months of the programme (Adler et al., 1997) and in many cases by the second year (Adler et al., 1998). In the next section, we look at the extent to which it was taken up substantively.

[5] This has been confirmed for some courses by an independent evaluation (SAIDE, 1998).

Thus, of the three aspects of learner-centred teaching that we have identified, the programme's emphasis is strongly on pedagogy, with limited discussion of curriculum and even less of interpersonal relations. The programme emphasises both the forms and the substance of learner-centred practice, with some variations across courses. We now turn to our data to investigate the extent to which that which the programme presents has been taken up by students (i.e. the teachers participating in the programme).

Teachers' take-up of learner-centred practices

In a previous section we argued that we can describe the relationships between forms and substance of learner-centred teaching in the form of a matrix (Table 6.1). In order to look at teachers' take-up from the programme we include the categories of "taken-up" and "not taken-up" in our matrix (Table 6.2). We compare our data with our base-line data collected in 1996 (Adler et al., 1997) and analyse the teachers' practices using the matrix in Table 6.2. In Table 6.3 we locate all of the teachers in the sample in the matrix and discuss patterns across the sample. Before we do this, we give a detailed example of a typical "teacher" from Categories 1, 2 and 4[6] to illustrate the kinds of learner-centred practices that we located in each category.

Table 6.2 Categories of take-up of learner-centred practices

		Form	
		taken up	not taken up
Substance	taken up	Category 1: Have taken up form and substance from the programme	Category 3: Have not taken up form but have taken up substance from the programme
	not taken up	Category 2: Have taken up form but not substance from the programme	Category 4: Have not taken up form or substance from the programme

A teacher in Category 1

Teacher 2[7] teaches at a well-established, and relatively well-resourced primary school situated in a semi-urban area of Thohoyandou. Three teachers at the school participated in the Further Diploma programme and the research project. The principal has consistently supported the three teachers in their studies and in implementing new ideas in their classrooms. The three teachers have worked together and formed a support group for one another. Teacher 2 teaches Grade 7, and over the three years of the research has been observed teaching a range of lessons including English grammar, reading and exploratory talk. Her class sizes have ranged from 16 to 36.

[6] None of the teachers in our sample were in Category 3.

[7] The numbers here correspond to the numbering of the teachers in Table 3.

Teacher 2's teaching changed considerably during the three years of the research in all three aspects of learner-centred teaching. In the area of interpersonal relations she created a relaxed yet disciplined learning environment, where learners felt comfortable in expressing their ideas. She encouraged learners to be aware of grammatical errors that she herself made, and to feel free to correct her. She told her classes: "When we are learning this language we are both learning, myself and you." This is a significant shift in authority in relation to knowledge, which, we argue elsewhere (Slonimsky & Brodie, 2001), is particularly difficult in the wake of apartheid education in South Africa (see Chapter 2).

In relation to curriculum, Teacher 2 managed to make her lessons relevant to learners' experiences. She selected texts which drew on learners' cultural heritages and which were enjoyed by the learners. She set projects that required learners to investigate their histories as well as their present social circumstances. Talking of a project on "families" she said: "It was a familiar topic and everyone had a lot to write, and they are writing their own individual stories from different families, and their parents are different, and depending on their backgrounds and a lot of stuff, I had a lot of stories." Her responsiveness to learners' needs was also shown by her practice of making charts and posters, which she used to motivate the learners to generate sentences. The learners' contributions were used as a starting point for illustrating specific linguistic structures. Over the three years, this teacher was observed to use a range of resources, including textbooks, the Further Diploma course materials, magazine articles, her own texts, posters that she made and those that learners made, for a variety of lesson purposes. She moved between the modes of listening, speaking, reading and writing, and moved appropriately between accuracy, fluency and meaning in learners' productions.

Teacher 2 considered that the greatest change in her teaching since she had begun the FDE programme was in her attitude to her learners. She felt that she was more in tune with their needs and the difficulties that they had in achieving success. This heightened awareness of the learners' prior knowledge and its impact on their current language learning experiences was observed in her pedagogy. She supported learners by carefully scaffolding the tasks that she set. She encouraged learners to express their ideas and interpretations of texts, promoting the idea of multiple interpretations of texts. She used group work substantively. She reflected on how to structure the groups, on how members were to contribute, and on which tasks were best suited to group work. She tried to encourage all learners to talk and was attentive to their responses. If answers were wrong she either encouraged other learners to help or she engaged the whole class in further discussion and explanation. Her learners were comfortable working in groups and were seen to interact and debate ideas. She used questions for a variety of purposes, including recall of information, predictions of plot or storyline, and to enable learners' interpretations of ideas. Her questions demanded that learners explain their thinking, again showing the substance of learner-centred teaching.

An example of how Teacher 2 integrated a range of forms of learner-centred teaching in a substantive way comes from a grammar lesson where she was teaching forms and functions of the present perfect tense. She put two charts up on the board with drawings and captions that illustrated singular and plural, and first, second and third person versions of the sentence: "I have/you have/he-she-it has/we have/you have/they have been good friends." She asked the learners to talk about similarities and differences among

the sentences in their groups. She then worked with learners' understandings as they reported back, allowing learners to comment on one another's contributions and to ask questions.

The three other teachers in Category 1 demonstrated similar take-up of both form and substance in relation to their particular subjects. In our terms, they are the teachers who have been most successful at using what they have learned in the programme to develop their practice. However, the teachers in Category 1 are by no means perfect teachers. We, and they, believe that they could still improve their teaching, even in respect of learner-centred teaching. One of the characteristics of teachers in this category is that they are continually striving to improve their practice.

A teacher in Category 4

Teacher 16 teaches at a school in the Northern Province. It is a relatively well-resourced school in relation to the rest of the sample. The school had a history of being one of the most respected schools in the area, with a high matric pass rate. However, the situation had deteriorated in recent years. The pass rate had dropped significantly and the staff had become increasingly demoralised. There was a great deal of conflict at the school between learners, staff and the principal, and the principal was often seen as the cause of the conflict rather than helping to resolve it. The school was afflicted with high absenteeism among learners and teachers, and many teachers did not go to class.

Teacher 16 is a committed teacher, and spent many afternoons after school with matric learners trying to finish the syllabus. However, she too had become increasingly demoralised over the three years of the research project. Her demoralisation was influenced both by the general tensions and difficulties within the school and by the lack of attention to matters of teaching and learning which she considered important. These included regular teaching and testing, and a subject department working together to achieve learning, being led and monitored by the Head of Department. This teacher was observed teaching Grades 8, 11 and 12, with class sizes ranging from 18 to 90.

In 1996, this teacher was the only mathematics teacher in the sample who used group work, and she used it relatively well. She was observed to ascertain and scaffold learners' knowledge appropriately in the groups and in whole-class situations. Her classrooms were comfortable and relaxed. In her interviews in 1997 and 1998 she articulated the most sophisticated understanding of learner-centred teaching among teachers in the sample. However, in 1997 she had stopped using group work, citing its impossibility in her large Grade 11 classroom. In 1998 she claimed that she did not use group work because other teachers complained if the desks were rearranged in the classrooms. It is of interest to us that a teacher who was already implementing course ideas relatively well in 1996 felt that she could no longer do so in 1997 and 1998.

In 1996 this teacher used questions to try to understand learners' mistakes in order to help them. In 1997 and 1998, when learners made mistakes, she would occasionally question further, trying to understand what their mistake was in order to point out to the class what not to do. In many cases, the teacher did not understand learners' ideas. For example, when she was dealing with "arms" and "vertices" of angles in Grade 8, a learner asked why she was talking about a "line" and not an "arm" of an angle. To the researcher, this was a sensible response from a learner, who was trying to work with her

current knowledge of English in order to make sense of the use of "arm" in a new context, which was represented by a line. The teacher was clearly surprised by this remark and did not know what to do with it. She laughed and gestured to the researcher in surprise. When asked about this and other instances in her interview, she could see why learners might have said certain things, but it had not occurred to her to think about or work with these in the lessons. It should be pointed out that this teacher was awarded distinctions for her two content courses in mathematics, so it was not because of limited mathematical knowledge that she could not hear learners' meanings, but rather because she was not oriented towards hearing them.

At times Teacher 16 would get angry and frustrated with learners who could not answer, or who struggled to solve problems which had been dealt with in previous years. She showed her emotions in class by shouting at learners, by commenting to the researcher, or by threatening learners with examinations. For example, in a Grade 12 lesson, most of the learners struggled to factorise the trinomial: $3n^2 + 2n - 320$. Because they could not find factors of 320 close enough to each other to give a difference of 2, they kept trying with 320 and 1 or 160 and 2. Eventually some used the quadratic formula, but she challenged this, asking why they did not factorise. She got very upset at the learners' inability to factorise and the fact that they were taking so long over it. She shouted at them that it was Grade 10 work, and that they should be able to do it easily, and did not discuss their difficulties with them. When she went over the problem on the board she merely did the factorisation, quickly and easily, as she would have had them do it. This is in direct contrast to her view that: "I shouldn't take them to be dull … each of them think and if I try to be to … to be positive to their responses then by not being harsh, or giving them a nasty face or whatever". In her interview, she was open about her frustrations, saying that they were related to the learners' lack of enthusiasm for participation and studying, and to the worsening conditions in her school.

So in relation to interpersonal relations and pedagogy, this teacher had not taken up the *form* of learner-centred practice from the programme. In fact, over the three years, she had discontinued practices that the programme values. In relation to the curriculum, she has always taught mathematics in conventional ways, neither integrating it with other subjects, nor relating mathematics to learners' lives. We have characterised this teacher as one who has taken up neither the forms nor the substance of learner-centred teaching, even though she had taken up both previously. We attribute this to her growing disillusionment with teaching in her school and note that the other teacher in her school is also in Category 4. The third teacher in this category teaches in a very poor rural school, and has struggled with much of the take-up in the course. Her case is more complex and is not dealt with here.

A teacher in Category 2

Teacher 8 teaches in the same school as Teacher 2, discussed in Category 1. She experiences the same supportive environment as Teacher 2. However, we have described her as taking up the forms of learner-centred practice without the substance. Teacher 8 had a relaxed style of working in her classroom and good interpersonal relations. She did not speak angrily to any learners, nor raise her voice, other than to be heard above the sound of learners working in groups. However, these positive interpersonal relations did

not enable substantive learner-centred teaching in relation to curriculum or pedagogy. Teacher 8 taught science to Grade 5 and Grade 7 learners, with class sizes of about 40.

There was little evidence of a shift in curricular aspects of learner-centredness in Teacher 8's lessons. There was no negotiation of the curriculum with learners, nor was there any integration across areas in science or with other subjects in the school. Her curriculum was responsive to learners' needs in that she selected appropriate tasks when preparing worksheets. This teacher showed evidence of being able to plan assignments that were investigative and extended her learners' thinking. However, when these tasks were mediated in the classroom, it appeared that she was not always able to follow through with her plans. Thus, she has taken on the form of a curriculum responsive to learners' needs, but not its substance.

In relation to pedagogy, this teacher worked almost exclusively in groups and her lessons involved a great deal of learner activity and experimentation. During these activities, she encouraged learners to think about the activity, predict the outcome, and then try the experiment to determine how the prediction would match the outcome. However, although she started with these laudable intentions, the actual execution of the lessons tended to result in group work and learner activity for its own sake, rather than her using it to ensure that science was being learnt. Much emphasis was placed on carrying out the activities, with the result that the scientific concepts that formed the basis of the activities were not foregrounded. The doing of the activity became the focus of the lesson, together with a report-back to the class. When the report-back took place, instead of using it as an opportunity to engage with the scientific concepts and possible misconceptions of the learners, the teacher listened without intervention, as did the rest of the class. This resulted in potential and actual misconceptions being stated by the reporters, with no intervention by the teacher. During her interviews, the teacher stated that during subsequent lessons she did engage with what was reported by the group leaders, but this was not observed on any occasion. It was considered by the researcher that such subsequent engagement, even if it did happen, would have been too late to influence much of what had been learned in the lesson itself.

During her questioning of learners, Teacher 8 varied in the extent to which she probed answers. On some occasions she did make attempts at probing, while on others she either ignored wrong answers or she gave the correct one. In one lesson she went to considerable effort to ensure that learners found out the answers for themselves, but she did not provide appropriate scaffolding to do this.

So while this teacher chose appropriate tasks and set them up well, she did not follow through, scaffold or mediate learners' understandings of the scientific concepts they were learning. All of the teachers in Category 2 struggled with probing and engaging with learners' meanings. Some, like Teacher 8, managed to select and develop appropriate tasks and set them up in useful ways in relation to what the learners had to do. Others struggled even with this aspect of their teaching. They used tasks for purposes other than those for which they had been developed, and used them inappropriately. There was little thought as to how the tasks related to previous or subsequent tasks, nor was it made clear to learners what they were meant to do. Some teachers organised the class into groups, but did not ensure that the learners worked together, and so we saw learners seated in groups but working individually. We have therefore subdivided Category 2 into two further categories, which we will discuss below.

A matrix of learner-centred practices

Having described three small case studies to illustrate our categories, we now turn to the whole sample and locate them in the matrix of Table 6.2. We then discuss patterns across the sample. We note that our final sample consisted of 18 teachers: 9 mathematics teachers, 5 English teachers and 4 science teachers, teaching at nine different schools in Gauteng and the Northern Province (see Chapter 3 for details of the sampling procedures). We indicate each of the teachers in the matrix using T1 to T18. For each teacher we indicate his or her subject (Eng, Ma, Sci); school (lettered from SchA-SchI); the province the school is in and whether it is urban or rural – (N,r) means Northern Province rural, (G,u) means Gauteng urban – and which grades we observed them teaching over the three years.

Before looking at the teachers in relation to the matrix, it is important to note the following: First, we are not suggesting that learner-centred teaching is a characteristic of a teacher, but rather of lessons. The same teacher may teach differently in different classes or in different subjects. Our location of teachers in the matrix can only be in relation to the lessons we observed. Second, no teacher can be located entirely within a particular category. Teachers may show some aspects of learner-centred teaching and not others, and may show the same aspect differently at different times. So the boundaries between the categories are fluid. Third, by placing teachers in the matrix we are not making an evaluative judgement of their teaching in and of itself. We are making judgements necessary for our research purposes, which are to reflect on our programme in the light of teachers' take-up from it, rather than to evaluate teachers' practices on their own terms.

Table 6.3 enables us to see a number of interesting patterns across the sample. First we note that there are no teachers in Category 3. On one level, we might have predicted this. Given that learner-centred practice is not widespread in South African schools it might be expected that forms would be taken on together with or before the substance. Our matrix does point to a predominance of *forms* of learner-centred practice (15 out of the 18 teachers are in Categories 1 and 2), and we will discuss this below. We also note that, for us, the different categories do not necessarily distinguish between "good" and "bad" teachers. There may be teachers whom we consider to be either good or bad in the same category. In fact, we would consider two out of the three teachers in Category 4 to be good teachers. The fact that they have not taken up what the course offers can be explained in the light of their contexts and in terms of the already existing integrity of their teaching. They have not taken on forms without substance, and they have not taken on forms in an ad hoc way.

The majority of teachers in our sample are in Category 2; in other words they are taking up forms of learner-centred teaching that are not accompanied by the substance. Our analysis suggests that teachers in this group can be divided into two subgroups. Group 2.1 represents teachers who work with new forms on a consistent and sustained basis. Our interpretation through observing and talking to them is that they think these are important and try to implement and work on new strategies. These teachers might be in transition towards the substance of learner-centred practices, and with further development and practice, they could begin to incorporate substantive aspects of learner-centred practice into their teaching. Group 2.2 on the other hand, consists of teachers who

Table 6.3 A matrix of learner-centred practices

		FORM	
		Taken up	**Not taken up**
SUBSTANCE	**Taken up**	*Category 1* T1 Eng, SchA (N,r), Gr 8, 9 T2 Eng, SchB (N,u), Gr 7 T3 Ma, SchC (N,r), Gr 8–10 T4 Ma, SchD (G,u), Gr 9–11	*Category 3*
	Not taken up	*Category 2* [Category 2.1] T5 Eng, SchA (N,r), Gr 8–11 T6 Ma, SchB (N,u), Gr 7 T7 Ma, SchD (G,u), Gr 8–12 T8 Sci, SchB (N,u), Gr 5, 7 [Category 2.2] T9 Eng, SchE (G,u), Gr 8, 9, 12 T10 Eng, SchF (N,r), Gr 5–7 T11 Ma, SchF (N,r), Gr 6, 7 T12 Ma, SchF (N,r), Gr 3, 5 T13 Ma, SchG (N,r), Gr 2, 5, 6 T14 Ma, SchG (N,r), Gr 2, 6, 7 T15 Sci, SchH (G,u), Gr 5,7	*Category 4* T16 Ma, SchI (N,r), Gr 8, 11, 12 T17 Sci, SchI (N,r), Gr 8, 10, 12 T18 Sci, SchC (N,r), Gr 10, 11, 12

display new forms of learner-centred practice, in a sporadic or ad hoc manner. Their interviews suggest that they do not reflect much on how the strategies work or might be improved, and that the strategies do not form an integral part of their teaching.[8]

The distribution of schools across the matrix shows that teachers in both rural and urban schools and in schools in the two provinces are found throughout the matrix. This suggests that teachers' take-up of learner-centred pedagogy is not directly related to the broader contexts of their schools – whether they are rural or urban, or according to the

[8] Some of these teachers may have used new forms only because the researchers were present in the classroom.

province in which they are situated. Schools A and C, whose teachers are located in Categories 1 and 2.1, are both extremely underresourced, rural, Northern Province schools. However, there is a clear distribution of particular schools in the matrix. Teachers in the same school are located in the same areas of the matrix. Teachers in schools A-D are found in Categories 1 and 2.1, teachers in schools E-H are in category 2.2, and teachers in school I are in Category 4. The only school where the individual teachers show significant differences is school C, which has teachers in both Categories 1 and 4, and this can be explained by the differences between the two teachers. We can explain the distribution of schools in relation to school morale and support. Schools F, G and I are the schools that are most characterised by lack of resources, unsupportive principals and tension and conflict among staff. School I in particular has experienced significant conflict and demoralisation over the past three years. Schools A and B in Categories 1 and 2.1 have principals who have themselves done Further Diplomas at Wits and so have similar understandings of innovative practices and the importance of enabling supportive teaching environments. Thus school support, in particular the support of the principal, is important.

There is also a clear distribution across grades. All of the primary teachers, except those from school B, are in Category 2.2. As mentioned above, the principal of school B has provided tremendous support for the teachers on the programme and the three teachers form a support group for one another. The other primary teachers are taking up forms without substance. This could be seen to contradict Cuban's (1993) findings that learner-centred practices are more readily taken up in primary schools. However, we need to consider that all of the teachers in Category 2.2 teach at poorly resourced schools where teachers and learners have limited access to English. In addition, since they are primary teachers, they are not subject specialists and in some cases, particularly that of the Mathematics teachers, they do not have any post-secondary education in the subject they were observed teaching (Adler et al., 1997). This is not the case with the teachers at school B, which is also a primary school. Both Teachers 2 and 6 have degrees with some subject specialisation.

Also of interest is that none of the teachers in Category 1 were observed teaching Grade 12 (the final year of secondary schooling), and all the teachers in Category 4 were doing so. This suggests, as is to be expected, that teaching Grade 12 is a major constraint on learner-centred practices.[9] The Grade 12 teachers in Category 4 do teach in other grades. However, most of their teaching is at senior secondary level, where the final examination determines much of what is taught. Although Teacher 16 and Teacher 17 also teach Grade 8, where they might be able to teach in more learner-centred ways, their first year of teaching at this level was in 1998, our final year of data collection. They had not yet differentiated teaching the lower grade from their many years of experience at higher levels.

One aspect of data analysis in the research project that has not been covered here is that of teachers' reflections on their practice. This has been developed in detail in Chapter 7, in which teachers are positioned in categories in relation to their reflective practices and the mismatches between their espoused and enacted practices. The teachers

[9] South African school learners write a National Examination at the end of Grade 12 that is a high-status, high-stakes examination. Results determine substantially the learner's eligibility for further study and employment, and in recent years have been made public as a reflection of the success of schools.

in the first group in Chapter 7[10] are exactly the same as the teachers in our Category 1. The teachers in the second group[11] include all of the teachers in our Category 2.1 and Teachers 15 (Category 2.2), 16 and 17 (Category 4) in our matrix. The third group[12] consists of our Category 2.2, excluding Teacher 15, and including Teacher 18 from Category 4. Thus there is strong suggestion of a link between teachers' reflective practices and their take-up of learner-centred practices. It is also the case that three out of the four teachers in Category 1 have a first degree, and the fourth has completed some credits towards a degree. Only two other teachers, one in Category 2.1 and one in Category 2.2, have a degree. Thus there are suggestions of relationships between further qualifications, reflection and learner-centred teaching.

Conclusions and implications

So our matrix paints a complex picture of teachers' take-up of learner-centred practices from the FDE programme. Our research suggests that it is not appropriate to make generalised claims, such as the one in the quote at the beginning of the chapter, that teachers "embraced the form rather than the spirit and content of the ideas" (Chisholm et al., 2000: 78), or that "all indications are that teachers have accepted the desirability of learner-centred pedagogy, but are unable to practise it" (Taylor & Vinjevold, 1999: 142). Our research is more resonant of Jansen's (1999), which argues that teachers take up the new ideas differently, in relation to their contexts, positionings and knowledge. We have shown that teacher characteristics, such as prior qualifications, reflective competence, grade level, subject knowledge and confidence, access to resources and support structures in their schools, are all implicated in their take-up of learner-centred practices. Many of the teachers who have taken up the forms only are primary teachers in impoverished rural schools. More positively, we have seen that for teachers to take up learner-centred teaching more substantively, support within their schools and from principals is important.

Another factor to consider is that, at the time of our research, some teachers might have been in transition towards more substantive practices. In developing any new competence in the classroom, it makes sense to expect that the take-up of forms would come before the take-up of substance. It may be the case that in further development of their practice, these teachers will begin to work more substantively, particularly those in Category 2.1. An important question for teacher education in South Africa, where resources are scarce, is the extent to which more external support might be necessary, or whether, after a two-year programme, these teachers are in a position to further develop their own practices.

How can these observations help us to reflect on the Wits FDE programme and in-service teacher education more generally? Our research project showed that many of the teachers who are taking up forms without substance are in fact struggling with other,

[10] These teachers show "some evidence of reflection in, on and for action in relation to lesson purposes, use of group work, new ideas from the FDE programme, professional development, and teaching and learning context".

[11] These teachers show "some evidence of reflection on and for action, but also contrasts between espoused and enacted practices".

[12] These teachers show "limited reflection, closer to "technical thinking" than to reflective thinking".

more basic aspects of their teaching (Adler at al., 1998; 1997). They struggle to provide continuity between lessons, and within lessons between different tasks. They have difficulties in determining appropriate levels for tasks. They do not assign and monitor homework, and they struggle to match lesson plans with purposes. These observations are reflected on further in Chapter 8. In-service teacher education programmes need to find ways to develop what has not been enabled by pre-service programmes, together with the new ideas they are developing. In other words, as discussed in Chapter 1, they need to work simultaneously with repair and reform.

In looking at teachers' take-up from our courses, we recognise that we were not the only influence on our students. The discourse around Curriculum 2005 was very prominent from the beginning of the programme and teachers would have learned much from workshops and publicity around the new curriculum, including the rhetoric. The emphasis on forms may have come from, and been exacerbated by, the discourse of the new curriculum policy. Group work is promoted as an explicit goal of the new curriculum, as well as a means to other learning goals. Primary school teachers were a particular focus for provincial and national education department workshops on the new curriculum. Teachers may have taken from these workshops the message that the forms and the substance of learner-centred teaching are the same. We also have some evidence that some teachers identified our programme with other workshops they attended, and believed that they were all transmitting identical messages. Our aim was to enable teachers to develop deeper understandings of curriculum and pedagogy, which would put them in a position to evaluate and use the new ideas of Curriculum 2005 in appropriate ways. However, we may have unwittingly reinforced ideas that we did not necessarily agree with.

Our analysis of the Wits FDE programme suggests that the subject and Education courses overlap in taking a general approach to learner-centred teaching. However, what is absent is a more textured development of the notions of learner-centred pedagogy in relation to the specific subjects. Generic theories of learning and teaching are important, but can only go so far. They need to be integrated with approaches to curriculum and pedagogy in specific subjects. How might we do this? This question is raised again in Chapter 8.

First, the programme needs to work more substantially with tasks and activities which could enable teachers to work substantively with a learner-centred curriculum and pedagogy. However, individual tasks and activities might not be enough. As Clarke (1997: 300) argues, "success in developing individual tasks and problems may not necessarily extrapolate to the development of coherent units of work". With reference to mathematics teaching, he argues strongly for the importance of curriculum packages or materials that go beyond individual tasks and that support teachers in working with new mathematical tasks and ideas in sustained ways. Working in this way must be accompanied by the reassertion of the importance of subject knowledge in learner-centred teaching.

Second, analyses of learners' responses to such tasks and activities need to be developed and worked with. Again, this cannot be done only in general terms, by sensitising teachers to the likelihood of misconceptions and alternative ideas, as we have done. Many examples from various topics can be collected and examined for their possibilities for developing conceptual knowledge in learners. Possibilities for teachers to scaffold learners' ideas can be identified and developed with teachers.

Third, we need to reflect on our own practices with students at face-to-face sessions. We need to examine how we choose tasks, hear students' ideas, and work with them. Since group work is such a pervasive aspect of our own practice, we need to think about how we model group work, and how our models ramify into our students' practices. Students see the forms of what we do. The question for us is to what extent they see the substance: how we set up tasks, engage participation, move the discussion on, introduce new concepts, and enable new knowledge. We can encourage teachers to reflect on their experiences as learners in our course and to extend these reflections to their learners' experiences.

Finally, our form-substance analysis in this chapter has given us a new way to reflect on our students' teaching. We can make such an analysis available to subsequent students, contextualised within the various subjects, arguing for the importance of learner, teacher and knowledge, and focusing on the interactions between them. We hope to do this in subsequent developments in our courses.

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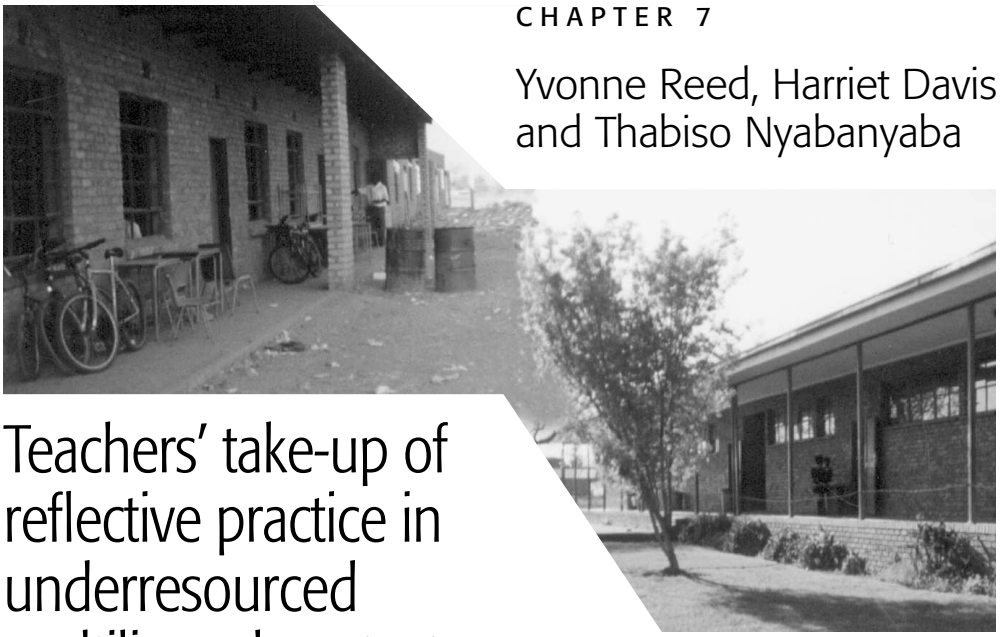

CHAPTER 7

Yvonne Reed, Harriet Davis and Thabiso Nyabanyaba

Teachers' take-up of reflective practice in underresourced multilingual contexts

Introduction

Discourse on reflective teaching has been produced and used predominantly in "developed" countries in which educational resources and other "public goods" are much more available to the majority of citizens than is the case in the "developing" world. In most schools in developing countries teachers work with large numbers of learners in underresourced classrooms. In some of these countries most learners and teachers are bilingual or multilingual and the official medium of instruction is not the main or primary language of the majority. In this chapter we describe and discuss reflective teaching in the context of post-apartheid South Africa, using data from the University of the Witwatersrand (Wits) Further Diploma in Education (FDE) research project on take-up from a teacher development programme in which reflective teaching emerged as an object of enquiry and reflection. We will argue that several factors are likely to contribute to both the development and expression of reflective capability, with teachers' access to discourses that enable reflection being particularly important.

As indicated in Chapter 1, the extension of teachers' reflective capabilities is one of the stated goals of the Wits FDE programme. In Chapter 2 Welch quotes from the *Norms and Standards for Teacher Education in South Africa* (1998), which refers to "reflexive competence" as one of the three "inter-connected kinds of competence" required of teachers. For these reasons the Wits FDE research project engaged with the questions of, firstly, what counts as "evidence" of the reflective practices of teachers and secondly,

what factors might enable or constrain the development of reflective capability by teachers working in underresourced, multilingual contexts.

We refer readers to Chapters 1 and 3 for details of the teacher development programme and the overall project of which the research discussed in this chapter formed a part. In the first part of this chapter we use selections from the literature on reflective teaching to problematise the concept and to identify some of the challenges facing researchers in South Africa and in similar developing country contexts. The substance of the chapter is then developed through our discussion of what teacher participants in the research project said and did in relation to *group work* as a teaching and learning strategy. Group work was chosen as the focus because the most visible change that the research team observed over the three years of the project was the increase in group work in almost all classrooms. We used information from several data sources (see below) to construct a table in which we have ranked teachers in three bands according to "evidence" of reflective practice (see Table 7.1 on the following page). Each teacher is numbered and we refer to these numbers in our description and discussion. We conclude the chapter with some suggestions for INSET course developers who aim to assist teachers to become reflective practitioners.

Questions that framed the reflective practice component of the Wits FDE research project

Calderhead & Gates have observed that "It is frequently presumed that reflection is an intrinsically good and desirable aspect of teaching and teacher education, and that teachers, in becoming more reflective, will in some sense be better teachers, though such claims have rarely been subjected to detailed scrutiny" (1993: 1). In relation to this observation, the research team asked the following questions:

- What do we mean when we use the terms reflection or reflective teaching?
- What do we consider to be evidence of reflection and/or of reflective teaching?
- What (if any) "patterns" do we find in the reflective conversations or the reflective practices of teachers who participated in the study?
- What (if any) explanations can we offer for any "patterns" that we find?
- Do we agree that reflective teachers are in some sense better teachers and if so, what suggestions can we make to course developers who wish to assist teachers to become reflective practitioners?

We attempt to respond to each of these questions in the five sections of this chapter.

As described in Chapter 3, the data on which we drew were collected in rural and urban, primary and secondary schools in which a sample of the mathematics, science and English language teachers enrolled in the Wits FDE programme were working. Financial and time constraints meant that researchers were able to visit each of the teachers for one week only in each of three successive years (25 teachers in 1996, 23 in 1997 and 18 in 1998, with the numbers changing as a few teachers were transferred, dropped out of the programme or were working in a context where schooling was disrupted). The data included transcribed interviews, teachers' narratives, teachers' responses to questionnaires, observation notes from lessons observed, videotapes of

Table 7.1 Attempted "ranking" of the teachers in relation to "evidence" of reflective practice

Group A: Some evidence of reflection in, on and for action in relation to lesson purposes, use of group work, new ideas from the FDE programme, professional development, teaching and learning context

1. Secondary school teacher, rural EFL context – some evidence of reflective predisposition in 1996, growth over three years
2. Secondary school teacher, urban ESL context – growth, especially in understanding of learners' needs
3. Secondary school teacher, rural EFL context – evidence of reflective predisposition and practices in 1996, some growth in 1997 and 1998
4. Primary school teacher, peri-urban ESL context – limited reflections in 1996, substantial growth in 1997 and 1998

*All of these teachers demonstrated sound subject knowledge and above-average pedagogic content knowledge

Group B: Some evidence of reflection on and for action, but also contrasts between espoused and enacted practices

Little change over three years:

5. Secondary school teacher, urban ESL context
6. Secondary school teacher, rural EFL context

Some growth:

7. Secondary school teacher, rural EFL context
8. Primary school teacher, peri-urban ESL context
9. Secondary school teacher, urban ESL context

Substantial growth:

10. Primary school teacher, peri-urban ESL context
11. Secondary school teacher, rural EFL context

Group C: Limited reflection, mainly on teaching and learning context and closer to Zeichner & Liston's "technical thinking" than to reflective thinking

12. Primary school teacher, rural EFL context
13. Primary school teacher, urban, ESL context
14. Secondary school teacher, rural EFL context
15. Primary school teacher, rural EFL context
16. Primary school teacher, rural EFL context
17. Primary school teacher, rural EFL context
18. Primary school teacher, rural EFL context (no evidence of growth)

*One factor noted by researchers as common to all in group three: limited subject content and pedagogic content knowledge

some of the lessons, examples of learners' work – all collected for each of the three years of the project. Together these provided access to teachers' reflections "in and on action" in ways that are described and discussed in this chapter.

A note on language

The teachers in the research sample work in a variety of multilingual or bilingual contexts. In each of these contexts English is not the primary or main language of teachers and learners, but it is officially the language of learning (medium of instruction). As noted by Setati et al. (see Chapter 5), "English language teachers had the responsibility of teaching English as an additional language. Mathematics and science teachers faced the double challenge of teaching their subject in English while learners were still learning English." This challenge is particularly acute for primary school teachers. Setati et al. argue that in South Africa there is an important contextual difference between the *English language infrastructure* of urban and rural schools and communities. In urban (and peri-urban) contexts, teachers and learners have opportunities to access English in the environment outside the school and thus it is appropriate to describe the classroom context as an additional language learning environment (ALLE) in which English is an additional or second language for learners (ESL). In the more remote rural areas, where access to English outside the classroom is severely limited, the classroom context is more appropriately described as a foreign language learning environment (FLLE) in which English is a foreign language (EFL). This latter context is one in which teachers use a limited range of lexis, syntax, registers and genres, particularly in primary schools. Some possible consequences for reflective practice of teachers' location in urban or rural, primary or secondary classrooms are discussed in this chapter.

Attempting to define reflection and reflective teaching

The term reflection "means so many things to so many people" (Russell, 1993:144. See also Calderhead & Gates, 1993; Zeichner & Liston, 1996; Farrell, 1998.) Zeichner & Liston describe a teacher who is reflective as one who "examines, frames, and attempts to solve the dilemmas of classroom practice; is aware of and questions the assumptions and values he or she brings to teaching; is attentive to the institutional and cultural contexts in which he or she teaches; takes part in curriculum development and is involved in school change efforts; takes responsibility for his or her own professional development" (1996: 6). They also believe that reflective teachers evaluate their teaching by asking the broader questions, "Are the results good, for whom and in what ways?" and not merely the narrower, technical question "Have my objectives been met?" (1996: 11).

In reviewing approaches to reflective teaching, Farrell discusses the distinctions between *reflection-in-action* and *reflection-on-action* first developed by Schon (1983). *Reflection-in-actio*n refers to insights teachers gain in the classroom while they are at work. Russell & Munby consider the essence of *reflection-in-action* to be "hearing differently" or "seeing differently" (1992: 4). For Farrell, it is reflection that "gives rise to on-the-spot experimentation" (1998: 12). *Reflection-on-action* refers to recalling, explaining and evaluating after a lesson and includes thinking about the reflections-in-action that were part of the lesson. To these two concepts Farrell adds *reflection-for-action* which he describes

as proactive in nature (1998: 12): using ideas from their reflections in action and on action, teachers can plan reflectively for future lessons or for other professional activities.

We believe that when researchers do not speak the main or primary language of the teachers whom they interview (as was the case for some members of the research team), classroom observation of reflection-in-action (as a teacher interacts with learners) and of reflection-for-action (when teachers plan opportunities for learning), can provide information that some teachers find difficult to express when they are reflecting on action in an interview being conducted in an additional language (English in the case of the research discussed in this chapter). In addition to considering the possible difficulties for teachers asked to speak or write reflectively in an additional language, researchers working in South Africa need to consider teachers' histories:

> … the very substance of reflective activity, taking seriously what one does as a teacher, validating and attributing significance to it, is a conceptualization that is often at extreme odds with prior conceptualizations that teachers of color in South Africa might have had about their work and role. This is both because of their oppression under Apartheid as well as a result of the destabilisation of schools during the period of unrest and rebellion in the eighties …
>
> (Zinn, 1997: 133)

As indicated by Walker (1993; 1994) and Adler (1997) in their discussions of teachers as researchers in South African schools, the majority of teachers in South Africa (and not only Zinn's "teachers of color"), are more used to following the prescriptions of education authorities than to working reflectively.

A further factor to consider is that the teachers were asked to discuss their work with either a lecturer from the FDE programme or someone closely associated with it. It is possible that this factor may have inhibited critical reflections on the programme. Also, it may have encouraged teachers to use the discourse(s) of the programme to display their engagement with it. When the project was conceptualised, the research team noted the possibility of finding differences between what teachers said and what they did – between their espoused and enacted practices. In their discussion of the research methods used in the studies undertaken for the President's Education Initiative in South Africa, Taylor & Vinjevold (1999: 90) argue that what teachers say (the espoused) has "weak status" as information if it is not related to other forms of investigation.

For all these reasons the evidence from observation of classroom practice is considered an important addition to the evidence obtained from teachers' spoken or written reflections.

What counts as evidence of reflection or of reflective teaching?

In order to explore this question, what some of the teachers said and did in relation to group work is described and discussed. In the impoverished pre-service teacher education provided in the era of Bantu Education in South Africa (see Chapter 2 for details) the focus was on whole-class, transmission-style teaching. Thus there are generations of teachers who have little or no experience of learning collaboratively or of facilitating

group-learning experiences. The Wits FDE course materials include discussions of possible benefits and limitations of small group work for learning, descriptions of strategies for implementing group work and examples of group-work activities. Some of the assignment tasks require teachers to use group work in their classrooms, and at residential sessions teachers participate in group-work activities, during which the course lecturers attempt to model good practice. When teachers were first visited in 1996 it was evident that where group work was used, it was a new practice in some classrooms. For example, learners took a long time to move into groups and did not interact comfortably with one another. By 1998 it was a well-established *form* in almost all the classrooms visited but the researchers found important differences between teachers in terms of the ways in which groups *functioned*. There were differences in reflection-in-action and reflection-for-action practices and in how teachers explained their use of group work in "technical" or "reflective" ways (Zeichner & Liston, 1996: 11).

Teachers' reflections on the selection and the organisation of group work as a teaching and learning strategy

Some teachers used group work selectively and were able to explain why they did so. For example:

> If I introduce something new, I don't group them until I see that no, there is other people can see it others don't, then I will give them work to do in groups. I usually teach first and make sure that other pupils has got the light what's going on. Then I'll group them; otherwise I don't.
>
> (Interview, Teacher 1, Group A in Table 7.1)

The interviewer observed that this Mathematics teacher sees group work as a form of peer tutoring for which she prepares the group leaders to play a teaching role. Another comment from the same teacher supports this observation. In talking about the group leaders she said, "I encourage them as I'm doing to ask questions, to ask leading questions which will help them [the group members] to find the answers." During one of the research visits she was observed in a class of 128 learners; and with such large numbers, her peer tutoring strategy could be a useful support for the learners whose groups she could not always interact with. In terms of Zeichner & Liston's attributes of a reflective teacher, it could be argued that she had examined, framed and attempted to solve a dilemma of classroom practice (1996: 6). This teacher stated in the 1997 interview that she had learned about group work from the Wits FDE courses. She became so interested in its possibilities that she chose to investigate her use of group work for an examination-equivalent project. She hired a video camera and cameraperson to tape her lessons for two weeks and then used the video to reflect on her teaching. These reflections were later developed into a conference paper which she co-presented with a Wits lecturer. These actions suggest that her practice demonstrated two of the other attributes of a reflective teacher listed by Zeichner & Liston: she took responsibility for her own professional development and she took part in a curriculum development that she reported to others.

Unfortunately, some teachers had appropriated group work as a form (either from the Wits FDE programme or in a few instances from NGO interventions), without reflecting

sufficiently (or at all, in extreme cases) on the kinds of tasks which are suited to group work, on the links between group tasks and other parts of lessons and on the reporting and recording of group work. Members of the research team recorded several examples where there was a marked difference between teachers' espoused and enacted practices. In the interviews these teachers explained their enthusiasm for group work with statements such as the following:

- Teacher 12, Group C: "When they are in groups they are free to talk" (whereas in the lessons observed, several learners in each of the groups had not participated at all)
- Teacher 8, Group B: "I have found that they really do understand so there is no need for them to copy down" (whereas the observer noted that on the following day the teacher had to re-teach the content of the previous day's lessons because very few learners could answer the questions she posed)

In relation to group work, the researchers noted the following evidence of lack of reflection-in-action, reflection-on-action and reflection-for-action in some of the lessons observed:

- The learning purpose of a group task and the links between this task and the lesson as a whole were not clear.
- Task instructions were not given with sufficient clarity or detail prior to the commencement of the group-work activity and so the teacher frequently interrupted the class to give additional information (arguably an example of reflection-in-action), or to simply repeat the instructions (in some of the lessons observed this was clearly not helpful as learners did not understand these instructions).
- While seated in groups, learners worked individually on tasks that were suited to individual work, but the teachers claimed that group work was being done.
- Only the group reporter left the class with any written record of the group's activities and this scribe, when chosen by learners, was probably the learner who was already the most proficient writer in the group.
- The resources were too limited for each learner to be actively involved (e.g. one ruler for a group of six engaged in a measuring activity; one dictionary for a group of seven working on a word puzzle).
- Learners were not given sufficient time to complete their tasks before teachers began a whole-class report segment of the lesson.
- There was no public reporting back and discussion of the work done in groups, with the consequence, noted by one of the observers, that there was no movement from informal group discussion (often in the learners' main language) to formalised, discipline-specific discourse (i.e., as described by Barnes (1992), there was no movement from exploratory to expressive talk).
- Every group reported in a way that was repetitious and time-consuming and caused many learners to lose interest.

In the interviews some teachers explained why they used group work rarely, if at all. In attempting to interpret these responses, we have found that it is not always easy to distinguish between a reflective or a technical response and what we have decided to term

"an excuse". For example, in describing the difficulty of organising group work, one teacher focused on the disruptions involved: "… they make lots of noise and they will take 10 minutes out of 30 minutes, which means I will only teach 20 minutes. And when I get out, the other teacher gets in, they will have to change again. That is a problem" (Teacher 15, Group C). It could be argued that this teacher was "attentive to the institutional context" in which she operated but it could equally be argued that she had not really reflected on why learners took so long to organise themselves and the classroom furniture and on what she could do about this. It is also possible that in terms of discourse, she could discuss only practical issues and not substantive professional ones.

We are also uncertain whether responses that in the view of the researchers are misguided should be considered examples of either a technical or a reflective response. For example, in reply to a question about the limited participation of group members in an activity, one teacher said: "I am planning to change them. I will take the one who is bright and put them in the one group who are not participating. Maybe it can work. I don't know but I will try" (Teacher 12, Group C). This teacher interpreted the problem as being lack of knowledgeable learners in some groups. However, according to the researcher what needed to be improved was free interaction among group members, which could be facilitated by instructions about how to work in groups – none had been given in the lessons observed. This teacher was attempting to solve a classroom dilemma (one aspect of reflective teaching) and was aware that change does not always result in improvement, but she seemed unaware of some aspects of the problem.

Teachers' reflections on information about group work in the FDE course materials

While a few teachers considered group work a good idea in theory but too difficult to implement in practice, the majority espoused it enthusiastically. We found that only the teachers whom we considered to be the most reflective responded critically to course material on group work. These teachers decided to adapt suggestions in the material in ways which they believed would benefit the learners in their classes. For example, one explained how she had changed the suggested reporting structure. She reflected on action, for action:

> … in the FDE materials they said, if … eh … in a group we should have one leader who can give the report. Now I tried first … I found that every … everyone is shy to give this report. Now I change the strategy. I said you have to discuss in groups, you tell me the answer as a group and they prefer to do that. Another thing, if I want one person to represent the whole group I don't call the child to the front. They have a stage fright. But if they can give the answer at the place where they are, they give it correctly and boldly, other than if they come in front. So from that one I change. I said no, for me I'm not going to let them to come in front of the classes. I let them sit where they are and give the answers. So now I'm moving quickly and faster.
>
> (Teacher 4, Group A)

Another suggestion in the course materials is that the roles teachers play when learners work in groups could include facilitating or monitoring the learning activities. Observers

reported that most teachers did attempt to play these roles (with varying degrees of success) when learners were engaged in group work. However, one teacher reflected on the possible negative effects of his presence in a group and explained why sometimes he took no part in group-work activities:

> It's much easier for them to talk so long as I don't go to them and listen to the type of language they are using. Because if you are still constructing a picture and then I want you to paint it in English then it's much more difficult. But when they are using their mother tongue it's quite easy. They come up with ideas and then the battle will obviously be the presentation. But as long as they are making sense I am okay with that.
>
> (Teacher 3, Group A)

With reference to Zeichner & Liston's five key attributes of a reflective teacher, this teacher was "attentive to the institutional and cultural contexts in which he or she teaches" (1996: 6). Observers of his lessons noted that he expected groups to report the outcomes of their activity in English, that he worked with their contributions (reformulating, extending, correcting misconceptions where necessary) for the benefit of the whole class. He expected each learner to make notes (though not everyone did) and in his large classes he did not ask each group to report on each occasion that group work was used, but instead called on different groups during a series of report-back sections in the lessons. In classes of between 60 and 80 learners he was attempting to make opportunities for learning available to all and it could be argued that, like the teacher who used group work for peer tutoring, his practice was that of a teacher who "examines, frames, and attempts to solve the dilemmas of classroom practice" (Zeichner & Liston, 1996: 6).

Reflections on student learning as a result of group work

Many of the teachers who were enthusiastic about group work did not appear to reflect-in-action or on-action with regard to the kinds of learning opportunities that they were making available or unavailable to learners. One teacher who was strongly in favour of group work explained its importance in her classes as follows:

> … they will learn what I give them to learn by talking to each other, by discussing, asking questions, manipulating tools, etc. etc. So they will be learning so they will not easily forget what they learn but they can forget when I tell them.
>
> (Teacher 8, Group B)

While the FDE courses have emphasised the importance of exploratory talk for learning, learners cannot always be a resource for one another. For example, in the more remote rural schools, learners have very little exposure to English and their limited vocabulary impacts negatively on their ability to read the information texts on which some group tasks are based. The researchers who observed the teacher quoted above noted that she did not even intervene when group reports to the class included obvious misconceptions. She had appropriated new discourse and was enacting new *forms* of practice, but without reflection on the *substance* of the learning activities.

In their facilitation of group tasks most teachers were observed to focus on procedures for task completion and in a few instances to be concerned only with correct answers. Many of the teachers appeared to find it difficult to reflect-in-action on learners' conceptions during the lessons (and therefore to guide, suggest alternatives, etc.) and almost equally difficult to reflect on these conceptions when invited to do so during informal conversations or more formal interviews with the researchers. One exception was a Mathematics teacher who gained high marks in all her FDE courses. During an interview she explained that when learners worked in groups she asked them to explain "why they are doing what they are doing" and if they could not, or if they could not see that they were making errors, she guided them or told them: "I'll give them the formula so that they can carry on from there" (Teacher 6, Group B). This teacher's own subject knowledge was more extensive than that of others in the study and this knowledge may have assisted her to reflect on learners' needs and to provide appropriate scaffolding.

Possible patterns in the reflective conversations or reflective practices of the teachers in the research sample

In this section we refer not only to evidence of teachers' reflective capability in relation to group work but also to their reflections on other aspects of their practice.

Reflections on lesson purposes: difficult for the majority of teachers; possible for some

> Interviewer: How do you choose what to do in your lessons?
>
> Teacher: Hau! Eeh! I think the question is very difficult for me to answer …
>
> (Teacher 12, Group C)

This teacher had great difficulty in offering any coherent account of what her teaching purposes were or of how she planned her lessons. The researchers who worked with her suggest that her established practices were destabilised by the Wits FDE programme. In 1996 she used a textbook which was accompanied by a lesson planning guide, but in 1997 and 1998 she attempted to implement ideas from the FDE courses without reflecting sufficiently on how to adapt these for her context. In fact, even when the researcher attempted to provide her with a reflective framework within which to discuss her lessons, she was neither able to explain coherently what she had hoped learners would achieve nor to reflect-for-action in subsequent lessons. She was not the only teacher to find reflective planning difficult. Observation of lessons on consecutive days led the researchers to conclude that some of the teachers worked in a very fragmented way: different topics followed one another in unconnected fashion. In the interviews the teachers who worked like this were usually unable to reflect on their choice of topic and lesson activities beyond such general comments as "It's in the syllabus". When asked why she used a textbook written for learners in a higher grade with beginner learners who could not manage any of the tasks from this book, one teacher responded that she liked using the difficult book because

> I thought maybe it is a step ahead but next year when they get there they will be just ready for the standard.
>
> (Teacher 18, Group C)

Such a comment indicates inability to reflect on learners' current needs and how to meet them. The teachers who found it difficult to express or enact lesson purposes were also the least able to reflect-in-action during lessons. It seemed to the researchers that when the learning purposes of the lesson were not clear to teachers, it was more difficult for them to attend to learners' conceptions, misconceptions or requests for help.

In contrast to the group of teachers just described, there were others who planned a coherent teaching and learning programme. In some instances these teachers used a textbook as a framework for this planning and in others preferred to consult a range of texts in order to develop their own teaching notes and their own activities for learners. Unsurprisingly, ability to plan coherently, with a recognition of learners' prior knowledge and skills and current learning needs, and to reflectively discuss this planning with the researchers, appeared to be positively related to the depth and breadth of teachers' subject knowledge and pedagogic content knowledge (both in terms of the knowledge they had before joining the FDE programme and in terms of what they took up from the programme). The researchers noticed that it was also the teachers who had the clearest ideas about their lesson purposes who were most able to reflect-in-action during lessons (e.g., by attending to learners' questions, conceptions and misconceptions in ways that promoted learning).

Reflections on new ideas from the FDE programme: both reflective and unreflective espousal and enactment of new ideas across teachers

Analysis of the interview transcripts and of field notes of informal conversations indicates that most of the teachers espoused the learner-centred discourse of the FDE programme. However, a question raised in the 1998 interim research report is pertinent here: "Is there blind or ideological commitment to new ideas, or a thoughtful engagement with new ideas as they work with them?" (Adler et al., 1998: 8). When teachers were asked about their understanding of learner-centred practice, the majority referred to group work. The teachers who used it selectively and who organised group tasks and group processes effectively were also the teachers who could most clearly express the purposes of their lessons. For some others there did seem to be "blind or ideological commitment" to it: it appeared to have become a routine, dominant and unexamined practice.

Most teachers spoke of how the FDE programme gave them new ideas for using existing resources (social, cultural and material) and for recruiting new kinds of resources into their classrooms. As with group work, there were noticeable differences between teachers in the ways in which they used these resources reflectively or unreflectively. For example, two teachers working at the same grade level used newspaper texts as the basis for lessons in which they focused on aspects of grammar in context. In both classrooms learners were asked to paste the texts into their classwork books, to underline each example of a particular grammatical feature and then to write sentences of their own using this feature. In the class of Teacher 4, Group A, the majority of learn-

ers had underlined the appropriate feature and made creative attempts at sentence writing. In the class of Teacher 12, Group C, learners appeared to have underlined indiscriminately and were not able to write their own sentences. Both teachers spoke with enthusiasm about "teaching grammar in context" by using newspaper and magazine texts and both spoke positively about what they had achieved. Teacher 12 seemed unaware of her learners' misconceptions and task difficulties.

Reflections on their teaching and learning context: energising for some; demotivating for others

Zeichner & Liston suggest that a reflective teacher is "attentive to the institutional and cultural contexts in which he or she teaches" (1996: 6). Perhaps because of the relatively or severely disadvantaged schools and communities in which they work, all of the teachers could speak reflectively about some features of their context. In most cases, whether the teacher was demoralised and demotivated by circumstances or became "involved in school change efforts" (another of Zeichner & Liston's attributes of a reflective teacher), seemed to depend greatly on the presence or absence of support from colleagues in their own school and/or other schools or NGOs in the area. For example, Teachers 4, 9 and 10 worked together to address some of the needs of learners in their own school and in other schools in their area by offering extra classes on Saturdays. The principal encouraged learners to participate in educational activities organised by an NGO and encouraged parents to support the school in practical ways (e.g., by contributing bricks for the building of a path through a muddy area of the school grounds). On the other hand, some of the other teachers felt that they were working in a context in which there was minimal interest in education. For example, one of the researchers noted the following:

> … although Ms X is conceptually able to reflect quite deeply on her teaching she does not do so. She does not want to reflect beyond certain points: why do her pupils struggle to participate, why do they not ask questions, why does she not mark books more rigorously? It is possible that to do so would be even more disempowering for Ms X, for it might bring her face-to-face with the real difficulties of teaching in her context and the real limitations of what she can achieve as an individual teacher.
>
> (Teacher 6, Group B)

Summary of findings on the presence or absence of reflective thinking and reflective practice

Though evidence of reflective practice and reflective responses to questions is very difficult to quantify, after using Schon's and Farrell's concepts of reflection in, on and for action, and Zeichner & Liston's description of reflective teachers in order to analyse data from classroom observation notes, video recordings, interviews, teacher narratives and questionnaires, we found it possible to place each of the teachers in one of three broad groupings. In Table 7.1 (on page 120) we have indicated whether the teachers work in primary or secondary schools, in urban, peri-urban or rural, ESL or EFL contexts (see the note on language in the introductory section of this chapter). We now turn to possible explanations for the patterns that the research uncovered.

Possible explanations of patterns of reflective/unreflective practice

Given that deepening teachers' reflective capabilities is an explicit goal of the Wits FDE programme, and given that programme staff have attempted to address this goal in course materials, assignments and contact sessions with the teachers, what explanations can we offer for the differences in reflective capability which we believe to be evident in the classroom practices and the conversations of the teachers in the research sample?

English language proficiency

In Table 7.1 all the primary school teachers in rural communities are located in the "least reflective" band. We suggest that this location may be at least partly explained with reference to language. These are the teachers who have least exposure to a wide range of lexis, syntax, registers and genres in English in their school and community contexts. This limited exposure may impact negatively on their take-up of input from the Wits FDE course materials and from the books and articles to which they are referred during their studies, all of which are written in English. Where take-up is limited, teachers have fewer resources with which to reflect in action, on action and for action.

As indicated earlier in the chapter, some of the researchers could not switch to teachers' main or primary languages during interviews or informal discussions with them. Those who are least practised in using English beyond what is needed to interact with beginner learners of the language may have found it more difficult to speak reflectively in English than teachers who use a wider range of vocabulary and registers both inside and outside the classroom (i.e. secondary school teachers and teachers in urban areas). However, one of the researchers who was able to switch to the main language of some of the teachers in the least reflective band reported that switching to this language did not promote reflective discourse. This suggests that in order to become members of a community of reflective practitioners, teachers may need to be apprenticed into reflective discourses in relation to what the Wits FDE programme refers to as "subject knowledge, subject pedagogic knowledge and educational knowledge", whether this is done through their main language or an additional one. Further research is needed here.

Teachers' subject, pedagogic and educational knowledge

We believe that teachers' ability to reflect on ideas from the FDE programme and to incorporate, adapt or critique these is related to the depth and the breadth of their subject, pedagogic and educational knowledge (see Chapter 6). The programme attempts to extend all three, but the variation in teachers' prior knowledge has been much greater than the course developers expected. The researchers observed some teachers teaching from a subject and a pedagogic knowledge base that was so limited that it negatively affected their ability to reflect on their practice. This was true of all the teachers in Band 3. Their inability to reflect was particularly evident in the more complex aspects of their work, such as developing a sequence of lessons that facilitated learning. From the evidence of changes in their discourse that were not matched by changes in practice, it seems that it was easier for these teachers to espouse than to enact new practices.

Teacher attitudes

In her discussion of teachers' responses to an in-service teacher development project in Hong Kong, Pennington reports two sets of findings from research in teacher education: efforts to develop reflective approaches to teaching are most effective either in those who already have reflective attitudes or those who already show some predisposition towards reflectivity in their attitudes of curiosity and interest in exploring knowledge (Korthagen, 1985; Goodman, 1986, quoted in Pennington, 1996: 343). From the start of our project (1996) there were some teachers who were more receptive to the researchers' visits than others. These were not necessarily the "best" teachers (though some were) but they appeared to be the most enthusiastic about learning (as evidenced by the questions they asked and their attempts to implement new ideas from the Wits FDE programme or from other sources such as education NGOs). Some of them were already working reflectively when we first visited their classrooms (e.g., Teachers 1 and 3); others began to demonstrate reflective capability in various ways, including the questions they asked the researchers, the changes they attempted to introduce in their classrooms and the observations that they made about these changes (Teachers 4, 10 and 11 are examples).

The context in which teachers work

Russell suggests that "an appropriate and supportive school environment" is a key factor in nurturing reflective practice (1993: 145). This description does not really apply to the school environments of any of the teachers in our study, but as already indicated, some teachers had collegial support that others lacked and the presence of this support seemed to be an important factor. Zeichner & Liston argue that reflection should be considered a social practice: teachers need a social forum for the discussion of ideas. The teachers whom we believe to be the more reflective are teachers who discussed their work with one or more colleagues at their school (e.g., Teachers 2, 3, 4, 7, 8 and 10) or with practitioners from outside agencies such as education NGOs (e.g., Teachers 3 and 11).

It may be beyond the scope of teacher development programmes to engage substantively with teacher dispositions, or the contexts in which teachers work. It is nevertheless possible to include a focus on academic literacy and on apprenticeship into reflective discourse, and reflective practice in a programme which aims to extend teachers' subject, pedagogic and education knowledge. Some suggestions to course developers are made in the final section of this chapter.

Suggestions to course developers who wish to assist teachers to become reflective practitioners

The four teachers we have placed in the category of "showing evidence of reflection in, on and for action" are all teachers whose classroom practices were considered the best of those in the research project, though for each of them there are aspects of their practice that could be further developed. Thus in relation to the teachers who participated in this project, our tentative answer to the question posed by Calderhead & Gates is that

there does appear to be a correlation between good teaching and reflective teaching. If this is so, then teacher educators need to consider how to assist teachers to become more reflective.

In their discussion of some of the key ideas in Dewey's *How We Think,* Zeichner & Liston note that, according to Dewey, reflection does not consist of a series of steps or procedures to be used by teachers. Rather it is a holistic way of meeting and responding to problems, a way of being as a teacher (Zeichner & Liston, 1996: 9). This raises the question of how teachers develop this "way of being". A key finding from the research is that each of the teachers in the study who was able to reflect in, on and for action was also a teacher who could be described as one who demonstrated good subject and pedagogic knowledge. Thus one of the challenges for writers of distance learning courses for teachers is to find effective ways of assisting them to extend their subject and pedagogic knowledge (see Chapters 6 and 8). From his experiences of working with "weak" student teachers, Russell suggests that some teachers need support in learning how to reflect and that this involves learning "how to consider events of teaching in fine detail and to plan for modest and attainable changes that could gradually produce improvements not only in performance and confidence, but also in an understanding of how different aspects of classroom activities relate and interact" (1993: 151). Some of the assignments in Wits FDE courses include tasks in which teachers are expected to describe "events of teaching" and then to write reflectively about these. While all of them are able to write descriptively (some in finer detail than others) many teachers have not been able to move from description to reflective analysis. It is possible that their difficulty in writing reflectively could be at least partly addressed through implementation of the two suggestions that follow.

Modelling a reflective process and providing access to reflective discourse

In order to provide this support in a distance learning or mixed-mode teacher development programme, course writers or facilitators of workshops could include classroom scenarios (in print or on videotape or, in privileged contexts, on CD-Rom) on which they ask the kinds of questions that it could be helpful for teachers to ask in their own classrooms. Carter (1992) quotes Richert (1990) on the value of including case studies in teacher education courses:

> The teaching moment or moments "frozen" in the case description allow the teacher to think about what has occurred in the particular situation described. Teachers can ask themselves, or ask one another, what the case is about, what the actors are doing or saying, what circumstances seem to determine what people do and say in the situation described, and what they might do in similar situations.

Carter then argues that teacher educators need to develop and use case studies in ways that connect with teachers' existing knowledge and experience: "If cases are ill-connected to teachers' everyday cognitions and modes of knowing about teaching, they will likely add little to the educative process in which many beginning and experienced

teachers wish to engage" (1992: 113). The data gathered during the three years of the Wits FDE research project offer many possibilities for developing case studies of contexts and teaching moments with which South African teachers could identify.

In addition to asking questions about a series of scenarios or case studies, writers or workshop facilitators could also offer some examples of answers to demonstrate to teachers how they can think about what they read or view. These "model answers" could help to overcome the problem that Cohen describes as follows: "The less one knows about what one observes, the less one can see, and the less one can see, the less one can learn" (1998: 174). These questions and answers could assist teachers to acquire the professional discourse that will assist them to speak or write reflectively about their practice. Edwards & Brunton argue that dialogue is central to the process of reflection on practice and that teachers need opportunities to be inducted into professional discourse and to experiment with it in order to "take control" of it (1993: 164). Opportunities for acquiring this discourse may be particularly important in a context in which teachers are expected to speak or write reflectively in a language (English) which is not their main language when they undertake further studies or participate in workshops, conferences, and the like.

Including small-scale classroom research projects in courses

Course developers could build small-scale research projects (with a focus on the classroom, the school and the community) into courses and provide guidance on how to collect data and how to analyse data reflectively. This has already been attempted in some of the Wits FDE courses, but these first attempts could now be revisited in the light of findings from the research project and from analysis of the teachers' responses to these projects. For example, in both their conversations with the researchers and in written reports on their classroom research projects, there is evidence that many of the teachers need guidance about what to look for and listen to when they observe or interact with learners. Course materials could include classroom observation schedules, together with explanations of what information these schedules could assist teachers to gather and why this could be useful to them.

Conclusion

As indicated in the quotation from Calderhead & Gates in the introductory section of this chapter, it is often presumed in the teacher education literature (predominantly written in "developed" or "first-world" contexts) that being more reflective leads to being a better teacher. One finding from our research, undertaken in a developing country context, is that those teachers who appeared more able to be reflective-in-action during lessons and reflective-on-action when planning their teaching or discussing their work, did offer learners richer, more coherent and more appropriately scaffolded learning experiences than those who appeared less able to teach reflectively. Another is that some of the teachers in the research sample (particularly those in Band 3) had not accessed the reflective discourse of the Wits FDE programme.

The responsiveness of most of the teachers in the study to ideas suggested in conversation with the researchers, and the finding that support from colleagues was an

important factor in promoting reflective practice indicate that school-based support could make an important contribution to teachers' professional development. As it is not possible for a mixed-mode or distance learning programme to provide this form of support, the challenge is for materials developers to introduce teachers to reflective processes and practices through the course materials and in particular to reflective discourse. Our suggestion is that they include case studies and scenarios that will "connect" with teachers' classroom experiences, and assignment tasks that will provide opportunities to practise thinking and writing reflectively. Where programmes operate in mixed mode, opportunities for trying out reflective discourse need to be built into contact sessions.

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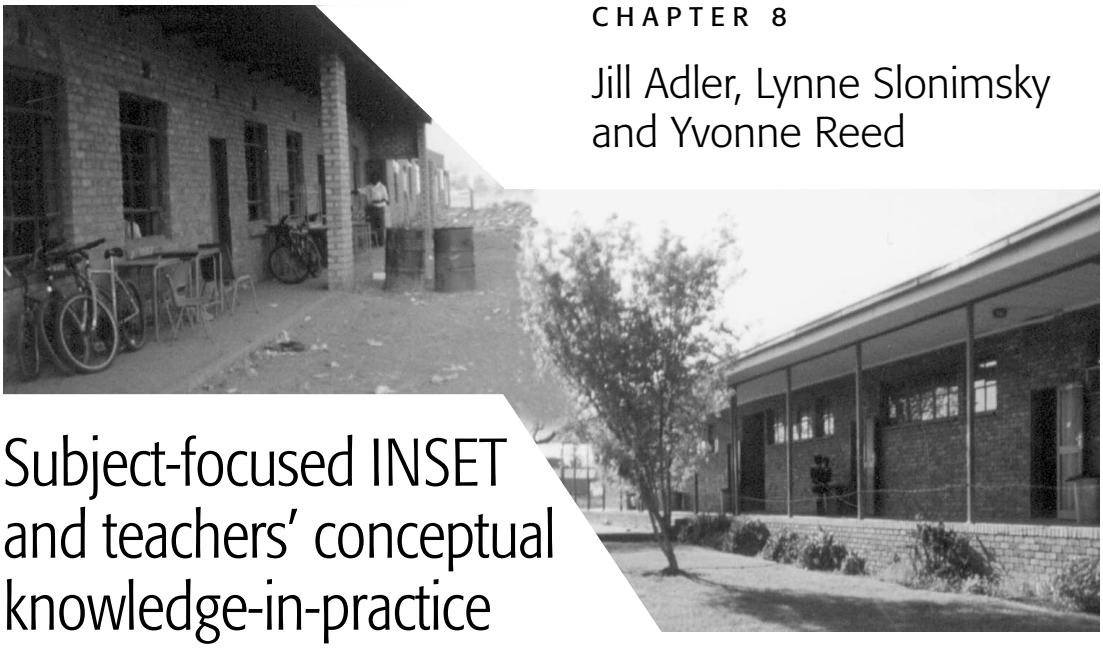

CHAPTER 8

Jill Adler, Lynne Slonimsky
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Subject-focused INSET and teachers' conceptual knowledge-in-practice

Introduction

The previous four chapters have discussed key areas of research in teacher education that framed the University of the Witwatersrand's (Wits) Further Diploma in Education (FDE) research project: resource availability and use, multilingual classroom practices, learner-centred practice, and reflective practice. The focus of this concluding chapter is teachers' take-up of subject knowledge and the relationship of this take-up to changes to their classroom practice. As discussed in Chapter 1, teacher education everywhere continues to face the challenge of what constitutes subject knowledge for teaching and how this is best acquired. This challenge serves as an appropriate conclusion to this book. In each of Chapters 4 to 7 the authors have consistently pointed out the significance of subject knowledge for teaching. Whether we are considering resource use, language or learner-centred practice, for example, this cannot be done in isolation from the subject knowledge being taught and learned. In a similar vein, as will become clear in this chapter, a consideration of teachers' subject knowledge cannot be isolated from its use.

> … [R]eform initiatives aimed at revitalising teacher education and classroom practices … need to get to grips with what is likely to be a far more intractable problem: the massive upgrading and scaffolding of teachers' conceptual knowledge and skills.
>
> (Taylor & Vinjevold, 1999: 159)

There is a tendency in South Africa at present (see Chapter 1) to describe the major challenge confronting teacher education as "teachers' conceptual knowledge". Reform,

redress and repair all hinge on teachers' conceptual knowledge. There are a number of assumptions that underlie this position. The first is epistemological and reflects a widely accepted view (one with which we would agree) that knowledge of subject matter for teaching is of primary importance, for without this, teachers would not be able to engage their learners in high-level conceptual thinking. However, what is left unexplored in this assumption and position is the nature of that disciplinary knowledge for teaching. There is increasing support for the position that *disciplinary knowledge for teaching* (what we will refer to as "teachers' conceptual knowledge-in-practice") is a special kind of knowing about the subject, and that this knowledge is substantively different from the kind of knowing and knowledge held by an expert in the discipline, for example a mathematician (Lampert & Ball, 1998; Ball & Cohen, 1999; Ball & Bass, 2000).

The second assumption is related to research methodology. The research reported by Taylor & Vinjevold assumes that what teachers know about the subject they are teaching can be unproblematically inferred from that which is "visible" in elements of classroom practice. And conversely, what is "not seen" is then indicative of some lack in the teacher. Their assumption is that these inferences are valid, that is, that elements of practice – such as levels of learner performance and levels of conceptual demands made on learners – can be directly attributed to teachers' knowledge, or lack thereof, of the subject matter they are teaching.

In this chapter we explore these epistemological and methodological assumptions and the challenges they continue to present for teacher education. The development and research in the Further Diploma in Education programme at the University of the Witwatersrand has led us to understand that neither the nature of subject knowledge for teaching, nor how its relationship to quality teaching and learning can be investigated, are straightforward. Our understanding resonates with the wider field as discussed in Chapter 1. Increasing research and development in teacher education has not yet provided definitive descriptions of the nature of subject knowledge for teaching, and how this knowledge base is best developed in initial and in-service teacher education. Indeed, this dimension of the Wits FDE research project was the most complex. We had difficulties in elaborating subject knowledge for teaching, the nature of its relationship to classroom practice, and how both can be investigated through research. As a result, this chapter, in comparison with Chapters 4, 5, 6 and 7, is more tentative in its descriptions and more "fuzzy" (see Chapter 3) in its conclusions. A great deal of work lies ahead in tackling challenges related to the nature and place of subject knowledge in teacher education.

We begin with a discussion of the local debate on the role of teachers' subject or conceptual knowledge for teaching, which we prefer to call teachers' conceptual knowledge-in-practice. We then briefly describe the subject-focus orientation in the Wits FDE programme. We will highlight what we identified as indicators of teachers' conceptual knowledge-in-practice. We then discuss our broad findings, in terms of both the presence and the absence of these indicators in the data. We suggest that the participating teachers left the programme with "more" subject knowledge and greater subject confidence, but that there was an uneven, complex and deeply situated relationship between this "more knowledge and confidence" and teachers' classroom practice. We posit that the task that lies ahead is to characterise and articulate "subject knowledge for teaching" and how its acquisition by teachers lies in the co-ordination of subject, pedagogic

and contextual knowledge – or what can be renamed teachers' conceptual knowledge-in-practice.

Teachers' conceptual knowlegde-in-practice

Since Wits University staff embarked on the FDE programme in 1995, there has been a renewed and vigorous emphasis on the importance of teachers' subject or conceptual knowledge in South African education research and policy processes. In *Getting learning right*, Taylor & Vinjevold (1999) report on a range of 38 educational research projects undertaken in 1998 as part of the President's Education Initiative (PEI) in South Africa. They admit that the projects do not constitute, even in combination, a systematic research programme into factors relating teachers and teaching to quality of schooling in South Africa. They nevertheless claim that the projects, in their combination, identify and interrelate important research questions. One key research priority relates to teachers' subject knowledge, or what they refer to as "teachers' conceptual knowledge".

The authors of *Getting learning right* make strong claims about teachers' conceptual knowledge and its relationship to student learning on the one hand, and to pre- and in-service teacher education on the other. They do this without a clear elaboration of what they mean by "teachers' conceptual knowledge". However, their descriptions (as we will show below) suggest that "teachers' conceptual knowledge" is their disciplinary knowledge: their knowledge, for instance of science, mathematics, or English language. Taylor & Vinjevold state, for example:

> The PEI research studies *strongly suggest* that teachers' poor grasp of the knowledge structure of mathematics, science and geography acts as a major inhibition to teaching and learning these subjects, and that this is a general problem in South African schools.
>
> (1999: 142, our emphasis)

They then posit a way forward:

> Further investigation of the relationships between teacher in-service courses and the conceptual knowledge of teachers and their students is required before firm conclusions can be drawn, but *this study suggests* that:
>
> - teachers' conceptual knowledge is significantly improved through subject-focused in-service training
> - improved teacher knowledge *leads to* improved students' learning.
>
> (1999: 155–156, our emphasis)

It is interesting to note that the discourse used is, in Bassey's terms, "fuzzy generalisations" (1999: 44); for instance, the study "suggests" (rather than concludes), and there is an acknowledgement that further research is needed. Despite this necessary hedging (given the research limitations), the analysis proceeds, shifting from fuzzy to full-blown generalisations and strong claims that teachers' conceptual knowledge *in itself* is the key to quality learning.

> The *most unequivocal finding* about teachers is that a poor grasp on the part of teachers of the fundamental concepts in the knowledge areas they are responsible for is a major problem in disadvantaged classrooms.
>
> (1999: 159)

> INSET programmes for teachers can have a significant impact on the quality of learning. *Improving the conceptual knowledge of teachers* ***alone*** gives them the confidence and resources to engage children at more challenging levels and undertake more adventurous learning tasks.
>
> (1999:161, our emphasis)

And they propose:

> … initial and in-service teacher training, which commences with a more explicit focus on high-level conceptual knowledge, in order to equip teachers with both the confidence and knowledge to undertake learner- and more specifically learning-centred classroom practice. Without a secure knowledge base to build on, free standing in-service courses on assessment are unlikely to have any purchase on classroom change.
>
> (1999: 203)

There is a simple equation here. Improvement in student learning is a function of teachers' knowledge of their subject matter, which is, in turn, a function of subject-focused pre-service and in-service teacher education. We agree with Taylor & Vinjevold's criticism of the emphases on pedagogy in teacher education that occur in isolation from conceptual knowledge. As has already been discussed in Chapter 6, substantive learner-centred practice appears to be a function of pedagogic subject knowledge. However, we disagree with their claim that a focus on teachers' conceptual knowledge *alone* is the route to improvement in teaching practices. In addition, as we have discussed in Chapter 3, inferring teachers' knowledge from classroom observations and learner performance is no straightforward affair.

The research reported in this book suggests that a simplistic response to upgrading teachers' subject knowledge will not yield its promise of better learner attainment. We are not alone in this view. Ma's (1999) interesting comparative research across Chinese and American primary mathematics teachers reveals that it is not necessarily further (i.e. tertiary) mathematics study that accounts for quality teaching and learning, but rather the depth of conceptual understanding teachers hold, or what she calls "profound understanding of fundamental mathematics". As Shulman notes in his foreword to Ma's book, Chinese teachers may have studied far less mathematics than their American counterparts, but what they know, they know "more profoundly, more flexibly, more adaptively". Moreover, Chinese teachers continuously refine their content knowledge through "deliberations with their colleagues on the content of their lessons … Conceptual knowledge for teaching is as much about pedagogy as it is about content" (1999: x–xi). As discussed in Chapter 1, the nature of activity in, and location of, teacher education remain key challenges in all teacher education.

We present here work in progress (see Dickson, 2001) on identifying and describing what constitutes conceptual knowledge for teaching. It is possible to identify four ana-

lytically distinct characteristics of what constitutes the "more" in relation to "teachers' conceptual knowledge base". In primary position is the importance for teachers of holding a *relatively broad and deep knowledge of the subject* they are teaching. But disciplinary knowledge, in and of itself, is insufficient for teaching. It has to be transformed, in moments of teaching and in teaching programmes, into sequenced, graded and developmental/progressive tasks for learners, learning and assessment. Thus, pedagogical knowledge, and specifically *knowledge of curriculum in their subject area*, is a key component of teachers' conceptual knowledge. At the same time, teachers' ability to transform their disciplinary knowledge into curricula is inextricably connected with knowledge of how children learn, and not only how they learn in general. *Teachers need to know how learners come to know their specific subject*, for example, how learners come to know scientific concepts. Finally, such coming to know is never isolated from the context in which teaching and learning take place. Teachers need to understand how *the teaching and learning of their subject comes to shape and be shaped by specific contextual conditions* (such as multilingual classrooms, or situations of conflict and violence).

Teachers' conceptual knowledge, or what we call their *disciplinary knowledge-in-practice*, is thus a co-ordination of disciplinary and pedagogical knowledge where the latter includes curriculum, learner, learning and contextual knowledge. The latter two components have been discussed in depth in Chapter 6. Here we focus on disciplinary and subject-focused curriculum knowledge, how and where these were dealt with in the Wits FDE programme, what our research enabled us to see about teachers' take-up from the programme, and where further research is needed.

Subject knowledge in the Wits FDE programme

When the Wits FDE programme was launched in 1996, the research and development team was not as deeply immersed in debates about what constitutes conceptual knowledge for teaching as we have subsequently become. We operated on the basis of the truism quoted in Chapter 1, that "teachers who know more teach better" (Cochran-Smyth & Lytle, 1999: 249). Our assumption was that teachers who knew more mathematics, science and English as an additional language would teach these subjects better. This need for "more" was particularly strong for us, given the need for redress and repair in relation to teacher education in the apartheid era (see Chapters 1 and 2).

Chapters 1 and 3 include descriptions of the programme's attempts to deepen teachers' knowledge base in an integrated way. Courses combine a focus on conceptual or subject knowledge (e.g. knowledge of mathematics), pedagogic subject knowledge (knowledge of how mathematics is learned and taught), and educational knowledge (knowledge of wider issues like resource-use, assessment, collaboration and mediation). There are two subject-focused courses in each of mathematics, science and English language, and one course in each specifically aimed at integrating the teaching and learning of the specific subject. The assumptions underpinning the two subject courses are that teachers who have experienced a three-year college diploma in the ex-DET College of Education system are likely to have experienced an impoverished approach to mathematics, or science or English language in general, and a limited engagement with subject matter much beyond the levels at which they teach. The subject courses were designed both to deepen subject knowledge and to present broader approaches to mathematics,

science and English. It was further intended that the approaches in all these courses would mirror the pedagogical messages in the programme as a whole.

It is beyond the scope of this chapter to provide detailed accounts of how the three different subject areas in the FDE programme interpreted "deepening" and "broadening" teachers' knowledge base. What follows here is a brief description of these courses at the level of the intended curriculum.[1]

Mathematics

The first course for mathematics teachers in the Wits FDE is called "Mathematics in Perspective". It was written for both primary and secondary teachers. Its main goals were to present mathematics as something that has a history, is cultural, connects with the real world, involves problem solving, and involves both skills and processes. The four sections of the course spanned number, algebra, geometry, and probability and statistics. Where appropriate, the history of numbers, for example, entered the course. This course intended to broaden teachers' understanding of mathematics, and particularly to extend their ways of doing mathematics beyond the procedural approach so dominant in school. The second subject course was divided into "Mathematics for the Secondary Teacher" and "Mathematics for the Primary Teacher", each focusing on key areas of these school curricula. Conceptual depth was a concern in these more specifically topic and level-focused courses. For example, there was a strong focus on fractions in the primary course, and on functions and calculus in the secondary course. In their work with fractions, teachers were provided with opportunities to work across a range of representations of wholes, discrete and continuous, and representations of fractional numbers (common and decimal fractions, ratio and rates, percentages). In the secondary course, teachers were introduced to the graphing calculator as a tool in their revisiting and visualising of functions and calculus, and as a possible teaching tool in their classrooms. The two subject-focused mathematics courses thus provided opportunities for teachers in the programme to deepen and broaden their mathematical knowledge, though not in consistent or necessarily explicit ways.

What was evident, however, as we review the course materials and reflect on what was offered in residential sessions with teacher participants, is that there was no explicit attention to progression, sequencing and grading of mathematical tasks, that is, to curriculum knowledge. This observation also applied to the course "Theory and Practice of Mathematics Teaching", described in more detail in Chapter 6. Implicit indicators of progression, sequencing and grading are simply embedded in the activities and exercises teachers themselves carry out in the various topics within the courses.

Science

A brief overview of the science-focused courses reflected similar emphases to the mathematics courses. The first science course was called "Science in Perspective" and there were two emphases here. First was the development of a specific focus on science in society. Components of the course were organised around themes of clothing and transport, for example, as social contexts for chemistry and physics. The second thrust in the

[1] Each of these courses has fully developed self-instructional learning materials.

course was on a conception of the process of science – of science as inquiry. Science was about hypotheses, experimentation and careful observation. The second science course was also split into separate courses for primary and secondary teachers, with general science the focus in the primary course and physics and chemistry in the secondary course. As with the mathematics courses, these were focused on central scientific concepts and ways of doing science. Thus, in these courses there was a similar attention to broadening and deepening teachers' science knowledge base. Further attention to conceptual knowledge in science was given in the "Theory and Practice of Science" teaching course, in which there was considerable work with teachers on concept mapping, and thus opportunity to experience scientific concepts as both relational and hierarchical.

English language

One of the goals of the English courses was to offer teachers the opportunity to extend their own knowledge of the language: to speak, read and write in a range of genres with increased confidence and competence. For example, this goal was the explicit focus of the course "Reading and Writing for Personal and Professional Growth". The course "Grammar in the Language Classroom" was developed in response to requests from teachers for a course that would both explain the grammar of English and offer strategies for teaching grammar. In "The Theory and Practice of English Language Teaching", the focus was on pedagogy in relation to learning to speak, read and write English as an additional language.

In short, across the subject-focused, and also in the more pedagogically focused courses (described in more detail in Chapter 6), there were attempts to broaden and deepen teachers' knowledge of the subject they were teaching, offering both new approaches to the subject and opportunities to revisit prior understandings of key content areas in new ways. In addition, while there was a pedagogical thrust to some aspects of the subject courses, the focus of attention (activity) for participant teachers, in the mathematics and science courses in particular, was on the subject *per se*. However, the absence of explicit attention to sequencing and progression in subject teaching, noted in the mathematics course intentions, extended as well to the science and English subject-focused materials.

Researching teachers' knowledge

There were pressures on the programme and on its research to demonstrate its impact, and increasing calls for impact to be evidenced through improved learner performance (see Chapters 1 and 3). In Chapter 3 we have discussed the problems with the double inference entailed here, as well as the limits of learner tests for revealing teachers' subject knowledge and so their take-up from, or the impact of, the programme. We worked instead at developing ways in which we could discern teachers' changing subject knowledge-in-practice over time, and whether and how such changes could be related to take-up from the FDE programme, and to their classroom practices.

Systematic empirical inquiry, that is, research into in-service professional development, is in many ways still underdeveloped. In their review of the nature of this research

in the USA, Wilson & Berne (1999) point to the difficulties of monitoring teachers' knowledge. In particular, projects have not found adequate ways of describing what the knowledge is that teachers are to acquire, and what indicators there are of its acquisition, particularly as it relates to improved classroom practice. The issue, as discussed in Chapter 1, is how researchers can develop analytical approaches that are rigorous yet respect the complexity of teaching.

Over the three years of the research, the Wits FDE research team constructed the following as indicators of teachers deepening and broadening their subject knowledge over time:

- Performance in subject courses on the programme
- Increased subject confidence – expressed and observed
- Greater breadth and depth of content covered in learners' written work
- Greater willingness to try alternative approaches to the subject
- Improved selection, sequencing and grading of tasks
- Greater eliciting and probing of learners' conceptions

The underlying assumptions here were that as teachers deepened and broadened their subject knowledge, so they would pass their courses; given time express and show greater confidence in their subject teaching; teach with greater flexibility across the various topics required in the curriculum; be able to approach their subject in diverse ways; be able to sequence, select and grade traditional and new tasks; and elicit and probe their learners' conceptions.

We have discussed the overall research design and process in Chapter 3 and so will not repeat this in any detail here. We will nevertheless describe how the instruments (see Addenda 1–3) and research processes we used provided data for exploring teachers' take-up from the subject-focus courses in the programme. Visits to schools in each of the three years of the project included structured classroom observation, video-taping of lessons, structured analysis of learners' written work and follow-up interviews with teachers. The classroom observation schedule recorded how teachers introduced their lessons and the nature of the tasks set (and so their approach to knowledge); and how teachers elicited and probed learners' conceptions. The schedule for analysing learners' written work included attention to breadth and depth of content covered over the year, and the nature of the written tasks set. In the follow-up interviews teachers were asked to talk about their lesson approaches and purposes, the lessons observed, their learners' written work, and their own learning in the FDE programme.

If we had wished to probe the relationship between the improvement in teachers' conceptual knowledge and their classroom practice over the duration of the research project, we might have designed the research differently. We could have focused visits and observations on a particular topic, grade level and sequence of lessons, and then observed the same topic and grade level in each year of the research. Although there are enormous practical difficulties in a specific focus such as this, it might have enabled us to track teachers' engagement with the subject in their classroom practice, and also show how their engagement related to their participation in the Wits FDE programme.

As it turned out, we rarely saw any of the teachers working on the same topic or even at the same level in the school over the three years, and so faced a far more complex

task in unravelling the relationship between teachers' further subject learning and the quality of their subject teaching.

The data we collected nevertheless suggest (and we have a great deal of evidence to support this) that over time, each of the teachers did take up subject-specific aspects of the programme and that they did act on these in their teaching. This happened in uneven ways (both within and across teachers), and with varying effects. Most significant however, is that the data suggest that there is no *simple* correlation between changes in teachers' subject knowledge base and changes in the overall quality of their teaching. We elaborate this "fuzzy" claim in the descriptions of what we learned in the next section.

What we learned

We have organised the description of what we learned into topics, each discussed in detail below.

Teacher diversity

- Subject knowledge take-up from the Wits FDE programme was different for different teachers. Subject knowledge take-up was heterogeneous.
- Teachers from the same school and in the same subject did not necessarily benefit from the subject courses in the same way.
- Different teachers in the Wits FDE enjoyed different parts of the subject courses and were stimulated in different ways to broaden and deepen their subject teaching.
- Teachers in different school conditions faced different constraints in their schools, with those in the most impoverished rural primary schools benefiting least

It is not possible to substantiate these claims in full here. Some are elaborated in other chapters. In Chapters 6 and 7 there is evidence of the last claim above. The teachers in impoverished rural primary schools benefited least from all aspects of the programme – and this included their attempts to learn more mathematics, science or English. To illustrate varied take-up from the subject courses and its relationship to teaching, we provide some examples from mathematics, drawn from detailed portraits of each teacher's practice over the three years of the study.[2]

Mrs X and Mrs Y teach mathematics in secondary schools in the Northern Province. Both teachers were trained as primary teachers in their initial training and have since been elevated to teaching secondary mathematics. In the "Mathematics for the Secondary Teacher" course, both had the opportunity to study mathematical content that they had not previously studied themselves, but that contained elements they were required to teach. Mrs Y struggled with this course, but managed, while Mrs X enjoyed this course and performed very well. Both teachers had to cope with overcrowded classrooms, and difficult physical conditions in their schools. Mrs X's school deteriorated

[2] In the first two years of the research, detailed portraits were written for each teacher. In the third and final phase, the portrait developed drew on the previous two portraits in order to track elements of take-up. Each portrait was structured to focus on resources, language practices, mediation, subject knowledge and reflections.

between 1996 and 1998, with collegial and staff-student relations becoming increasingly conflictual. Mrs Y's school drew learners from very impoverished environments and in her interviews she spoke of the social ills she dealt with in her Grade 8 classes, where, for example, she had learners who were significantly over-age (e.g. 21), and others who had suffered domestic abuse.

During the FDE programme Mrs X focused most of her attention on the subject courses, but paid less and less attention to her pedagogical strategies over the three years. In her interview she was clear that she benefited most from the subject courses. The researcher noted that this was not surprising, given the difficult conditions she faced. Mrs X's initial attempts at trying out new ideas in 1996 were virtually absent in 1998. She nevertheless still set herself challenges, such as taking on a Grade 8 class when all her recent experience was in Grades 11 and 12. She hoped that this would ease the burden on teachers in the upper secondary who constantly battled with the gaps in learners' background knowledge. And she struggled to mediate mathematical learning at this lower level (see Chapter 6 for more detail). This is clearly not a function of whether she understood the mathematics she was trying to teach (angles), but rather an issue of pedagogic subject knowledge – i.e. difficulties in transforming this mathematical knowledge into pedagogical tasks appropriate to the needs of relatively young learners.

Mrs Y, on the other hand, focused most of her attention on her pedagogical strategies, and deepened interest in, and understanding of, learners and learning. She spoke at length in her interviews of how her teaching had improved as a result of her participation in the FDE programme. For example, despite her large classes (some of which contained over 60 learners), she tried out and reflected critically on group work as a learning and teaching strategy; she elicited and listened carefully to learners' productions and tried to acknowledge and then work with these; and she ventured more bravely into teaching geometry and trigonometry, areas that she had previously neglected because of learners' poor background knowledge.

The point of these two snapshots is that they reveal that both teachers had an adequate subject base on which to build their knowledge for teaching, though they did this in different ways. In addition, while Mrs X demonstrated that she knew and understood more mathematics than Mrs Y, this did not always translate into effective mathematics teaching, particularly at lower grade levels than her previous experience. The snapshots reveal further that in any learning programme, participants will be selective about what it is they attend to. It is also possible to suggest that their selective attention is to some extent a function of the context they were in, but equally a function of their personal dispositions and background knowledge, and how these play out in their contexts.

The remaining teachers in the research sample were also selective in their attention to various courses, and hence the heterogeneity in take-up from the subject courses. It is nevertheless interesting to reflect further on ranges of performance in the subject courses.

Performance on subject-based courses as related to quality of teaching

- Of the 18 teachers in the third year of the research process, 17 had successfully graduated from the programme, most at the end of the second year. As in all programmes, the results across the teachers in their subject courses varied. Of course,

performance in course work tells a limited story: within the selection of subject matter in the subject-focused courses in the programme, most of the teachers mastered enough of this content to pass – some only just, others performing very well.

- There appeared to be some correlation between relatively poor performance on the courses and little, if any, change in the quality of classroom teaching. Some of the teachers who just managed to pass their content courses struggled with the level of demand made on them. Some also had difficulties with the academic literacy demands (reading and writing English at the FDE level) of the courses. It is thus not surprising that they continued to have difficulties with communicating subject knowledge to their learners. It is important to note further that the teachers who struggled most came from the most impoverished rural school contexts where, in addition to inadequate physical resources, they were working in what we referred to in Chapter 5 as English foreign language learning environments.

The above "outcomes" state the obvious, in relation to both varied performance and the apparent correlation between poor grasp of subject knowledge, gaps in their knowledge of English, and the quality of subject teaching. What, then, in terms of the research goals, does such performance indicate?

All the teacher participants, even those who just managed to pass, learned "more" mathematics, science or English. But transforming this "more" into improved quality teaching was no direct affair, and appeared to relate to both the individual teachers' knowledge base and the context in which they were teaching. Perhaps Taylor & Vinjevold's claim that subject knowledge "*alone*" (1996: 61) is needed to improve teaching holds for teachers whose knowledge base is so limited that their teaching does not seem to benefit from a broader-based programme like the Wits FDE. This leads to two "fuzzy propositions" (Bassey, 1999: 44) that, like all propositions, need further research.

- *Teachers with a very limited knowledge base in the subject they are teaching need to first develop a base of disciplinary knowledge. They need opportunity over a period of time to relearn their subject, and to do so in such a way that they can develop conceptual depth in relation to the subject they are teaching.*
- *Where their knowledge of the language of learning and teaching (LOLT) is also limited, they need to develop this further.*

What these propositions ignore, is how teachers' school contexts factor in to their learning, and so too their teaching. This too must be the object of further research.

Across the diversity of attention to and take-up from the subject courses by the teachers, we could, nevertheless, identify patterns of take-up.

Increased confidence in the subject and consequently in teaching

Teachers' perceptions

All teachers, including those who just passed their courses, expressed increased confidence in their subject knowledge, and felt that it had helped them with their subject

teaching. The primary teachers, in the main, were more expressive in this regard, stating that they had "learned so much", and from "all the courses". We know from many evaluations of INSET programmes (see JET, 1996) that while most could demonstrate that teachers were "happy" with their learning, this said nothing about the impact of the programme on their teaching and their learners' learning. However, experience of growth in confidence is important. As Graven (2002) argues, a key dimension of teachers' learning is their increasing sense of professional self-confidence.

Researchers' observations

The teachers' stated increase in confidence was accorded with our observations in many, though not all, of their classrooms. Across the English teachers, researchers noted that teachers were both more fluent and more accurate in their own use of the language. Researchers who observed mathematics and science teachers noted that some teachers were able to work more flexibly with the content they were teaching, and that some tackled topics that they had previously avoided.

Mrs Z, for example, taught mixed-number addition in 1996 and in 1998. In 1996 she instructed learners to first convert each mixed number to an improper fraction and then to calculate the common denominator by multiplying the denominators of the given fractions. This instruction was to hold for all additions or subtractions, even in cases where the denominators shared common factors. She explained in the interview that "otherwise they make mistakes". In 1998, by contrast, she demonstrated far greater flexibility as to how calculations were carried out, and she was far more responsive to learners' explanations – a result, it appears, of her studying fractions in greater depth in the course "Mathematics for the Primary Teacher". In addition, Mrs Z was one of the few teachers to explore more open learning tasks as well as new topics in mathematics (e.g. tessellating shapes, data representation). As she came up against some limitations in her own subject and pedagogic content knowledge (e.g. how to represent a bar chart as a pie chart) she was comfortable with inviting the researcher to assist with this during the lesson. Her colleague, Mrs S, had gained enough confidence to invite learners in her English classes to correct her use of English and in 1998 the researchers observed learners doing this on a few occasions.

Eliciting and working with learner conceptions

Difficulties in working with learner productions

Chapters 5 and 6 both illustrate the fact that all the teachers became more successful at eliciting learners' productions (e.g. getting learners to verbalise what they were doing, to give answers, and to express their meanings, their initial conceptions or recall of a topic). At the same time, however, most of the teachers had difficulty in probing what their learners said or did, and in providing constructive feedback. In some instances what learners said was ignored. This phenomenon has been discussed in some detail in previous chapters. We make the point again here as, viewed from the perspective of subject knowledge for teaching, we see again that there is no simple relationship between increased levels of subject knowledge and this fundamental subject-based pedagogical skill.

Content coverage

- Across all the teachers in the research we saw limited coverage of the required syllabus. In some cases, topics were left out.
- Some teachers included too many different concepts in one lesson, and as a result, they dealt with these concepts too superficially.
- Across the board, conceptual depth was rarely expected or demanded of learners.

Coverage of subject knowledge through the school year and learner performance became major areas of interest and concern as we proceeded with the research. We saw how difficult teachers found it to cover the required syllabus each year. Through the research, we came to understand that a number of factors lead to poor content coverage, factors that are likely to affect implementation and attainment in any curriculum. In some cases the teachers did not feel confident enough with a topic, and so tended not to teach it. But the problems we saw with regard to breadth and depth of coverage were only partially linked to *teachers' subject knowledge*. They were also related to *learners' background knowledge* as well as to the general culture of teaching and learning in the schools. In many cases teachers had difficulties because their learners had neither the necessary background knowledge, nor the motivation to learn. In such situations, what happens is that less and less is covered each year and we can see a spiral of limited coverage up the levels of schooling.

Mr P, one of the urban secondary mathematics teachers, explained why he struggled to cover the required mathematics each year, and why he continued to struggle with learner performance. In his school, over the three years of the research, we could see improved attendance by both teachers and pupils and improved day-to-day functioning of the school. However, a deeper malaise remained and learners' results, with the exception of one class, were not improving. Mr P's Grade 11 test results in 1998 were, on average, poor. In response to a question on what he thought reasons for this, he said:

> Ja, one thing that does not help, is the *background of the pupils*. It is difficult for me when pupils come from other schools – *they don't have the right base in mathematics.* It hampers because I have to go back, and sometimes I talk about something and they should know it from the previous year and they don't. And the other thing is *the attendance.* I always have to tell them they must be at school, motivate them. And the other thing is *the language.* Some of them do not cope. That is why I use different languages. When I use English and I think pupils understand and then I might find that when you test you find they do not understand it. And the other thing, there is a tendency to think that when the teacher gives homework, they have to write homework, and *they don't think they have to understand the homework.* So they get help from each other, copy from another. I discovered when they write the test and now they have to work for themselves, it becomes apparent what is going on … I always tell them that it is "Because you have been taking it from … you are letting yourself down".
>
> (our emphasis)

Mr P's struggles were pedagogical and contextual. That he did not manage to cover the curriculum effectively was not a function of his subject knowledge. His mathematical

base was sound, as he was one of the few teachers on the programme to have successfully completed two years of tertiary mathematics study at university level. His comments revealed the multiple roles expected of teachers – and thus the complexity of transforming subject knowledge into effective learning opportunities. Mr P does not only have to diagnose and remediate gaps in learners' subject knowledge. He also has to be a language teacher, and at the same time a counsellor who motivates learners and instils new kinds of learning responsibilities.

Lesson purposes, selection and grading of tasks

- Many of the teachers found it difficult to state clear subject-focused purposes. They showed this difficulty in how they selected and sequenced tasks in their lessons. This was most acute when teachers tried to work with new kinds of tasks.
- Some teachers selected tasks that were both at the appropriate level and that were graded in difficulty. However, most of the tasks set in the lessons we observed, and those we saw in learners' books, were at a low level of cognitive demand. This was more of an issue in primary classrooms.
- Secondary mathematics and science teachers kept to current textbooks and thus displayed fewer content selection difficulties.

As mentioned in the section above on the content of the FDE courses, there was no explicit attention to lesson purposes and to developmental issues like the selection, sequencing and grading of tasks in the FDE courses. This issue is discussed in more detail in Chapter 6. It is thus unsurprising that we saw little change in how teachers selected, sequenced and graded tasks over the three years of the project. What is at issue, and this is discussed below, is why these developmental concerns were not explicitly focused on anywhere in the FDE programme.

Difficulties in changing approaches to knowledge

As discussed above, various subject courses introduced teachers to new orientations to their subject. "Mathematics in Perspective" dealt with the history of some mathematical ideas, with integrating mathematics with real-life problems, and with a general approach to mathematics as problem solving. These ideas were reinforced in the "Theory and Practice of Mathematics Teaching" course. The emphasis in these courses is quite different from the emphasis on procedures that dominates mathematics classrooms in South Africa. Similarly, in "Science in Perspective", science was approached as inquiry, and there was also an emphasis on integrating science with its uses in society. This is a different orientation to the current emphasis on facts in most of our science classrooms. In "The Theory and Practice of English Language Teaching", an emphasis was placed on learning an additional language through communication, and on providing opportunities for the integration of speaking, reading and writing English in classroom tasks. These new orientations to knowledge are also features of Curriculum 2005. We were interested to see whether teachers were able to take up these orientations to their subject in their teaching, and determined this through the ways in which they introduced lessons

and concepts as well as through the nature of the tasks they set for learners. We found that

- Some teachers attempted to construct tasks and lessons that drew on these orientations to knowledge. Nevertheless, in general, knowledge was still treated as procedural, factual and fragmented.

Across all the teachers there was very little evidence of their broadening their dominant conception of their disciplinary knowledge. Mathematics remained a restricted body of procedural knowledge. Attempts at meaning negotiation on the one hand, or contextualised tasks on the other, were both ultimately reduced to the acquisition of procedures. Science remained a collection of facts, rather than a process of inquiry. Where experiments were done, emphasis then reversed onto how to carry out the procedure with insufficient attention to the science of the experiment. One consequence of the attempts by some of the English teachers to adopt a more communicative approach was very limited production of written work by learners. The difficulties of shifting orientations to knowledge in the context of schooling are well known and these observations were thus no surprise.

Discussion

How do the indicators and fuzzy generalisations above add up? Teachers left the programme with more subject knowledge, though this was held in a variety of ways and to varying depths. All expressed increased confidence in themselves as teachers, and in many cases such increased confidence was observed. Teachers with a sufficient base of subject knowledge were able to benefit from the subject focus in the programme, though not always in ways that impacted directly on their teaching, with this impact being a function of both their personal disposition and the context in which they worked. In contrast, teachers with a poor knowledge base struggled to rise to the demands of the programme and appeared to leave the programme with little added to their repertoire of subject teaching. This struggle appeared most acute where teachers were working in very impoverished contexts. All teachers struggled with syllabus content coverage in their subject, with sequencing and grading of tasks and with new approaches to knowledge.

These descriptions help us to see that take-up from subject-based courses does not transform in any even, simple or linear way into changes in the quality of teaching. In other words it is impossible to isolate a notion of subject knowledge for teaching from curriculum, learners and context. Indeed, in each of the "findings" discussed above, there were necessary linkages between curriculum, learning and context. Teachers' conceptual knowledge-in-practice is a more fruitful basis upon which to proceed to explore the issue of how disciplinary knowledge for teaching is developed through teacher education and how it might be evidenced in research.

We learned valuable lessons for the Wits FDE programme from attempts to investigate teachers' subject knowledge, despite the complexity and constraints we faced in this aspect of the research. In-service programmes for teachers tend to treat participating teachers as similar in their interests, their backgrounds and their contexts, and expect relative evenness in take-up across teachers. We have learned just how diverse

teachers are, both when they enter and when they leave a programme. Programmes like the Wits FDE need to reflect carefully on how they are working with diversity among teachers.

As recommended in Chapter 6, programmes like the FDE need to offer focused and explicit opportunities for teachers to work on selecting, sequencing and grading tasks in specific subject domains for learners. We worked as if such knowledge-in-practice did not need focused attention, perhaps with the unconscious assumption that this kind of knowledge had been acquired in pre-service programmes and through practice. This theme recurs, with different emphases, throughout Chapters 4 to 7, leading to the strong suggestion that conceptual knowledge-in-practice is a critical component of ongoing learning for teaching. Developing this kind of knowledge includes paying attention to how concepts and skills develop in the subject (e.g. how the concept of a fraction develops within mathematics), to how learners develop such concepts themselves, and to how both of these might shape and be shaped by the schooling context. And this kind of focus on subject knowledge for teaching in in-service programmes needs to include familiar as well as new topics or areas of subject knowledge.

Finally, such programmes in South Africa, in both the short and medium term, need to attend to the serious issue of how teachers work with learners who have serious gaps in their background knowledge. Without this, the spiral of limited breadth and depth of coverage of the required curriculum will persist, and so too poor learner performance on any testing where such curriculum coverage is assumed.

Conclusion

Hargreaves (2001) and Elliott (2001), two seasoned teacher education researchers, write of the current demands of educational reform across the world, and how these are producing paradoxes in teacher education, and consequently acute challenges. Teachers are expected to teach new knowledge in new ways, and so engage in ongoing learning in relation to their professional expertise. They are expected to produce learners with high-level skills and integrated and flexible knowledge so that they may take their rightful place as informed and active citizens in their new knowledge societies. Teachers are also expected to play a significant role in eradicating the social ills and inequalities that their learners bring to their classrooms.

These complex expectations are evident in the draft National Curriculum Statement (see Chapter 1) for South Africa

> The overall vision for the kind of teacher required for the National Curriculum Statement is a teacher who is socially and politically critical and responsible, professionally competent and in touch with current development in his/her area of expertise. Teachers should be open to views held by learners and other peers and should subscribe to the notion of being life-long learners. In this regard teachers are also expected to assume a measure of responsibility for their own development and for the implementation of the curriculum.
>
> (DoE, 2001: 79)

At the same time as teachers are expected to rise to these new social, intellectual and professional challenges, they are expected to produce competitive school results, for

they will ultimately be judged on how well their learners perform on high-stakes assessments, be these national examinations or international comparative tests. Such pressures increasingly work against teachers having and taking the time to reflect critically on the substance and ongoing development of their work.

And teachers must rise to all these expectations while financial cut-backs and increasing managerialism corrode the status of the profession: In South Africa fewer school leavers are entering initial teacher education programmes, and many within the profession, particularly those in scarce and valued areas like mathematics, science and English language, are leaving for less stressful and more lucrative jobs.

In South Africa we have new *Norms and Standards for Educators* (see Chapter 2) which detail multiple roles and competencies required for teaching. Subject/disciplinary knowledge is recognised as a key competency – necessary, indeed of primary importance, but not sufficient. Our concern, one born out of working to redevelop pre-service and in-service teacher education programmes, is that attempts to address multiple roles and competencies could lead to diminished attention to conceptual knowledge-in-practice. On the other hand, the strong message in *Getting learning right*, that subject knowledge alone accounts for teachers' ability to demand high-level thinking of their learners, creates a similar concern. There is a pendulum swing in teacher education policy in South Africa between

- a focus on pedagogical strategies and contextual issues without careful links to how these do or do not support conceptual learning, and
- a focus on conceptual knowledge that ignores the complexities of transforming this knowledge into appropriate opportunities for learning in school classrooms.

Teacher education faces critical challenges in rethinking what constitutes teachers' conceptual knowledge-in-practice and how this can be developed and acquired through pre-service and in-service teacher education programmes. We posit that the task that lies ahead is to characterise and articulate "subject knowledge for teaching" and to clarify how its acquisition by teachers lies in the co-ordination of subject, pedagogic and contextual knowledge – or what can be renamed teachers' conceptual knowledge-in-practice.

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ADDENDUM 1

FDE: Mixed-mode FDEs and their effects 1998

DEPARTMENT OF EDUCATION

Research team leader: Prof. JILL ADLER

CLASSROOM OBSERVATION SCHEDULE

Name of school: .....

Name of observer: .....

Date of observation: .....

Teacher's name: ..... M ❑ F ❑

Standard: .....

Total number of students: ..... (according to mark book/register)

Number of female students: .....

Number of male students: .....

Number of students present: .....

Subject: English ❑ Maths ❑ Science ❑

Lesson topic: .....

Length of lesson: .....

Time of lesson: .....

Observed lesson no.: .....

Video: YES ❑ NO ❑

CHECKLIST CLASSROOM MATERIALS

USE GREY LINE FOR COMMENTS

	No	Yes
1. Is there a desk /table and chair for each learner?		
2. Is there sufficient room for learners to work?		
3. Is there a chalkboard?		
4. Is there chalk?		
5. Is there a duster?		
6. Is there a table and a chair for the teacher?		
7. Does each learner have a textbook for the lesson?		
8. Is there enough room for teacher and learners' movement in class?		
9. Does each learner have an exercise book or paper to write in?		
10. Are there any additional learning/ teaching aids (visible) in the class?		
If yes, list		
11. Is there electricity?		
Is it used?		
12. Is there enough light in the classroom throughout the lesson?		
13. Is there a lot of noise coming from outside the class?		
14. Are there any other physical constraints?		
15. How are the learners' arranged? ❑ Groups ❑ Rows individual ❑ Rows pairs		
16. Does the arrangement change during the lesson?		

LESSON DESCRIPTION

1. As you observe the lesson keep **SEQUENTIAL NOTES** of the lesson as it unfolds.
2. After the lesson write comments on:
   - how the teacher introduces and concludes the lesson
   - what the purposes of the lesson are
   - what resources are available and what was used (physical, human and cultural)
   - how maths/science/English language content was presented and developed (nature of knowledge) and task demands
   - the teaching-learning approach and quality of teacher-learner and learner-learner interactions
   - what was learned and what potentially could have been learned
   - what (in your view) has been appropriated from the FDE programme.
3. Please write clearly and legibly.

N.B. It is crucial for later analysis that both 1 and 2 are done carefully and fully.

In the schedule below, mark the box which best reflects your observation of the teachers' practice. Where necessary make additional comments on your observation. Again, comments need to be written so that they will make sense to you ***and others*** for analysis. Comments serve to relate and give meaning to your quantitative allocation, explaining 1/3 appropriacy, pointing out difficulties, providing elaborations.

A. INTRODUCTION

LESSON INTRODUCTION
(not a continuum but description of possible types)

1	2	3	4
There is no explicit start to the lesson but learners continue with work.	Lesson begins by going over homework.	Lesson begins with an activity that arouses attention and opens issues for the lesson.	OTHER (specify)

Comment (was the lesson appropriately introduced):

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B. RESOURCES

B1. EXPLICIT ORGANISATION OF GROUP WORK

1	2	3	4
No group work. Whole class only.	Learners seated in groups but work individually.	Learners seated in rows but work in pairs.	Learners seated in groups and work together.

Comment (on what the teacher is doing and whether she gets to all groups):

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B2. LEARNER-LEARNER INTERACTION WITHOUT TEACHER

1	2	3	4
Learners do not question each other or probe for details/ they do not have discussions with each other.	Learners question each other /discuss privately.	Learners only question or help other pupils when prompted to do so by the teacher.	Freely enter into discussions with each other.

Comment (on the frequency):

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B3. WHOLE-CLASS TEACHER-LEARNER INTERACTION

1	2	3
Totally controlled by the teacher.	Predominantly controlled by the teacher.	Control of interaction shifts between learners and teacher.

Comment (on the frequency):

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B4(a). USE OF AVAILABLE RESOURCES (e.g. chalkboard, exercise books, textbooks)

1	2	3	4
No material available for learners or teacher to use.	Only the teacher uses the materials in front while the learners are observing.	Teacher and some learners use materials.	Teacher and learners share and use materials.

Comment (name materials used and the functions it served):

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B4(b). USE OF ADDITIONAL RESOURCES

1	2	3	4
No material available for learners or teacher to use.	Only the teacher uses the materials in front while the learners are observing.	Teacher and some learners use materials.	Teacher and learners share and use materials.

Comment (name materials used and the functions they served):

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B5(a). TASKS WITHIN THE LESSON

1	2	3	4
Poor or inappropriate tasks given.	Standard textbook tasks, not well graded.	Standard well-graded task(s) on the board/from the textbook.	Standard and investigative tasks that extend learners' thinking.

Comment (on the frequency):

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B5(b). USE OF LANGUAGES IN PUBLIC DOMAIN ***(ENGLISH ONLY)***

1	2	3
No opportunity for language use at all.	Language use without production.	Learners given opportunity to generate own utterance/language.

Comment (on the frequency):

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B6. USE OF LANGUAGES IN PUBLIC DOMAIN (not a continuum)

1	2	3	4
Predominantly main language used by both teacher and learners.	Predominantly English spoken by teachers and learners.	Only teacher/ learners switch for a range of purposes. (Delete which is not applicable)	Teacher and learners switch for a range of purposes.

Comment:

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B7. LANGUAGES IN INDIVIDUAL TEACHER-LEARNER INTERACTIONS

1	2	3	4
Predominantly in main language.	Predominantly in English.	Only teacher/ learners switch for a range of purposes. (Delete which is not applicable)	Teacher and learners switch for a range of purposes.

Comment:

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B8(a). LANGUAGE PRODUCTION **(MATHEMATICS ONLY)**

1	2	3	4
Learners are not given any opportunity to enter into mathematical conversations (either with each other and/ or with the teacher).	Learners enter into conversations that focus on stating the procedural steps.	Learners enter into conversations in which reasons for procedural steps also become explicit topics of conversations.	Learners enter into a range of mathematical conversations.

Comment (on the appropriacy of the practice and its frequency):

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B8(b). LANGUAGE PRODUCTION **(SCIENCE ONLY)**

1	2	3	4
Learners are not given any opportunity to enter into conversations with each other.	Learners enter into conversations that focus on the entering of data into a worksheet or completion of tasks set without discussing implications of such data/tasks.	Learners enter into conversations that involve discussion of results obtained or implications of tasks set.	Learners freely converse about implications and conclusions which result from experiments completed or tasks set, and suggest modifications for the future.

Comment (on the appropriacy of the practice and its frequency):

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C. CONCEPTS AND CONTENT

C1. CLARITY OF EXPLANATION OF CONCEPTS BY TEACHER

1	2	3	4
Unstructured explanation.	Relatively structured explanation.	Clear and structured explanation.	Flexible and good explanations.

Comment (on specific concepts dealt with in the lesson, the frequency, strength and weaknesses of the explanation):

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C2. TEACHER DEALING WITH LEARNERS' CONCEPTIONS AND MISCONCEPTIONS

1	2	3	4
Does not notice misconceptions.	Notices and gives the right answer.	Notices and engages individual learner(s) in some kind of explanation.	Notices and engages with the learners' conception/error and facilitates conceptual clarity.

Comment (on what kind of errors does teacher focus on/specific concepts and frequency):

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C3. CONTENT KNOWLEDGE AND CONFIDENCE

1	2	3	4
Poor knowledge of content area.	Basic knowledge with inaccuracies.	Sufficient knowledge and relatively confident.	Good knowledge, confident and shows greater understanding of the subject (relates to other ideas/ concepts/topics).

Comment (on whether content level is appropriate for class):

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D. MEDIATION

D1. QUALITY OF LEARNER TALK/EXPLANATIONS IN PUBLIC DOMAIN

1	2	3	4
Learners only give one-word answers to teacher.	Learners give explanations of what they did procedurally to teacher.	Learners explain their thinking to teacher.	Learners explain and engage in debate with each other and teacher.

Comment:

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D2. HOW THE TEACHER USES QUESTIONING AS A TOOL FOR TEACHING

1	2	3	4
Does not ask questions at all.	Asks questions that only require recall, repetition or simple factual answers ("what" questions).	In addition asks questions for elaboration, justification or explanation, i.e. asks questions that encourage conscious reflection (what and why questions).	In addition asks questions that make extended intellectual demands on learner(s).

Comment 1 (on the appropriacy of the intellectual demand of the questions the teacher asks and the frequency):

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Comment 2 (on HOW the teacher uses whole-class questioning and WHETHER and HOW CHANTING or CHORUSING is a feature, give examples):

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D3. HOW THE TEACHER RESPONDS TO LEARNERS' ANSWERS

1	2	3
Ignores incorrect answers by calling on other volunteers until correct answer is obtained.	Responds to incorrect answers in a manner that encourages further effort	Responds to both correct and incorrect answers in a manner that encourages further effort.

Comment (on the frequency):

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D4. INTERACTION BETWEEN THE TEACHER AND LEARNERS

1	2	3	4
No interaction between the teacher and learners	Interacts only when teacher asks questions.	Interacts when both teacher and learners ask questions.	Both teacher and learners initiate interaction.

Comment (on the frequency):

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E. CONCLUSION

LESSON CONCLUSION
(not a continuum but description of possible types)

1	2	3	4
Lesson ends without proper conclusion.	Lesson ends with a task for learners but without appropriate consolidation or conclusion.	Appropriate summing up.	Setting of tasks to link next lesson.

OTHER COMMENT (it is appropriate or needs improvement):

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ADDENDUM 2

FDE: Mixed-mode FDEs and their effects 1998

FACULTY OF EDUCATION, UNIVERSITY OF THE WITWATERSRAND

Research team leader: Prof. JILL ADLER

TEACHER INTERVIEW SCHEDULE FRAMEWORK FOR INTERVIEWER

INTRODUCTORY COMMENTS

You might want to start with something like: "Thank you so much for once again allowing us to sit in and observe your lessons and this time over two days. We have had a lot of time to chat informally between lessons and during breaks and now I would like to be able to follow up more carefully with you, your reflections on your teaching and the FDE programme, especially now that you have graduated (are nearly graduated)."

REMINDERS

1. You will probably have already discussed aspects of the lessons you have seen with the teacher – feel free to discuss these. **In this interview we are trying to learn as much as we can from the teachers, what they think their learners need and how they try to provide this.** In particular, we want to understand more about their purposes in teaching, how and why they select and organise the way they do. And of course, now, how they perceive themselves, their continuities and changes, what counts as change for them and whether, and in what ways, they feel they have benefited from the programme. The kinds of issues added are
   - what they think their **learners' needs** are
   - what the teachers feel **enables or limits their teaching**; whether they have faced **"interesting, encouraging" experiences** in the school this year in general and in their teaching in particular; whether they have faced **crises in the school and their teaching**
   - what the teachers feel would make them a **better teacher**
   - what they feel are the differences when they **teach different grades**
   - what they feel has been **affirmed and/or destabilised** in what they do
   - their **professional and curriculum development activity**
   - the **meanings** they attach to their descriptions and priorities for **good teachers and successful lessons, and concepts they might use like "learner-centred".**
2. The difference this time is we know and they know what we have seen before, so we need to be working with this carefully and **arrive prepared for the interview based on portraits as well as what has just been observed**. We need to be referring to our previous visits, their views expressed then, and so on.

3. Again, we need to be sensitive to the possibility that the teacher might misread the questions we are asking – see it as a criticism rather than an inquiry. Rephrase if necessary. You could also say:
   - In this interview, we may not always understand each other. If I ask anything that isn't clear or sounds strange, please tell me so that I can try again to make it clearer.
4. **REMEMBER to ask for permission to tape-record the interview**.
5. **Most important** – this is our final formal time for conversation with the teachers so we are hoping to generate as much information and understanding from them as possible. This can hopefully be elicited if we ask them to tell us about things that have happened in their teaching (stories), if we ask them to justify why they say some things, to explain what they mean, to give us examples, and so on.

SCHEDULE

In this study we are interested in six main aspects of teaching:

1. What you think your major purposes or goals are in teaching your subject at *** level in your school – per lesson and over a whole year
2. The content you teach and how you approach and present it, and how this differs across different grade levels
3. What resources you have, and whether and how you use them
4. What teaching strategies you use and how you mediate learners' learning, again across grade levels
5. What assessment strategies you use
6. How you reflect, yourself, on your teaching

All of these have been part of the courses in the FDE programme. Through these visits and the research process, we are trying to understand whether and in what ways the programme has had, continues to have, or has not had a constructive role in these aspects of your teaching.

In relation to these six aspects of teaching, we are interested in whether and in what ways, as a result of your FDE studies,

- you feel your teaching has changed,
- you feel you are better at meeting your learners' needs, and
- what you feel enables or hinders you in your teaching practices.

In other words, try to elicit from the teachers

- *what counts as change for them*
- *what they feel has been affirmed in what they do*
- *what they think their learners' needs are*
- *what the teachers feel enables or limits their teaching*
- *what the teachers feel would make them a better teacher (both in relation to themselves as teachers and then to the school and system)*
- *the meanings they attach to their descriptions and priorities for good teachers and successful lessons, and concepts they might use, like "learner-centred"*

- *what they feel the differences are when they teach different grades*
- *their professional and curriculum development activity.*

Our goal is to be able to improve the programme through insights and experiences of its own students (yourselves), and disseminate what we learn to others in the field, and in this way be of greater benefit to INSET education in South Africa.

So I would like us to be able to talk about these areas of teaching – not only in terms of what you have been teaching these past two days, but also in relation to what we observed and videoed in 1996 and 1997, and to your wider and ongoing experience as a teacher.

The interview could start off with a very open question: "Let's talk about your experiences over the past two days and my observations ... and then we can discuss what you think has changed for you (what has stayed the same, what has changed for the better, what for the worse) over the past three years."

And then you move later to probing specific areas to ensure comment on the main areas above in themselves and in relation to role of the programme. The above then is the framework for the interview.

There are a few questions to end with that do not relate directly to classroom practice, that need to come in if they have not yet been covered:

- Whether the teacher has been promoted in any way formally or informally
- The teacher's professional activity within and outside the school

ADDENDUM 3

Further Diploma in Education, University of the Witwatersrand

MIXED-MODE FDEs AND THEIR EFFECTS, AUGUST 1998
Research team leader: Prof. JILL ADLER

DATA ON LEARNER PARTICIPATION AND PERFORMANCE

1. *LEARNER ACTIVITY AND PARTICIPATION IN CLASS* IS PART OF OBSERVATION SCHEDULE AND COVERED THERE (and thus reflected in all classes observed).
2. *LEARNERS' WRITTEN WORK* – DATA COLLECTION BY COMMENTS AND NOTES FROM ALL FORMS OF WRITTEN WORK DONE BY *LEARNER*S, INCLUDING SCRIBBLERS, CLASSWORK, TEST BOOKS AND CLASSROOM WALLS (collected from a sample of learners from one or more classes at one level).
3. *LEARNERS' PERFORMANCE IN INDEPENDENT TESTING.* THIS IS STILL FOR "TESTING" VIABILITY AND WORTH OF TESTING IN THE LONG-TERM STUDY, and will only be given if the teacher is teaching classes at Grades 7 or 9.
4. *LEARNER MID-YEAR SUBJECT PERFORMANCE* – DATA COLLECTION BY NOTES ON EXAMINATION/TEST PAPER, SELECTION OF SCRIPTS, MARK SHEET (collected from one or more classes at one level).

1. LEARNER ACTIVITY AND PARTICIPATION IN CLASS

There are a number of items in the observation schedule that illuminate learner activity and participation (in particular B1, B2, B3, B4, B7, C5/D1).

2. EXAMINATION OF LEARNERS' WRITTEN WORK

2.1 Their books

In one or more of the classes you observe, at least the class videoed (and this should not be a seriously problematic class e.g. 5D at Mmbara with 25-year-olds and long-time failures by the system): working with the 9 learners identified below, ask the teacher if you may see all their notebooks (the books that they use for all kinds of written work in the subject, rough work, classwork and test).

MAKE NOTES ON THESE BOOKS ACCORDING TO THE SCHEDULE FOLLOWING.

2.2 Class written work

If possible, take copies of learners' written work during one of the classes observed. If need be provide some paper which we could take away and copy overnight and return to the teacher the next day.

3. LEARNER PERFORMANCE ON INDEPENDENT TESTS

If your teacher has a Grade 7 or 9 class, ask if there could be one period during the time there where they take an hour's test, set by us.

The purpose for some testing in this phase is to see what we can learn from it. In the mathematics there will be some standard questions, algorithmic and procedural, that we know are reflected in the teaching in the base-line study. Then there are a few additional extended items. It will be interesting to see what learners' performance is on both types of items.

4. LEARNER MID-YEAR SUBJECT PERFORMANCE AT SCHOOL

Select one of the teacher's classes you are observing, preferably the one that is videoed, and not a wildly problematic class, and ask to see the mid-year mark sheet for that class.

Select the three bottom, middle and top performers in the mid-year results in the class. Ask to see

- the test or examination paper they answered
- the scripts of these nine learners

Comment on these according to the schedule attached.

Here we are trying to see levels of success of learners relative to what is taught in school. What kinds of knowledge are assessed and how? And how do learners fare?

SCHEDULE TO ASSIST IN MAKING NOTES AND COMMENTS ON LEARNERS' WRITTEN WORK

Comments:

The purpose here is to have an account of learners' written activity in the subject as an indicator of what it is **they are required to "practise", "master", and what kind of knowledge is signalled as important in the wider curriculum-in-use.** This can provide useful information as to how practices in class are reflected and reinforced in written work, and learners' apparent success with these.

Describe what you observe in the range of notebooks in terms of:

1. The spread of "content" (whether there is good syllabus coverage) and how the content appears to be presented (as bits of fragmented knowledge?). In maths and science this would relate to topics covered and their sequencing, in English to different aspects of language use – responses to reading, writing in a range of genres and language exercises.

   The form of written work (i.e. the different types of writing that you see). Is it simply exercises? Are there experiments in science? Are notes written as well? In English what kinds of writing do you see? Is there any evidence of drafting prior to final versions of texts? In maths is it all symbolic form, or are verbal explanations also present?

2. Is the written work across the three performance groups of learners the same? Are the differences in tasks qualitative or simply quantitative (more for the "good" learners)? What differences across the books? What are the similarities or convergences?

   What and how are learners successful in relation to what is taught?

3. Is written worked marked? By teacher? Learners? Both teacher and learners? How frequently?

   What is the nature of the feedback given to learners: simply ticks and crosses, or are there motivational comments (e.g. good work, keep it up, etc.)? What about conceptual engagement – does the teacher comment conceptually on the learners' work or provide guidance for the learners? Are there any errors/inaccuracies in the teacher's feedback? What is the focus of the marking?

   What is the focus of the marking in learners' books? E.g. answers only in maths or also processes?

4. Is there any evidence or clues to teachers' knowledge of their subject in the learners' books? E.g. good summaries, conceptual clarity? Any errors in learners' notes that appear to arise from the teacher?

Use the comment sheet attached:

Fill in the name, level of the learner (i.e either good, average or weak), books seen and whether you saw a test, an exam or both.

Name	Level	Books seen	Test/Exam (script/paper)
1			
2			
3			
4			
5			
6			
7			
8			
9			

SCHOOL .....

TEACHER ..... **CLASS** .....

OBSERVER ..... **DATE** .....

BOOKS SEEN/ WORKSHEETS/ WALL DISPLAYS/ CHARTS

CLASSWORK BOOK [Y] / [N]; TEST BOOKS [Y] / [N]; SCRIBBLERS [Y] / [N]

OTHER (list these) .....

1. CONTENT AND FORM OF WRITTEN WORK

1.1 COVERAGE:

Gaps	Satisfactory	Good

Comment (i.e are learners given experience of content range):

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1.2 FORM *(MATHS & SCIENCE)*:

Exercises and tasks only	Exercises, tasks and apparently copied notes	Exercises, tasks, apparently copied notes & other (specify)

Comment (what kind of mastery is expected and apparently achieved):

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1.3 FORM *OF LEARNERS' WRITING (Maths and science)*:

Standard procedures only	Varied procedures	Standard procedures + other (e.g explanations, justification, discussion of results, etc.)	Varied procedures + other (e.g explanations, justification, discussion of results, etc.)

Comment:

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1.2 & 1.3 FORM *(English)*:

	Yes	*No*
Language exercises (syntax focus)		
Vocabulary development exercises		
Responses to texts read ("comprehension" plus literature, etc.)		
Writing genres represented		
Evidence of writing as a process (e.g drafting, editing, correction)		

Comment:

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2. DIFFERENCES/CONVERGENCES BETWEEN BOOKS OF "GOOD", "AVERAGE" AND "WEAK LEARNERS"

Quantitative only	Qualitative only	Quantitative and qualitative

Comment (what features are apparently contributing to the differences in books across levels):

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3. MARKING

3.1 BY WHOM:

None	Teacher only	Learners only	Teacher and learners

Comment **(N.B. Follow up in interview to verify)**:

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3.2 FREQUENCY:

Never	Infrequent	Frequent

Comment:

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3.3 NATURE OF FEEDBACK:

None	Ticks and crosses only	Ticks and crosses + evaluative comment	Ticks and crosses + guidance to learners

Comment:

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3.4 FOCUS OF MARKING:

Comment for example on whether focus of attention in marking is on answer only, spelling, grammar, process/procedure; or all parts of experiments in Science, etc.:

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4. INDICATORS OF TEACHER'S KNOWLEDGE

4.1 FLAWS ***NOTICED*** IN THE WRITTEN WORK & ATTRIBUTABLE TO TEACHER

Many	Occasional	None noticed

Comment (mention error and state why you think it is attributable to the teacher):

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4.2 How does the teacher work with errors in learners' written work (distinguish between, for example, grammatical errors, conceptual errors, wrong/right answers, spelling, etc.)

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5. IS THERE DIFFERENTIAL MARKING BETWEEN GOOD, AVERAGE AND WEAK PUPILS? YES/NO

Comment (what are the differences):

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6. Comment on ACTUAL time over which written work (and hence related class-work) has taken place since January – note whether there are periods when no written work is done/ or when a lot seems to get done.

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Note: In all the above, comments need to relate to experiences learners have as indicated in their written work and their apparent success in this work.

TEACHER .....

SCHOOL ..... **CLASS** .....

OBSERVER ..... **DATE** .....

SCHEDULE TO GUIDE NOTES AND COMMENTS ON EXAM/TEST PAPER AND SCRIPTS, AS WELL AS LEARNER "RESULTS'

TEACHER .....

SCHOOL ..... **CLASS** .....

OBSERVER ..... **DATE** .....

EXAM PAPER/TESTS SEEN:

EXAM PAPER(S) [Y] / [N]; TESTS [Y] / [N]; SCRIPTS [Y] / [N]

OTHER (list): .....

DATE OF EXAM/TEST: .....

LENGTH OF EXAM/TEST: .....

1. CONTENT AND FORM OF EXAM/TEST ASSESSMENT (based on exam paper/tests)

1.1 COVERAGE:

Gaps	Satisfactory	Comprehensive

Comment on relationship between exam/tests and classroom practice (has what's tested been taught and vice versa?):

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1.2 FORM: TYPE OF KNOWLEDGE ASSESSED *(Maths & science)*:

Procedures only	Procedures + problems	Procedures, problems + other

Comment (kind of knowledge assessed):

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1.3 FORM: VARIETY OF QUESTION TYPES/ASSESSMENT *(Maths and science):*

Question requiring:	*Yes*	*No*
Simple recall, repetition, or facts		
Understanding		
Application (e.g. problem solving, investigations, etc.)		
Evaluation (i.e elaboration, justification or explanation)		
Are there any open-ended questions?		

Comment on the range of assessment tasks:

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1.4 ASSESSMENT OF READING COMPREHENSION AND LITERATURE/ SETWORKS *(English only):*

	Yes	*No*
All answers located in the text		
Some answers require interpretation/critical response		

Comment:

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1.5 ASSESSMENT OF WRITING *(English only):*

Comment on appropriacy of topics set and genres assessed:

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1.6 ASSESSMENT OF GRAMMATICAL KNOWLEDGE *(English only)*:

	Yes	*No*
Discrete item exercises		
Contextualised questions		

Comment:

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2. LEARNER PERFORMANCE (based on mark sheet and related learner scripts)

Comment on spread of marks:

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3. DIFFERENCES/CONVERGENCES BETWEEN SCRIPTS OF "GOOD", "AVERAGE" AND "WEAK LEARNERS" (based on selected scripts)

None	Quantitative only	Qualitative only	Quantitative and qualitative

3.1 Comment on amount completed, and quality/nature of responses:

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3.2 Comment on amount/nature of "errors":

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4. MARKING

4.1 COMMENT (is it consistent?):

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4.2 FOCUS OF THE MARKING:

Comment, for example, on whether focus of attention in marking is on answer only, spelling, grammar, process or procedure, or all parts of experiment in Science, etc.:

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4.3 NATURE OF FEEDBACK:

None	Ticks and crosses only	Ticks, crosses + comments	Ticks, crosses, comment + conceptual engagement

Comment:

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4.4 MARKING MEMO/CRITERIA FOR ASSESSMENT:

Not present	Available but not used with learners	Available and used with learners

Comment:

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5. INDICATORS OF TEACHER'S KNOWLEDGE

5.1 FLAWS NOTICED IN THE SCRIPTS & ATTRIBUTABLE TO TEACHER:

Many	Occasional	None noticed

Comment (mention the error and state why you think it is attributable to the teacher):

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5.2 How does the teacher work with errors in learners' test/exam (distinguish between, for example, grammatical errors, conceptual errors, wrong/right answers, spelling, etc.)

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6. OTHER COMMENTS/NOTES

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